The Olympian System

of

Physical and Mental Development

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Part One

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THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART ONE

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The Olympian System of Physical and Mental Development consists of Charts, Instructions, Text Material and Outlines as follows:

THE CHARTS

General Chart for Daily Normal Exercise.

Charts for Men	*Charts for Women*
Spine Flexibility.	Back and Spine.
Strengthening the Stomach.	Abdominal and Digestive.
Chest and Shoulders.	Overcoming Weaknesses of Women.
Arms and Legs.	Arms and Shoulders.
Agility and Flexibility.	Bust and Chest Development.
Advanced Strength Building.	Flexibility for Grace and Poise.

Three Charts of Instructions for the above.

TEXT MATERIAL IS GROUPED AS FOLLOWS

PART ONE EXERCISE	Section One—Physical Training. Section Two—Constitutional. Section Three—Exercise for Women. Section Four—Recreation and Athletics.
PART TWO DIET	Section One—Essentials of Nutrition. Section Two—Hygienic Eating and Food Preparation. Section Three—Curative Diet.
PART THREE PHYSICAL FITNESS	Section One—Keeping Young. Section Two—Health Guarantees. Section Three—Dodging Disease. Section Four—The Body Anatomical.
PART FOUR EFFICIENCY	Section One—Improving the Human Race. Section Two—The Body. Section Three—Personal Attractiveness. Section Four—Practical Psychology.

OUTLINES

The Outlines take the place of the instructor or lecturer and are calculated to stimulate an appetite for further information, and rouse the student to follow eagerly and enthusiastically the suggestions and instructions contained in the Olympian System and thus enable him to achieve Physical and Mental Efficiency.

First Month	(a) The Foundations of a Successful Life. (b) Prolonging Our Youth.
Second Month	(a) Necessary Normal Exercise. (b) Correct Diet.
Third Month	(a) Attaining Standards of Perfect Physique. (b) Correct Standards of Beauty.
Fourth Month	(a) The Prevention of Disease. (b) Strengthening Weak Organs.
Fifth Month	(a) Keep Your Ideal Weight. (b) Recreation in Relation to Efficiency.
Sixth Month	(a) Eugenics. (b) Parenthood and Child Training.
Seventh Month	(a) Energy Building and Efficiency. (b) Practical Psychology.
Eighth Month	(a) Character Building. (b) Personality Building.
Ninth Month	(a) Mentality Building. (b) Success Building.

THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART ONE

EXERCISE

SECTION ONE
PHYSICAL TRAINING

MAKE YOURSELF A SUCCESS

By BERNARR MACFADDEN

THE purpose of the Olympian System is to help you to make the most of yourself.

Few people realize the best that is in them.

Men and women are born into this world with God-given faculties and capabilities which may be either developed or wasted. These talents and faculties are like so many seeds. Under right conditions of encouragement and training they will grow and flower and bear fruit. Under other conditions, like seeds planted in desert soil, they find growth expansion impossible.

The successful men and women in this world are those who have cultivated their best faculties, who have provided a physical and mental atmosphere in which these may flourish. The failures, the wretched, the unhappy, are those who have allowed their best faculties to go unused, undeveloped, and finally to become atrophied and lost. Indeed, if one does not encourage and bring out those flowering plants which represent his virtues and capabilities, his personality will rapidly be dominated by the choking growth of weeds—the character weeds.

The Olympian System has two fundamental aims.

The first is to show and convince you that if you so desire you can not only find success, but *make yourself a success,* in all that this means.

The second purpose of this system is to show you *how you can* become a success.

Even the best of human beings have many weak points, many faults and flaws. It is not a crime to have these imperfections. It is only a crime to be satisfied with them. Self-improvement consists in eliminating as many of our failings as possible and in building up our faculties where we have been deficient.

But to accomplish any marked improvement, one must commence with an honest self-analysis. Can you be honest with yourself? Can you sit down and analyze your own character, personality and mentality and do it honestly—so as to discover any reasons for your lack of success? What are your weak points? Permit yourself no excuses, no self-pity, no self-indulgence, no pleading of circumstances. Try to make it honest self-analysis. If you are at a loss to know how to proceed with this self-analysis, consider first the factors that make for success, and then apply these considerations to the study of your own make-up.

What makes for success? The fundamental requirements are energy, brains, will-power and personality. If you are lacking in any one of these four general fundamentals, you will have difficulty in attaining your purposes.

Energy is the driving power back of every successful man or woman. It means capacity for work. It also gives one that capacity for concentration that makes for a better quality of work. It has its basis in health and bodily vigor.

You may consider your body as a machine—as a dynamo. It is in part the purpose of this system to

enable you to build a state of physical fitness—to keep the human dynamo in such good running order that an unlimited supply of nervous energy may be generated to be used in your work and achievements. First of all you must keep fit.

The other fundamentals of success, brains, will-power and personality are also in a large measure dependent upon the state of your physical health. The dyspeptic is never of sound mind. A disordered liver gives one a disordered disposition. A poisoned blood stream is likely to be manifested through poisoned thoughts. It is only under conditions of pure blood, perfect functioning and strength and steadiness of nerves that one can enjoy a clear head, thinking energy, will-power and personality. An elaborate course in mental and emotional training is included in the Olympian System. It is intended to give you "a sound mind in a sound body."

If you will make an analysis of your own character and personality, you will very quickly discover your weak points. If not, your friend may be persuaded to be honest enough to tell you them. In that way you will ascertain just what features of the Olympian System will be most valuable in your case.

You have two primary aims in life—happiness and success. In the last analysis, however, happiness depends upon success. There is no real happiness in life for the failure.

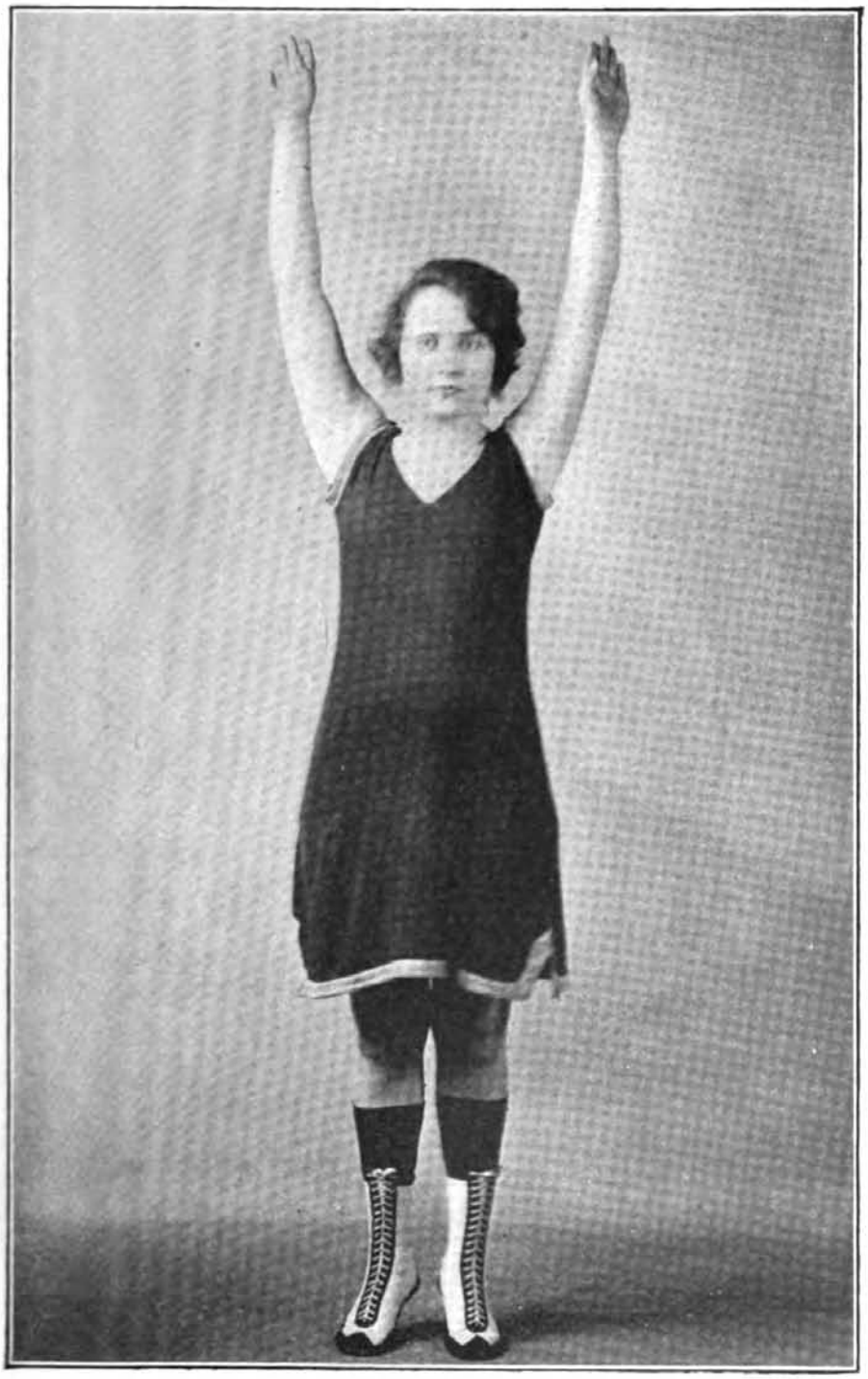
You may be sure that success is not a matter of luck. It is a matter of fitness, effort and good work well done. No one who makes the most of himself physically, mentally and spiritually, and who then does

the best work of which he is capable, can possibly be a failure. If you approach the study of the Olympian System in the proper spirit, determined that you are going to make use of the lessons to be learned in making yourself a better man or woman, then this course will be of priceless value.

The Olympian System has been very carefully prepared with the help of a widely selected list of authorities, each contributing a helpful and often inspirational presentation of some subject upon which he has specialized. No one specialist could have produced a course of this exceptional value.

LIGHT EXERCISE

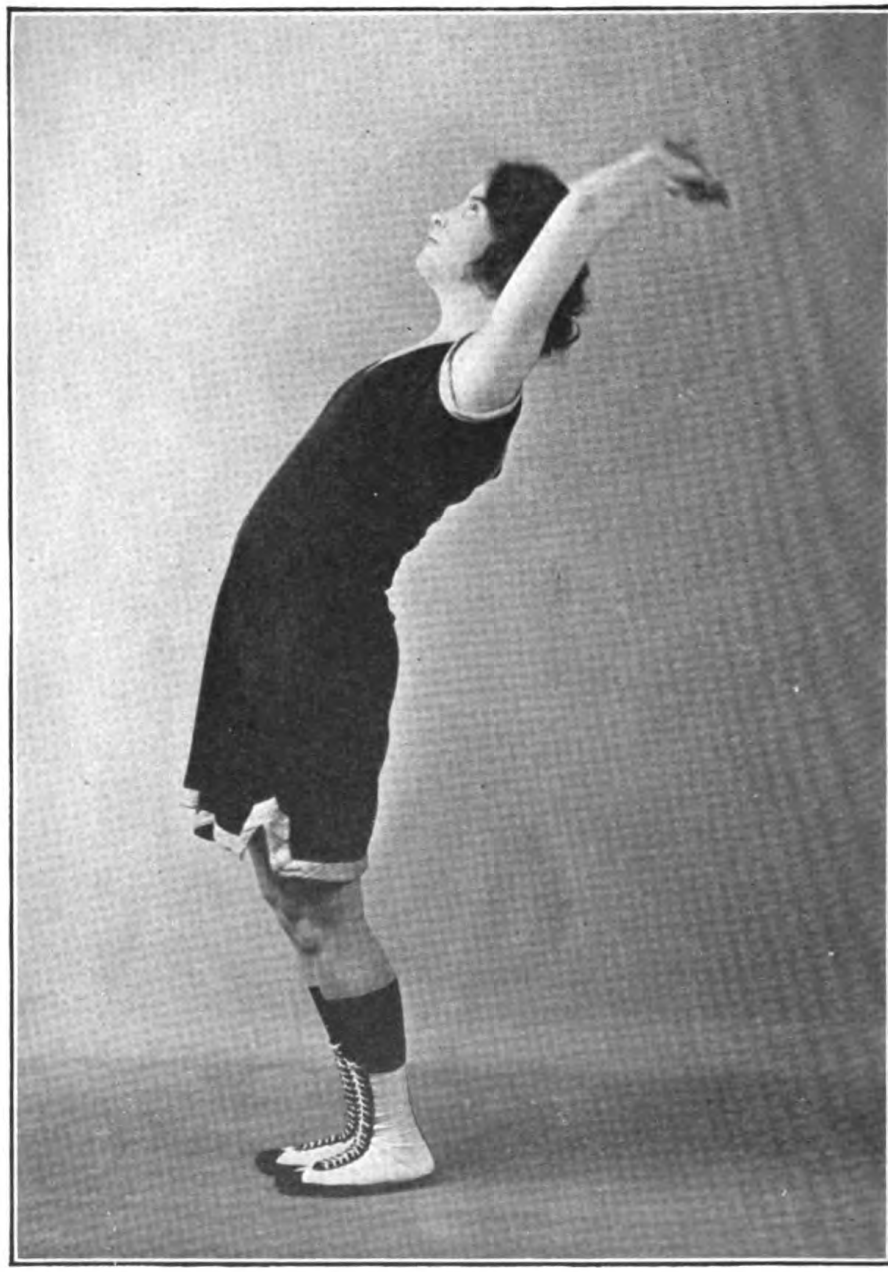
Stretching is the ideal form of light exercise, stretching nerves, blood vessels, tendons and other tissues, as well as muscles, etc. Perform each of these movements five to ten times. This is the most familiar spontaneous stretching exercise. With hands back of head, stretch head and elbows vigorously.



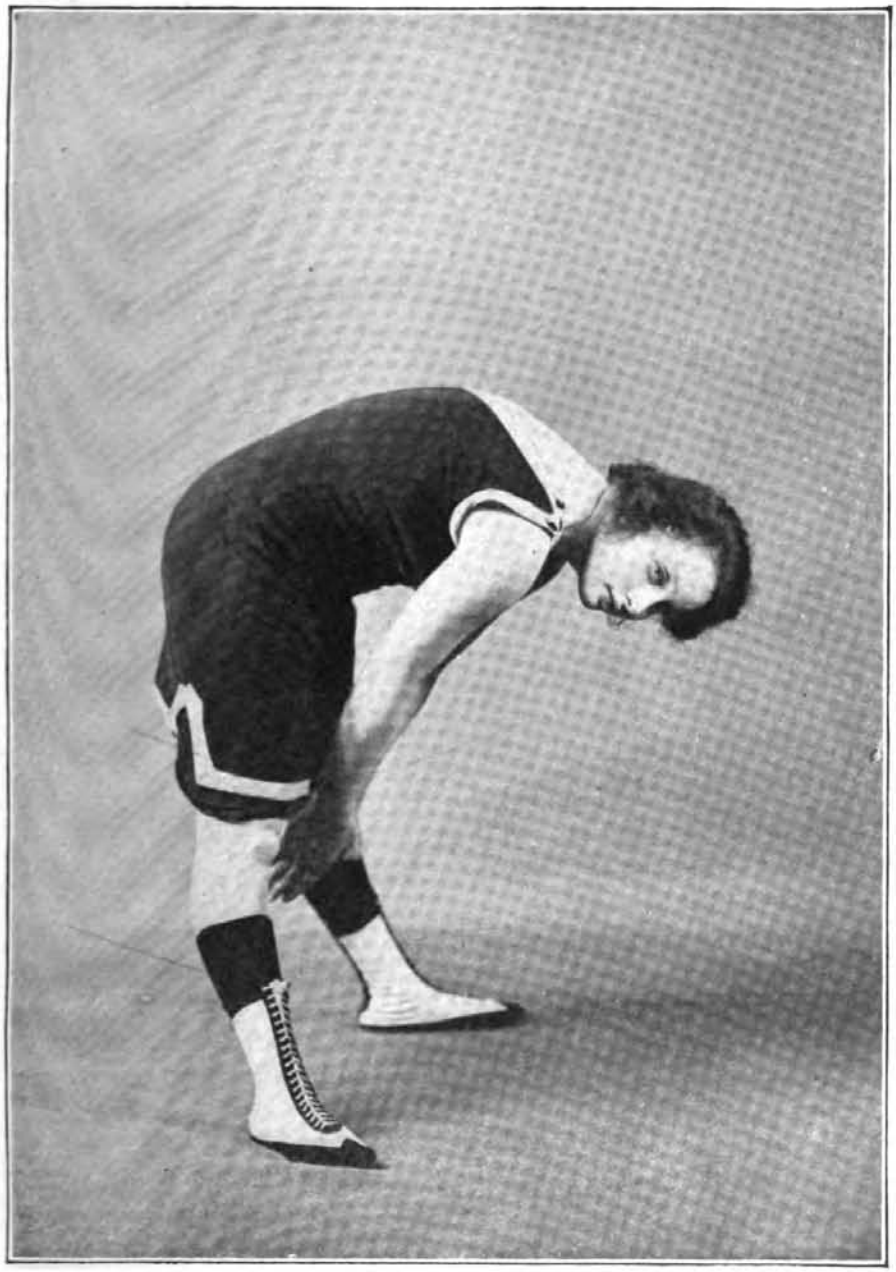
Stretch arms high over head, rising on toes. Stretch vigorously from toes to finger tips.

With feet well apart turn and stretch the right arm far over to the left foot. Then swing around, stretching the left arm beyond the right foot, repeat and continue.

With one arm raised over head, stretch upward with that arm while stretching downward with the other. After five or ten efforts reverse, raising other arm. Next bend first to one side, then to the other, swinging the upper arm high over the head.



With hands above the head, stretch backward as far as you can, maintaining perfect balance. This will raise and expand the chest.



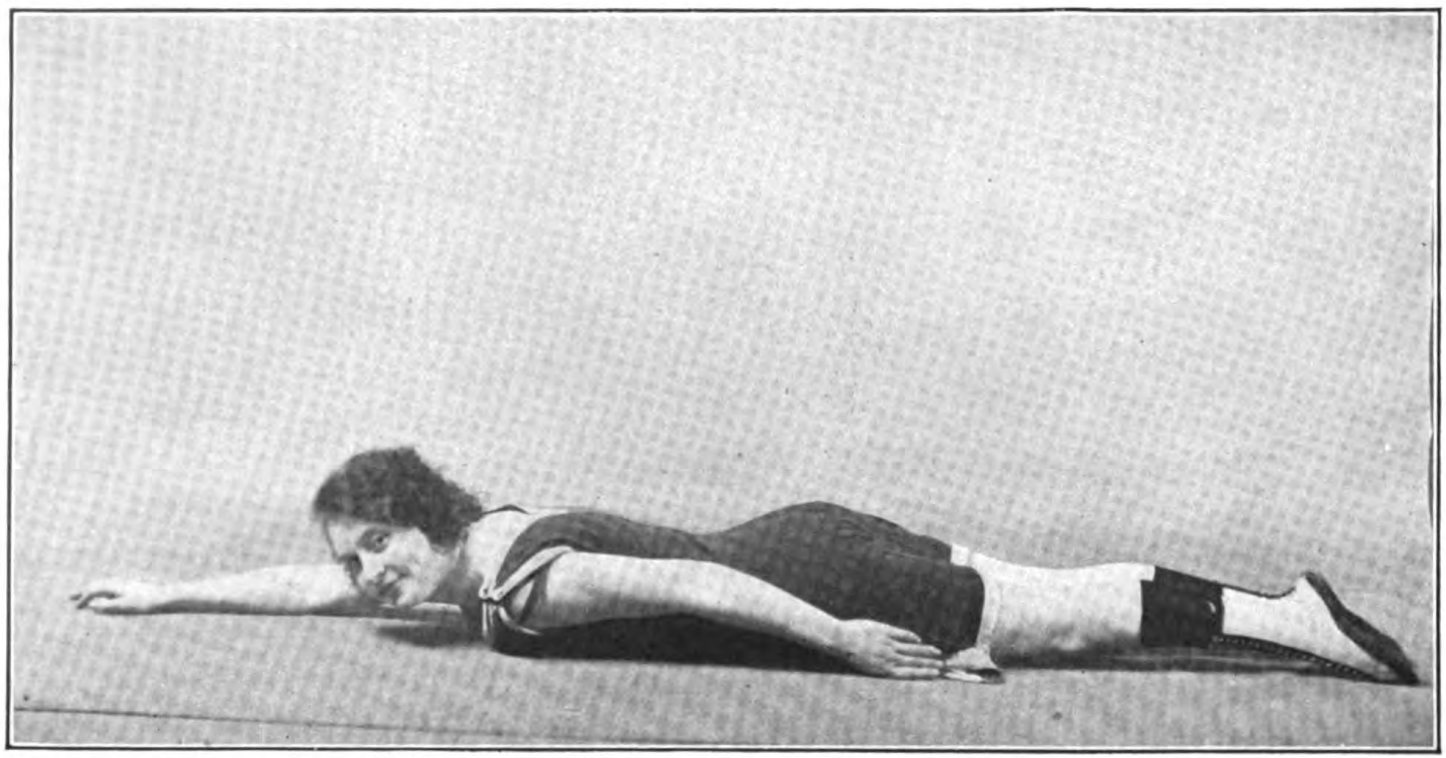
With the feet apart bend forward and stretch the hands backward between the legs as far as possible.

With the arms at the sides, bring the hands straight backward as far as possible, stretching energetically.

Stand on one leg and stretch the other far forward, maintaining your balance. This can only be done well by extending and stretching the toes. Alternate with each leg.

Raise and stretch the knees upward alternately, as in the photograph. Bring the knee as close to the chest as possible while standing erect.

One can stretch certain parts of the body best by doubling up as tightly as possible. Fold yourself up like a jack-knife and "squeeze" yourself together, then straighten out to full length and repeat.



Stretch out at full length on bed or rug, stretching one arm upward, the other downward, then alternating by reversing the position. This is an excellent movement for loosening the upper spine.

LIGHT OR HEAVY EXERCISE—WHICH?

By BERNARR MACFADDEN

ONE of the most frequent of all questions bearing on physical training is the following: Is light exercise better than heavy exercise?

Better for whom?

It is this application of the question to the varying needs of different individuals that calls for more or less understanding of the subject of exercise generally. Different types of men and women in varying degrees of strength and development undoubtedly have different requirements. There is no question that one may sometimes fail to get satisfactory results because his method of exercise is not intelligently planned. It is quite possible for one to do himself harm through wrong methods of training, just as he may benefit from right methods. It is, in fact, not often that one does himself any real injury through exercise, but it frequently happens that one fails to improve as well as he might.

Muscular exercise seems such a simple matter that many people do not realize that there is anything to learn about it. They take it for granted that if you use the muscles they will get strong. But there is more to it than that. One should understand some of the basic laws of physical training so that his efforts may be directed effectively. It should be the duty of every man, woman and child to acquire at least a certain amount of information upon what we might term the "first principles" of physical culture so that he can judge of his own requirements in this respect.

It cannot be said arbitrarily in regard to light and heavy forms of exercise that either is better than the other in a general way. It is entirely a question of the relative fitness of each in individual cases.

One of the first rules of exercise is to avoid unnecessary strain. It is true that in striving for extremes of strength it is necessary to tax the muscles practically to the limit of their power each day. But for the ordinary purposes of health and development, it is always best to keep within the limits of ease and comfort in exercise. That is to say, one should not attempt any movements which cannot be executed with comparative ease. Particularly if one is not accustomed to vigorous methods of training should one be careful to avoid overtaxing the muscles and consuming too much nerve-force. There should be no excessive expenditure of energy, for it is really the physiological results of the exercise that are most desired in the average case.

How can one tell whether or not a certain exercise is too violent or too much of a strain? The best test of this is probably found in the sense of trembling or nervous unsteadiness of the muscles following the exertion. If you experience this trembling you may know that your exercise has been too violent for your present degree of development. Fatigue of the muscles, even to the point of a slight ache, may be accomplished by suitable exercise without this sense of trembling being manifested, and in that case you may take it that the exercise has not been too severe.

If you find that your exercise simply has the effect of waking you up, causing a feeling of stimulation and exhilaration, and especially if it makes you feel that you

would like to do more of it, then you may know positively that the work is doing you good. But just there is the point at which to stop. Unless you are training for special results in the way of endurance or unusual development, it is best to discontinue your exertions before the feeling of vigor has given place to constitutional fatigue. If you will do this it is utterly impossible for you to over-exert yourself. There is nothing in the world so stimulating to the mind and nerves as the right kind of exercise, and, of course, this means not too much. In the beginning it is often found that a very little exercise will go a long way.

We have just referred to constitutional fatigue. This is a very different thing from the local fatigue of a particular muscle or group of muscles. For instance, you may continue to repeat a certain movement until the muscle or muscle group involved is temporarily fatigued, and this fatigue is manifested in a pronounced aching and weakness of the part. This condition is local and is relieved by a brief rest. In the same way you may produce in sequence a temporary local fatigue of all the different parts of the body and yet without experiencing any marked loss of general bodily energy. In other words, you may still retain your sense of general constitutional strength. If you can do this, it is good physical culture. It is by this policy that muscular development is accomplished without an excessive drain upon the vital resources. But constitutional fatigue, on the other hand, is brought about when one's exertions have been carried to a point at which the general bodily energy or reserve strength seems to have been to some extent used up. It is this exhaustion of the reserves of

nerve-force that should be particularly avoided in connection with intelligent physical training.

The unsuitability of heavy or violent exercise to those not accustomed to it is so obvious even to the uninitiated that it is sometimes responsible for a prejudice against physical training generally. Also, because of this prejudice against heavy exercise and the consequent approval and over-valuation of light exercise in other minds, it has even been stated in some instances that light exercises are best for building great strength. From the fact that light exercises are undoubtedly preferred in certain types of cases, however, one must not assume that they are superior for all purposes. The fact is that great strength can be developed not by light exercises, but only by vigorous forms of training involving the expenditure of great strength.

For those in delicate condition and of limited development, it is folly to attempt anything in the way of vigorous exertion. Likewise, for those who are not accustomed to exercise, only light movements should be attempted, even though they are fairly heavy in build and seem in moderately good health. A fleshy condition does not mean muscular vigor, and one should never jump from physical stagnation to extremes of violent effort. One should never make a sudden plunge into vigorous physical training, not only on account of the general effect, but particularly on account of the unaccustomed strain on the heart, blood vessels and internal organs. But especially where the muscles are weak and undeveloped, and the vitality is low, light exercises only should be used. Without doubt many persons go wrong in trying to take a man's size portion of exercise when a baby's dose would be about right.

Under the influence of light calisthentic work unused muscles will be quickly infused with life and will develop rapidly up to a certain point. Lack of exercise is unnatural, and the muscular structures inevitably degenerate under such conditions. But by calling them into daily action with moderate exertion they will quickly respond and acquire the tone and vigor which make for health, and which will prepare them for further progress in the way of development and strength building if one desires to develop a marked degree of strength.

We must remember that the purpose of exercise is not merely muscular. Especially in light exercise it is the physiological result that is most important. First of all it is the effect of exercise upon the circulation that one should consider.

Everyone, in spite of himself, enjoys a certain amount of light muscular activity in the ordinary movements of everyday life, even though he walks only a little. But while the circulation of the blood does not stop, even when a man lives an inactive life, yet it is comparatively stagnant and he cannot possibly enjoy the same condition of bodily vigor and organic strength as his neighbor, whose circulation is kept active and accelerated to an unusual degree at certain times of the day through appropriate special exercise of some kind.

The fact is that exercise not only keeps the muscles in good condition but it keeps every tissue in the body healthy. In those parts of the body subject to movement in the course of one's activity, the very blood vessels themselves undergo a process of stretching and contracting. The nerves are stretched and massaged as it were. The state of tension to which the tendons,

ligaments and even the bones are subjected affects their strength and health. In short, exercise has the effect of massaging and stimulating every cell in the body as well as the larger structures.

Moreover, through the improved circulation induced exercise has the effect of cleansing the body internally. Waste material is more perfectly taken up by the blood-stream and eliminated. Worn out, dead cells are eliminated. New cells are built up. Indeed, the unusually active circulation brought about by exercise has the general effect of flushing, so to speak, not only the blood vessels themselves, but all of the bodily tissues.

Aside from these general constitutional results, one should not ignore the direct effect upon the internal organs of all movements which involve bending, stretching, and twisting of the trunk of the body. This organ-strengthening influence of exercise will be given such attention as we proceed with our system that we will not stop to dwell upon it here.

But while it is the constitutional rather than the purely muscular influence of exercise that is most important, it is essential, in order to get even the former result at its best, that the muscles themselves should be properly used. To a large extent the difference between exercise and the ineffectual bodily movements of everyday life is found in the fact that our ordinary activities involve only a limited sphere of movement. We move the hand perhaps a few inches only in doing a certain thing. We move the arms usually a few inches at a time. We move the head a couple of inches. We turn or bend the body no more than is absolutely necessary for accomplishing various purposes, instead

of twisting or bending it to the full limit to which our muscular structures make it possible.

In exercise of the right kind, on the other hand, we move the arms not a few inches but as far in every direction as the muscles are capable of carrying them. Again, we bring the head far forward, back and sideways, to the full extent that the action possibilities of our muscles will permit.

Exercise to be effective should embody this principle. In other words, in extension movements one should actually stretch the parts with each repetition of the exercise. In flexing or bending movements the muscles should be contracted to the fullest degree, and the flexing or bending of the part of the body concerned should be carried as far as possible.

The number of repetitions of each exercise will depend upon the condition of the individual. Ordinarily it is sufficient to do each movement ten or twenty times. In some cases each movement might be executed thirty times or more. But when forty or fifty movements are not sufficient to produce local muscular fatigue, you will understand that you are then ready for exercise of a more vigorous character.

It must be understood that in all cases, even for the most powerful athlete, light exercise is of undisputed value by reason of its effect upon the circulation of the blood and the internal organs. For many persons of a light-boned type, light exercises will always be most suitable.

THE NEED FOR VIGOROUS EXERCISE

By BERNARR MACFADDEN

MEN and women enjoy various degrees of strength. Some are strong, some are weak.

In the same way there are various standards or degrees of health. And of ill health.

What is your standard?

Is your health vigorous, feeble or indifferent? Are you satisfied with a mere bodily existence, or do you demand a standard of health that implies the possession of a high degree of vital strength, nerve strength and organic strength?

Perhaps the most interesting point about truly vigorous health is that it is invariably associated with muscular strength. The weak-kneed individual who thinks he does not care anything about *strength,* but only wishes to have *health,* does not know what he is talking about. Vigorous health is almost unthinkable without a normal muscular development and the all-around physical energy that goes with it.

There is no such thing as good circulation, proper bodily warmth under all conditions, satisfactory nutrition and all-around health without a muscular system that is normally developed. And this requires a measure of daily exercise that will to some extent test one's strength. Light exercises have a certain value of their own. They are indispensable under certain conditions. They form a foundation for advanced physical training. But for the man who has reached a certain degree of progress in the building up of strength, that is to

say, for the man with a normal and vigorous development, light exercise is practically no exercise at all. A person of robust constitution needs real muscular exertion, not only in order to keep the muscular system in good condition, but also in order to wake up his heart, lungs and the internal organs generally. The mild effort involved in light calisthenics will not have sufficient effect upon these organs in the case of a vigorous man or woman.

The time has passed when the "out of bed" standard of strength and health can be acceptable to anyone acquainted with the principles of physical culture and the possibilities of the human system. We can no longer regard the mere capacity to sit up and take nourishment as a condition of true health. And yet the advice offered on the subject of exercise in many quarters is chiefly in the direction of caution lest one should really exert himself. These theories of light exercise only, the fear of exercise, the suggestions on the "careful life" or the "delicate life," are all based on a misunderstanding of our true physical needs. They are the outgrowth of a failure to appreciate the natural vitality and energy of human life.

Not only is activity of a vigorous character natural, but it is practically inevitable and unavoidable in the case of a truly healthy person. He will "go to it" spontaneously, instinctively. When you marvel at the strength and physical power of some of the lower animals, remember that the human animal should be no less full of vitality and stirring energy, and that under normal conditions this energy will put itself in evidence through activity of a strenuous character in one form or

another. Remember that such energetic activity will be indulged in because it is natural and because it is enjoyed, and that no harm will come from it because the human system has been adapted to just such a stirring, vigorous, strenuous life through hundreds of thousands of years of it on this earth.

Energetic and concentrated effort of an intellectual character is comparatively new, though even that has become natural to us. But vigorous physical exertion is as old as the hills. Our bodies have been shaped and evolved for it, through all the ages, and it is quite the right kind of activity for one who is properly developed and has nothing the matter with him organically.

Unfortunately, so many of us, for various reasons, are not normal. And among other things, our very civilization tends to induce physical stagnation. Apparently some people think that they secure sufficient exercise in handling a knife and fork, or even in rolling their own cigarettes. What kind of men are we when we fear to undergo exertions that really test our strength, or when we are physically capable of using tools no heavier than those of the manicure artist! Indeed, many of us apparently need assistance in putting on our overcoats.

Do you fully realize the importance of the muscular system in maintaining health? Do you keep in mind the fact that under normal conditions the muscles make up from forty to fifty per cent of the bulk of the body? When you understand that the greater part of our food is consumed in the muscles, and the greater part of our bodily warmth is produced in them, you will commence to see more clearly their importance in maintaining a

good circulation. You will also better understand why the person who is lacking in muscular tissue must be below normal in other physiological respects. He cannot possibly be at his best when this vitally essential part of his being is not fully developed, and not sufficiently active to insure a vigorous circulation and a well-balanced state of the bodily functions in general.

Just here is a very good suggestion for the person who complains of cold feet and hands. In some cases a weakened heart action may be partly responsible for this condition. But as a general thing, the lack of circulation is very closely related to deficient muscular development and lack of daily activity.

About how much exercise, then, do we need? The man or woman of low vitality will need only a little, though that little will be needed badly in order to gain strength. But the man or woman with a sound constitution and the capacity for a high degree of energy needs considerable activity in order to maintain real bodily vigor and a large fund of energy.

But the amount of exercise is determined by its intensity or quality of effort, as well as by the time devoted to it. So far as the building of strength is concerned, the intensity or vigorous character of one's activity is far more important than the quantity as indicated in the number of repetitions of some gentle movement.

Let us see. From the standpoint of foot-pounds and energy expenditure, there is no difference between ten repetitions of a five-pound effort and one fifty-pound effort. But as a matter of exercise for strength building, there is a tremendous difference. And it is

important that everyone interested in exercise from the standpoint of strength building should understand this.

Strength of muscle is measured by its power to contract against resistance rather than by its ability to repeat a movement against small resistance. A five-pound effort, so to speak, may be quite easy, and after one is able to repeat it ten times, it would perhaps require very slight additional strength to be able to repeat it a hundred times. But it will require ten times as much strength to make the fifty-pound effort as it does to make the five-pound effort.

Now, if one wishes to gain the strength to handle fifty pounds in a certain way, he should not attempt to acquire this by handling five pounds in the same way, no matter how many repetitions of the exercise. It is not repetition but exertion against a greater resistance that will best develop increased power. Otherwise the girl typist would have hands as strong as Arthur Saxon.

For building strength, therefore, one should very slowly increase the amount of resistance to muscular contraction, or gradually adopt exercises of a more vigorous character. It goes without saying that progression in this respect must be made by easy stages. In other words, one should not jump from a five-pound resistance to a fifty-pound effort, but should increase the resistance gradually.

There is a fundamental difference between strength and endurance, though endurance naturally depends to a large extent upon one's strength. However, in the building of a high degree of strength, even one or two movements each day performed against great resistance will accomplish more in promoting muscular bulk

and power than prolonged repetition of some easy movement.

This explains why some of the world's famous "strong men" have been fat. Louis Cyr, the Canadian giant, looked like a fat man in spite of the prodigiously powerful muscles concealed by his adipose covering. The reason why fatness may persist in such a case is because it requires very little heavy work to maintain strength of this kind, and one may not indulge in enough activity to consume or burn up the fat. A large amount of light, fast exercise would be more effective in this direction. At that, the fat type of "strong man" is naturally more healthy than the merely fat man who takes no exercise and lacks the strong man's large percentage of healthy muscular tissue.

A very good example of the comparative muscle building value of vigorous and of light exercise is seen in the distinction between fast running, commonly called sprinting, and long distance running. Long distance running is an example of endurance rather than of strength. It requires only a moderate muscular development. Given leg muscles sufficiently developed to be able to trot a couple of blocks, it does not take much more development to enable one to run a couple of miles at the same easy pace. But sprinting requires an enormously more powerful contraction of the driving muscles of the legs. Running at top speed calls for the highest degree of muscular power that can be obtained. Therefore, practice at fast running will develop the leg muscles to a degree impossible to attain by any amount of long distance work. Sprinters are invariably beautifully muscled and vigorous looking specimens of the race.

This does not mean that I advocate fast running in all cases. I simply use this example to illustrate the relation of greater resistance to the development of increased muscular power. In most cases easy long-distance running is more constitutionally healthful and beneficial than sprinting. Remember, however, that even slow running is a form of fairly vigorous exercise.

Granting, then, that vigorous exercise is not only desirable but essential for the normal and well-developed man or woman, the question is, how vigorous? This will depend upon the individual. One should avoid extremes. He should not strain himself. All that is necessary is a degree of real resistance sufficient to test one's strength to a certain extent. It should be sufficient to make one exert himself. The half asleep type of exercise is of no value. Your efforts should be sufficiently energetic to wake you up and to enable you to "feel" your strength.

Probably no type of exercise is more generally satisfactory for complete and symmetrical development than those forms of physical training in which the muscles are concerned with handling, so to speak, the weight of the body itself. Anyone with a normal development should be able to handle his own body in this way easily and freely under all conditions. Indeed, if the question should arise as to what is normal development, it might even be defined as that which enables one to have perfect and easy control of his own person under all conditions.

It is for this reason that gymnastic apparatus work may be recommended. It is not necessary that one should have the use of a modern gymnasium for pur-

poses of physical training, but if one has convenient access to such a gymnasium, the apparatus work will be found ideal, especially for building strength of the upper body. Work on the parallel bars, horizontal bar, flying rings and vaulting horse, giving one the ability to handle the weight of his own body readily under all conditions, is conducive to what we may term normal development. If you find such exercise too strenuous at present, do not attempt it then until you have had sufficient preliminary training with lighter exercise.

By way of vigorous exercise that may still be regarded as healthful and normal, I know of nothing that is better than wrestling. Wrestling is a form of athletic competition. But it is also the most perfect of all forms of physical training for those who are already strong enough to indulge in it. It is a natural exercise. It permits one to indulge his strength to its full limits and yet, if he is properly trained, it does not cause him to over-exert himself, for the reason that his strength is opposed only by the approximately equal strength of his opponent. Wrestling is fascinating because of the element of competition. It is interesting. It calls for quickness of mind. Finally, it is also the ideal exercise for building endurance and strengthening the internal organs. At the same time, no one should attempt such a violent form of recreation unless he has first developed a high degree of all-around bodily vigor.

Perhaps, after all, many persons searching for health will need most to be cautioned on the subject of overdoing their exercise. Enthusiasm will carry many of them too far. I have a letter from an athlete who has mastered the art of chinning the bar with one hand, who

asks whether it is better to repeat it as often as possible at one time, with the utmost effort, or to do it a moderate number of times and practice it more frequently. He has found that when he strains the muscles of the arms by chinning to his utmost capacity, he produces a discomfort something like rheumatism. Chinning the bar even with two arms is a truly energetic exercise. If you are able to do it twenty times to make a record, then it would be best to attempt it only fifteen times as a matter of daily practice. Do not tax yourself to the limit in this way.

Another student writes that although he has exercised a great deal, the muscles do not seem to increase in size and strength. Possibly he has given too much time to light exercise. On the other hand, if his exercise has been sufficiently vigorous, it is probable that he already has a full and normal development, considering his build and possibly light bony frame, and that he has no real complaint to make about his physique. You must consider your own particular type of build. Do not be misled by statements as to "what you should weigh," or by tables showing "standard" measurements. You may be "thick-set," with a comparatively heavy bony frame, or you may be naturally slender, and in either case your measurements and weight may be away off from the average shown in the tables, and yet be absolutely normal. The real test lies in bodily energy. Are you nimble, active? Do you feel strong, energetic? Are you full of life? These are the essentials. The so-called "standard" of measurements would perhaps be abnormal in your case.

Remember that if you can handle the weight of your

own body easily, quickly, comfortably and freely, under all conditions, your development is normal and satisfactory, even though your measurements may not approach Sandow's.

DEVELOPING THE CHEST

By BERNARR MACFADDEN

THE human chest, the uplifted, expanded human chest, is at once the source and symbol of human power and achievement. It is the link that bolsters and backs up the brain and brawn and saves the human form from the appearance and the reality of being a mere mechanical housing for a thinking machine.

It is these symbols of things of the soul, of emotion and intelligence, that give the spiritual greatness to the art and to the reality of the human form. And these psychological parallels to purely physiological laws are what made man's body more than blood-fed flesh and the human chest more than a container for a pair of lungs.

All the people who have thought at all have recognized that a good chest was a prime necessity for a good man. Artists have found in the human chest a source of beauty and symbolic strength not to be excelled by any other part of the body. Athletes, whether their goal be strength, agility or endurance, have always gloried in a good chest, and chest expansion has long been conceded as the most important indication of physical quality that could be expressed in a single measurement. Even those who have no love for body beauty or athletic achievement have been forced to recognize the chest as the seat of human vitality and essential to all life's strength, whether for the achievement of the muscle or the mind.

Universally conceding its importance, men have long used the terms "weak chests" and "powerful chests." Asked to define a weak chest, most men, even well-informed men, will say that a weak chest is a flat chest. Tuberculosis, the disease of weak lungs, has been supposed to find particularly welcome lodgings with flat-chested hosts. Some years ago Dr. Woods Hutchinson measured the chest index of a number of tuberculous patients, with a view of getting data to prove his theory. Imagine his surprise to find that consumptive chests were not as flat as the general run of the race.

To take the chest index, one measures (at the level of the nipples) the chest diameter from front to back, and from side to side. Suppose the former to be 8.4 inches and the latter 12 inches. Then dividing 8.4 by 12 we get 70 per cent, which is the chest index. If the chest were perfectly round, this chest index would be 100 per cent, and if twice as wide as deep the index would be 50 per cent.

The average human chest index is 70 per cent. But the index of consumptives, as found by Doctor Hutchinson, was nearly 80 per cent, meaning that they had rounder, more barrel-like chests than the average. But on such round chests it was found that the shoulders tend to hang forward and down, and the shoulder blades, instead of lying flat upon the back, tend to slide around to the sides with the edges sticking out like sprouting wings. This gives the consumptive's narrow chest an appearance of being flat when the true chest cavity is just the opposite.

And now comes the interesting part of the story: Animal chests are very deep side to side. It is a funda-

mental principle of evolution that the infant represents an earlier type in the history of the race; and sure enough, in the unborn babe human embryo we find this same type of deep chest—that is, with an index as high as 115. At birth the shape is almost exactly round, giving an index of 101. The chest now rapidly flattens. The youth in the early 'teens has an index of 80. The woman's chest remains permanently more round, or with a higher index than the man's. Likewise the negro's is also more like the primitive type.

From all this we reason that the consumptive chest is a case of "arrested development" or retained immaturity. The remedy for the individual is more exercise of the same type as that which originally evolved the wide human chest from the deep animal chest.

To have a strong chest is to be a strong man. It is the thing we beat on with our fists when we want to outroar the lion. The breath of life comes and goes with the heaving of our ribs. The strength to grip and grapple and spring and claw and fight are there, superimposed over the bony cage of our ventilating apparatus.

To be weak in either breath or strength means a failure in the end; to be big in both means a completeness of power and beauty and victory.

The flat chest—the sunken chest—the undeveloped chest—are tokens and proof of failure.

Use your chest. Inflate it, expand it, uplift it. Put air in it, put muscles on it. Beat on it, if you will, and roar.

Let there be back of a good chest a good back; and a back is a backbone plus plenty of porterhouse steak, the highest priced tissue on the bill of fare.

The backbone must be curved just right. That's why the little wizened, sure-enough monkey stayed in the trees and chattered while brother man went out and conquered the green earth—for man got an extra kink in his vertebral column that stuck out his ribs at a roomier angle.

Chief among the muscles of the human chest is the pectoralis major, with its point tucked in at the shoulder joint, and spreading in fan-shaped fashion over the upper front of the two halves of the chest. Add a pound of flesh here and both feeling and fact of a man's power and beauty are increased many fold.

Somewhat greater in bulk, but less conspicuous, are the latissimus dorsi muscles on the side and back of the shoulder, which pull the arm down and back. But we do not think of them as chest muscles, for the chest of a man is usually viewed from the front.

Beneath the pectoralis muscles are the serratus magnus or big saw teeth muscles. It is these that give to the well-muscled man the notch-like corrugations on the sides of the chest. These muscles pull the ribs up and the lower part of the shoulder blade down. Co-operating in this good work are the intercostal muscles. Altogether these rib-raising muscles do the chest breathing—the breathing for emergencies and surplus power. This ability to raise the ribs and increase the lung room inside is the source of chest expansion.

True chest expansion can be best measured at the level of the point of the breast bone and below the lumps of the great muscles fore and aft that pull the arms about. Do not confuse this measure of power of the chest with that of shoulder muscles, as one is likely to

do if the tape measure is placed close under the arms in taking chest expansion. Strive to make powerful the true chest expansion honestly measured, and then to add to it the further grace and beauty of the pectoralis major and the latissimus dorsi.

The best chest development exercises are those that will develop the muscles on the sides and front of the chest and increase the power for deep breathing. All arm raising movements expand the chest and are helpful in its development. Deep breathing should not be neglected. Ideal movements for the purpose are those given in the chart covering chest exercises.

PERFECT POSTURE SIMPLIFIED

By THOMAS LLOYD SWIFT

DO you carry yourself like a man or a baboon? Do you sit down like a creature with a backbone or like a jelly-fish?

The first characteristic of the human animal is the erect position. But many of us merely hang together, as it were, from the waist up. Instead of standing and walking as though possessed of a spine that extends up to the base of the skull, we simply droop above the waist and get along as best we can without actually tipping over.

The true erect attitude is the position of vigor and energy. It indicates that one is thoroughly alive. The drooping, hanging, sloppy attitude is the attitude of weakness, of laziness, and lack of character. Also, it is unfavorable to the best functioning of the vital organs.

The first thing a soldier learns is to stand up. This is because those in charge of military affairs demand efficiency and energy in the men engaged in this branch of public service. The world has not yet realized that the same degree of physical energy and efficiency are needed in the affairs of civil life. However, the soldier is not trained to stand erect merely for the sake of the physical or physiological advantage, but also for the sake of the mental and moral associations of such a posture.

Almost everyone realizes, though sometimes only in a vague way, the need for improved posture. When

we were children we were told to "stand up straight," to "sit up," and "hold your shoulders back." And parents today say the same thing to their children. There is the incessant effort to improve posture but usually without knowing how. The mere effort to hold the shoulders back to prevent round shoulders is fruitless. The secret of good posture lies in straightening the upper spine.

It is for this reason that Bernarr Macfadden's method of upper spinal exercise, which he calls "vitolysing," is a simplified solution of the entire problem of securing good posture. It is this cervical spine, consisting of the seven uppermost vertebrae, that in the case of most people is most seriously bent out of shape through faulty carriage. Mr. Macfadden holds that this simple form of exercise for this part of the spine not only tends to straighten and strengthen the mechanically wonderful structure encasing the spinal cord, but that it is favorable to increased vigor and activity of the central nervous system—a sort of mental and nervous stimulant. This is only natural. The importance of a normal spine has been so thoroughly demonstrated not only by osteopaths and chiropractors, but by many others, that nothing needs to be said upon that subject here. But good posture is such an important factor in keeping the spine normal that the value of vitolysing in this connection cannot be given too much emphasis.

To attempt to pull the shoulders back and hold them back in the endeavor to gain good posture, while somewhat commendable, is more or less futile so long as the central and basic structure of the body is ignored. The backbone is the fundamental and dominating structure

of all vertebrate creatures. The limbs, together with those structures which we call shoulders and hips, are merely built out from the spine, as are also the ribs for encasing the most vital of our organs.

To make a real improvement in posture, therefore, it is essential that this central supporting pillar of the body should be straightened out in a normal manner. As a matter of fact, the moment the upper spine is straightened up through the practice of vitolysing, the chest is automatically raised to its normal elevation and the shoulders take their proper position naturally. You do not need to think of expanding your chest or pulling your shoulders back if only you straighten your upper spine. Following this, all of the rest of the body will naturally assume its normal position.

Vitolysing consists in the simple exercise or movement of drawing the head backwards in such a manner as to straighten the neck. This is not done by throwing the face upward and tipping the head back, for that may be done by simply using the axis or second cervical vertebrae as a pivot, and without materially affecting the vertebrae directly beneath it. To accomplish true straightening of the cervical spine, the face must not be thrown upward, but the chin must be kept down and pulled backward or inward. That is about all that you need to remember, simply pulling the chin as far backward or inward as you can without raising it. This is vitolysing. You can do it while looking straight ahead, or you can vary it by turning the head first to one side, then to the other, pulling the chin backward while keeping it down. In turning the head, it will be seen that the chin is simply drawn backward, first over one

shoulder and then over the other. It is simplicity itself.

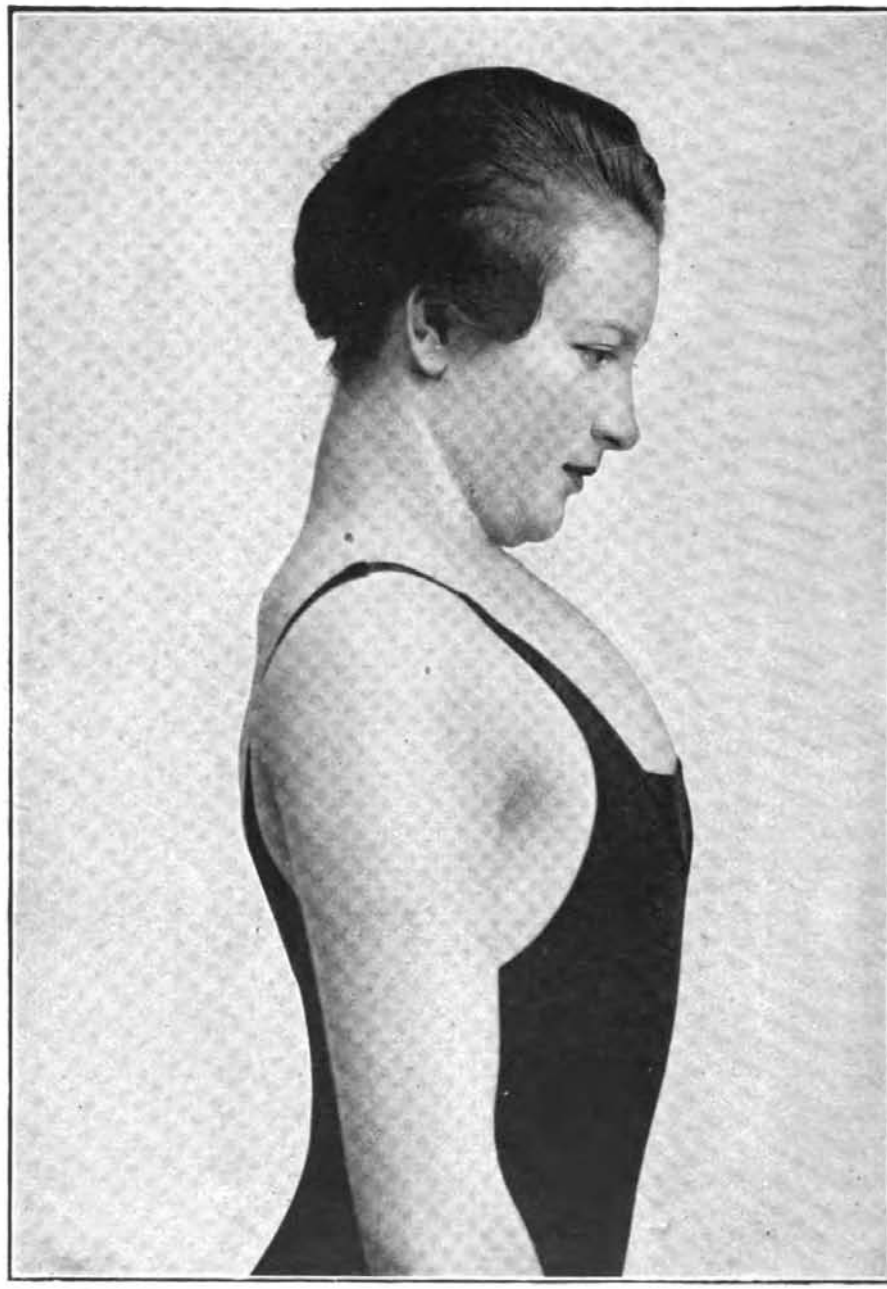
Now if you will try this little exercise you will find that it does not merely affect the neck, but the carriage of the entire body. You will find that the chest is automatically raised to its normal position, that the abdomen is raised and drawn inward and that the curve of the small of the back is slightly exaggerated. This is the normal dorsal curve. You will find, in short, that vitolysing will at once give you the bearing of a soldier. It is a "setting up" proposition. To put it another way, when the soldier is taught to stand correctly, straightening himself up, drawing his head back, he is virtually taught what Mr. Macfadden tells you to do in this simple little exercise. But all that you need to think of is your chin. Keep that down. Pull it far back. This means, of course, that your head will be drawn back with it, involving the straightening of the neck and upper spine.

I have just mentioned the effect upon the arch of the back. There are some curious misconceptions on this subject in the popular mind, probably due largely to such unfortunate terminology as a "straight back" and what is often called "sway back."

You need not be afraid to accentuate the arch of the back or dorsal curve.

This curve is a natural and inevitable accompaniment of our erect position. If you go down on your hands and knees, thus dropping back to the original quadruped position, the curve in the back practically disappears, but when you raise the upper body to the erect position there must inevitably be the bend in the spine which we find in the normal dorsal curve. The reason for this is the fact that the hips are not so placed

The first position in Bernarr Macfadden's exercise known as "vitolyzing." This shows the normal and careless attitude.



"Vitolyzing" consists in straightening the upper spine by the effort of bringing the chin backward, inward and downward, as in the photo. This changes the entire posture, straightening the spine and raising the chest.

This is a variation of "vitolyzing," the same movement being executed while turning first to one side, then to the other. The movement consists of bringing the chin inward, downward and backward.

or constructed in relation to the spine that the backbone and legs are strictly on a straight line with each other. The hips are so placed upon the lower end of the backbone that the sacrum and lumbar spine instead of extending vertically upwards incline forward at a slight angle. This angle varies somewhat in different individuals. An erect position of the upper body then naturally involves a bending of the spine above this point in order to secure the erect human posture. The more perfectly erect the position the more marked is this curve. It is perfectly natural. The other two curves, the lumbar and cervical, are likewise incidental to the erect posture. There is, therefore, no such thing as a "straight spine," speaking literally. The term is only used to differentiate a good posture from the stoop-shouldered attitude.

And yet, even writers on the subject of good posture sometimes express a needless conservatism in regard to doing the very thing that will give one a truly erect attitude. Much is said in discussions of this subject about the "straight line position." The straight line in question is an imaginary line upon which good posture is supposed to be founded. In many cases it is only confusing to attempt to approximate this imaginary straight and vertical line. If one will straighten the upper spine and accept the natural accentuation of the curve of the back, he will not need to worry about this straight line position. His posture will be perfect without any further thought about the matter. In attempting to secure the straight line position one gathers the idea that he should stand up straight, but not too straight. He feels that he must not exaggerate the curve of the back,

and yet it is just this slight exaggeration that gives the soldier his true military bearing—which is at the same time the ideal carriage of vigorous manhood and womanhood under other conditions of life.

The minute you mention the curve of the back, someone is almost sure to warn you against a certain bug-a-boo known as "sway back." If we were talking about horses, mules, or other beasts of burden that had been injured from the carrying of excessively heavy loads, we might have justification in using the term. But no physical culturist need ever have any fear of such a condition. If the term is sometimes applied to one possessing a marked dorsal curve, the term is only bestowed arbitrarily. It does not necessarily mean a condition of weakness. A weak back is not ordinarily manifested in this way, but rather through the bent or stoop-shouldered attitude. The curve of the back, as we have already said, varies with individuals. The women of Spain, for instance, are noted for the distinct character of this curve. It is really determined, however, not by the condition of strength or weakness of the back, but by the relative angle at which the bony framework of the hips is attached to the sacrum or lower end of the general structure known as the backbone. If there is a considerable forward inclination of the sacrum, then the curve of the back will naturally be more marked when the person stands erect.

The best way to secure good sitting posture is by vitolysing. If you are writing at a desk, instead of bending over, try vitolysing to straighten you up and then lean forward from the hips instead of curving over the desk.

Again, when sitting back in a chair, even if it is as badly made as practically all chairs are, the best way to secure a healthful position—under the circumstances—is by vitolysing. Get your upper spine straight and the entire trunk of the body will be improved accordingly.

Bad posture is not only antagonistic to the welfare of the spinal cord, and, therefore, to the nervous system as a whole, but it means a cramped chest. It means a lack of room for the free action of the heart and lungs. It also means a crowding downward of the stomach, liver, spleen and other functional organs. This is accompanied by a protrusion of the abdominal region. Downward pressure of this kind is bound to interfere with the functions of all these organs and it is particularly detrimental in the case of women. It is true that women, as a general thing, preserve erect posture more satisfactorily than men through the artificial bracing of the body brought about by the corset. On the other hand, the beneficial effect of the erect position thus secured in the case of women is offset or more than offset by the constriction of the body and the pressure upon the internal organs. Even when there is no marked constriction of the waist line, as in recent styles, the "straight front" corset produces such direct pressure upon the abdominal region as to be equally detrimental.

The psychology of good posture, however, should not be overlooked. We have already mentioned this in connection with the bearing of the soldier. The erect position is the attitude of dignity, of self-respect, of confidence and of courage. One does not need to be a psychologist or scientist to understand the significance

of the hanging head, or the suggestion of spirit and energy conveyed when the head is held erect. The man who has been accustomed to going about with a "hang-dog" attitude will find that he will think better of himself the very instant that he has learned to stand up like a man.

The value of good posture and the value of vitolysing as a means of securing it cannot be over-estimated for this very reason. There is sound psychology in all this, and the mere formation of the habit of carrying oneself in this erect attitude will help one tremendously in the building of character.

WHAT CROOKED SPINES DO TO GOOD HEALTH

By Dr. EDWIN F. BOWERS

AWAY back in that ancient day, when mankind commenced to part its hair from its eyebrows and give its forehead a chance to come out into the open, those who took time to think noted that they were fearfully made. The more they thought about it the more fearfully made and intricate they knew they were. And no one—least of all a physician—would exhibit flustered agitation in admitting that the body is an extraordinarily perfect machine—automatic, self-regulating, self-adjusting, and even self-restorative—up to a certain point. In fact, thousands of medical men have sung eulogies and chanted pæans in extolling the perfection of this marvelous machine—used for a season by the spirit.

And yet, only within the memory of those still living has the idea gained ground that if this body is a machine, its functioning and nutrition may proceed upon a basis of mechanics, as well as of chemistry:

That every one of the three hundred and ten movements known to the science of mechanics having its counterpart in the anatomical architecture, and every known principle and device its prototype, maladjustment and improper relation of these parts one to the other must be uncommonly common:

That among all these levers, bars, wedges, pulleys, joints, pipes, pumps, eccentrics, wheels and axles,

spirals, beams, trusses, girders, ball-and-socket joints, arches, columns, buffers, cables, and supports, the strain and stress of life must frequently develop mechanical trouble:

And that this mechanical trouble must affect the smooth running of the engine—just as would mechanical trouble affect the running of any engine.

Of course there are many thousands of physicians who do not yet see why falls, blows, jars, strains, wrenches, and the contraction of muscles and ligaments from improper posture, exposure to dampness or cold, or because of excessive fatigue or over-exertion, should cause any maladjustment that couldn't be securely and satisfactorily mended with a pill.

But their number is gradually growing less. And the number of their former patients, who have been convinced by experience that eggs can be made to stand on end, and that a machine that goes wrong becomes structurally defective, is rapidly growing greater. All of which brings us to the consideration of what crooked spines do to good health.

This subject introduced itself to my notice about seven years ago in the guise of an experience. I, who had never had a pain or an illness worth mentioning—excepting for a triple portion of toothache and all the dental horror that accompanies tooth trouble—developed "rheumatism." This localized in the right hip, from which it was diffused pretty generally over the back, and while not severe it was most persistent and aggravating.

I attended to that miserable rheumatism generously and whole-heartedly. I gave it nitric acid, salicylates,

and everything to drink or eat that I or any of my medical friends could think of. I treated it also with vapor and hot-air baths (and they were baking hot), electricity in several forms, phylaccogen, vaccines, and other hypodermic injections, massage, passive motion, vibration and physical therapy, and homeopathy.

I spent weary weeks in the dentist's chair. I sought high and low for hidden sources of infection in sinuses, tonsils, or other lurking places for germs. I tried more different varieties of diet—based upon more different theories of the pathology of acidosis and the rheumatic diathesis—than I ever before had heard of.

In short, I tried about every accredited form of treatment that promised relief from this nagging, obstinate devil that was riding me into a condition of chronic irritability. I didn't try psychic suggestion because I knew from experience with scores of cases that the subconscious mind can only influence functional troubles, or else pathological troubles that have a basis in a neurosis.

This was my condition, persistent more than a year, when I encountered a friend at a medical meeting in Boston. This man, a well-educated and thoroughly conscientious physician, had given up the practice of medicine, and had taken a course in osteopathy. He still wrote prescriptions occasionally, as he thought they were needed, but most of his work was manipulative.

I listened with ill-concealed scorn and pity to his raptures about the results he was getting, and had I not known him to be honest and trustworthy, I should unhesitatingly have said that he was a stout, bald-headed fanatic, and that what he needed most of all, and im-

mediately, was a guardian to steer him clear of a writ of lunatico de inquirendo. I was that obtuse and ignorant, you see.

Anyhow, I stopped over in Springfield on my way home. My friend put me on the table and poked his inquisitive fingers among the joints of my spine. If I had had abscesses distributed between four or five of them, the poked places couldn't have yielded up more pain and tenderness to the square inch. Then the doctor stretched me out and measured the length of my legs. After which he handed down the decision—it wasn't an opinion—that my right leg was three-quarters of an inch shorter than the left. I sat up and corroborated this fact for myself. The acute tenderness on the spinous processes didn't need corroboration. I admitted the fact of their presence without compulsion.

My friend then announced that I had a "subluxation of the sacroilliac joint," which, translated, meant that the head of the right thigh-bone was rotated slightly backward in the socket of the hip—putting the nerves, ligaments and muscles involved on a constant tension—and that the spine was curved to one side below, as well as above, in order to accommodate itself to the disturbed equilibrium caused by the shortened leg. Also that the "rheumatism" was the result of the "pinching off" of the nerve and blood supply. This in turn was caused by the pressure exerted by the spinal vertebrae, because of their abnormal position with relation to the vertebrae above and below them.

The exciting cause of the condition, my friend concluded, was my practice of blithely and impulsively stepping from a street car or a train before waiting for the

jinrikisha to come to a stop. All of which seemed very reasonable and sensible. And anyway, seeing was believing.

So the doctor proceeded to make my lower limbs mates. He grasped the recalcitrant leg, and swung it around for a few minutes in arcs and circles, to limber up the ligaments and muscles concerned in this nefarious shortening. Then he gave the member one grand final backward thrust, and jerked it forward in a tremendously potent extension. He repeated this extension maneuver once or twice, and then compared the legs. They were now exactly the same length.

He then twisted and turned my spine, and snapped the deviated vertebrae into their proper alignment. Almost immediately the areas alongside the spinous processes hitherto so tender under pressure "cleared up." Two more treatments, at intervals of a few days, put that thigh bone and the spinal vertebrae into their proper places—to stay.

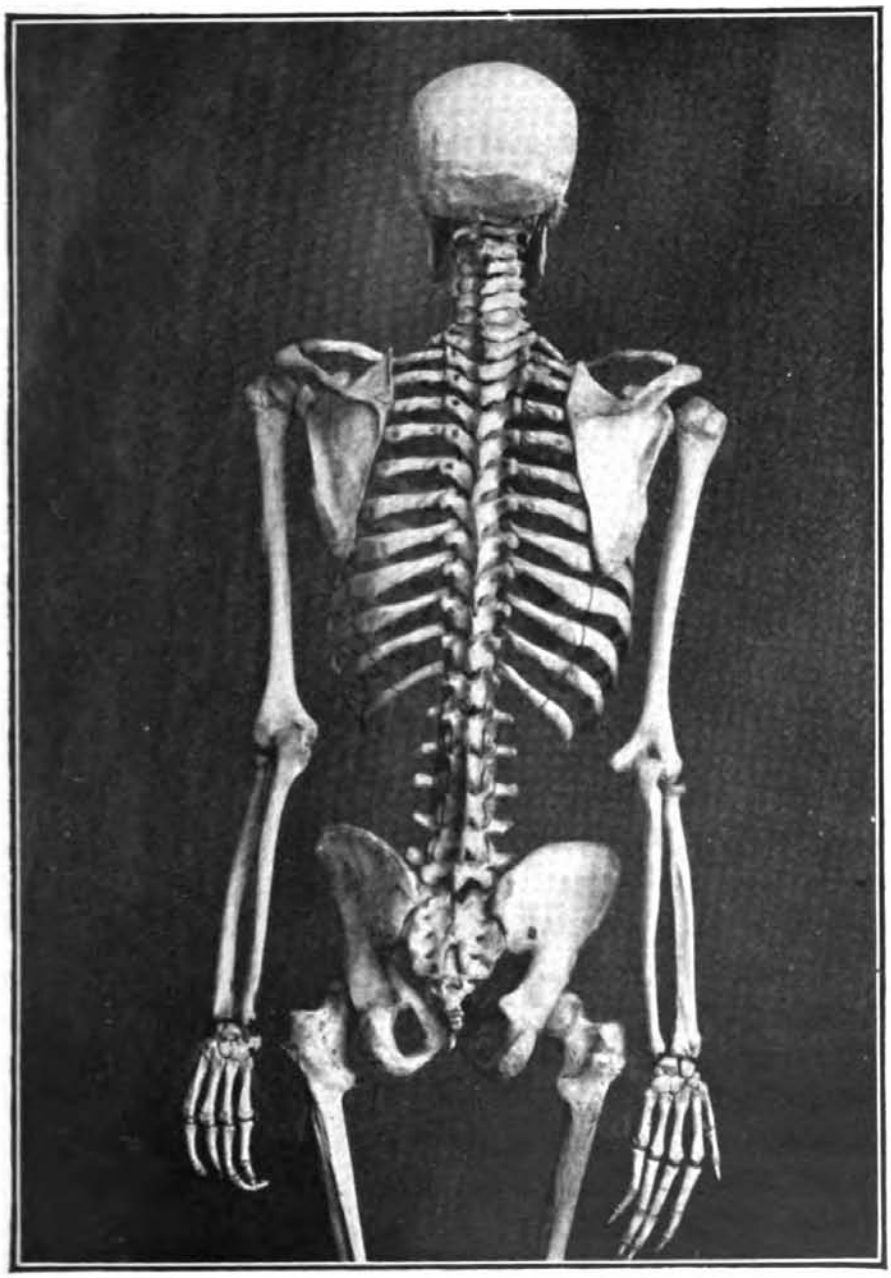
And now, after a lapse of six years, I have had no return of the rheumatism. I now refrain, however, from "hopping off" cars and moving vehicles, even though I do occasionally lose a few valued seconds thereby.

Since that time I have made a fairly comprehensive study of the philosophy of the mechanical causes of disease, and of the various theories involved, and while I think it foolish to claim, as do many well-meaning osteopaths, that all diseases have their original cause in some mechanical interference with the nerve or blood supply, yet the number of such conditions is undeniably great—much more so than medical men might imagine.

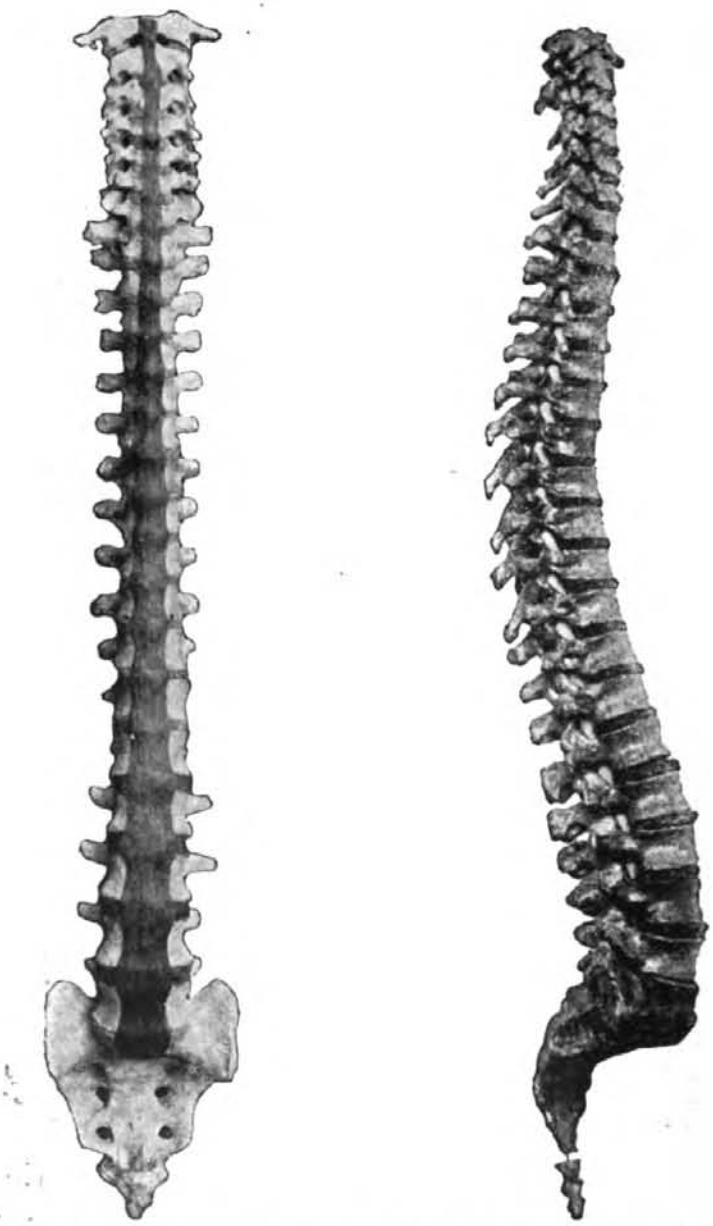
In making these egregious claims, however, the osteopath is not unique. We have oculists who profess to cure practically all diseases to which frail humanity is liable by fitting on a pair of glasses, or by dividing a too rigid eye muscle! gynecologists who vehemently maintain that if the patient is a woman her treatment properly falls within their province; nerve men, who can't possibly see anything except nerves; orthopedists who adjust a patient's equilibrium to his shoes and cure him of whatever ails him, from locomotor ataxia to warts on the knuckles; dietitians who relieve intermittent hearts and varicose veins by regulating the character and quantity of the food; and so on through the entire list of specialties.

Those of us who try to take a large view of the human body as it becomes interesting to doctors know that green apples, infection, lack of exercise, bad air, too little drinking water, too much food, constipation, bunions, mouth-breathing, crowded teeth, decaying teeth, and ten thousand other causes may and do produce disease. And this does not in the slightest detract from slipped vertebrae and ribs or maladjusted joints as causative factors in organic disorders—some of which may be most remote and apparently unrelated to the original source of the trouble.

Now, while any hinge or joint in the entire bony framework is liable to displacement to a greater or less extent, the slips and lesions occur with greatest frequency among the thirty-three bones (with their intervening cushions of cartilage) that form the spinal column. The slightest "rotation" in any one of these bones may be fraught with serious consequences, owing



The human "backbone" or spinal column is the central and foundational structure of the entire body. Other structures are but appendages of the spine. It should be kept erect, strong and flexible.



The human spinal column. If the spinal bones or vertebrae are out of line it means pressure upon the spinal cord and spinal nerves, with derangement of the parts of the body controlled by those nerves. Posterior view at the left. The figure to the right gives the side view of the spine showing the cushions or cartilages between the vertebrae.

to the fact that every organ in the body derives its vitality through nerve centers in the spinal cord.

The nerve connections exit from the vertebrae and the ribs exactly where these bones hinge upon each other. Thirty-two pairs of nerves pass out from the spinal cord through the little bony grooves fitted for them by the struggles of the organism to adjust itself to changing environment. These grooves connect with the ganglia of the sympathetic nervous system—the system that controls digestion, nutrition, and all the other functions of the body that work while we sleep, and at all other times. These little knots of nervous matter lie immediately over the hinges of the ribs and their vertebrae.

Consequently, every twist of a vertebra upon its neighbor, every slip of a rib upon its backbone attachment, every contraction of a ligament or inflammation or congestion of a spinal muscle, must necessarily result in squeezing or "impinging" upon the delicate nerve filaments, and, because of irritation produced by pressure, disturb their function. Even such an apparently trivial cause as a "kink" in the muscles of the back may draw muscles or ligaments with sufficient tension to irritate the spinal nerves and their connecting nerve fibres.

Now, one of the duties of certain of these nerve fibres (the vasomotors) is to regulate, by dilation and contraction, the size of the blood vessels, and consequently the amount of blood supplied to the various organs with which it has direct connections. Therefore, when the normal function of the nerves is interrupted by a bone-squeezing pressure—caused by these faults, rotations,

"springs," slips, dislocations, or what-not—the tendency is for the area fed by their particular nerve supply to become abnormal—perhaps anemic, perhaps congested. In any event, the vitality of the organ is affected, its function and its normal nutrition decidedly interfered with. This interference, in turn, is transmitted by the organ ultimately affected back to the nerve ganglion from which the trouble originated, further increasing the ire of that irascible little bunch of nerves.

For instance, if there is any mechanical interference in the nerve centers that control the stomach, that worthy and much abused organ will retaliate by refusing to secrete its proper amount of digestive fluids. It will also refuse to churn the food and digest the pabulum—perhaps too generously presented to it. When fermentation and pain develop, as they undoubtedly will, the stomach telegraphs the bad news back to local headquarters in the ganglia of the spinal column, and headquarters promptly responds by becoming very "sore," as does also the pathway of nerves that lead into the ganglion headquarters.

And so the osteopaths claim—and my experience seems to bear this out—that these sore spots on either side of our spines may be mechanical blockades to nutrition. Also that they are indications of trouble in the organ or organs to which the ganglia located in these spots are central nerve-distributing stations, and that by correcting the lesion both the sore spot and the organ it is "sore" about can be cured at one fell swoop.

Therefore there is justification for the osteopathic claim that to enjoy health one must have a free and uninterrupted nerve connection, so as to distribute vital

force to all the cells of the body. Also, that a free, unimpeded blood and lymph supply must be provided if we would properly nourish the body cells and remove their débris for elimination.

So a normal back should not be crooked. From a direct back view the spinal line should be straight. Yet the backbone must curve. It must curve four times if it is to be considered normal. For these curves are necessary to balance up and give the proper "spinal axis," as well as to allow proper poise and elasticity. If you haven't these normal curves, you have a "straight spine," which is quite as bad, from a health standpoint, as a crooked one. Both varieties need skilled attention.

Yet stiff painful backs are frequently due merely to a muscular contraction and to the squeezing down of these muscles and ligaments upon the irritated nerves. I have found that a thorough kneading and a firm stroking of the entire spinal column—from neck to tail—especially if a liberal amount of olive oil be rubbed in at the same time—will do wonders in relieving this muscular tension, and with it the nervousness, irritability, insomnia, headaches, and various other conditions that have their origin in this "nerve pinching."

I am also convinced that much can be done—provided there is no actual displacement of the axis or atlas, or of the cervical vertebrae, which may require mechanical adjustment—by the neck stretching and spine straightening exercises given in this system.

The mechanics of this method are sound. And the invigorating effects upon the circulation and on the musculature involved in the exercise decidedly beneficial.

BACK BUILDING CHAIRS

By CARL EASTON WILLIAMS

WHY do we slump in our seats? We have been told ever since early childhood to "sit up straight." We have been warned about spinal curvature, cramped organs and other evils growing out of faulty position, and yet when we settle down in a chair we come as near to lying down on it as the shape of the thing will permit. Why? Should we follow instinct or instruction in this matter? Should we continuously brace up and keep erect, preserving the military attitude in the sitting position, or should we simply rest lazily and carelessly in our chairs and save energy? Should we "sit up" or sit down?

What is the natural sitting position? Let's take a look at the natural man—the savage. He sits on the ground in a position that the "good posture" expert would declare highly improper and unhygienic, with his back all humped over in one unbeautiful curve from the lumbar spine to the back of his neck. And the hired man on a Dakota farm, coming in from a hard day's work in the field, sits down on the bench by the kitchen door with the same identical curve on his back. He is tired and he simply sits down "loose." He wants relief from the strain and effort of holding himself up. And that's what we all sit down for.

And yet what the hygienists tell us about good posture is all true. Of course it is. An erect position is favorable to the spine and nervous system, gives room

in the chest and prevents the displacement or sagging of the vital organs. Absolutely true—and important. But there is another factor that is even more vital.

Why do we lazily try to sit down on the "small of the back"? Well, why do we sit at all? There's the answer. For the same reason that we lie down. It is relaxation. We want fatigue freedom, relief from muscular tension. And where hours of time are involved, that means a great deal. For the sedentary, seated worker, is the rigidly erect attitude recommended by the expert to be expected? Is it even advisable? Can one work all day in such a position advantageously? Of course not. It is a waste of energy, a tax on one's strength, a perfect fatigue producer. If we sit down to rest, why not rest?

The real trouble is with our chairs. It is absurd to tell people how to sit properly when their seats will not permit it. You can't sit right in a seat that is wrong. But that is just what the wise ones used to tell you to do. The fact is that an intelligently made chair, fit for human occupation, is a thing unknown. Where is our inventive ingenuity? We construct airplanes, submarines, railroads, engines, skyscrapers, phonographs and "wireless" apparatus. But we have not yet made a comfortable, sensible or scientific chair for general use. Perhaps this is because a chair is a common, everyday article.

The conventional chair is a physiological outrage. If you are the ordinary adult male you instinctively try when sitting down to make your chair more comfortable by tilting it back, balancing on the hind legs. Like a flash your wife speaks up and tells you to bring that

chair back to all fours and sit up decently. See what you did to the wall plaster? Or you'll hurt yourself going over backward. But your instinct was right. If you are alone, the chances are that you will put your feet on the table. Bad manners but good hygiene. It rests the heart, saves energy.

Another impulse for comfort is to turn the chair around, straddle the seat and sit facing the back. You fold your arms over the back and lean forward on it—very comfy. Again wifey corrects you: "Turn around, sit up properly and be respectable." Especially in company. But again your instincts are right and she is wrong. As a matter of fact, this is about the only really healthful and at the same time comfortable position in which to sit on an ordinary chair. The chair back makes a splendid chest rest. The chest is raised, and the position of the back is ideal.

In your search for comfort, the next thing you do is to capture the rocking chair. That's a little better. But because you find it comfortable you promptly insist that mother shall have it, or wifey herself. And then you wait until you can get back to your desk at the office next day, where you can tip back and relax. Of course some one tells you to take the "easy chair," but the miserable thing is anything but easy, even with its arms, and you can only make it easy by tilting it back.

Now, every chair should be an easy chair. A seat is intended, first, last and always, to be an instrument of comfort. That's why they put the back on. Honest it is. But see how they bungled the job! Your seat should not be the means of causing physical strain and fatigue. It is true that you can sit in a military posi-

tion, head up, chest active, stomach drawn in, on a bench, log, stump or anything else. If you expected to do that, it wouldn't matter how your chair was made. But the right chair should afford the maximum relaxation, and with this should be combined a healthful position. Rest—the saving of energy—should be the keynote. And at the same time the body should not be cramped, nor any of the organs crowded. Such a combined result is easily accomplished, but the chair should be properly tailored for the purpose.

The first thing wrong with the ordinary chair is the level seat. This is very proper on a bench or piano stool, but on a chair with a slanting back the level seat only makes a very good sliding cellar door. If you lean against the back of the ordinary dining chair you can only save yourself from the toboggan slide by bracing your feet against the floor. At that you are likely to coast down half way across the seat. And that's why you seem to try to sit down on the middle of your back; you simply hang from the points of support at hips and shoulders. No chair can be satisfactory so long as one is in perpetual danger of avalanching out of it unless he keeps at least one of his feet on duty in front pushing the floor away.

In order to secure a chair that one can tolerate, we will have to go back to first principles of comfort, as found in the tilting back of the chair, or in the inclined seat of the rocker. It is true that some seats are made with a very slight incline, lower behind, but this is not enough. The incline should be sufficiently marked to allow one to relax utterly without experiencing any tendency to slip forward. In other words, it should be

at least equivalent to that of a comfortable rocking chair. If you will slip a thickness of two or three books, or two or three inches of boards or blocks under the front legs of any chair, it will be very satisfactory, so far as the incline of the seat is concerned.

But the usual chair back is even worse than the seat, for the point of contact and support is too high, being at the worst possible place. Properly, the chair should fit into the small of the back, giving support at that point. The suggestion by Bernarr Macfadden, years ago, to use a chair with a short, straight back, reaching only slightly above the waist line, was excellent. Also the suggestion to tie a sofa cushion to the back of the chair, about eight or ten inches above the seat, to afford support at this point, fills all practical requirements beautifully, so far as the back is concerned.

A chair back design which extends straight upward for eight or ten inches, and then curves back to a considerable angle, combined with the inclined seat already mentioned, should enable one to relax comfortably and yet keep the trunk of the body in the most helpful position. If you have also a foot stool (not a table, necessarily) to go with this, you will find all of your energy available for purposes other than maintaining a vertical position or pumping blood up several feet. This matter of saving energy through comfort and relaxation in sitting is a subject to which our "efficiency" experts or engineers will some day give attention, not only in connection with office and factory work, but even in department stores.

There seems to be a prejudice against rocking chairs —in theory rather than in practice—perhaps harking

Showing how a chair of ordinary design may be made to "fit the back." One or two inches are first sawed off of the back legs to give the satisfactory incline so that one may sit far back without straining to do so. Also a cushion, suspended at the small of the back, gives the desired support at this point.

A simple method of making an easy chair easier. The horizontal seat is given a backward slant by the simple process of placing the front legs upon a support. If a cushion is also provided to fit the small of the back, such a chair will be both restful and hygienic.

back to the Puritanical notion that anything pleasant or comfortable must be iniquitous. But the rocker is, on the whole, a thing to be cultivated. It is often badly balanced, pitching too far forward when rocking, and standing too straight when still. If it is inclined to throw you out when rocking forward, so that you must brace your feet on the floor, it is a badly made rocker. But when balanced fairly well back, give me the rocker. The back is at fault, of course, the same as other chairs, but this can be remedied with a cushion as suggested. Rock as much as you like. Never mind the kill-joy who tells you that rocking makes you restless, or consumes energy. And don't notice the injunction of the pseudo-hygienist who tells you that rocking the baby will make it an idiot or lunatic. The rhythm of the rocker does you good if you enjoy it. Follow your natural instincts in this. If it gives pleasure, then be sure that it is beneficial in one way or another, just as is swinging.

The Morris chair, or reclining chair, supposed to offer the maximum of comfort, does have a definite value because you can relax in it, and can more nearly lie down than in any other style of chair. But the back, cushioned as it is, has the same fault as any other chair. You usually hang between the middle of the seat and the back. It is important in any kind of a seat that the hips should sit well back. But because of the usual dimensions of the reclining chair, at least in the length of seat, it only fits those who are well over six feet in standing height, who naturally enjoy longitude between knee and hip. Also, the seat is frequently level.

Naturally one cannot appreciate the importance of these considerations without understanding the relation-

ship between good bodily position and the normal curves of the spine. Unfortunately the whole subject of good posture has been much confused through the frequent references to the supposed advantage of the "straight spine." It seems ignorantly to be assumed that an erect attitude means a straight spine, ignoring the evident curves of the human backbone. These curves are not accidental, but the natural result of evolutionary changes, and they have a simple mechanical explanation.

The straight spine is the piscatorial and quadrupedal form. Even the backbone of the ape is not curved like that of man, being more nearly quadrupedal. And that's why the ape cannot stand entirely erect. The erect position was a later development, and required a bend in the back to get it. This bend, producing the familiar lumbar curve, is due to the fact that when standing erect the legs do not extend in a straight line from the pelvic structure, but are attached at an angle at the hip joint. Or, to put it in another way, the pelvic structure does not extend straight upward following the line of the legs, but slants forward. Of course the sacrum, or base of the spine, is wedged in between the hip bones, at the back, and likewise runs forward here. When on hands and knees, a quadrupedal position, we may attain an approximately straight condition of the lumbar spine, but when rearing up to the erect, human attitude we must bend at this point, hence the lumbar curve.

The new-born baby is more ape than man in some respects, and the spine is approximately straight. So far as the pelvic structure is concerned, the infant at birth is practically a quadruped. Lay him on his back,

and his legs stick up in the air, doubled up in the manner that fond mammas think so cute and baby-like. It is simply quadruped-like. The reason is that the natural angle at which the legs are jointed to the pelvic structure is approximately a right angle. As the baby grows this angle becomes greater and he is more likely to extend his legs in a straight line with the body when at rest. By the time he is ready to stand and walk the pelvic bones have acquired the human form and the curves in his backbone begin to appear.

From all of which it will be seen that we cannot expect to have a straight back, and that in attaining a good erect position, such as is conducive to a high, full condition of the chest, we must expect a pronounced arching of the back in this lumbar region. Instead of striving for a straight back, one should if anything accentuate this arch. Some writers, lacking any acquaintance with anatomy, have said that this arching of the back causes the abdomen to protrude, but just the reverse is true. The fact is that the chest is raised, the digestive organs are drawn upward from a sagging to a normal position, and the abdomen is retracted. You can see it clearly in the pronounced military position. The extreme military attitude is not required, but an approach to it in the standing position is desired.

What to do when sitting on a bench? Or when there is no chair back? Then at least, most experts will say, it is important to sit erect. Perhaps. But it is still a question as to whether the cost in energy involved in so doing is not even worse than the effect of crowding the organs through the humped-over but relaxed position. Yet when engaged in some active, concentrated

work you will certainly have better application and control by sitting erect. The best way to do it is by sitting well forward on the seat, with one foot under it and the other thrust out forward, keeping your head up, and maintaining a position of easy balance. Remember what we have said about the lumbar curve. If you will stretch your arms high above the head it will instantly give you perfect poise and the best possible sitting position. But if you can secure a chair that will hold you in the same posture and allow you to relax and rest, you will have realized the ideal.

Finally, why do so many women maintain a more presentable sitting position than men? It's because they carry an artificial chair back or support, fitted to the body, under their corset cover. Uncorseted women commonly sit as badly as men, and often look worse doing it.

STANDARDS OF STRENGTH AND PHYSIQUE

By L. E. EUBANKS

IN the beginning, let us understand what is meant by the "average" man. Somehow the term has been confused with what is properly described as the "ideal."

Now, briefly, the average is the *mean* type *as found,* and does not indicate what development *may be;* the *ideal* represents perfection or approximate perfection. While the ideal weight, stripped, for a height of 5 feet 8 inches is 151 pounds, the average is only about 132 or 133—a great and very important difference, you see.

Authorities differ surprisingly in their numerical estimates. It seems there should be more agreement, but physical qualities vary widely, and the deepest research possible to one inquirer would touch only a small number of persons, relatively.

But all knowledge is relative, in any event, and we know at least as much of our physical selves as we do about the mysteries of mind.

In standing height we American men average, approximately, 5 feet 8 inches. Authorities do not agree on this, ranging from 5 feet 7.5 inches to 5 feet 8.3 inches. However, 5 feet 8 inches cannot be far off. We are not the tallest people, as some believe; several civilized nations, notably Sweden, and some savage tribes, show a taller average; but neither are we among the shortest: a certain Australian tribe shows the low figures

of 52.75 inches; the Chinese average 65.85. Galton gives 67.50 for the English.

In sitting height the American male adult averages 35.8 inches. In this particular we learn from artists that the average is the ideal. It seems that any noticeable deviation in length of trunk detracts from the beauty of the body. Incidentally it may be mentioned that the long trunk and comparatively short legs characteristic of professional "strong men," though an indication of exceptional organic and vital power, constitute a chief criticism of that type of athlete.

The average man is woefully deficient in the chest; and Americans are in danger of sliding still further down here, owing to the ever-increasing preference for sedentary occupations. Our average normal chest is but 34 inches, whereas it should be about 39. Five inches means a great deal. The average lung capacity is a little more than 250 cubic inches, and it should be at least 300.

The waist girth, with the average, is only about an inch short at 29.

Other comparisons may be seen in the following table of the ideal compared with average measurements for a man 5 feet 8 inches in height:

AVERAGE	PARTS MEASURED	IDEAL
35.8	Height seated	35.8
70	Arm span	68
14	Neck	15
34	Chest normal	39
250 cu. in.	Lung capacity	300
29	Waist normal	30
11.75	Biceps	15
10.5	Forearm	12

AVERAGE	PARTS MEASURED	IDEAL
6.5	Wrist	7
35.5	Hips	35
20.5	Thigh	21
14	Calf	15
8.5	Ankle	8.5
133	Weight nude	151 to 154

Understand, the right hand column is given merely as perfect for that height—to show what a man of average height should measure; the question of an ideal height will always remain a matter of taste.

You will notice that our average man does not lack so very much in the legs; constant use of the lower extremities does a vast deal for their contour and strength. It is regrettable that we are not forced to develop our arms and chests similarly.

In strength this man is far, very far, from what he might easily be. Instead of being winded by a run of a block he could without much trouble train to trot three or four miles. That extra fifty cubic inches of lung power is worth any man's effort. And it is not at all impossible; the writer is 5 feet 8¼ inches tall, and has registered 350 several times on a thoroughly reliable instrument. This was reached from a beginning of 280.

Even the legs, wherein the average man carries most of his strength, are not what he might easily make them. In Yale University the average for our 5 foot 8 inch man was found to be 420 pounds. Now think of Herman Sell doing the deep knee bend correctly seven times with a bar-bell of 440 pounds across his shoulders! Also H. P. Hansen, of Copenhagen, did the same exercise sixty-five times with 277 pounds on March 19, 1899. George Hackenschmidt, the giant Russian wrestler,

sat Turkish style and rose to standing position with 187 pounds on his shoulders. These facts show how weak the average man is in his strongest muscles compared to what he could be with a little training.

In a test of the back, our subject registers 345 pounds. The world's record for the "dead lift" is 1,897 pounds! The back press underneath a platform is 4,300 pounds by the same man, Louis Cyr, the French Canadian.

In the hand one would naturally expect a fair degree of power, but records show that the grip and wrist are remarkably weak. Even in the cases of our famous "strong men" the hand is comparatively weak. This should not be; a good grip is a valuable asset, useful in everyday life—or, at least, may be any time. The average man grips 94 pounds on this forearm test. He could probably double it in three months' practice! The writer easily sent the indicator around to 180 after only a few weeks of finger exercise.

In grip feats some remarkable records have been made, and mention of a few may be interesting: Louis Cyr lifted from the floor by the grip of *one* hand 987 pounds. He lifted with one finger, without artificial aid of any kind, 552½ pounds. (I believe the world's record is something over 600.) In card tearing many men have mastered two decks. I saw a professional *quarter* two decks and tear three. One well-known strong man claims to have torn five decks! Of course this may be "in the cards." A novel "stunt" was performed by O. C. Watson, a Denver physical culturist; he "chinned" a bar, or rather a ring, by the strength of a little finger alone and in that position held at arm's

length a bucket of water on the little finger of the other hand!

The average person knows very little about the "marks of strength" in the human figure. As a rule he knows horses, dogs and chickens, but he would be utterly unable to examine a man's body scientifically and state correctly its condition and strength. Even among physical instructors there are many mistakes and oversights in the treatment of pupils.

Naturally, the first impression we get of a physique has to do with the general proportions of height and weight. A comparison of these two and a glance at the face to see whether it is florid or pale, constitute the popular diagnosis. I have seen some ludicrous blunders made in guessing at weight and measurements. The casual observer never thinks of the relation of the head to the shoulders. Men with undersized heads often appear much larger in the shoulders and chest than they really are, while a person with a large, broad head is usually underestimated in weight. Again, the verdict of good health on the evidence of a florid face is poorly founded. Where the circulation is strong and properly balanced there will be no very high color; the body will be more nearly the color of the face than is ordinarily found. I know of one boxer whose athletic ability is beyond question, yet he is considered pale; and I know another boxer of marked ability who has a better color on his body than in his face.

Now, to begin with, height is an important thing; but not as the popular mind regards it. Contrary to general belief, exceptional height is not a good sign as regards strength. There are not many very tall men

who succeed in perfecting their proportions. In muscle tests they are greatly handicapped by poor leverage, caused by the length of their bones. Organically they are at a disadvantage and more susceptible to strain; the surface of their bodies being greater than that of shorter persons of the same weight, more effort is required of the organism to maintain the bodily heat; the heart must sustain a higher column of blood and, consequently, must work harder. I contend that the medium height is best for strength. I know there are famous athletes who stand above six feet, but they are exceptional and are strong in spite of their stature rather than by reason of it. I grant that tall persons have the advantage in certain games and sports, but I am writing of *strength*. Of course, if the sitting height is great compared to length of leg, this is some compensation, for it indicates large and vigorous internal organs. Launceston Elliot, the great English weight-lifter, is a magnificent specimen of manhood standing about six feet two inches; but his body is noticeably long. McArthur, who won the Marathon at Stockholm, is six feet tall, but he had unusual preparation for the race, having trained a number of years. Even so, he fainted at the finish and was a badly used up man. He stated that he suffered severely and was done with Marathoning forever.

As regards weight, it will be approximately correct as a natural result of good proportions. A few pounds' discrepancy either way from stereotyped figures need not matter much. Differences in the density of the bones, in the ages of the subjects, etc., must be considered.

The chest girth is an important measurement, but is sometimes very deceptive. A man may have an enormous chest but poor lung power. Chest expansion, as usually taken, only measures the contractile power of the external muscles. Of course these are valuable and I believe in their cultivation, but the true way of ascertaining lung capacity is by a volumetric test. How many cubic inches can the subject register on a spirometer or pneumauxetor? He should blow two inches for every pound of his normal weight. Many famous strong men who boast of chests of forty-five inches and weigh 200 pounds, cannot blow 300. Some of these men can "expand" from ten to sixteen inches! The writer "blew" 350 cubic inches when his chest expansion was only six or seven. This shows the error in the ordinary "insurance examination." Of course, the habitual breathing should be deep, easy and without any unusual sound. The diaphragmatic action should be free and this "abdominal capacity" should amount to one cubic inch for every pound of the normal weight. In testing the diaphragmatic capacity, great care has to be observed to keep the chest muscles out of the effort.

Externally the chest should be high, broad and full, with muscles, not necessarily massive, but well defined. The following rough rule may be used for approximate estimates in measuring the girth of a man's chest: Start with 33 inches for a height of five feet two inches; add inch for inch up to six feet. Chest depth is important, and should be consistent with the breadth.

The waist must not be too small. Some authorities argue for a great difference between the chest and waist; but I have never seen a proof of its desirability in tests

of strength. Generally speaking, a difference of six or seven inches in small men and of eight to ten in the big fellows will be found right, I think.

In the average man the hips are as large as the chest; but they should measure a few inches less—from two to four, according to the height and weight.

Examine the neck carefully. If this part of the body is large and shapely without having been exercised particularly, it indicates the possession of a good constitution. This is not always the case, but I have found it generally so. A man five feet two inches tall should have a neck of twelve inches; for each additional inch in height one-half inch in neck girth is required. Well developed spinal muscles have the same constitutional significance as has a large neck. An erect, well-formed back is a splendid indication.

Square shoulders are considered indicative of strength. I consider their importance exaggerated; for most of our strongest men are not noticeably square shouldered. In fact, many of them rather lean to the sloping type. Most of the men who look fine in their clothes because of pointed shoulders do not stand examination well. Really, when the muscles at the base of the neck are fully developed and the deltoids are prominent, the sloping appearance is quite natural. It does not follow, at all, that the bony structure is different from that of other people. Broad shoulders are very desirable; they usually mean good deltoids and generally accompany a broad chest. In measuring shoulder breadth the calipers must be used; no other means is exact. The instrument should not be placed far down on the deltoid muscles, but just below the shoulder

points. A well-built man of five feet two inches should measure 15.5 inches in this way. For each additional inch in stature we should expect about three-eighths of an inch in shoulder breadth.

In examining the arms note their length. Other things equal, short arms are stronger than long arms. Of course, any freakish abnormality in this direction is undesirable. On the upper arm two measurements should be taken; first around the greatest prominence when the arm is relaxed and held out horizontally at the side; secondly, when the arm is doubled up in the familiar "feel-my-muscle" position. The man showing the greatest difference in these measurements doesn't always have the "best" arm. The full contraction of the triceps is not measured in this process; and this muscle is fully as important as the biceps. Ordinarily, a small contraction on a large arm means too much fat, but in trained men the smallness may be only apparent—caused by the triceps making the extended measurement large. Ideal figures require that the contracted arm measure the same as the (normal) neck and (normal) calf; but this equality is rarely found. If the neck is correct the biceps may run an inch smaller without loss of proportion.

I believe in good forearms. Many trainers pay little attention to these. Good development here means a good grip even against the handicap of small hands. The wrist must be strong but need not be especially large. Thomas Inch, holder of several weight-lifting records, has only a seven inch wrist.

In examining the thighs, do not rely entirely on the measurement as usually taken. I have seen a twenty-

two inch thigh prove much stronger than one of twenty-four, owing to the former's superiority at the important point—right above the knee. Also, due credit should be given the possessor of good back-thigh muscles. These are among the most neglected muscles of the body. As usually measured, the thigh of a man five feet two inches tall should be about seventeen inches. For every additional inch in height the thigh should gain three-quarters of an inch.

The calf is a deceptive muscle. It is often remarked that certain excellent athletes and strong men have very small calves compared to their other muscles. The movement of the foot by contraction of the calf muscles is a most perfect use of the lever principle. If the foot is short the leverage is good, and Nature sees no use for great motive power; hence the small calf. If the ankle joint is set far back, giving a long front foot and a short heel, big calves are almost inevitable. Africans are a long heeled race and consequently have small calves. So do not believe all thin calves weak; look at the leverage before condemning them.

In the tests of strength it should be borne in mind that from a health standpoint the marks made by the big muscles are of first importance. That is, the larger the muscle masses involved the greater the organic demand and (consequently) the greater their value in determining the functional strength.

The lung test, volumetric, is of prime importance. How regrettable that we have no such means of measuring the digestive power, nervous energy, etc.

Besides these measurements and tests, examination should be made of the skin, eyes, hair and nails. The

skin should be warm, elastic and slightly moist; smooth and free from eruptions, of course. I have already said that its color should be neither pale nor flushed. A simple test of the circulation is to press the end of the finger hard against the forearm for a moment; if the blood brings back the usual color to the spot promptly, when the finger is raised, a good circulation is indicated.

The eyes are a good barometer of the general health, if there is no local defect to mislead one. They should be clear and bright with pupils jet black. The iris should be of uniform color; if it is streaked with brown and shows irregular spots, some organic sluggishness is indicated.

The hair will often show certain conditions of the general health, but it is by no means an infallible guide. There are many people with enviable "shocks" who are not healthy, and I have known remarkably strong persons to have very poor hair. Local scalp conditions have to be considered. Regarding hair on the body, the same remarks hold true. It usually denotes vitality, but there are many, many exceptions.

Coming back to the average man, there is another point of weakness which is all too apparent to any experienced observer. I allude to the muscles of the upper back and posterior neck. The lack of strength here accounts for the sunken chest and humped shoulders we see every day. Nowhere is the difference between the properly trained physique and the average figure more marked than in the chest, shoulders and upper back.

I have several times had occasion to correct a certain mistake regarding the proper development of the chest, and cannot forbear mentioning it here. It is this:

A man decides to fill out his chest and carry it properly, to take the "active chest" attitude. Immediately he works long and hard to develop his pectoral muscles (those on each side of the upper chest). These grow stronger, harden and *shorten*. Naturally they draw the shoulders forward and inward, concealing any real development the man may gain and cramping the thorax. This exercise is all right; but the main one should be an expansion of the arms backward with a resistance so arranged as to bring out the muscles along the spine and those between the shoulder blades.

Another serious weakness in the average man lies in the abdominal muscles. The "corrugated iron" development seen in some athletes may not be especially desirable, but a high degree of strength here is far more important than most persons realize. I have seen a number of people who could not stand the following easy test of the abdominal muscles: Have the subject lie upon his back with hands clasped behind the head. Now hold his feet and knees down and have him come to a sitting position.

Another muscle that is usually weak and undeveloped in men who have done no training is the biceps of the thigh, the flexor that draws the calf up to the back of thigh. Nearly all the leg strength possessed by the average man lies in the extensors or front thigh, and many physical culturists betray the same inequality. Note the beauty of contour in thighs that are well developed all round, and you will appreciate this posterior muscle. Picking up weights from the ground while holding legs fairly straight, and any branch of athletics that requires the feet to be brought well up forcibly, like

hurdling, will call on these back-thigh muscles. Rope-skipping will do much for the average man here, and in other directions, too.

The average man falls lamentably short in physical development, but his muscular control—alas! he has none. To tense or harden the muscles of the upper arm or calf should be as easy to any person as to move hand or foot. Yet we find nearly all untrained men as helpless in this matter as wax figures. Now control is of decided value; a man with muscle bulk and no power of application nor ability to co-ordinate movements is only half a man. The study of control should go hand in hand with the development of muscle.

Control, being primarily a mental matter, leads us to the discussion of the average mental attitude toward the body. You may notice in nearly every case that the possessor of a good physique is proud of it. Now this regard for his physical self is no more the result of his development than it is the cause; that is, he thought of his body, reverenced it perhaps, cared for it—and was rewarded. The contempt for the body formerly a part of some religions is no longer countenanced. The motto of a famous English organization, "Sacred thy body even as thy soul," is worth world-wide observance, and not until we appreciate the rights and dignity of the physical side of our nature can we attain the ideal state.

In conclusion I submit a table of *average* measurements for the different heights as I have found them in about fifteen years of physical culture experience.

AVERAGE MEASUREMENTS FOR VARIOUS HEIGHTS

Height without shoes	Weight with clothes	Neck	Chest	Waist	Biceps	Forearm	Hips	Thigh	Calf	Lung capacity cubic inches
5 ft. 3 in.	110	12.50	29.50	25.	9.75	8.50	32.	18.	12.	175
5 ft. 4 in.	113	12.75	30.	26.	10.	8.75	32.50	18.50	12.50	190
5 ft. 5 in.	120	13.	31.	26.50	10.50	9.25	33.50	19.	13.	207
5 ft. 6 in.	125	13.25	32.	27.50	11.	9.50	34.	19.50	13.25	220
5 ft. 7 in.	131	13.50	33.	28.	11.25	10.	34.50	20.	13.50	240
5 ft. 8 in.	140	14.	34.	29.	11.75	10.25	35.50	20.50	14.	255
5 ft. 9 in.	150	14.25	35.	30.	12.	10.50	36.	21.	14.25	270
5 ft. 10 in.	160	14.50	36.	30.50	12.50	11.	37.	21.50	14.50	285
5 ft. 11 in.	165	14.75	37.	31.	12.75	11.25	37.50	22.	14.75	300
6 ft.	170	15.	38.	32.	13.	11.50	38.	23.	15.	315

STRENGTH TESTING

By MILO HASTINGS, B. Sc.

IT is said that exaggeration is the fundamental basis of the American sense of humor. Whether intended for humor or not, exaggeration in regard to the record feats of the world's strong men was very much in evidence before Christopher Columbus waded up the beach at San Salvador.

About that which a man loveth he boasteth. And when there is no accurate measurement of feats of strength, the reports thereof are likely to run to such ridiculous extremes as to throw all such performances into the nebulous regions of doubt where even conscientious truth tellers lose credit for their painful accuracy.

That we may have accurate records of strength and fair comparisons of one man's strength with another, it is necessary that the pull of proud muscles be exerted against some force, the resistance of which is the same one day as the next. Few strength records of the ancient past are accurate, because the science of the accurate measurement of weight and force is comparatively new. Lord Byron's duplication of the Greek god's swimming feat stands out as a delightful exception, for time and tide change for no man, and we have every evidence that the waters swish and gurgle through the Hellespont even as they did when gods sojourned on earth and paid court to the daughters of men.

The usual method of measuring strength as distinct

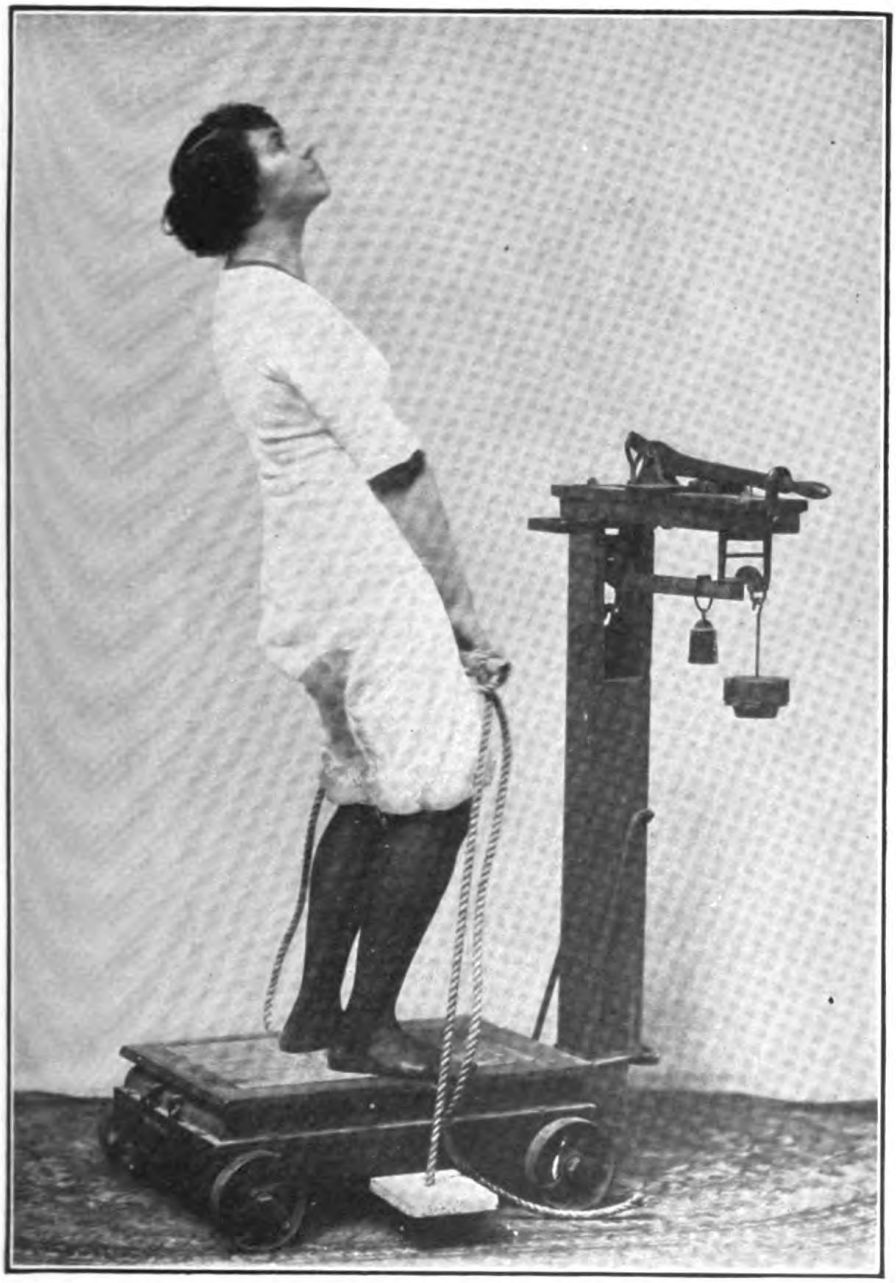
from agility or endurance is either that of lifting dumbbells or lifting against the reaction of a recording spring instrument, as with the dynamometer used in gymnasiums and anthropometric laboratories. The lifting of dumbbells furnishes the most exercise, and the best sport, for there is some skill required, and some little time is consumed in the exertion of the strength. But the best means for testing the actual strength that can be exerted in one moment is the dynamometer. But dynamometers properly constructed for this purpose are rather rare and expensive instruments and will be available to but few.

Most of us remember the tests of strength and skill adapted by the men folks as they gathered around the farm barn while waiting for the turkey to finish browning on Thanksgiving Day. Chief among such tests was to see who could "lift the most" on the platform scales. The method involved was to squat upon the scales and reach the fingers under the edge of the frame which supports the platform proper. By straining or lifting in this rather awkward position the extra force of the lift is added to the weight of the man upon the platform. From the greatest weight that could be raised on the scale beam, the weight of the man was subtracted and the figure remaining gave the net measurement of the strength exerted. The method was accurate and sound, and afforded a fair comparison of one man with another; but the lifting position was awkward and did not give a man an opportunity to exert his full strength.

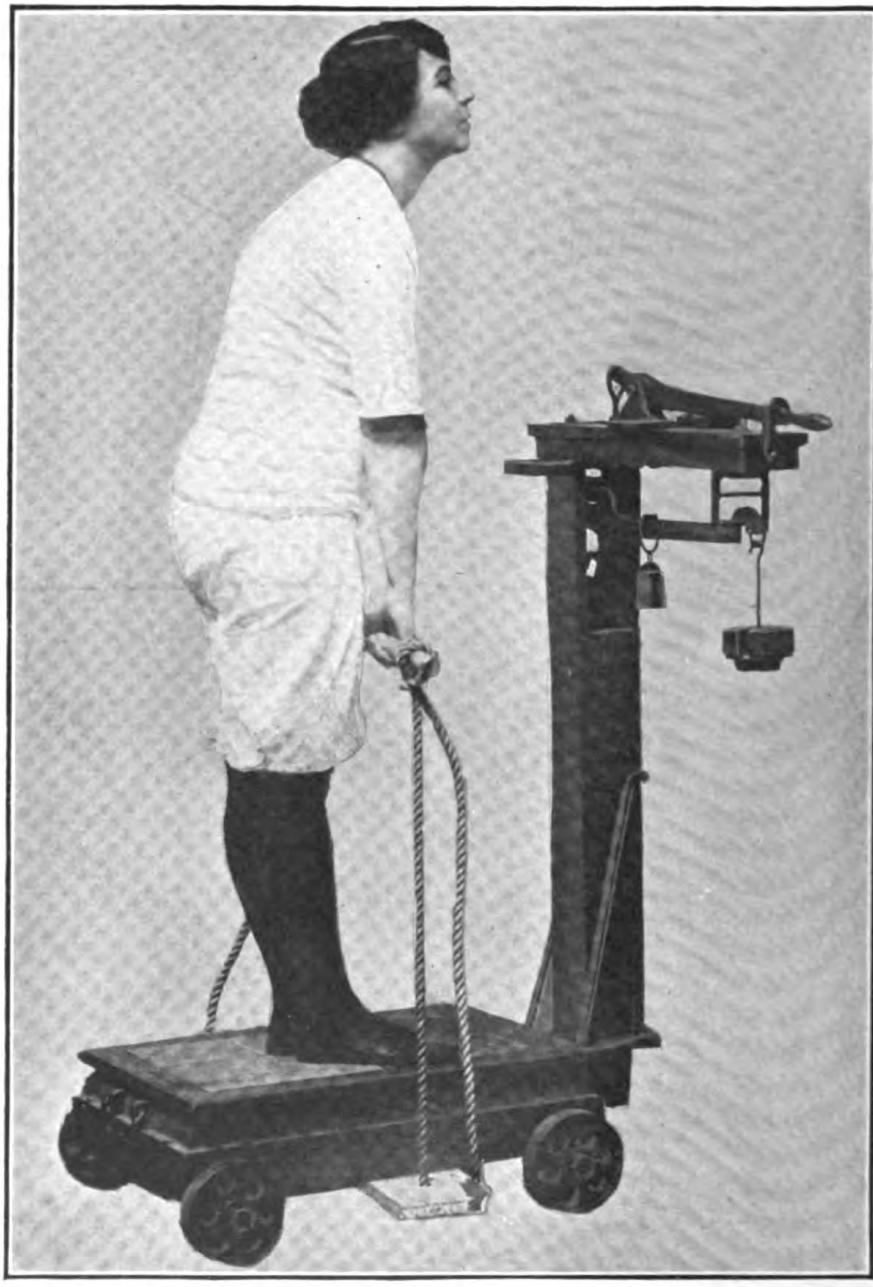
By taking the same sort of scales and putting a bar or board underneath the frame and attaching ropes or chains to the board and tying a crossbar at the proper

STRENGTH TESTING
AND
WEIGHT LIFTING

This is a popular, old-fashioned, "farm-hand" strength-testing method. It is not satisfactory because in this cramped position on the platform scales one is unable to exert his full strength and consequently cannot do himself justice.

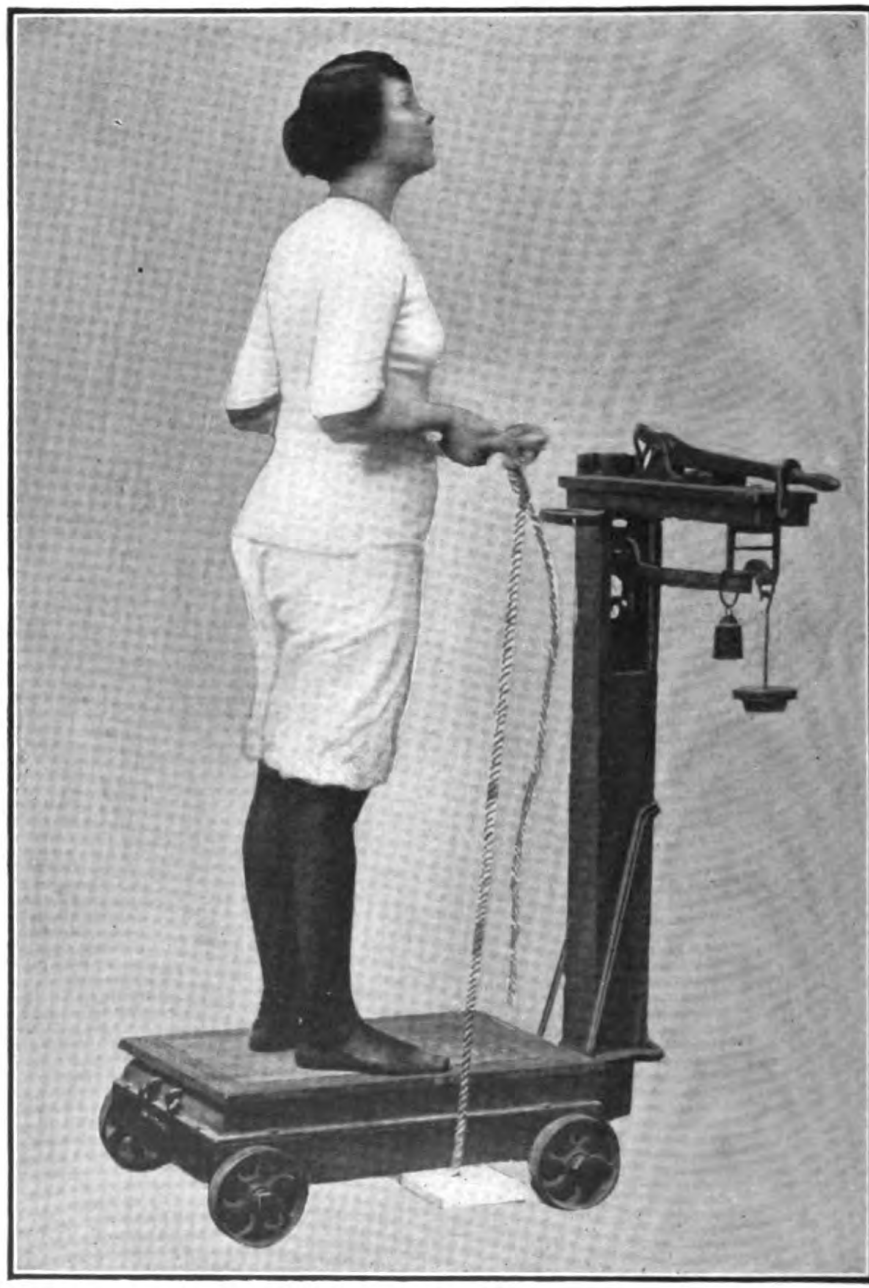


This is a leg testing lift performed by bending the knees slightly and resting the grip-bar against the upper thighs, as illustrated.



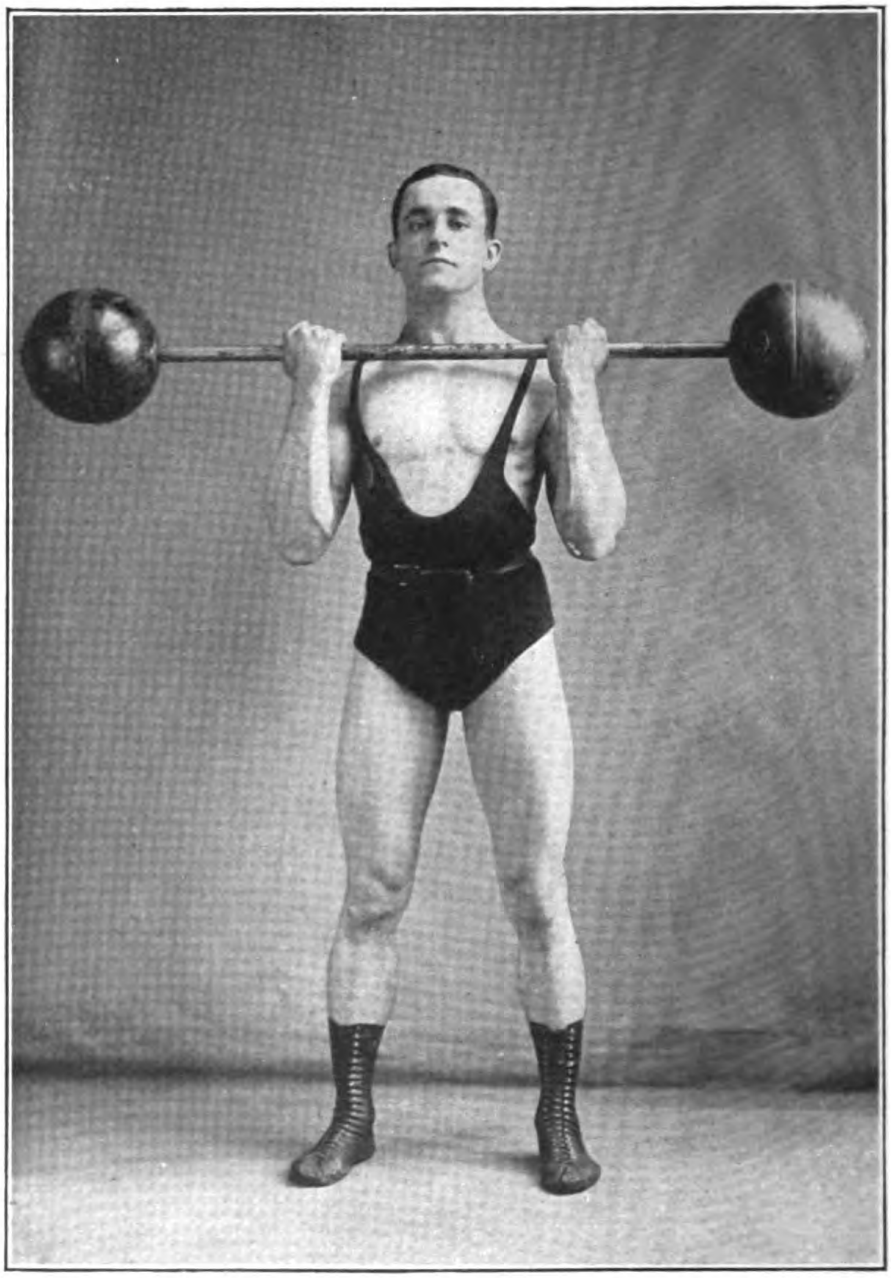
Showing an arrangement for more accurately testing one's strength. This is a back-lift, the legs straight and the back only slightly bent so as to give greatest lifting power, also freedom from strain.

This is a calf-testing lift, the lifting bar being adjusted to rest upon the knees and the lift being made by raising the heels, as illustrated.

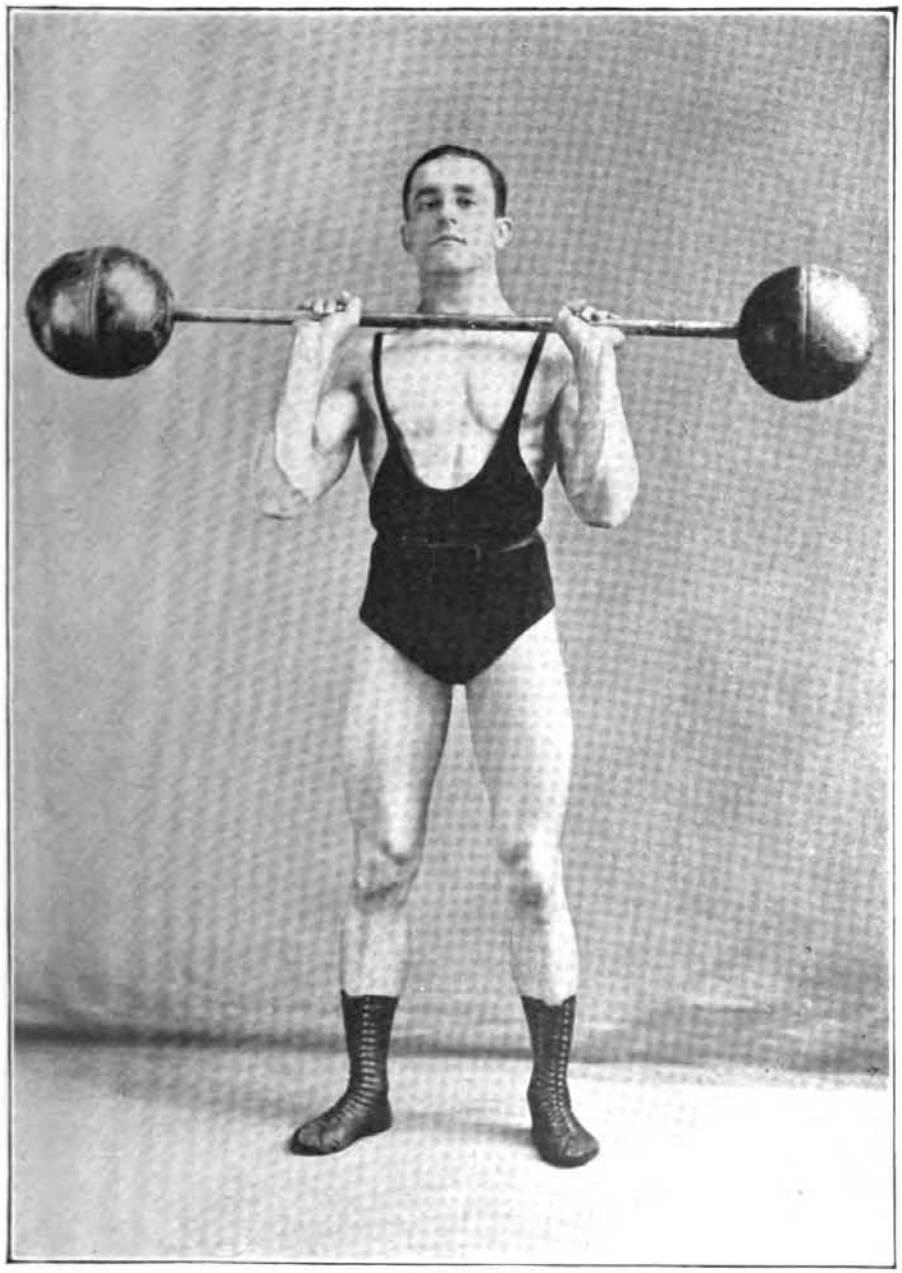


This is a biceps-testing lift, the arms being doubled at the elbows at right-angles.

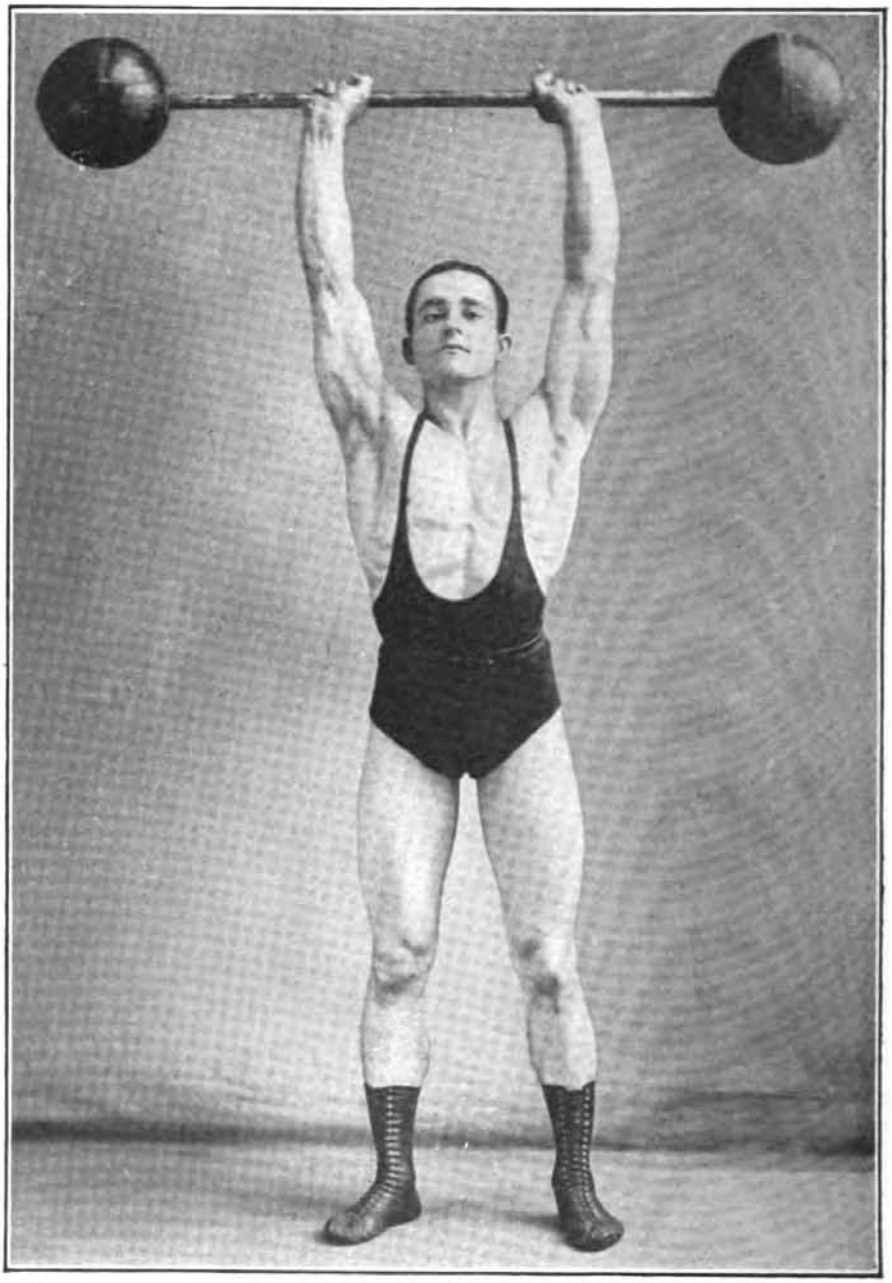
This is a shoulder-testing lift, sufficient rope being allowed to bring the application of lifting power a little above the shoulders.



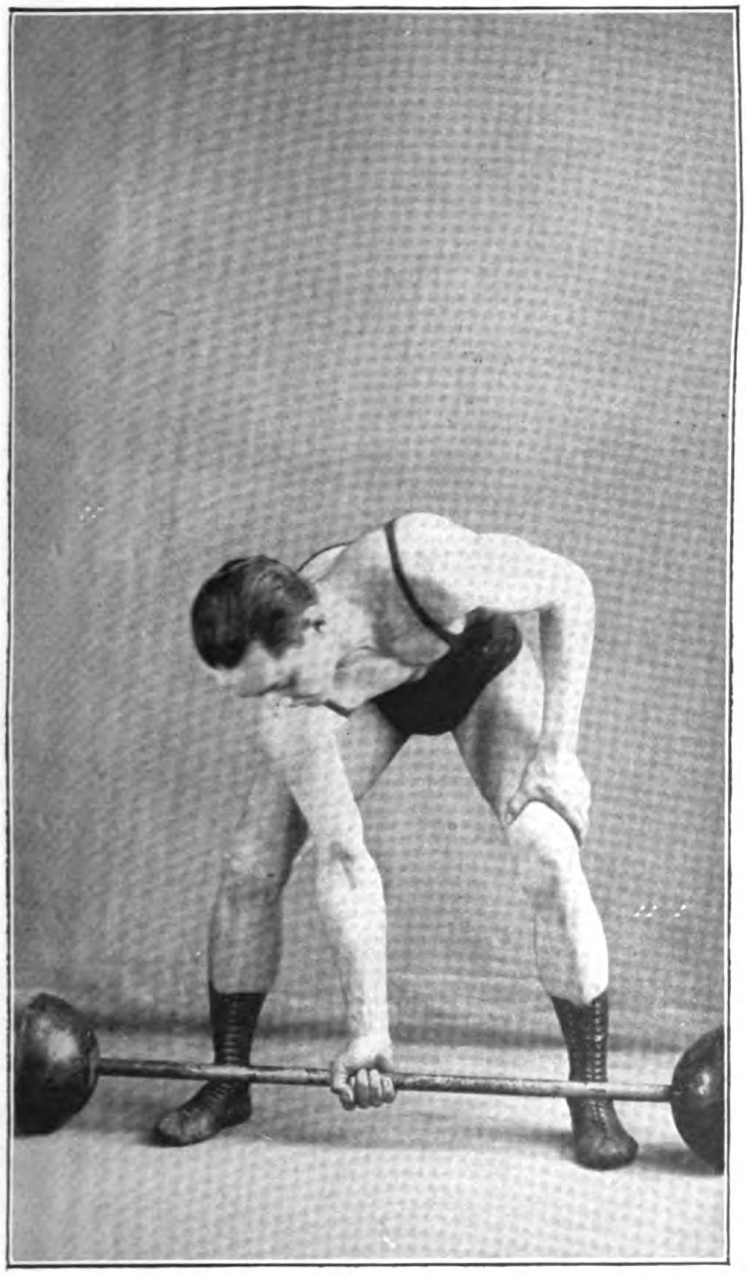
Weight-lifting is a genuine strength-builder and permissible if one uses a bar of only moderate weight. In this arm or biceps exercise, lower the bar to arm's length, raise to shoulder, and repeat.



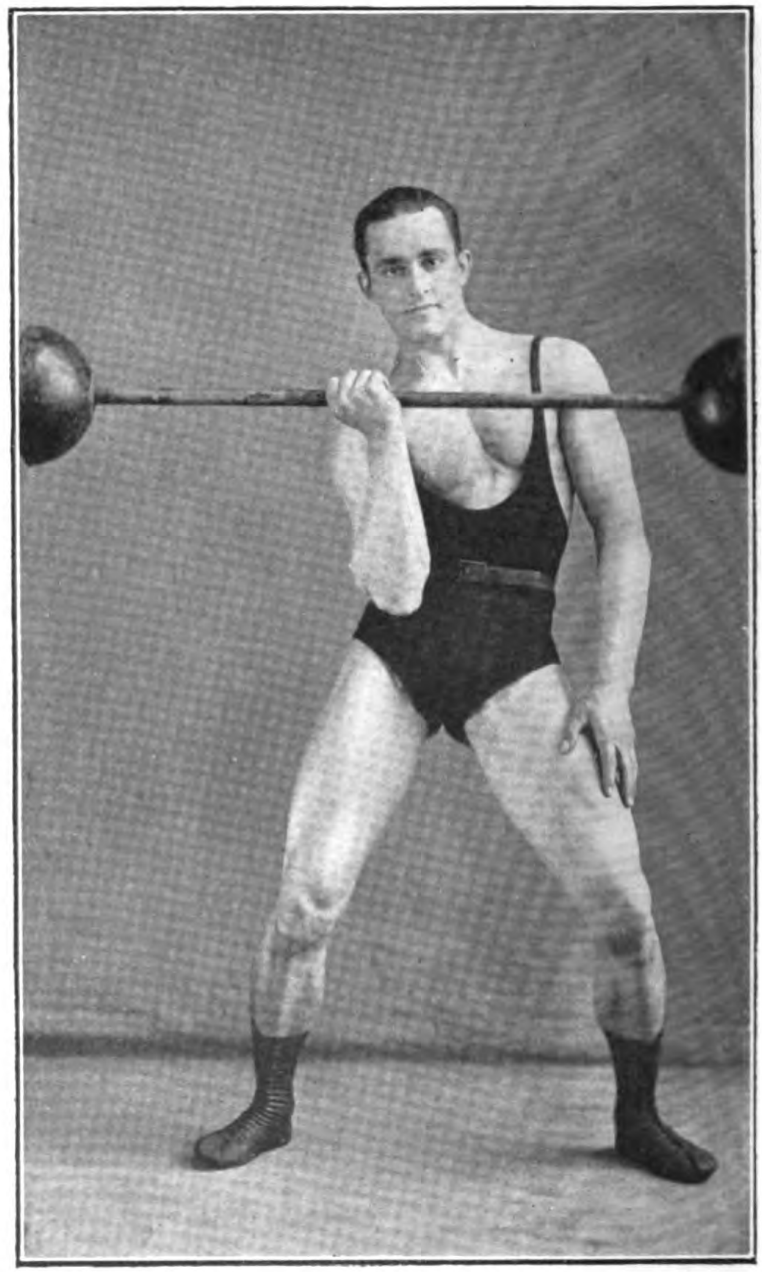
This is an arm exercise for the biceps, performed with the palms turned down. It is also the position for the straight push over head.



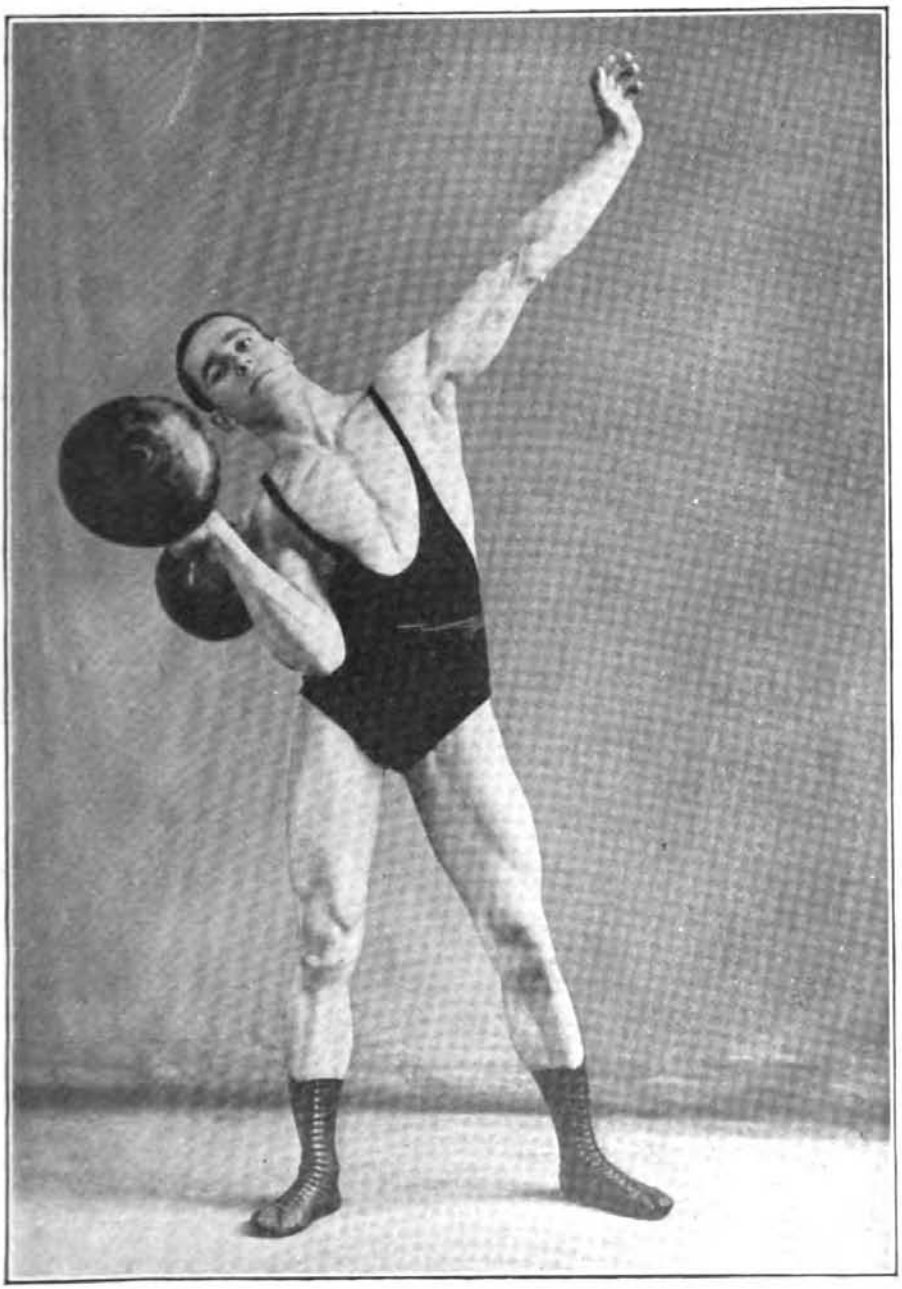
The straight push up from the shoulders to high over head is the ideal shoulder exercise. Always watch the bar or weight. The model here inadvertently looked at the camera.



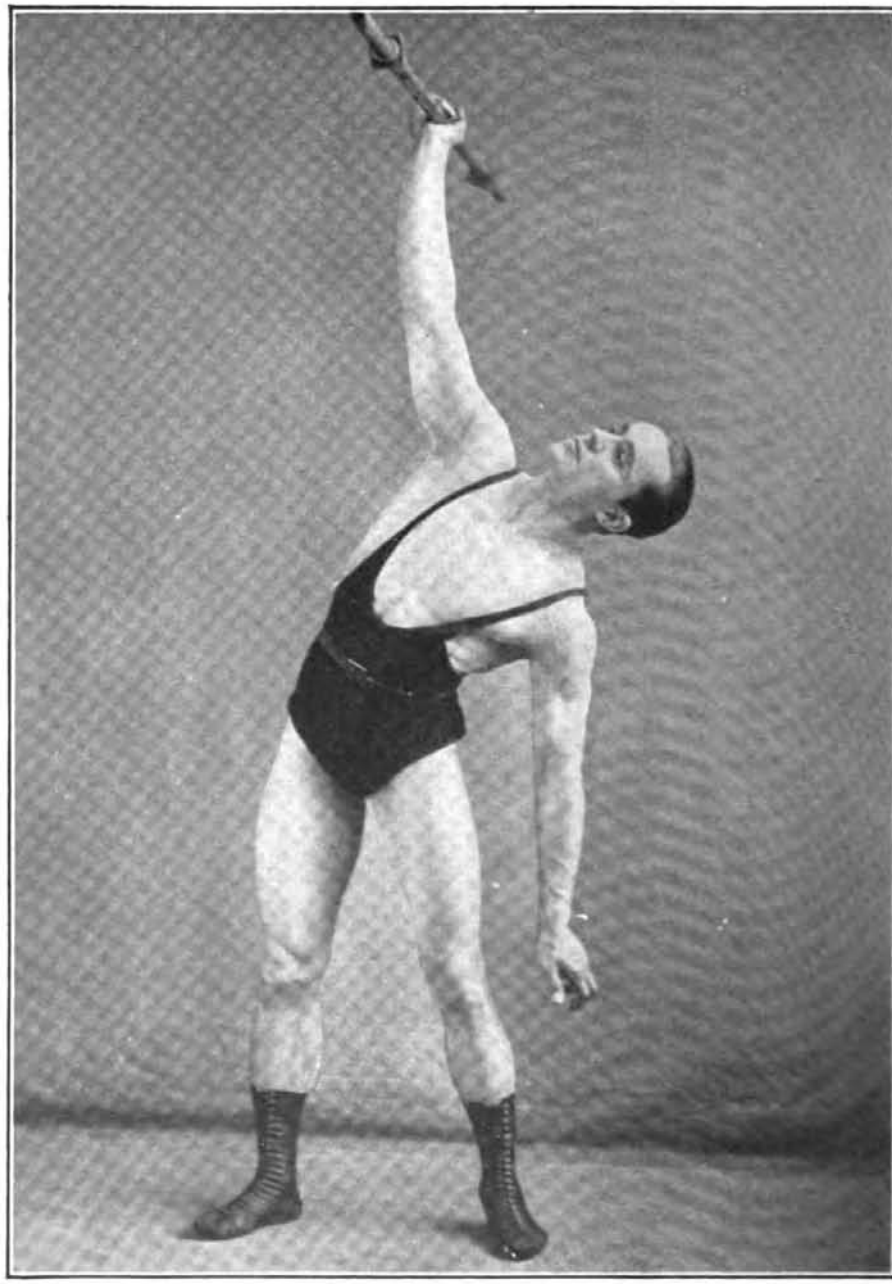
How to bring a bar to the shoulder. Grasp it, standing well balanced with feet apart, first making sure that the back is kept straight and the lifting power is exerted by the legs and not the back. (See next photo.)



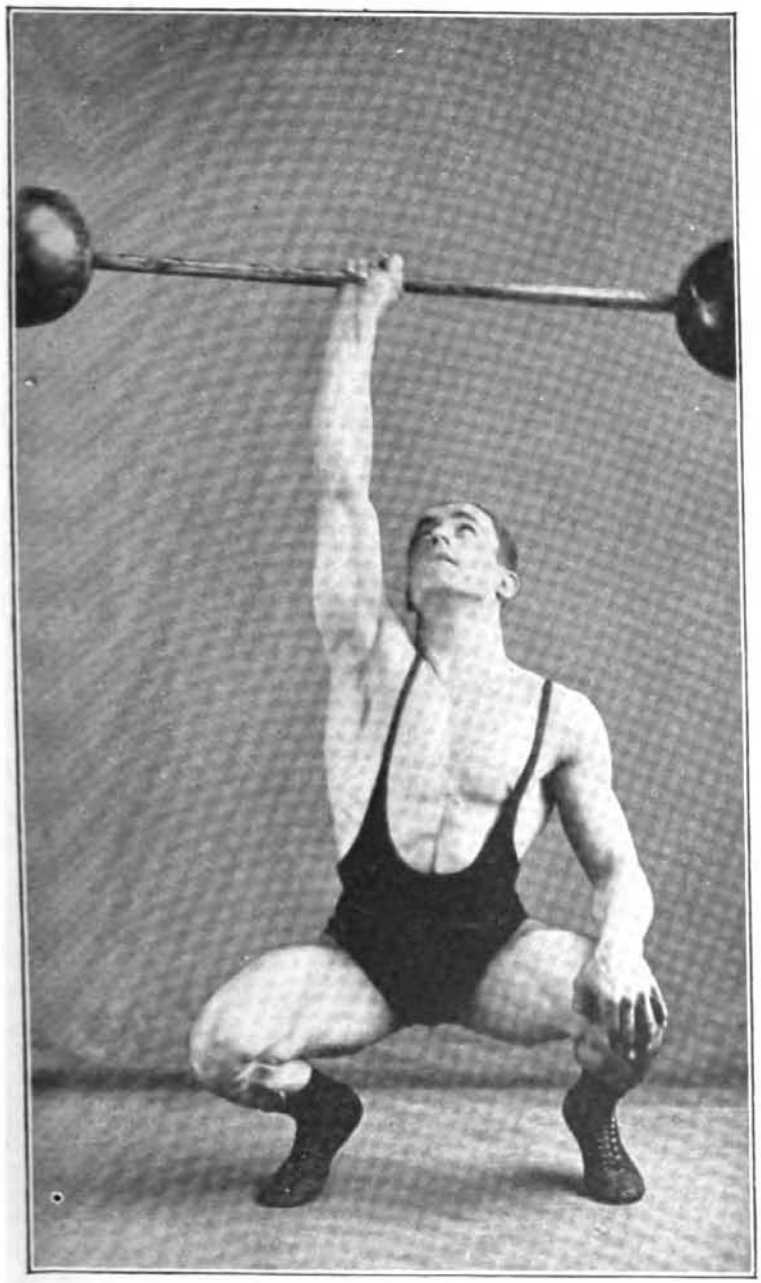
From the previous position make a strong upward pull with the strength of the legs, doubling the elbow and forearm under the bar as soon as possible. This is more easily done after the first lift by an instantaneous dip or squatting action, dipping down under it and getting the forearm perpendicular.



There are other styles of one hand "push up." The first is a pure arm lift, standing as nearly erect and stationary as possible. But it is easier to do it with a side-bending action, starting with the above position. (See next photo.)



Completion of the one arm push-up with the side-bending action. From the position in the preceding photo, swing the other arm down and the entire body far to the other side as the weight is pushed up. Practice equally with both arms.



This is the trick of performing a "snatch" from floor to high over head. Starting from a position like that in the fourth photo of this series, but with palm turned backward, and back straight, give the bar a far upward impetus by a strong leg lift. As soon as the bar has reached the elevation of the top of the head, suddenly drop down under it to the squatting position shown here which will enable you to get your arm straight under it, and then rise slowly to your full height.

height, the lift can be made in a more comfortable position and one in which the greatest strength can be exerted.

In the illustration here shown, hemp rope is used and auger holes are put through the board as in an old-fashioned swing seat, while a "half hitch" can be used. But even with the best knots known to sailor-lore, there is a certain stretch and slip in the rope that keeps the device from being quite perfect. A couple of light chains with hooks that would permit of ready adjusting and could not slip or stretch would make a perfect apparatus. Or one may determine the proper heights for various lifts and make a pair of wire loops for each.

Having devised such an apparatus, there are yet two points that should be observed if one would gain the best results. The height at which the bar is placed for each lift and for each person must be properly adjusted. The second point is that in lifting against a gravity scale there is this disadvantage compared with a dynamometer. In the gravity scale there is no record of the lift until a previously set point is reached. Thus, if we think we are going to lift 300 pounds and set the weight on the scale beam at that figure, and then made a lift of 299 pounds pressure, we have no record of it; whereas if we go a pound beyond the set point we have no credit for our extra pound. With the dynamometer, whatever strength is exerted is recorded. Hence in lifting with a scale it is desirable to learn the approximate weight that one can lift in a preliminary trial, and then come back after being well rested and make as few trials as possible to make the maximum lift.

The number of lifts that can be measured with the

device herein described and illustrated is limited only by the fact that the lift must be done in an upward direction. We must pull or push upward.

LEG LIFT. To adjust the lifting bar, stand with back and legs perfectly straight. Find the height at which the hands in front of the thighs will conveniently grip the bar. Then lower this position from three to four inches by bending legs. This will give you the correct position for lift.

BACK LIFT. The back lift is very similar to the leg lift in general position, but the absolute rule is that the legs must be kept straight at the knees. The back lift is much greater with the bar at the proper height than if one were to stoop over to lift a heavy weight from the floor.

CALF LIFT. To perform this lift one must sit down, resting the weight of the body on a chair. If there is room on the platform to set this chair, the weight of the body, chair and apparatus will be deducted from the weight on the scales; but if the chair is set off the scales, as in illustration, the weight of legs and apparatus upon the scales must be determined before the lift is made, and such weight subtracted from the total lift as registered on the beam. The lift is made by raising the heels as high as possible. To exert the full strength in this lift, the bar must be very accurately adjusted, as there is only a couple of inches for movement. A flat board on the bar and a pad beneath the board will protect the knees.

BICEPS LIFT. In order to avoid any possible inaccuracy due to lifting with other muscles, it is necessary to make a rule that the biceps' lift be taken with

the arms from the elbow to the wrists held as nearly as possible in a horizontal position. The bar may be held at such a distance in front of the body as one finds suitable to the exertion of the greatest strength. The most likely position will be three or four inches from the body.

SHOULDER LIFT. (Push up with the arms.) This is similar to the classic movement of pushing up a barbell above the head. The limit in pushing up the barbell is determined by the weakest position, and hence this lift, to be most comparable to the push-up with the bell, should be taken with the elbow raised until the upper arm from the shoulder to the elbow is horizontal. In the illustration the elbows are held a little too low.

By chaining the lifting bar down to within a couple of inches of the scale platform, one may lift with the toes, thus measuring the strength of the flexor muscles of the lower leg. In the leg lift as well as in all arm lifts, it is obviously practical to measure the strength of the limbs separately as well as together. In the leg lift the muscles used are those that straighten the knee when bent, and these form the greater bulk of the thigh muscles. The muscles on the back of the thigh that bend the knee can be tested by holding the thigh vertical and bending the calf up horizontally behind, and lifting with the back of the heel. In this position one may be found to be surprisingly weak. The heavier use of these same muscles as well as the muscles of the buttocks may be made in straightening up the body when bent forward at the pelvis. A test of the strength of these muscles, as well as those of the back, can be made by standing with the legs straight, and bending the trunk forward until it is nearly horizontal; then lifting with the bar

on a pad on the back of the neck. As proof that this is a leg lift, the strain will be found to run down the backs of the thighs to the insertion of the cords below the knee.

The muscles of the trunk are not capable of making many different lifts. The ordinary back lift practically includes them all, though one could measure the strength of the abdominal muscles by lifting when leaning very far back, or better, by lying on the back across a chair or bench with the feet strapped down and attempting to raise the body with the abdominal muscles.

There are a number of minor lifts which may be devised for the arms. If the legs and spine be held perfectly straight and there is no stretch in the apparatus, it is possible to make a lift through a small distance by merely raising the shoulders. To measure the strength of the neck would be easy if one found a suitable way of making the bar stay placed on the head.

The most powerful lift that can be made on platform scales is the lift in harness, in which the record is 3,239 pounds, whereas the greatest record made when the strength must be exerted by gripping with the hands is but 1,384 pounds.

THE TRUTH ABOUT WEIGHT LIFTING

By CARL EASTON WILLIAMS

MANHOOD means strength.

At least it ought to. Any man between the ages of twenty and fifty who lacks at least average strength is almost bound to lack also a certain degree of self-respect, if his instincts are entirely normal. If you are not strong, vigorous, quick, alive in every inch of your being, then what kind of a man do you call yourself?

There is only one way to get strong.

You can not gain strength simply by drinking plenty of pure water, breathing plenty of clean air, or by concentrating on your subconscious mind, even if you know how. And you can not gain strength simply through eating pure food, hygienically prepared and in scientific quantities.

The only way you can get strong is through exercise—real exercise. You must exert your strength in order to build strength, and the amount you build and keep will be in proportion to the amount that you expend.

In order to get results from exercise it is necessary to employ resistance of one kind or another to the action of the muscles. It does not matter whether this resistance is supplied by the weight of your own body, by the person or muscles of another individual, by weights of any kind, by springs, elastic cords or other mechanisms, or even by the trick of opposing one group of muscles against another group in your own body through mental

control. The important thing is resistance. And the amount of strength that you develop will be in proportion to the amount of resistance that you habitually overcome in your daily exercise. A consistent and logical program of strength building, therefore, really involves the use of a moderate amount of resistance in the beginning, suited to one's limited strength at the time he begins his task of physical improvement, and the use of a progressively increasing resistance as he gradually gets stronger until a normal condition is reached.

It will be clear from this, therefore, that light exercises, whatever their virtues in special cases, do not offer a complete or satisfactory system of physical training for the average man. The light, free movements commonly used in class drills or calisthenic work at home are excellent for the beginner. They are suited to the condition of any one who is unaccustomed to physical activity, but as soon as they have really accomplished their purpose of improving the circulation and toning up the muscular system, they become inadequate because they no longer have any material effect. For the chronic invalid, or perhaps the sufferer from heart trouble, light exercises of this kind are entirely satisfactory. But for those who are strong, and for those who are trying to get strong, light calisthenic work is far from sufficient. One soon reaches a condition in which one or two hundred repetitions of a certain exercise may not fatigue him. In other words, he has reached the point where this exercise is no longer exercise. He needs increased resistance. If repetition of light movements meant strength, then a typewriter girl would be able to outgrip Frank Gotch.

Extremes of strength, such as will enable one to lift horses and elephants, or to pick up with the teeth great hogsheads of beer or sauerkraut, or whatever it is that they pack in hogsheads—such extremes of strength are abnormal and not half as much to be desired as extremes of wealth. As a matter of fact, only a limited number of men have the constitutional foundation that will enable them to rival our Sandows and Saxons. Very few of us care anything about rivaling the ox or the hippopotamus, but every one ought to have the strength that will justify him in calling himself a man. Every one of us ought to be well set up, vigorous and capable of handling our own weight freely and easily under all kinds of conditions, or of carrying easily or opposing the strength of another person of our own weight. This is not an impossible ideal. It represents only the normal development which every man should attain, if only for the sake of his own self-respect, as already suggested.

Now, it is because weight lifting has been found to be the quickest and most effective means of building unusual strength that old time physical instructors have used it so much. It produces results. On the other hand, weight lifting has been frequently condemned by others who claim that it produces a muscle-bound condition, slowness of movement and bunchy, unsightly muscles.

What is the truth about the value of weight lifting for the average man? There is no doubt that for the strong man of the circus it is the unqualifiedly proper thing, but how about you and me? The question of the advantage of weight lifting depends partly upon what you are exercising for. Are you looking for strength? Are you looking for constitutional benefit?

We may differentiate various forms of exercise in three groups. First, we may take exercise for the sake of body building or the development of strength. Second, we may take exercise for constitutional purposes; i. e., for improving the circulation, toning up the internal organs and promoting the health generally. Third, one may practice special exercises for that training of the brain and nervous system which is involved in the attainment of skill. The cultivation of endurance involves a combination of the first two. Strength is necessary for endurance, but the latter involves the improvement of the internal organs and the quality of the blood to such an extent that its requirements are strictly constitutional as well.

Now, many forms of exercise partake somewhat of all three of these classifications, yet there are certain forms of exercise which will serve chiefly for only one or the other of these purposes. Certain games chiefly involve the development of skill—brain and nerve training. There are others, like walking, mountain climbing and cross-country running, which are mainly constitutional in their effect. And there are still others, like weight lifting, which are primarily strength and muscle building. Wrestling is an ideal combination exercise for strength and endurance, or strength and constitutional improvement. Golf combines skill and constitutional benefit.

While the ideal form of exercise for you and me would of course be something of a constitutional nature, yet a normal measure of muscular strength is really the foundation even for that, and for this reason nearly every one needs a certain amount of purely development exercise.

There is nothing fundamentally wrong with the theory of weight lifting. It is the abuse of this form of physical training that may result unfavorably. For the rugged and stocky type of build, a certain amount of weight lifting may be regarded as an ideal form of training. In the case of other men of comparatively frail physique, with light bones and poor development, the lifting of heavy weights would be out of the question. But even a light boned man should build up strength proportionate to the type of physique that he represents, and intelligence in the use of light weights suited to his requirements would, undoubtedly, offer one of the most perfect means of gaining the development that he needs. The trouble is that the untrained man is prone to attempt to lift big dumbbells simply because the Professor does it. If the frail beginner had sufficient judgment and restraint to start in with weights of fifteen or twenty pounds, doing a little work each day, and was then satisfied to increase the amount of weight used by a few pounds at a time from week to week, he would progress naturally, scientifically and healthfully to a condition of strength of which he might well be proud at the end of several months. In other words, even the slender type of man may profit by a system of weight lifting, intelligently laid out.

Another important thing for the beginner to know is where to leave off. If he keeps on progressing he will reach the point at which he will attempt to handle weights that are too heavy for him. This is largely a matter of judgment. The rugged and stocky type of man is not likely to hurt himself. Probably a gool plan in all cases, but especially for the man of small-boned

physique, is to keep within the limits of easy effort. If you experience a trembling sensation following an exertion, then you may know that it has involved too great an expenditure of nervous energy. In that case, make haste more slowly.

It is not the writer's purpose to give detailed instructions on the scientific handling of weight. You do not need a gymnasium, for you can secure a barbell of adjustable weight, i. e., one to which you can add a few pounds at a time, or take away from, as your needs may require. I would suggest a very simple plan of exercise that will be both beneficial and enjoyable. It is a plan of using a moderate weight, such as will give a fairly satisfactory measure of resistance and yet avoid the possibility of strain. In a word, the system suggested by the accompanying illustrations is one intended not so much for developing great strength as for pure health building purposes. It will answer splendidly for that ten or fifteen minutes per day which some of us busy people set aside for exercise, irrespective of all other demands upon our time.

The idea of this mode of training is to secure a bar of moderate weight to give real resistance to your efforts and yet avoid the possibility of strain, as already suggested. Take, for instance, a weight corresponding to two-thirds or three-fourths of what you are capable of lifting with your greatest effort. This means that you will be able to handle it comfortably and easily with a number of repetitions of each exercise. It will mean real exercise and the expenditure of considerable strength, and will be found very interesting as compared with ordinary free movement work because weight lift-

ing happens to be one of the most absorbing and fascinating forms of exercise known. There is something about it which makes it interesting, probably the mere satisfaction of overcoming a considerable amount of resistance.

It should not be necessary to spend any money for the purpose. The chances are that somewhere around home you have an old piece of lead pipe that is just about the right weight. Perhaps you can get hold of a good iron bar for the purpose. Any piece of iron that is not too heavy may answer. If you are the average man it is quite possible that a bar of one-third or one-half your own weight will suit you nicely. Perhaps you would want it a little lighter, possibly a little heavier. You can judge that for yourself.

Once in a while some physical culture enthusiast complains that in spite of much time devoted to exercise he has failed to improve his development. Probably in most of such cases, the development is already normal. However, it may be worth while suggesting that a little attention to weight lifting might solve the problem in many such instances.

One does not necessarily need to keep it up until he has made a modern Hercules of himself. Nor does it necessarily follow, on the other hand, that because one is developing an extraordinarily powerful muscular system his health is being sacrificed. It is possible to overwork in the direction of muscle building, just as one may overwork in business life or in farming. It is true that even professional strong men have been known to have poor health. They have suffered from disease, and a few of them have died early, just as have other athletes,

but this is not a necessary part of unusual muscular development. The chances are that most of those who have taken up weight lifting as a means of development have been far healthier men than the average man of inferior physique, and much healthier than they would have been without this exercise. It is not true, generally speaking, that muscularly strong men have weak organs. Why should they? There is every reason why, as a rule, they would have better organs than the average, just as they have better bodies in other respects.

It is not my purpose to recommend weight lifting by wholesale. There are so many other forms of exercise that there is no need of weight lifting, even for strength building, if one prefers other types of exercise. On the other hand, there is no real objection to weight lifting for those who desire it. It is unquestionably an effective strength building method. Practiced exclusively, there is no question that it makes one slow, but if one does a moderate amount of weight lifting and keeps up other forms of exercise in which great speed and activity are involved, he may develop or retain speed at the same time that he develops strength.

My own recommendation to those who desire to take up weight lifting would be to use it as only a part of one's system of training. Use it as a muscle builder to lay the foundation for other athletic work. At the same time, practice bag-punching, boxing, baseball, running, tennis, and other games which make for speed and skill. And do not forget that as a permanent system of setting up exercise the movements illustrated, in conjunction with a bar or pipe of moderate weight, is well worth trying out.

Perhaps the first thing to learn in handling a weight is the necessity for keeping your eye on it at all times. Do not attempt to push the bar above your head while looking off at the distant landscape. The question of balance is of supreme importance in this form of exercise. You are likely to lose your balance and possibly strain yourself unless you keep your eye on the bar.

Another important fundamental necessity is that of keeping the back straight, or nearly straight, in picking up weights from the floor. Reach down by bending the legs at the knees. The extent to which you accomplish your lifting work by the large and powerful muscles of the legs rather than by the arms, will surprise you when you study the mechanism of weight lifting.

At the same time, you will understand that the handling of any weight involves practically all of the muscles of the body. If it is properly done, the strain is distributed, as it were, among the different muscles. The back, the powerful muscles of the stomach and abdomen, the legs—all are involved in the vigorous "base of support," which enables the muscles of the arm to maintain or push up the weight properly balanced.

It is for this reason that weight lifting is such a remarkable form of exercise for building symmetry. It is not true, as many suppose, that the characteristic weight lifter has an exaggerated biceps; if anything, one would expect him to have an exaggerated *triceps*. The fact is however, that of all athletic types the man long trained in weight lifting has the most symmetrical development of all other parts of the body, including the legs. This is true, not merely because these various parts may be particularly strengthened by special movements intended

for them, but because even in the arm lifting all of these other muscles are vigorously brought into play.

No definite instructions can be given as to just how many repetitions of each exercise are desirable. It would be best in the average case, however, not to force the exercise too far. Do not continue any movement until extreme fatigue is reached. If you wish to develop the utmost strength and endurance, it will of course be necessary to exercise to the point of marked fatigue. But where constitutional benefit is the main object, you should stop before you have gone beyond the stage of feeling stimulated and full of energy.

HOW CHILDREN SHOULD EXERCISE

By BERNARR MACFADDEN

HOW can we make our children strong and sturdy? A good start in life is everything. "As the twig is bent, the tree is inclined."

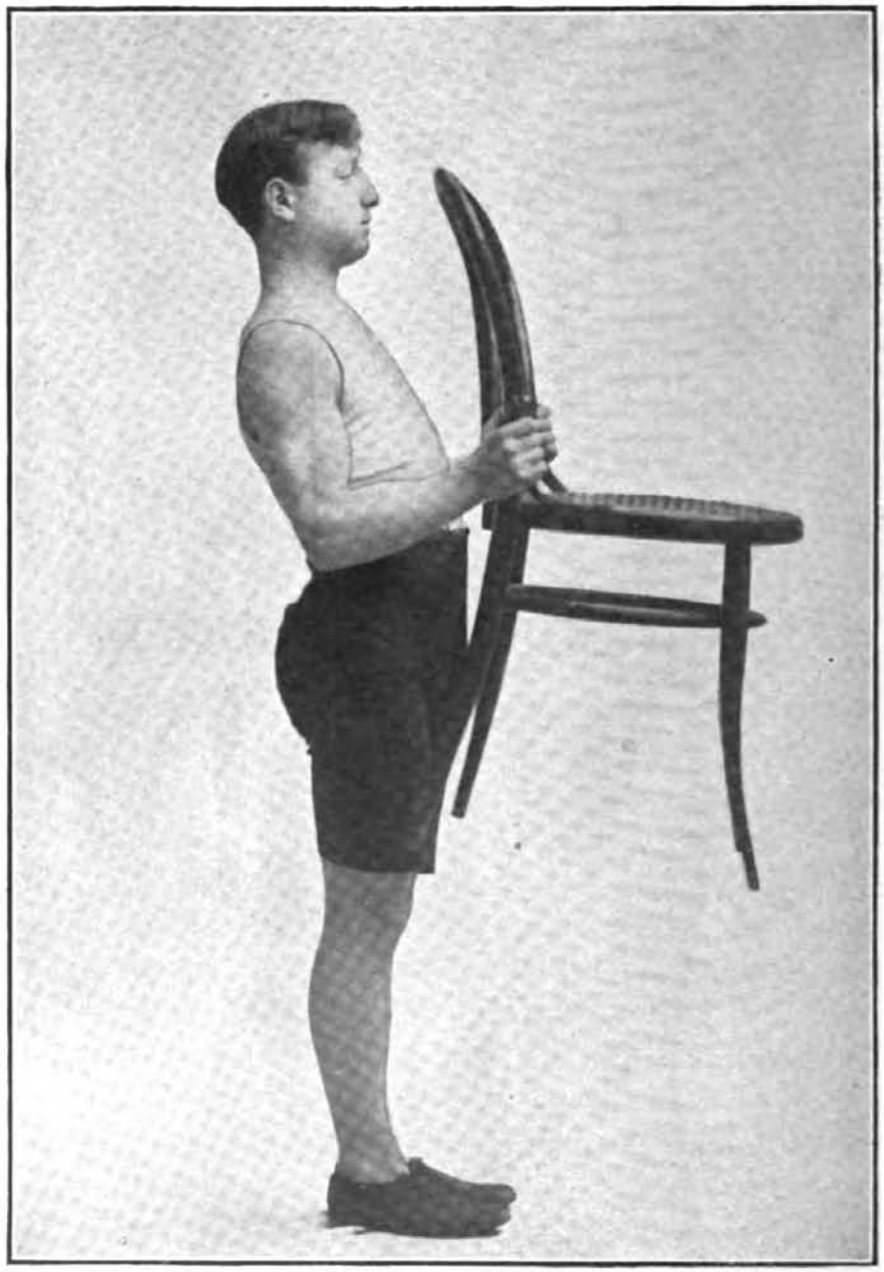
It is chiefly a matter of proper physical training. It is true that much depends upon nutrition and proper care in other respects. And the fact of having been born with a strong constitution means a great deal. But what about the puny, delicate child? We want to make him strong also. The fact is that exercise is far more effective in childhood than in later years. The results are more immediate and the corrective and remedial possibilities are infinitely greater. Besides that, it means health. Exercise does not merely mean stronger muscles. It means better circulation, more functional power, better elimination of body wastes, and consequently purer blood and more nerve force generally.

Play is probably the most important factor in child life, aside from the question of proper food. Play is indispensable. Every normal child is impelled by his natural instincts to play almost continuously through his *waking* hours—and in the case of a vigorous child this play will assume a very active form for the most part. The child's mind is educated and trained through play as well as his muscular system. I have no doubt that more hours spent in play and fewer hours spent in school by growing boys and girls would result in making them better men and women from every standpoint. Kittens,

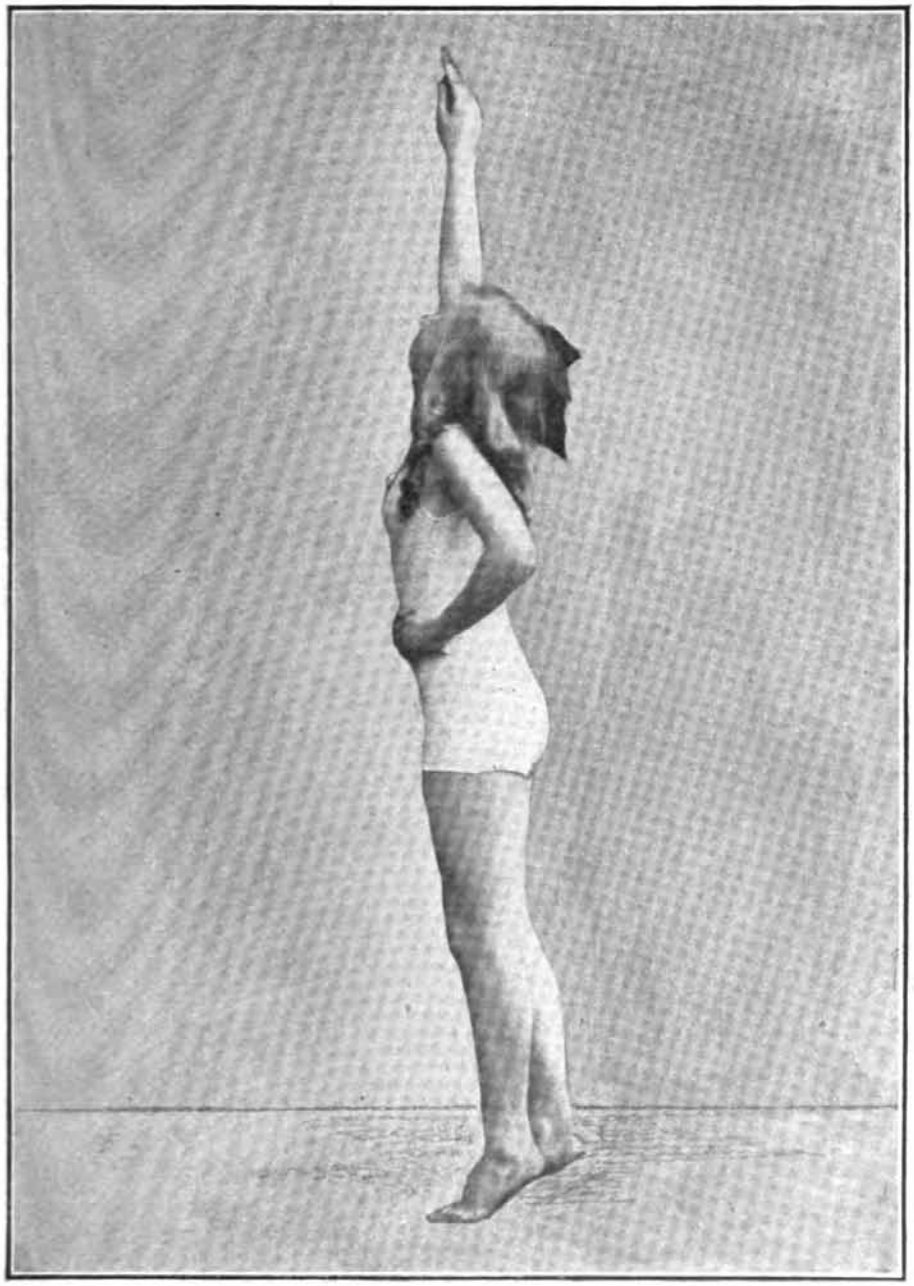
puppies and the young of all animals train their minds and learn the use of their muscles, and at the same time develop their muscles, chiefly through the activity of spontaneous play, which is Nature's great and universal school for all forms of life. Regarded purely from the standpoint of exercise, play has the great advantage of sustained mental interest. The fact is that a healthy child, being very much upon the same plane as any other young animal, is likely to secure in the form of play just about as much exercise as he may need for his constitutional requirements.

But in the matter of physical development it is often otherwise. In many cases the mere activity of play is not enough. It may be sufficient to provide for the welfare of the heart, lungs and functional system, without providing the means for correcting special weaknesses of the back, chest or other parts. And insofar as weaknesses of this kind may affect the general carriage of the body, causing the stooping of the shoulders, the cramping of the chest, the depression of the ribs, and the crowding of the digestive organs below, it will be seen that even for constitutional purposes play may not be sufficient. Special training in such cases will be necessary. Every boy and girl should be "well set up," with a good erect carriage, head properly held up, full chest, strong back, well set shoulders, and a firm, vigorous condition of the abdominal region. To the extent that ordinary play fails to provide for this condition, other systematic exercise will be required. A child may play ever so much and yet fail to build up a robust body, just as many adult athletes, however active in their respective specialties, are far from models of

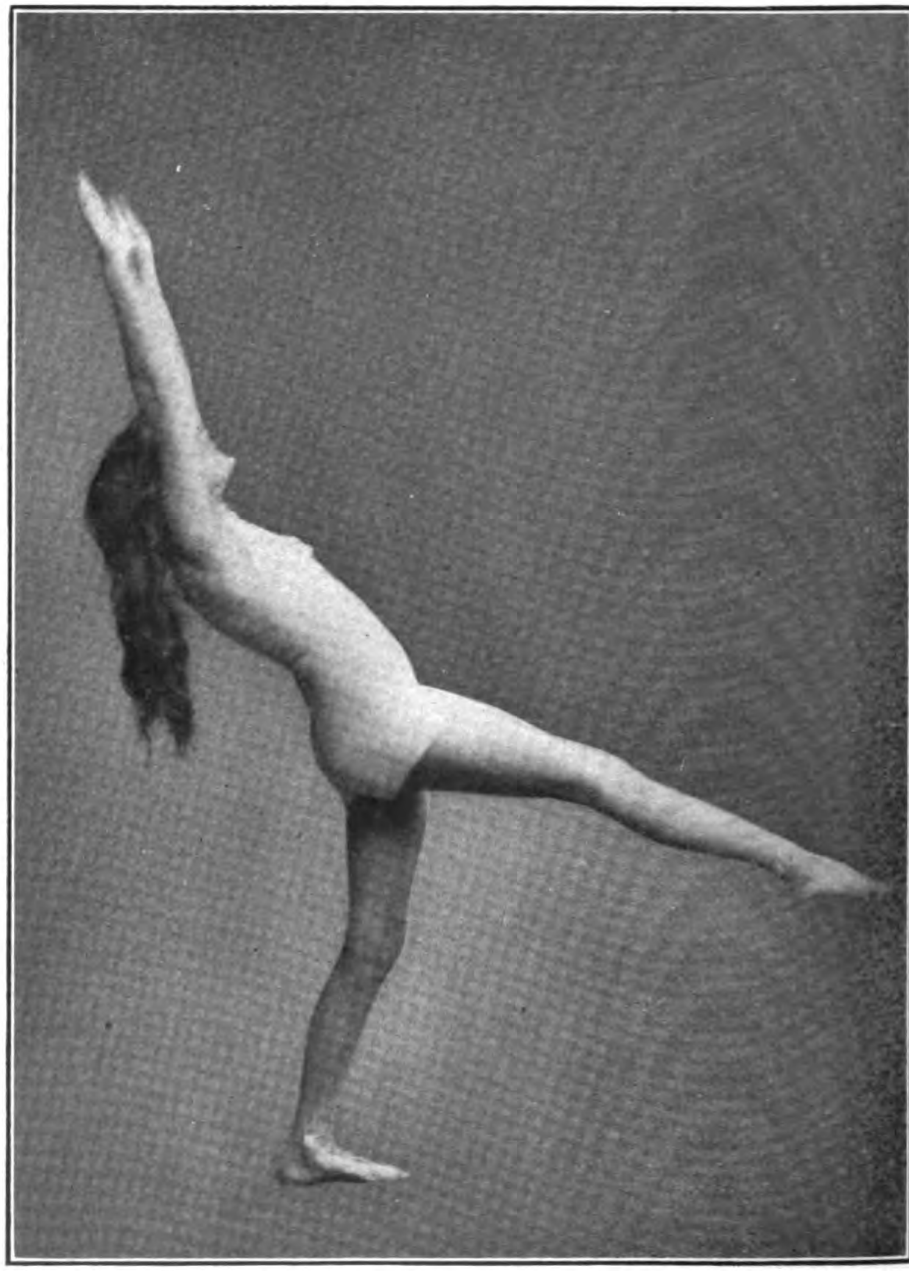
HOW CHILDREN SHOULD EXERCISE



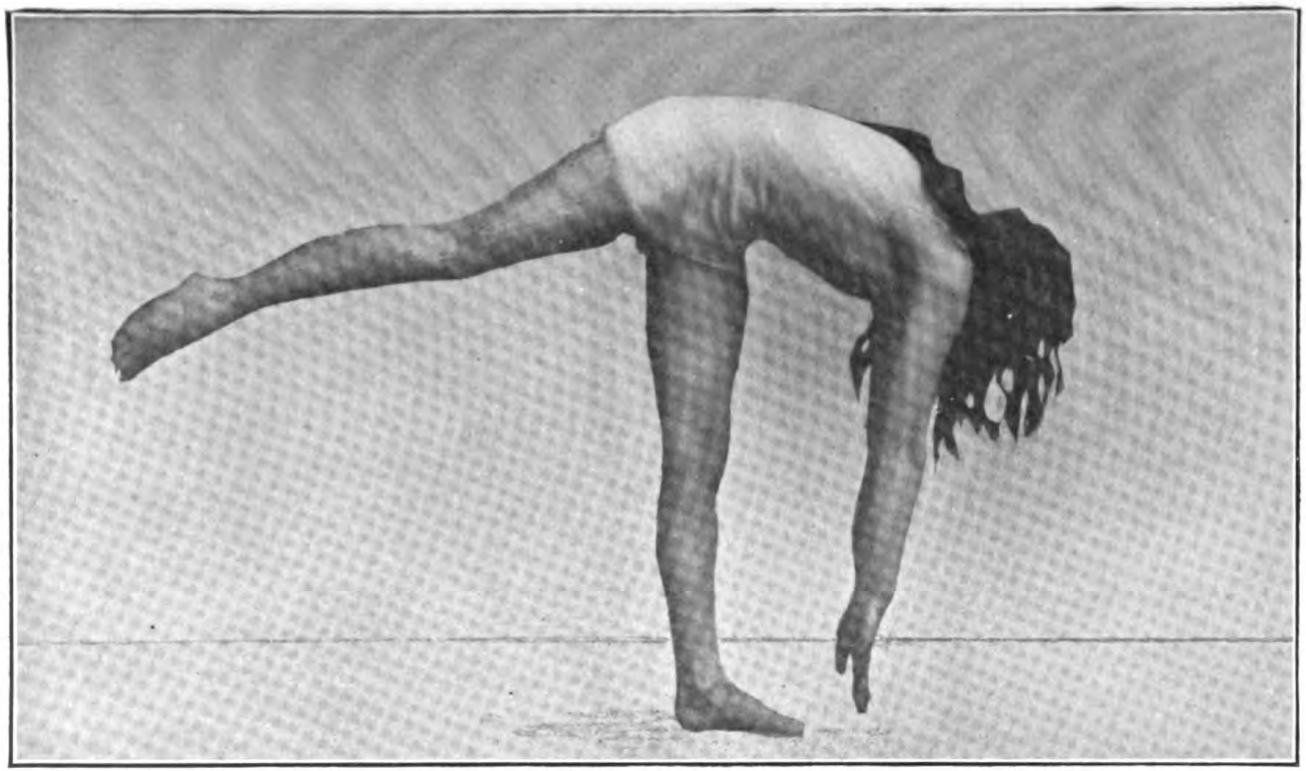
An ordinary chair makes a good home apparatus for systematic exercise. Starting in the position shown, you can execute many movements, pushing the chair to arm's length forward, upward, to each side and downward, then execute body-twisting and bending movements. Try to figure out as many exercises with it as you can.



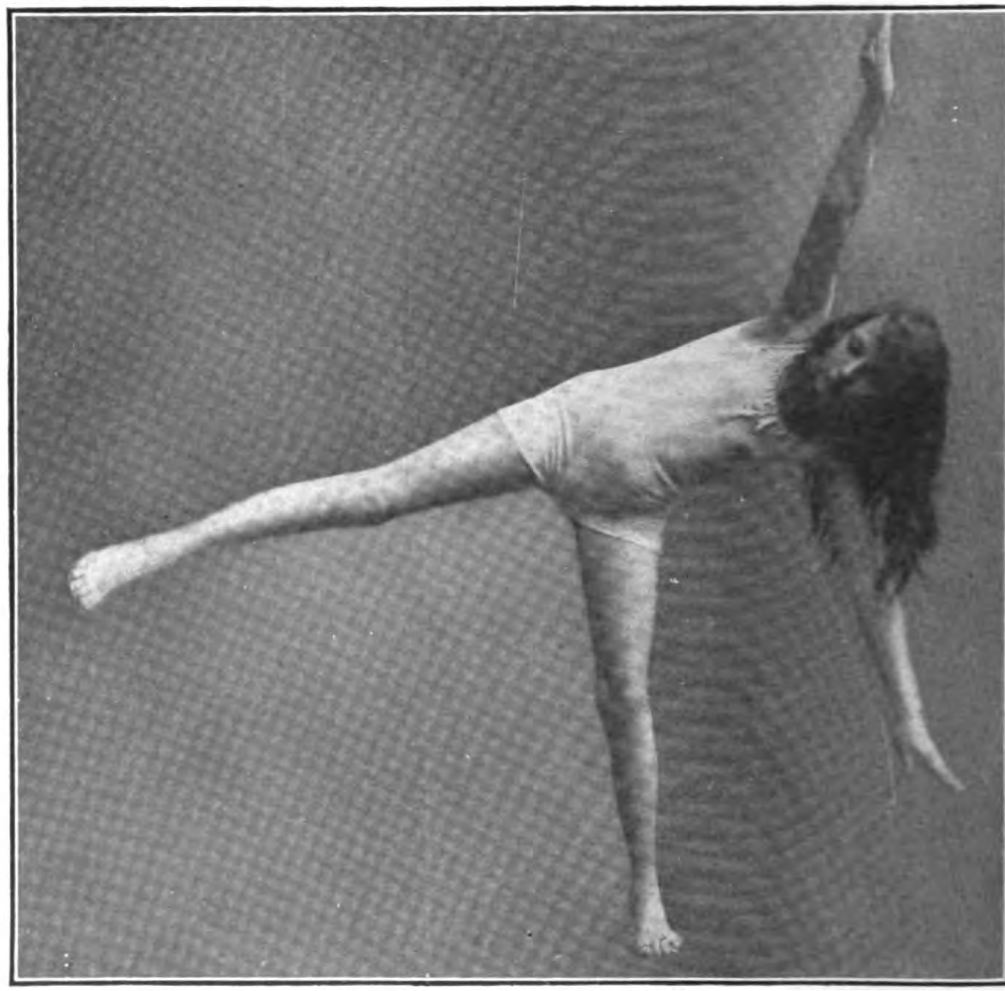
There is no better exercise than stretching. Place a mark on the wall or door frame as high as you can reach, and each day see if you cannot place the mark a little higher. Do this with each hand. It may help you to grow.



Balancing exercises are the best in the world for muscle control and co-ordination. Standing on one foot, extend the body backward as in the photo.



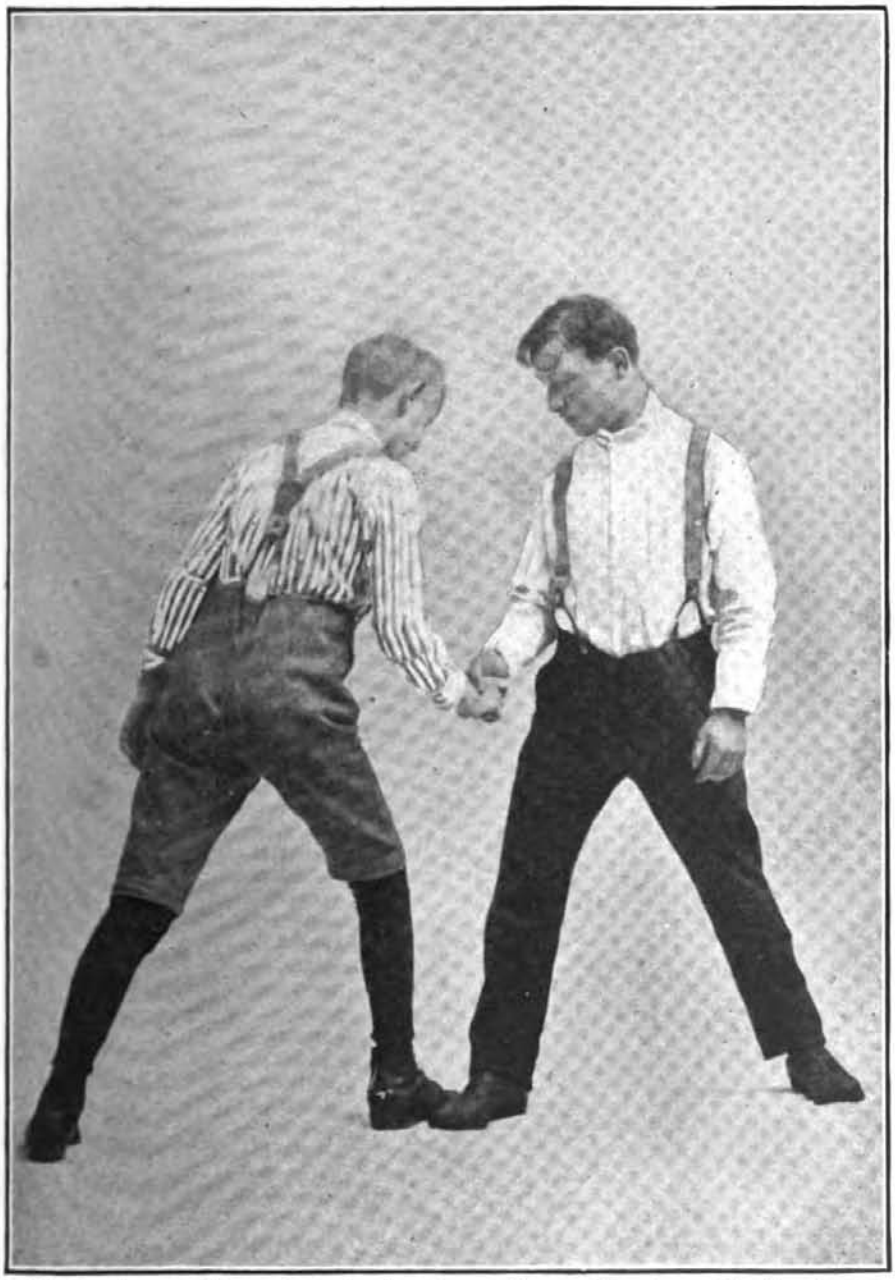
Standing on one foot and extending the other leg backward, see if you can reach down and touch the floor, as in the photo. Then raise the arms horizontally and repeat. See if your friends can do it.



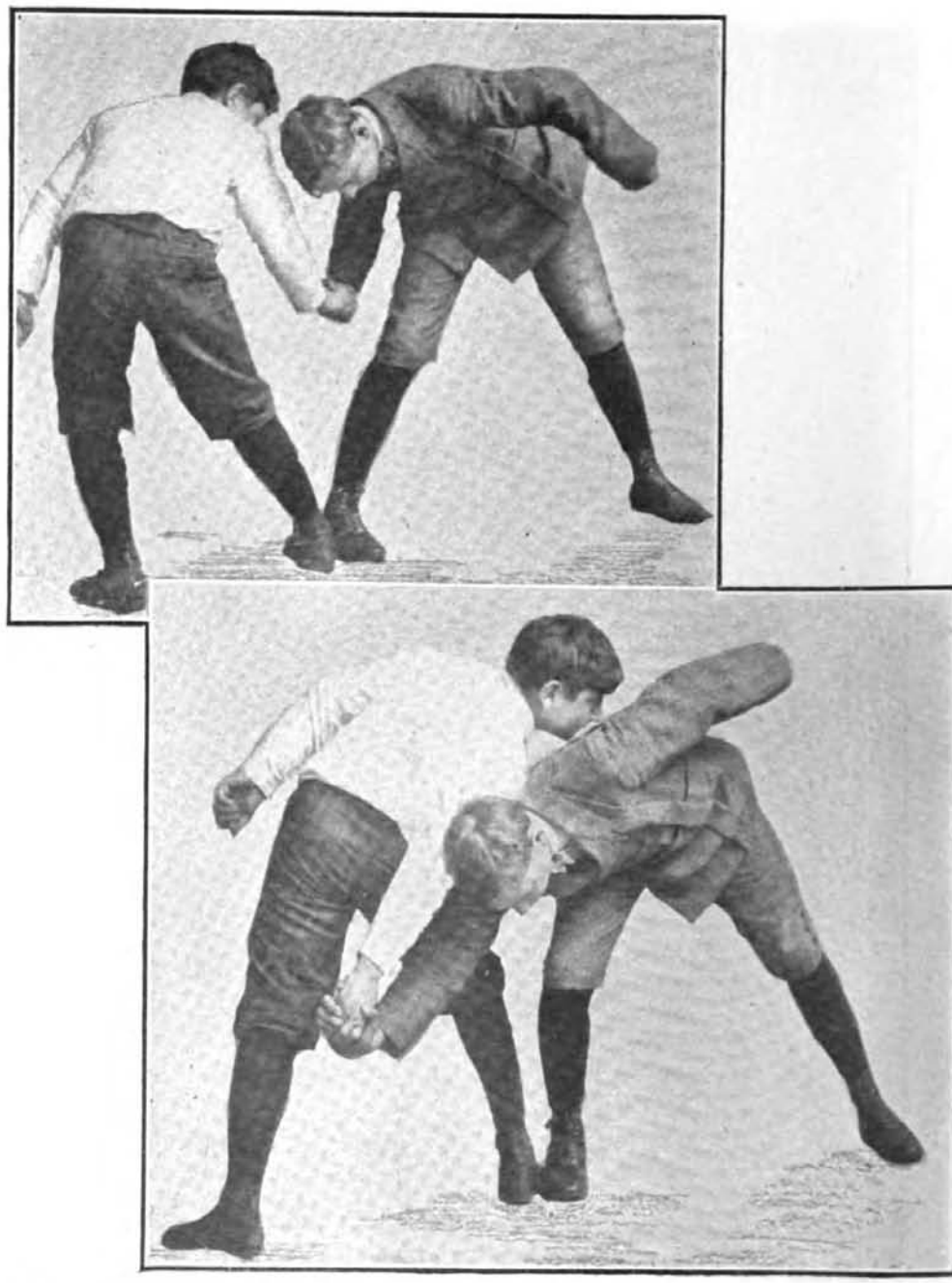
This is another balancing and floor-touchi ng exercise, done sideways. If you cannot touch the floor, at least maintain your balance while trying to do so.

Here is a stunt that every husky boy should be able to do. Start with the arms straight and the hands on the backs of two chairs, lift your feet and then lower the body until the shoulders are between the hands, then push up again. Try this on your friends.

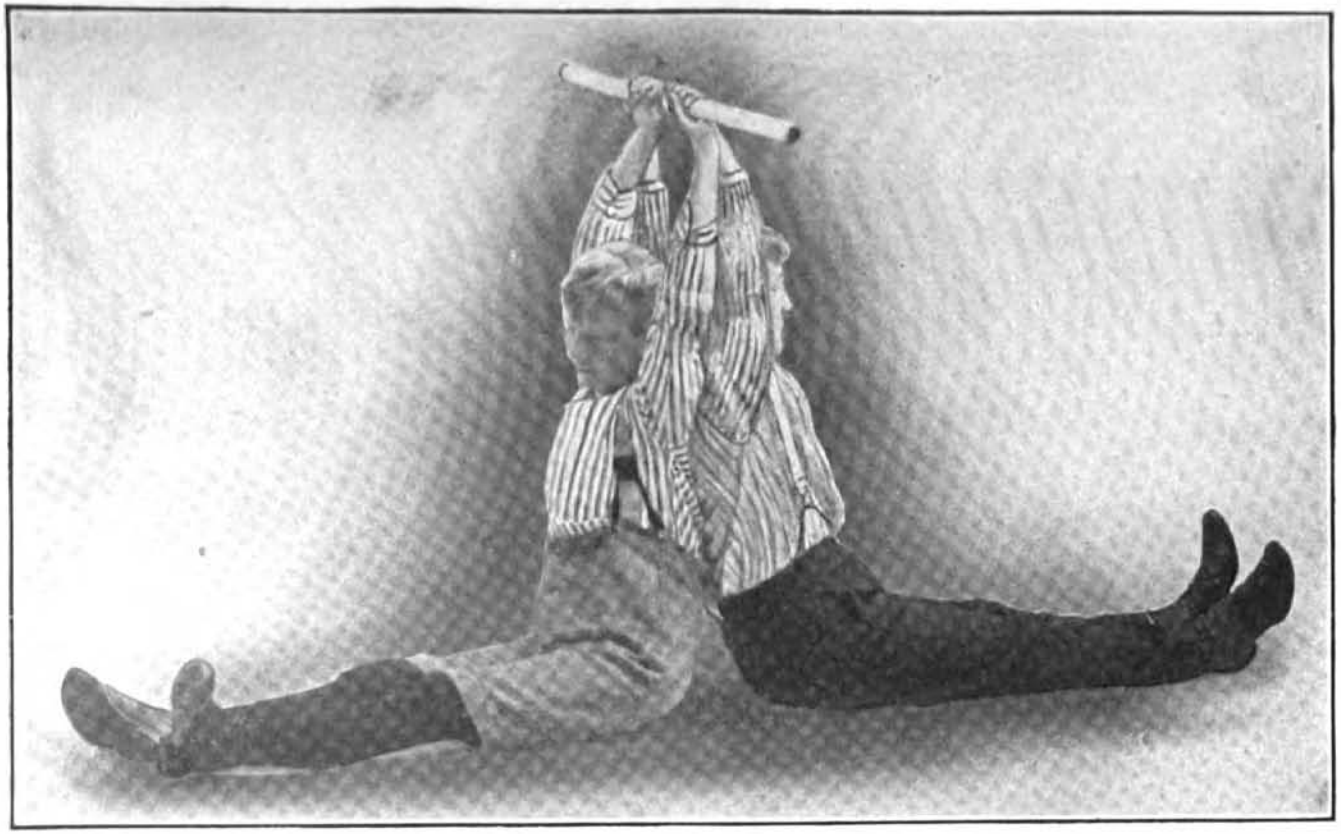
Fancy dancing is an ideal exercise for children. The simple folk-dancing steps are valuable for building grace and bodily control, as well as for endurance and strength. Miss no opportunity to join a dancing class.



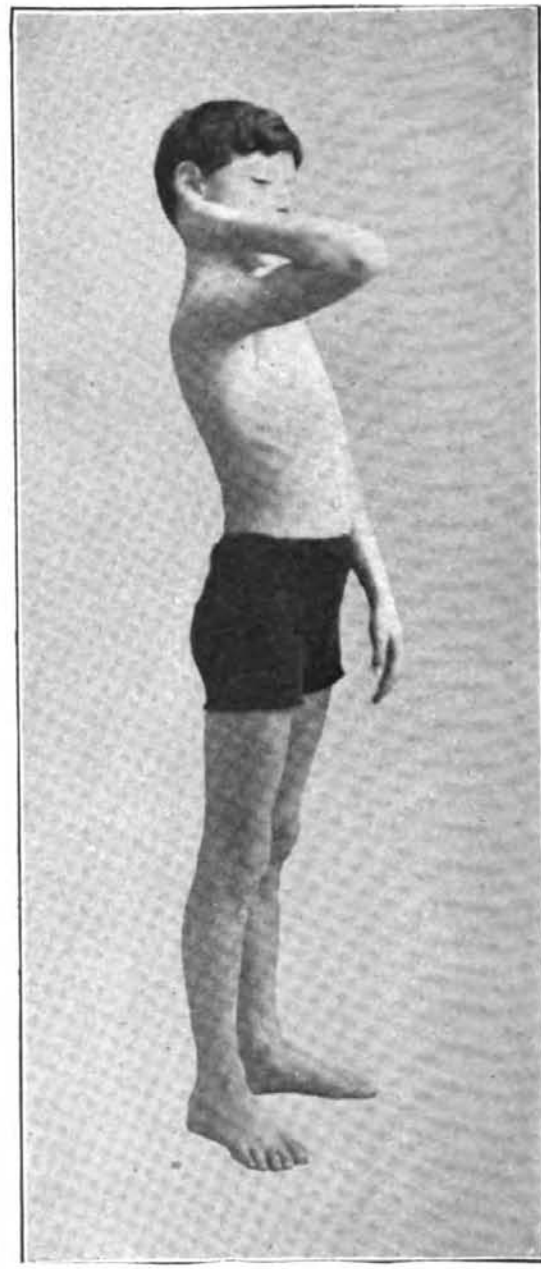
This is the position taken for hand-wrestling. Clasping right hands, the right feet are placed together and each contestant makes an effort to throw the other. If one is compelled to move his foot to keep his balance, or to touch the floor with the hand or knee, that constitutes a fall. A contest is based on three falls out of five. Then try it left-handed.



Showing hand-wrestling in action, both boys struggling. Starting from the position in the upper photo, the boy at the left suddenly brings his arm far back, causing the other to step forward to keep his balance. That means a fall



Here is another splendid competitive game. Sitting on the floor, back to back, with a broom stick grasped at arm's length above the head, each tries to pull the stick away from the other. Try it with your chums.



Here is a simple little stunt calling for muscle control, quickness and dexterity, rather than strength. Bring the doubled arm upward until the forearm is horizontal. Then place a sack of four or five pennies upon the elbow, balanced as in the photo. Now with a lightning-quick movement, jerk the arm downward and under, and catch these pennies in the hand. See if your friends can do it.

symmetrical development. The fact is that persistent, systematic exercise will accomplish what play alone never can accomplish in building strength and in perfecting every part of the body.

Now, it may be that for some robust and active children, play will be sufficient, because they will naturally adopt the more energetic forms of it. And again, some children seem to have a natural muscular development. This, of course, means that they develop very easily and seem to enjoy a condition of remarkable vigor without the necessity of special training to acquire it. They are fortunate. As a general thing they are naturally stocky. But for the child who is naturally delicate and undeveloped, as for the man or woman who is undeveloped, nothing can take the place of systematic training. Usually it is the slender types of boys and girls who most require special exercises, particularly if they are inclined to be nervous, or if they belong to that class of very "quiet" children who have a tendency to look at pictures and play with blocks in early childhood, instead of running and romping, and later on are inclined to sit in a corner and read a book instead of getting outdoors to go skating or coasting or playing tag. These children should have special attention.

It should be noted, however, that mere slenderness in itself does not mean lack of energy or a poor condition if the child is otherwise sound. Remember that there are different types of children just as there are of men and horses and dogs. Some are naturally heavy and thick-set, and some are naturally slender, with light bones. The slender boy or girl may be in perfect health, with good color, a hearty appetite, and a seem-

ingly remarkable degree of strength for weight and build. When in the right condition such a boy is usually a good runner and one of the most active of all types of children. So slenderness does not necessarily mean backwardness or weakness. But when a child is thin as a result of lack of development, and when this condition is accompanied by a pale face, poor carriage, a hanging head, round shoulders, flat chest and pouchy abdomen, then he certainly needs careful and continuous attention, with a proper course of systematic corrective exercise to build him up. If quiet or nervous, his play will not give him more than a fraction of the constitutional exercise required, and he will need to be encouraged to engage in the various sports and games that ordinarily interest children.

On the other hand, the fact that a child is large, or belongs to a naturally heavy type, does not necessarily mean that he is as vigorous as he should be. The heavy child is more likely to be sound and normal. But sometimes he has simply grown rapidly and has a heavy framework of bones, but without the development and stamina that ordinarily go with his height and weight. Especially if his carriage is faulty and his chest and shoulders are not properly set, he is as much in need of special exercise as the boy who is thin because he is frail. If he breathes through the mouth, which may indicate adenoids, he should have plenty of outdoor play and special training in breathing exercises and chest expanding movements. I might say, also, that while a serious case of adenoids will require removal, which is a very simple operation, yet in a great many cases these growths will disappear by themselves with enough outdoor life

and active exercise. The fat boy is, of course, abnormal, and his measurements indicate nothing as to his real development, except in the matter of chest expansion and the difference in the measurement of his biceps when the arm is extended and flexed. Later on the boy who has grown fast and is much bigger and heavier than the other boys of his age should have special attention, for it may happen that his heart has not grown proportionately and he may not have the stamina of a boy who has grown more slowly. He should not be allowed to compete in football and other games with boys five years older than himself just because he is as large, for the reason that he is not yet so strongly knit and can not be expected to have the same endurance. Special training in such a case will be of benefit, together with supervision in the matter of athletics and sports.

In early infancy not much in the way of special training is desirable. One really should not try to force a child's development at any time. It takes between twenty and thirty years to grow a man, and his development is necessarily a matter of slow growth. A puppy or kitten can creep around the day it is born, but it takes months for the human baby to learn to do even that. A baby baboon from the very first is able to hold its own weight by clinging with its hands to the hair on its mother's chest, being carried around in this way. Of course the baboon is not so far removed from the human race, and the human infant likewise has a considerable power of grip. The occasional human infant can hold its own weight when born by hanging on to a small stick or a couple of fingers with its hands. But even this is only a survival from a previous stage of evolu-

tion, and a baby of our species in the beginning is entirely helpless. A colt can walk the day it is born, but the baby cannot walk for a year, more or less. The human being has a higher organism to develop, and it takes longer. A dog a month old knows more and has better control of himself than a child of many months, but he will not know more than a fraction of what the child knows when he gets through growing.

So in training the child, do not try to force his growth. Try simply to follow his natural growth and merely make him strong. Don't try to make him walk before his brain cells are ready and his bones are strong enough. You cannot hasten his growth, but you can do some harm by trying to.

In the first few months of the baby's life, therefore, content yourself with giving him plenty of freedom of movement, so that he may proceed to train himself by kicking and jerking his arms around until he finds out for himself that he has legs and arms and that he can move them in some definite manner according to his desire. The trouble is that babies are usually bound and harnessed up with too much clothing and don't get a fair chance at cultivating footwork or punching an imaginary bag while lying on the back. Better keep the little feet warm by heavy socks than by an extra yard of skirt. When the baby has his air bath, however, just before giving him his warm water bath, you may rub his back with the bare hands and exercise his arms and legs with passive movements. You may also try out his grip by letting him take hold of your little fingers and lifting a part of his weight, perhaps pulling him up to a sitting position. In a few months you may

practice lifting his whole weight by the arms, by the legs, by the left hand and right foot and by the right hand and left foot. And this is about enough. Do not try any "stunts" with a young baby. And aside from this very moderate amount of training, the infant should depend mostly upon his own exertions for his exercise.

When between two and five years of age, a child may be given some special attention in the way of training. When two years old, if he is an average child, he should be somewhere in the neighborhood of 31 inches high and 27 pounds in weight, during the next three years gaining about three inches a year or a little more, and four or five pounds a year, until at five years of age he is somewhere near 41 inches tall and 40 pounds in weight. After that he gains about two inches a year, and his weight is about doubled at about twelve years. Of course there is much variation in height and weight. A child may be either over or under these figures and still be perfectly normal and vigorous. But if he approximates these figures you may be assured that he is all right, so far as weight and height are concerned.

When children are between two and five years of age it is well to have them exercise with other children of similar age whenever it is convenient, for it will stimulate interest. Naturally the play spirit should prevail so far as possible, not only with children at this age, but at any age, in performing almost any kind of exercise. Of course the play idea should never lead to such frivolity as to offset the effectiveness of the exercise, but the element of play should enter, perhaps, in the form of competition to see which child can execute an exercise the most perfectly, who can stretch the higher, or whether

a single child can do a thing better than he did it last week. With these very little people, however, it is especially advantageous if they can exercise together in little groups of two to four. Children between five and ten years, on the other hand, may commence to exercise individually, for they will be capable of understanding the purpose and each one can make a specialty of any movements that he may need for corrective purposes. But even with boys and girls at this age, a little company in the matter of general "setting up" exercises may help to lend interest.

Variety should be the keynote of exercise for very young children. Incessant change will suit them best, and nothing that seems to call for endurance should be attempted. Let the exercise be active, but not long continued. It is important to provide little girls with clothing that gives them approximately the same freedom that little boys enjoy. Fancy white dresses may be pretty, but they are not serviceable for purposes of play and exercise. Bloomers should be an important part of a little girl's clothing.

Children from five to ten years of age may be given a great deal of special training if they need it, and it is at this time that special corrective exercises are particularly effective. By this time they generally develop a love of strength for the sake of strength, and are capable of taking a certain pride in the body and its development, all of which may be turned to good account. The best thing one can do for children at this age is to provide some form of simple gymnasium in or about the home. A backyard "gym" is a fine idea if you have the space around your home. Sometimes an

ideal exercise room may be fitted up in the loft of a spacious barn. Or an extra room in the house may be given over to the purpose. You do not need much apparatus.

Children are primitive by nature, and they naturally find their greatest interest in these primitive, physical activities. But for building real strength there is nothing like the formal systematic exercises already referred to. Each exercise has a specific result, and a few well selected movements will go a long ways. Generally speaking, they may be much the same as those which are usually recommended for adults, for the same purposes. Bending exercises are especially good for children, and they can always do them well because of the natural suppleness of the body in childhood. Stretching exercises are particularly to be recommended when the children are from five to ten years of age, not only because they are favorable to proper growth and the perfect alignment of the spine, but also because they lift the chest and are conducive to proper carriage, thus also keeping the abdomen firm and the internal organs in position.

A flat chest is a rather common weakness, and while running will do much for such a child, he should give his lungs more room by developing the chest through special exercises. This does not mean exercises for the chest muscles so much as those that bring the shoulders back, and expand the chest. All movements which raise the arms high above the head will be effective. Movements which bring the shoulders back and then down are particularly appropriate, and a circular movement of the shoulders, forward, then upward, then far back,

then vigorously downward, will do great things for a flat or sunken chest. The same line of treatment will be very effective in a case of what is known as "chicken breast," and if taken at this time of life such a defect can be practically obliterated. In fact, even at the age of twenty, corrective exercise of this kind will work wonders with such a condition. Give special attention to the position of the head, for if one holds his head up his general carriage of the body is likely to be satisfactory.

A thin and puny neck is frequently an unsightly feature of the delicate child, but it is one that responds most readily to exercise. It will improve as a result of the general development gained through play, but special neck exercises are necessary to get a truly satisfactory improvement.

Weak hands are not unusual, and call for much practice in gripping, the best plan being to do a great deal of lifting of the body or hanging on ropes and horizontal bars. Broomstick exercises and little tug-of-war exercises are splendid for this purpose, as well as for the back and legs.

Weak ankles and tendencies toward flatfoot are not infrequent. Low heel shoes, or so-called "spring heel" shoes should be worn, free from "arch supports" and fitting well around the instep, but with plenty of space for the spread of the toes. Going barefooted and wearing moccasins or sandals would be good treatment in such cases. And after the feet have been thus provided for, plenty of rope skipping, dancing, running and skating should be indulged in, together with special exercises at home, which should consist in rising high

on the toes and on the heels, circular movements of the feet, and bending inwards and outwards as vigorously as possible. Persistence is what counts in these cases. It is easy enough to avoid flatfoot and to strengthen the ankles. Bow-legs and knock-knees can be much improved at this age. Deep knee bending, or "squatting and rising" exercises, are very effective in such cases, though mechanical pressure should also be brought to bear in the required direction many times each day, even if it is only pressing with the hands.

At from ten to fifteen years of age the exercises can take on more nearly the character of exercises for adults, pure and simple. Boys at this age can commence to do resisting exercises, and will be ready to try out the strength of their arms, shoulders and back in various simple ways. Wrestling, for instance, would benefit them. Girls at this age, however, should give special attention to exercises for the waist, chest and pelvic region.

So far as growth is concerned, one should not take published tables too seriously as applying to individual cases, for a child may be normal and yet not conform closely to the "average" as expressed in such tables. In this way the "What you should weigh" tables found on penny-in-the-slot weighing machines are more or less misleading, for they refer to averages and ignore the question of variations in type. The fact is that the normal is probably above the "average" in many respects, since the average includes such large numbers of those far below normal in development and health. And yet slenderness of type may place a perfectly healthy and normal person below this average. So do

not worry about measurements if your boy or girl is healthy and vigorous. The question of energy is more important than measurements. At the same time it may be of general interest to know that boys of ten years may usually be expected to run from 52 to 54 inches in height and weigh between 60 and 70 pounds, that boys of twelve years will be from 56 to 58 inches tall and weigh from 70 to 90 pounds, with an average of about 80, and at fifteen years will be from 63 to 66 inches tall and weigh from 115 to 125 pounds. Girls at ten and twelve years may be expected to average a little under these figures, and at fifteen may slightly exceed them.

THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART ONE

EXERCISE

Section Two
CONSTITUTIONAL

THE SEVEN AGES OF EXERCISES

By HENRY SMITH WILLIAMS, M.D., LL.D.

IN any discussion as to the value of exercise we must bear constantly in mind the fact that the human machine is a mechanism that undergoes a fairly definite series of modifications with the lapse of time. In other words, the factor of age must always be considered when we attempt the specific discussion of exercise in its relation to health and longevity.

It will perhaps fairly accord with the stages of development of the average individual, and will serve a convenient purpose for the present discussion, if we think of the normal life as spanning seven periods or ages—not, however, delineated in accordance with the Shakespearean tradition. Speaking in general terms, we may define these epochs as follows:

(1) Childhood, up to about the age of 10.
(2) Adolescence, from 10 to 17.
(3) Early maturity, 17 to 25.
(4) Full maturity, 25 to 40.
(5) The "old age of youth," 40 to 50.
(6) The "youth of old age," 50 to 65.
(7) The period of decline, above 65.

Of course individuals differ as to the rate of development, and also as to the precise period at which retrogression sets in; but I think we may take the ages above outlined as fairly representative of the border lines between the different epochs in a normal life. The actual lines of demarcation are, naturally, far less fixed

and arbitrary than the citation of a census of birthdays would indicate.

My present purpose is to attempt to outline, briefly but explicitly, the kind and amount of exercise that is in my judgment desirable for the average individual of fairly normal constitution during each of periods in question. The judgments about to be expressed are personal opinions based on first hand study of a large number of individuals, including many remarkable athletes both amateur and professional. Let it be understood at the outset, however, that I am here speaking not so much of the development of the athletes as of the normal amount of exercise desirable for the average individual who has no thought of entering into athletic competition, but who does desire to secure the largest possible modicum of health and to give himself the best possible prospect of longevity.

First, then, as regards exercise for the child under ten years of age. At first thought it might appear that no set rules and no fixed exercises are necessary or desirable for the normal child, inasmuch as the tendency to exercise is spontaneous, and the desire for the playing of games seems instinctive. And such a contention is not without a measure of force. It should be recalled, however, that one of the distinctive characteristics of the child's organism is that in the early years the brain structure develops in size quite out of proportion to the muscular structure. A boy of nine can very commonly wear his father's hat, though he would be quite lost in the parental coat and trousers.

As a result of this preponderance of brain over muscle, there is a surplusage of nervous energy that

tends to find an outlet in incessant activity. Nor is there great danger that such activity will lead to dangerous excesses, for the healthy child when exhausted falls into a profound sleep, and recuperates rapidly. The danger is rather that the child will be made to utilize too large a share of this energy in school studies at an early age, and be physically confined in house or schoolroom for so many hours that time does not remain for adequate letting off of steam on the playground.

Modern educators realize this danger, and introduce systems of calisthenics that are not without their uses. But such cut and dried exercises are after all a very poor substitute for competitive games.

If the time devoted to calisthenics could be given over to sparring, wrestling, or running, the results would be far more beneficial. But of course this is not always feasible.

It should be made possible, however, for every boy to take some lessons in sparring and wrestling before the age of ten. There is no reason why he should not thus be taught to use his muscles effectively from the outset. Every boy has occasion at least a few times in the course of his school period to settle a dispute in primitive fashion, and, while a "rough and tumble" fight has undoubtedly merits, yet such a contest gives every advantage to size and mere strength and is conducive to the fostering of the spirit of the bully; whereas it is a salutary thing to have both the strong and the weak convinced early in life that feeble muscles trained to act in proper co-ordination may be counted on to hold their own, and more than hold their own, against far stronger muscles that lack this training.

I would not seem to lay too great stress upon such training, however, for the child under ten years of age. The thing that I would emphasize is that during this period the child should have opportunity to mingle much with fellows of its own age in the open, and should be urged to take part in the rough and ready games of childhood. Few things are more unfortunate, and more likely to handicap the child later in life, than the development of a tendency to keep away from its fellows, avoiding that healthful competition through which excessive egoism and egotism are curbed and the fundamental lesson inculcated that human society is an institution that necessarily puts restrictions on the liberties of the individual, requiring to some extent the curbing of primeval instincts, and putting a premium on self-control no less than upon self-dependence.

If I may seem to dwell too much upon the question of training the individual during this first period, I would reply that the old saw about the bent twig expresses a profound truth; and would urge that few persons other than physicians who have made a special study of the subject realize to what extent the training, both physical and mental, of the first ten years of an individual's life determines not merely the broad outlines but even the details of his future activities.

Equally critical, though in a somewhat different way, is the period of adolescence—say from ten to seventeen. During this period the physical organism undergoes profound modifications, and both body and mind are subjected to dangers that until recently have been considered to lie outside the scope of popular discussion. Against these dangers, perhaps the most impor-

tant of safeguards is physical exercise. Under existing conditions of society, it is not usually feasible for the newly focalized energies to have a normal outlet; and the best substitute is found in muscular exertion, along the lines of competitive sports, carried sometimes to the point of healthful fatigue. Such competitive exercises develop courage and self-control even as they develop the muscular tissue; their effect on the mind is no less beneficial than their effect on the body.

Of course it must not be forgotten that the body during this period is by no means mature. On no account should the youth under seventeen be permitted to take part in contests that require excessively prolonged effort. If he boxes, the bouts should be limited to six two-minute rounds. If he wrestles, he should be matched against an individual of comparable strength and skill, and should never go more than ten minutes at a bout. If he runs, he should confine his competitive attempts to 100 yard or 220 yard dashes; never going the half or the full mile, much less undertaking the Marathon distance.

The main reason for insisting on these restrictions is that the heart, no less than the other muscles, is developing during this period, and may very readily be made to take on excessive growth, preparing the way for future difficulties that may make the individual a chronic invalid in middle life, or may bring about a fatal issue from "heart disease" before the normal time of full maturity.

The same reasoning applies, though with somewhat abated force, to the conditions that should govern exercise during the succeeding period, when the individual

is entering full manhood—the period that we have roughly outlined as between the ages of seventeen and twenty-five. During this period the muscular system often seems to reach its acme of energy and responsiveness. The championships in running, swimming, jumping, and at tennis and allied games, are very generally held by youths under twenty-five. Nevertheless, it is, I am confident, a mistake to suppose that the muscular system normally reaches its fullest development and its greatest possibilities of efficient activity before that age.

The chief reason why so many athletic championships are held by youths is that it is chiefly youths who, in the nature of the case, are free to compete.

Soon after a young man leaves college he usually finds himself preoccupied with business cares, and is no longer able to give sufficient time and attention to training to enable him to keep in the championship class. But it should be recalled that athletes who hold professional championships usually get their honors after the age of twenty-five.

It is pretty obvious, then, that the muscular system is only approaching full maturity, not reaching its full climax, in the period from seventeen to twenty-five. In my opinion, the individual during this period should be regarded as still lacking something of seasoned maturity, and should refrain from putting his muscular powers to the fullest test of endurance. I think it highly unwise that Marathon races and four-mile boat races should be permitted at all; but if they are to be countenanced, I believe that the persons indulging in them should be at least twenty-five years old, and should have conditioned themselves for the effort through long

periods of carefully graded exercise. The accomplished turfman sends his two year olds and three year olds to the post carrying light weights and asks them to go only short distances. He knows that a horse should be fully matured before it is asked to carry heavy weights and to go the full mile or mile and a quarter. Common sense requires that the same principles should be applied to human athletes; and experience tells us that the average individual does not reach full physical maturity much before the age of twenty-five.

Personally I question whether any man who has taken proper care of himself, and has never injured his system by excesses of any kind, is at his physical best before the age of thirty-five.

As to the specific choice of exercises for the individual during this period of early maturity, the decision may usually be left to the individual himself guided by his natural tastes and capacities. Boxing, wrestling, rowing, fencing, tennis, hand-ball—each is good of its kind, and infinitely better than any system of non-competitive calisthenic or gymnasium exercises. Yet the latter are not to be scorned if the former cannot be had. The time has not yet come, however, at which the individual needs to drive himself to the task of exercising, or pay the penalty of obesity, flabbiness of muscle, and general physical disrepair.

That time approaches, however, as you enter the succeeding period—twenty-five to forty—and it is fully at hand before you reach the close of that period. This is the time of full maturity, when if ever the muscular system is capable of great feats of endurance, to which, nevertheless, the wise man will subject his system as in-

frequently as possible. Unless you are a professional athlete, there is no reason why your muscles should ever be put to the supreme test of endurance contests. In boxing or wrestling or rowing or tennis playing, you will as a matter of course exert your full strength on occasion; but only for limited periods, if you are wise, and never to the point of profound exhaustion.

The chief reason why long-drawn-out contests are to be avoided is that they put an excessive strain on the heart, which may lead to permanent dilatation of that organ. We have seen how muscular exertion accelerates the flow of the blood, and brings an added strain on the heart, which must beat faster and harder to relieve itself of the inrushing current. It should be remembered, too, that the free perspiration that accompanies active exertion implies the taking of water from the blood.

I have known a wrestler weighing 140 pounds to lose eight pounds of weight in the course of a single contest.

This implies that the blood is depleted of its watery constituents to an extent that must render it fairly viscid—giving it an almost molasses-like quality that necessarily makes its propulsion through the vascular channels, in particular the capillaries, inordinately difficult. This in itself is a sufficient reason for eschewing prolonged contests. I have already stated that I think that Marathon races and four-mile boat races should be interdicted. I believe also that a two-hour limit should be placed on even professional wrestling contests. For amateur wrestling contests, the fifteen-minute limit usually imposed is a wise restriction.

I repeat that the individual who is exercising for

health, with an eye to longevity, should on no account indulge in any contest that is so prolonged as to thicken his blood and carry him to the point of extreme exhaustion. If he violates this rule he does so at the risk of incurring a permanent heart malady.

And what of the man who is passing maturity—he who is entering the forty to fifty year period? A fair answer might be found in the phrase: "The same, only a little more so." There is no reason why the man who has led an athletic life up to this time should not continue to box and wrestle and row and play tennis throughout his forties. But if he is wise he will lay less stress on the competitive element in these parts than he did in the earlier epoch. I am inclined to feel that wrestling is a better exercise than boxing for the man at this period. At wrestling one can gauge the amount of exertion somewhat more in accordance with one's inclination, choosing his own rest periods, and modifying the particular manner of his activities. Properly regulated, wrestling is the ideal exercise for the mature man.

Hand-ball may also be regarded as a nearly ideal recreation for the man at middle age. It has the added merit of being a game equally adapted for women. It is superior to tennis in that it brings both hands into play. It has an added practical advantage in that it is played on a court of moderate size, which may be established in an ordinary gymnasium. There should be a hand-ball court, or series of hand-ball courts, on the roof of every office building in every city.

The man who has passed the half century mark may still play hand-ball, and play it rather strenuously. But he will have learned to substitute skill in "placing" the

balls to some extent for violent action; and he will know that he must not hope to compete in celerity of movement with the younger generation. He will select opponents of his own age, and renounce all thought of playing in "championship" form. But he may enjoy the game, nevertheless, and may secure to the full the benefits of exercise that is sufficiently energetic to lead to a profuse perspiration, keeping his entire muscular system, including the heart, in excellent tone; his digestive apparatus in good working order; and his nervous system just sufficiently unstrung.

The man in this over-the-line epoch may still exercise on the wrestling mat, if he can find a proper associate; but he should absolutely interdict the thought of competition for mastery of a younger antagonist. If he cannot wrestle without putting forth supreme efforts, which are likely to overtax the heart, he had better keep off the mat altogether. He is now in an epoch in which the bodily machine is tending to show the effects of wear, and although he may feel as well as ever, and even as strong as ever, he has not the capacity for endurance that he once had. His heart muscles, like his other muscles, are tending to weaken, and a much less degree of strain than they could formerly have endured may be harmful to them. As he is exercising for health and longevity, he must henceforward favor his bodily machine a little, as he would an automobile that has seen its best days. But even at that he may be able to do an amount of work that a man who had not so well cared for himself in earlier years would be quite unable to duplicate. And if he carries out the scheme of exercise with judgment and discretion, he may maintain

robust health throughout this period, and finally enter the last lap of the race in a condition that may with propriety be described as "fit."

I know men who have had sixty-five birthdays whom it would be an obvious affront to describe as old. They are sixty-five years *young*.

The remaining years might, perhaps, be characterized as the golf epoch. Doubtless golf is the best of games for the man who has distinctly and unequivocally passed his athletic prime. This is not to say that golf is a game to be scorned by younger persons. It is a good game for men and women of any age. But by itself it scarcely gives adequate exercise to meet the needs of a robust person of early manhood or middle age. It is pre-eminently a game for the old.

The indoor counterpart of golf is billiards; not an athletic game, surely, yet affording an amount of exercise that may be very helpful to the person of frail physique and to the one-time athlete against whom birthdays have been checked in the long series. The man in his eighth decade has muscles of only reminiscent strength and bones that are relatively brittle. He must conserve his energies. The walk across the golf links with an occasional swing at the elusive ball; or the walk about the billiard table with the mild piston-stroke of the cue against the ivory, will afford just the kind of exercise, seasoned with the stimulus of interest, that his superannuated (but not necessarily debilitated) mechanism needs. With these games there may be associated certain calisthenic exercises to meet special needs, and this is equally true of the exercises suited to the individual at any age.

WALKING—THE PERFECT CONSTITUTION BUILDER

By HARRY WELLINGTON

WHAT is the best of all exercises? That's easy. Everybody knows. It is the one form of activity that really keeps alive the millions of men and women who are neither interested in physical culture nor compelled to earn their bread by muscular exertion.

It is quite true that at the present day large numbers of people take their Sunday afternoon walk in an automobile. But there are still a few of us who continue to get along very well on "Adam's express." We put on our "glad rags" and try to make each Sunday afternoon a gentle imitation of the Easter Parade.

But how do we walk? The truth is that in many cases we do not. We poke. Some of us stroll. Some of us saunter. And many of us simply place one foot in front of the other, alternately, and thus progress gradually in a forward direction. But we do not stride, we do not walk, we do not loosen up—on these tedious Sunday afternoon airings, when we chiefly put on airs.

The real pleasure of walking—the full benefit of walking—cannot be realized except by waking up and stepping out in a manner to make one breathe and to set the blood in active circulation. It is not enough merely to walk. It is the way you do it that counts. Poking along slowly means stagnation of the circulation and the stiffening of the muscles. Next to standing still

WALKING
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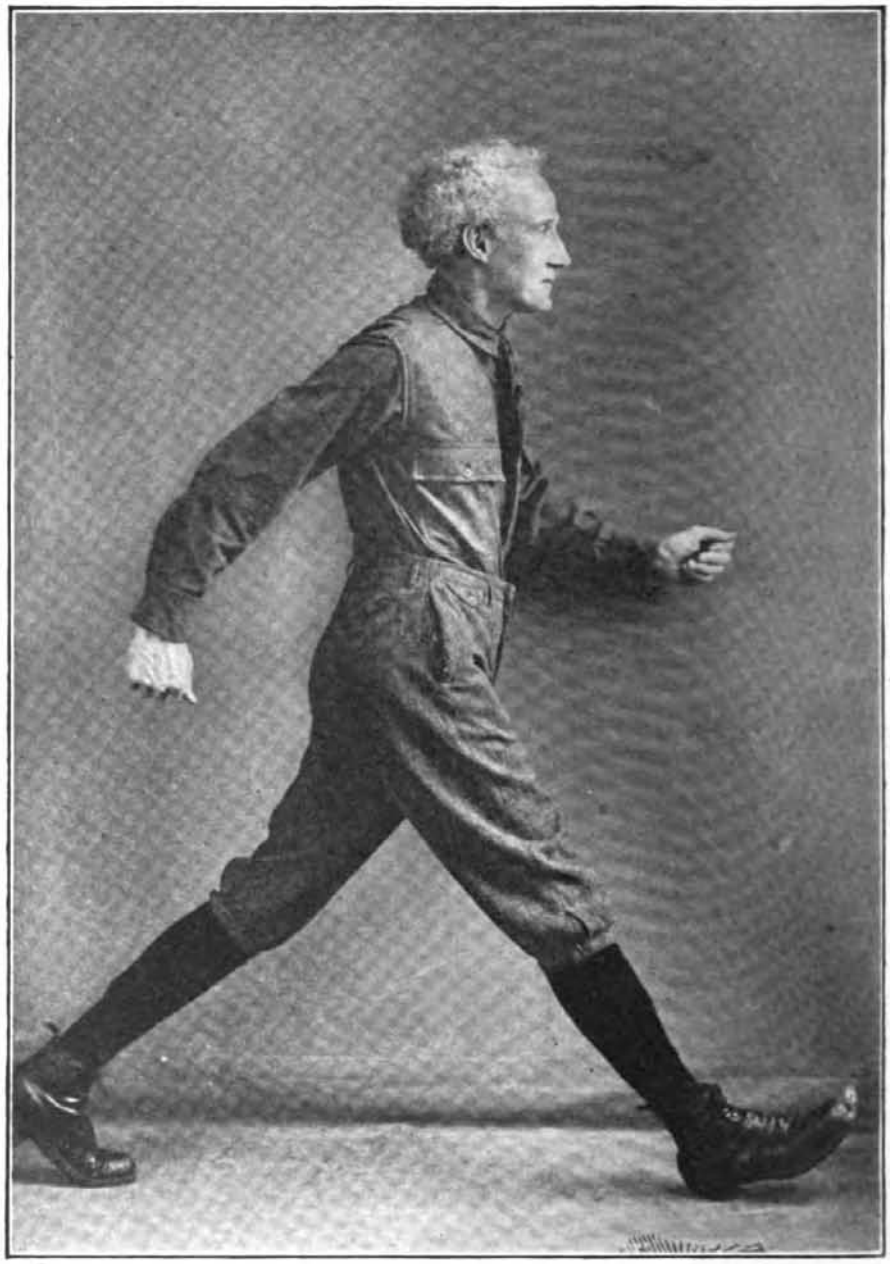


This photograph of James H. Hocking shows the characteristic heel and toe action with which speed in walking is acquired. The stride is helped by the vigorous forward and backward swing of the arms.

James H. Hocking at the finish of his one-day New York to Philadelphia walk at the age of sixty-three years, covering a distance of 97 miles in 19 hours and 16 minutes. He recently walked from New York to Buffalo, 405 miles, in 6 days and 4 hours, arriving at noon the seventh day. The photo shows the heel and toe stride, the hips swinging with the legs, that is, the left hip swinging forward with the left leg, the right hip with the right leg, and so on, thus adding inches to each stride. This is a "straight knee" gait, the locomotion power being derived from the large gluteal muscles of the hips. This heel and toe action enables one to swing on his way up hill without slackening speed, and with the least hill-climbing effort.

A typical walking club in action. Lovers of walking often find this splendid exercise most enjoyable when undertaken in the company of others. Many cities now have one or more walking clubs. There should be one in your community.

for a long time, there is nothing so fatiguing as slow walking. On returning home instead of feeling invigorated one feels like lying down. If you have walked lazily you will feel more and more lazy.

To enjoy your walk and benefit from it you must develop a stride sufficiently energetic to constitute real exercise, not only for the muscles, but for the internal organs. Your walk should wake you up, not put you to sleep.

It is not necessary to force your pace too much, but you should at least develop a good, free swinging stride that will carry you along in a way to cover the ground, or sidewalk, in such a way that you will have arrived somewhere when you have finished.

Much has been written on the subject of the stride for walking races. For ordinary comfort and pleasure, however, the athletic racing stride is not desirable. At the same time, a modified heel-and-toe action is necessary if you wish to make good time comfortably. In other words, while there should be no exaggeration of the heel-and-toe action, one will do best to feel the weight on the ball of the foot at the proper point in each stride. You will have a more swinging, elastic gait, a more comfortable carriage, and a better walking action if you follow out this idea. And always walk toeing straight forward. Don't turn your toes outward like "ten minutes to two."

The most important point, however, in attaining a comfortable long-distance stride is the knack of swinging the legs forward from the hip. In other words, there should not be too much knee action. If you swing the leg forward from the hip and at the same time swing

that hip forward slightly with the leg, you will find that you can to some extent lengthen your stride and attain a much better speed with no more effort. Try it. The action of this stride may be compared with that of a "pacing" horse, as against the high knee action of the "trotter." A little practice in this swinging style of gait will enable you to develop your own peculiar stride, or in other words, that with which you can travel most easily and effectively.

Good posture is, of course, a great advantage in walking. If you will first stretch your arms high above the head, thus raising the chest, you will find yourself well poised, and if you will maintain this position of the trunk of the body, swinging the arms freely at the sides and using the swinging style of stride above mentioned, you will be ready to negotiate distances with the least possible effort and trouble.

Walking is naturally at its best on country roads and dirt paths, not only because of the fresh, pure quality of the air, but because of the natural soft footing of earth. It may be said, however, that when, because of circumstances, one finds occasion to walk distances on stone pavements, the use of the much advertised rubber heels will be of great advantage. They relieve the shock of the heel upon the pavement and establish a condition not unlike that of walking on a dirt path. Rubber heels are being used more and more, not merely because "it pays to advertise," but because they really serve a valuable purpose in this way.

As for the distance to be covered, this depends upon the individual. There is no benefit to be derived from over-exertion. One should be guided by the limits of

his vitality and strength. It is better to walk with a fairly vigorous stride for a moderate distance, and thus develop strength, than to walk slowly for a long distance. By walking until slightly tired each day and gradually increasing the distance, one's power of endurance will be increased easily and naturally. The average man or woman, in ordinary health, should in a few weeks acquire the endurance to walk eight or ten miles at a good, free stride without becoming too much fatigued. Of course this is not a long walk, but it is sufficient for ordinary purposes. Even a walk of four or five miles will answer fairly well in the average case.

Cross-continental "hikes" are interesting, but because of the practical requirements of everyday life it is only the leisured few that can indulge in this pleasure. From the health standpoint, however, cross-continental walking has little or no advantage over ordinary hiking in one's own home locality.

The question of walking in company or in solitude is one to be determined by individual inclinations. There are many who most enjoy the privacy of a country walk in which one is left unmolested either to think out his business and personal problems or to enjoy the undisturbed contemplation of the beauties of Nature. Others, again, and probably the majority of people, prefer congenial company. It is for this reason that interest in this delightful exercise is stimulated by the formation of walking clubs. As we know, the health-giving value of any form of physical activity is all the greater when it is more enjoyed.

There should be a walking club in every community.

If there is one in your city or town, it will do you good to join it. If there is not, it is simple enough to organize a group or association for the purpose.

Just what degree of "organization" may be desired will depend largely upon the temperament and inclinations of those interested. There are some people who are natural born "jiners" who like to go through some red tape so that they may feel that they "belong" to something or other.

But it is really not necessary to go to any trouble in the matter of organization. It is a question as to whether the formal or informal type of walking club is the more permanent, but it is certain that neither will outlive the natural interest of the members in the activities and purposes of the organization.

The "Wanderlusters" of Baltimore, Washington, St. Paul and other cities are probably the best examples of walking associations without an iron-clad organization. As a matter of fact, they have never adopted any rules, elected officers or collected membership dues, and their "hikes" are kept up purely through the interest of those participating. The Baltimore Wanderlusters were the first in the field. In the beginning a small group of persons interested had an announcement published in the papers that they were planning to take a Sunday walk, starting from a designated place at a specified hour, and that everyone in town was cordially invited to participate. The idea proved to be an immediate success, and in a short time hundreds of persons turned out for the weekly hike. One of the more active spirits was selected as a "Pathfinder," by general agreement, and different routes were chosen on successive

Sundays. Different persons have at times acted as Pathfinder.

There was some doubt of the success of the plan at first, owing to the fear that some of the rougher elements in the town might spoil the pleasure of the others by their behavior. It was found, however, that a quiet walk of a number of miles through the country, with more or less fatigue at the finish, was not just the kind of diversion that would attract the rowdies, and no trouble of this kind was ever experienced. Those participating in the walks were found to be all good, wholesome people, having the refinement and intelligence to appreciate the advantages and pleasures of walking under such conditions. To a large extent they are lovers of Nature.

So many persons have turned out on some of these walks that they have often been termed "community hikes." It is estimated that fifteen or twenty thousand persons in Washington have, at one time or another during the past two years, participated in these outings. The usual plan is to start at two o'clock in the afternoon from the terminus of some street car line, and the distance covered is from eight to ten miles, practically consuming the rest of the afternoon. Places of historical interest are much chosen for objective points.

In New York City the walking clubs have chiefly taken a somewhat different form. The Metropolitan pedestrians are for the most part organized in athletic clubs having membership in the Amateur Athletic Union, and are intended to promote competition as well as health and recreation. The Walkers' Club of America is regarded as the pioneer of the big organizations in New York City, and has undoubtedly done a

great deal for the progress of walking as an American sport. For the past year or more a two-squad system has been in force to suit the requirements of the "veterans" on the one hand and the unseasoned or new members on the other. As a rule the beginners cover a distance of from ten to twelve or fifteen miles, while the other squad continues on to cover a distance of perhaps thirty-five miles. There is also a women's branch.

The other most prominent New York organization is the American Walkers' Association, Inc., "to promote walking for health, recreation and competition," but apparently somewhat less strenuous than the Walkers' Club of America, and more suited to those who simply desire the recreative and pleasurable aspects of the exercise. The distances average a little shorter, being ten, twelve or fifteen miles for the short distance squad, and averaging from twenty to twenty-five miles for the seasoned members, though sometimes covering thirty miles.

Which is the better type of club, that devoted to competition or that intended to promote the recreational and health building features of walking? Which is the better form of activity? No one can settle the question for anyone else. For the full-blooded, athletic young man, it is quite likely that only the competitive form of walking will make a very strong appeal. For others, and undoubtedly the greater number of persons, the "hike" for health" is the thing, with a more moderate pace and greater enjoyment of the beauties of Nature along the way. But certainly there is room for clubs devoted to both kinds of activity in every city. The lad who feels ambitious to smash George Goulding's records, or to

walk eight miles an hour, should have an opportunity to try himself out.

"Hikes" are likewise a feature of the activities of the Boy Scouts in many places and also of the Y. M. C. A. Camps for Boys. In the latter camps there is nothing to which the boys look forward more eagerly than a weekly tramp over neighboring hills or mountains, or through woods and valleys, carrying a pack, preparing their own simple meals as they go, and perhaps sleeping in the open with the protection of a good poncho.

There are many mountain-climbing organizations throughout the country, the foremost of these being the Appalachian Mountain Club, with headquarters in Boston, having a membership of nearly two thousand enthusiasts. They have marked many trails with the club's sign, an arrow bearing the initials A. M. C., pointing the way to attractive localities for the hiker. Each year new trails are marked out in the New England mountains. In favorite localities the club has erected camps and cabins which serve as a convenience not only for members, but for other walkers as well. Much interest is shown in mountain climbing in Salt Lake City and along the entire Pacific coast, the clubs for the purpose being almost innumerable. Mountain climbing is simply a more strenuous form of "hiking" and where the topography of the country is such as to provide the opportunity, there is no form of recreation more beneficial or enjoyable.

The difficulties of many of our best militia regiments on hikes of even moderate length have shown that the average citizen is not capable of walking more than ten

miles without unusual fatigue. On the other hand, seasoned members of the walking clubs are capable of tramping from thirty to forty miles every day without any ill effects. Fine marksmanship and the best military equipment in the world are of no use to the soldier who cannot march. However, the military argument is unnecessary. If hiking will make better soldiers, it will also make better men and women from every other standpoint.

FRESH AIR AND DEEP BREATHING

By BERNARR MACFADDEN

THERE are very few individuals who realize the value of air. If you walk along the street of the average city during the cool weather and note the closed windows that are to be seen everywhere, you will understand how few know anything of the value of air—how few fully comprehend the importance of oxygen in building and preserving vigorous health. Oxygen is the most important of all food elements. You can go without solid food for weeks—you can go without water for several days, but you cannot live without air for five minutes. There you really have the relative importance of air, water and food. If the average individual does not secure a satisfactory supply of good, pure, nourishing food, he becomes dissatisfied and is likely to acquire the impression that he is starving himself to death; but the same individual can breathe enclosed air over and over again and imbibe in a wholesale way the poisons that result from a habit of this character and yet he will make no complaint.

There is a vast amount of mystery connected with the human body, and we still have a great deal to learn. I am very much inclined to accept the theory which has been advanced that with every breath we inhale there is a certain amount of electrical energy, and that the oxygen furnishes this energy in the form of electricity. As the oxygen mingles with this vital fluid, the electricity (human energy) is taken up by the nerves and

carried to the nerve centers, where it is stored away in this human powerhouse. You can call it nervous force, electricity, and it is known by other names, but it is this particular force that furnishes the power to carry on the functional and all other processes of the body. It is this power that is used in digesting your food, in running, walking, in performing muscular feats, or even talking. This nervous force is also needed, even for mental work. In fact, more nervous energy is used in mental effort than when one is doing ordinary manual work.

I have often had mental workers say to me, "What is the use of my taking muscular exercise? I do not want big, strong muscles; I do not care to lift heavy weights. I want to reserve all my strength for mental effort." But I am inclined to think that these mental workers are beginning to realize that strength of the body is needed to give one the nervous energy that is required in mental work. The energy that is used by the brain is brought to it by the aid of the nervous forces, and the nervous forces of the body can be increased by building up additional muscular power.

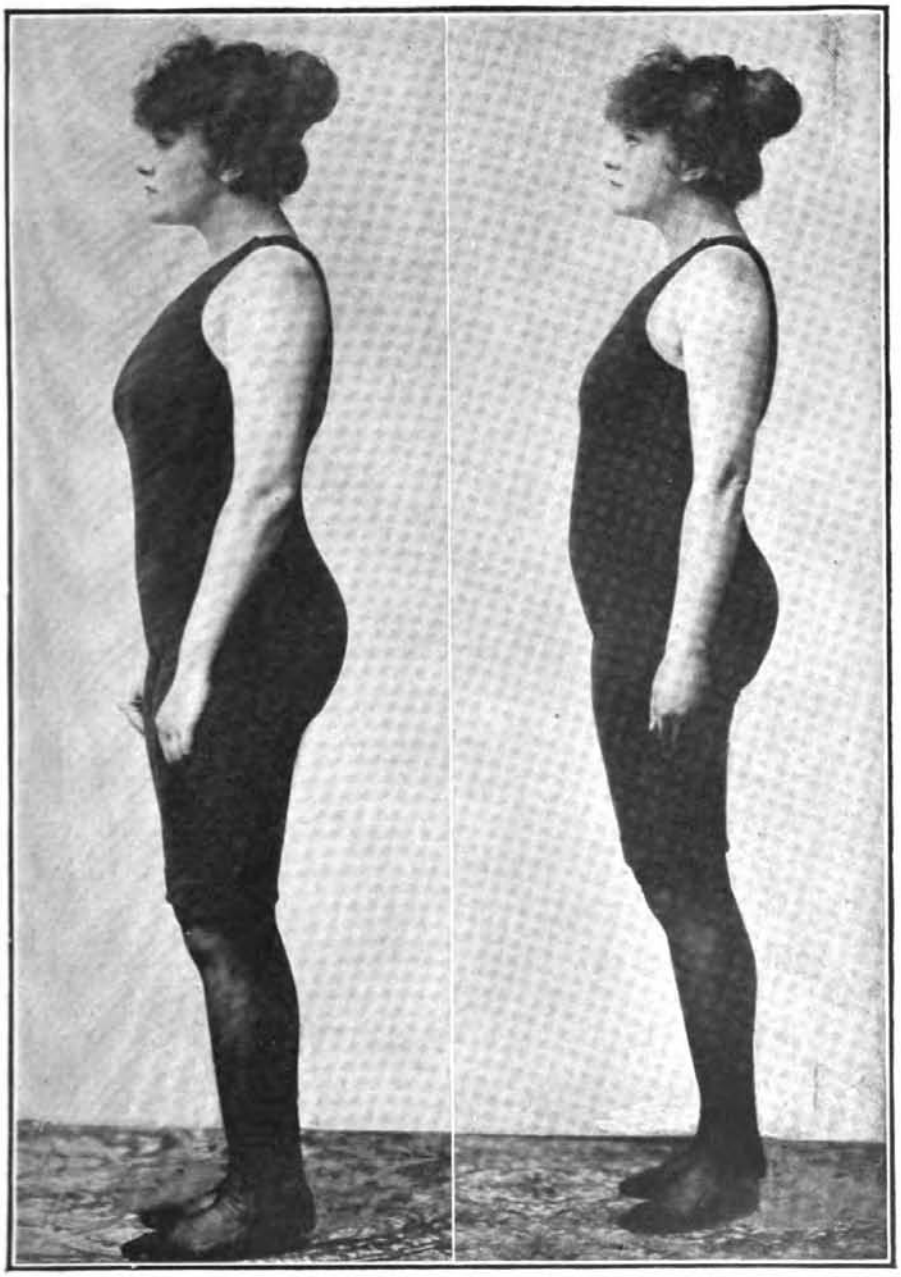
Many years ago, when I first became interested in these subjects, I had the value of fresh air called to my attention. At that time I had what might be called a perpetual cold during the entire winter. I was also very much afraid of lung trouble and was not far from the disease on several occasions. After absorbing a few of the theories as to the value of fresh air, I concluded to open my bedroom windows. I pulled down the windows an inch or two at the top and imagined that I was ventilating my room. At that time I had

developed considerable strength, though in the fall I would catch a cold and it would cling to me until the next spring or summer. With that cold I had the hollow, consumptive cough, and I did not free myself absolutely from these symptoms until I really and truly became a fresh air crank—until I learned to open my windows wide—until I fully realized that one really cannot secure too much fresh air, and that it is impossible to absorb more oxygen than one needs. When these important facts were impressed upon me, I pulled down or pushed up my bedroom windows as far as I could.

I know a great many are much afraid of draughts. A draught is nothing but a current of air. Go out of doors on any windy day and you will meet a draught. When you are sleeping in a draught, when the wind is blowing right on you, you may be absolutely certain that you are breathing fresh, pure air—provided, of course, you are not living in a smoky city. If the window is open but slightly, and the air in the room is not stirring, you are likely to breathe the same air two or three times; and when you breathe air more than once you are absorbing poisons—you are breathing a certain amount of carbonic acid gas. You cannot breathe air of that kind and maintain the highest degree of health. You need all the oxygen you can secure. Oxygen builds strength of the highest degree—it is a food of the greatest possible value. No matter what your occupation may be, you should demand good, pure air, and by all means rid yourself of the draught superstition. I know a great many are afraid of draughts. The fear of them has been induced because the average individual has an

idea that draught causes a cold. What is a cold? It is nothing more than an endeavor on the part of the functional organism to rid the body of a certain amount of impurities in the form of mucus. If your body is full of impurities and you do not catch a cold, you will probably, at a later period, have a disease much more severe. When there is too much poison in the body, one of the easiest ways of purifying and cleansing it is through the aid of a cold. Never be afraid of a cold; whenever you acquire a complaint of this kind, it is your duty to help the organism eliminate the excess poisons—help the body "clean house."

Very few know anything about breathing. I was professionally engaged in physical training a number of years before I learned the main facts about breathing. For a long time I was impressed with the idea that in order to secure the best results from a deep, full breath, one must draw in the abdominal region all he could while expanding the chest to its full capacity. I was also of the impression that one should hold the abdomen in as much as possible when walking, in order to maintain a proper position of the body, and I had followed this out so carefully that I had actually restricted my lung capacity. After a while I began to notice that my strength was not as great as it had formerly been. On one occasion, about this time, I started on a mile run. I was amazed at the result, for I was tired out before I had reached half the distance, and naturally I was puzzled as to what was the matter. I finally concluded that it might, perhaps, be in the breathing, and instead of trying to see how much I could swell out my chest I began to breathe abdominally, or diaphragmatically,



Showing correct diaphragmatic breathing. The chest walls are held entirely unmoved, the lung expansion being accomplished by downward action of the diaphragm which causes expansion of the body in the abdominal region and around the waist-line. Exhaling causes a flattening or retracting of the abdomen as in the photo at the left, while inhaling causes expansion, as in the photo at the right.

drawing in the breath and expanding the abdominal region. By merely making this change in my breathing I found I could run a mile without tiring in the least. That proved to me beyond all doubt that previously I was not using all my lung power. I was crowding my lungs and not using their full capacity.

Very few men breathe correctly, and women are more at fault in this regard than men. If you want to know how to breathe lay on his back a small child that has never been hampered by restrictive clothing, and then watch him breathe. You will notice that every time he draws in a breath, the abdominal region will rise, and every time he exhales one, the abdominal region will lower. This will give you the basis for a proper method of breathing. When the abdominal region rises, the diaphragm which separates the lungs from the stomach, intestines, etc., goes downward, thus drawing the air downward to the lowest part of the lungs and filling to their fullest capacity every air-cell in the lungs. As the diaphragm goes downward, a certain amount of motion is transmitted to all the important organisms below the diaphragm—the stomach, liver, intestines, etc.—and this small motion induced by proper breathing unquestionably has a very beneficial effect upon the entire digestive process. The process of digestion is carried on much more satisfactorily when you breathe correctly than when you breathe merely from the chest.

Most women are chest-breathers—that is, they breathe from the chest alone. There is practically no evidence of the breathing process in their abdominal region, and this accounts for the small breathing capacity of most women. The breathing capacity of the average

woman is usually less than two-thirds of that of the average man. This restricted breathing also accounts to a very large extent for the weakness of the average woman. This statement may seem surprising to many, but the strength of one's body depends very largely upon the lung capacity, and a man or woman with a large breathing capacity is usually far above the average in muscular and nervous strength. Therefore you will find that in every system of health building you are required to give a great deal of attention to what we call deep breathing. Breathing exercises fill the body with oxygen and create human electricity, so that if you give the theory a thorough trial, you cannot doubt the truth of this statement. If you are trying to build the highest degree of attainable strength, you will have to give a great deal of attention to the needs of your body in the matter of oxygen. There are various methods of acquiring the deep-breathing habit. The average individual is a shallow breather—he does not use the full capacity of his lungs, and when he breathes in this manner he cannot develop the human machine to its fullest capacity. Whenever you go into the open air, you should try to acquire the habit of drawing in a deep, full breath, filling the lungs to their greatest capacity and being careful always to expand in the abdominal region first. Thereby the air is drawn down to the lowest part of the lungs, and every air-cell secures the benefit of an increased supply of oxygen. If you form the habit of drawing in the air in this manner every time you go into the open air, you will finally be taking deep breaths unconsciously. A habit of this kind will result in supplying your body with oxygen, with power, in

greatly increased quantities. It is only those who follow this rule that know the full meaning of superb, exhilarating health, and when one believes in developing this kind of health, he cannot ignore the requirements of the lungs.

I most emphatically condemn anything that restricts the expansion of the abdominal region, thus interfering with the natural action of the diaphragm. If the abdominal region is restricted, it cannot move outward, and the diaphragm cannot pull the air downward into the lowest part of the lungs. Any restriction of the abdominal region is, therefore, detrimental to health, and yet you hear some women say that a corset cannot injure them. I firmly believe that this restricting device is one of the principal causes of the complaints from which women are everywhere suffering at the present time. You need all the power you can secure to run your human machine. You need energy to digest your food, you need energy even to wink your eye. There is not a single functional process carried on within the body that does not use a certain amount of energy, and if you restrict the capacity of your lungs, you will to a certain extent lessen your manhood and your womanhood.

I believe that the average woman should be nearly as strong as a man. I believe there should be but little difference in the strength of the sexes. You will find that the female among the lower animals is very nearly as strong as the male. Some of our best race horses, for instance, are females. Female gymnasts are as strong and capable as the men, and some of these women attain wonderful strength.

Rhythmic breathing is of very great value. For instance, when you are walking or running, and want to increase your energy, take the same amount of time to draw in your breath as you do to exhale it. If you are walking, inhale your breath during six or eight steps, and then take the same amount of time to exhale it. When you are beginning a walk, it is a good plan to extend the steps as much as possible, always being careful, however, to take the same amount of time to breathe outward as you do to breathe inward. The importance of this suggestion is due to the fact that you empty your lungs and fill them more completely at each breath. After you have walked a while, you will require more air and will have to accelerate your breathing; but I can assure you in advance that you will be able to walk much farther without becoming fatigued than when breathing in the ordinary way. In fact, I have found cases where one has become very much fatigued while walking or running, and by simply adopting the suggestions given herewith the tired feeling disappeared. If you do not believe this statement, try it yourself. I am fully convinced that my success in life has, to a certain extent, been due to proper breathing. Whenever I go into the open air, almost unconsciously I draw in a deep, full inhalation. You cannot do anything in life without energy, and when your body is filled all the time with superabundant power, work of any kind ceases to be a task and becomes a pleasure.

Don't be influenced by the night-air superstition! Night air may not be so full of oxygen as the air which you breathe during the day when the sunlight is permeating it, but it contains all the elements necessary to

maintain the highest degree of health, and even if it were possible to shut out the night air, it certainly would not be advisable to shut in a room and breathe over and over again the same air, for then you would simply be breathing poison. Under such circumstances you are bound to rise in the morning with a sleepy and "loggy" feeling, and during the day you will suffer from lack of energy, because at night, when the voluntary powers of the body are at rest and the rebuilding process within the body goes on, you have not normally profited therefrom. The body absorbs new force, new energy, when you breathe good air all night, and you will then awake refreshed, feeling strong and thrilled with new power.

Do not be deceived by the damp-air theory! Damp air is not different from any other air, except that there is a certain amount of moisture held suspended in it. This dampness cannot hurt the lungs any more than water would hurt the stomach when it is required. In large cities where there is a great amount of dust floating around, dampness is in many cases advantageous, because the dust merely sinks to the ground. Damp air cannot harm anyone. A foggy atmosphere may not be as pleasant as the dry air that comes with clear sunlight—it may not have such a vitalizing influence, but there is not a great deal of difference. Foggy air contains a vast amount of oxygen, and breathing it deeply will always bring advantageous results. When the air is full of dust or smoke, the conditions are otherwise. Dust is harmful to the lungs. The same can be said of smoke. When moisture is taken into the lungs, which occurs when the air is damp, it is readily absorbed and

can do no harm; but dust or smoke, when inhaled in very great quantities, is bound to interfere with the action of the lungs, and in time is likely to produce disease.

In conclusion let me emphasize the necessity of acquiring the deep-breathing habit. Develop your lungs to their fullest capacity, expand in the abdominal region. Do not wear anything that will restrict this expansion, and whenever you go into the open air from a closed room, be sure to follow my suggestion and fill the lungs to their greatest capacity. If you follow this advice you will soon notice a gradual increase in your strength—you will possess a clearer brain, and there will be far more opportunity for the attainment of life's greatest success.

DIAPHRAGMATIC AND INTERNAL EXERCISE

By THOMAS LLOYD SWIFT

THE most important fact about physical culture is that strength can be cultivated or built. This applies to internal strength as well as to the state of vigor of the large external muscles. We speak of the important large muscles of the body as external only in their relation to the vital centers.

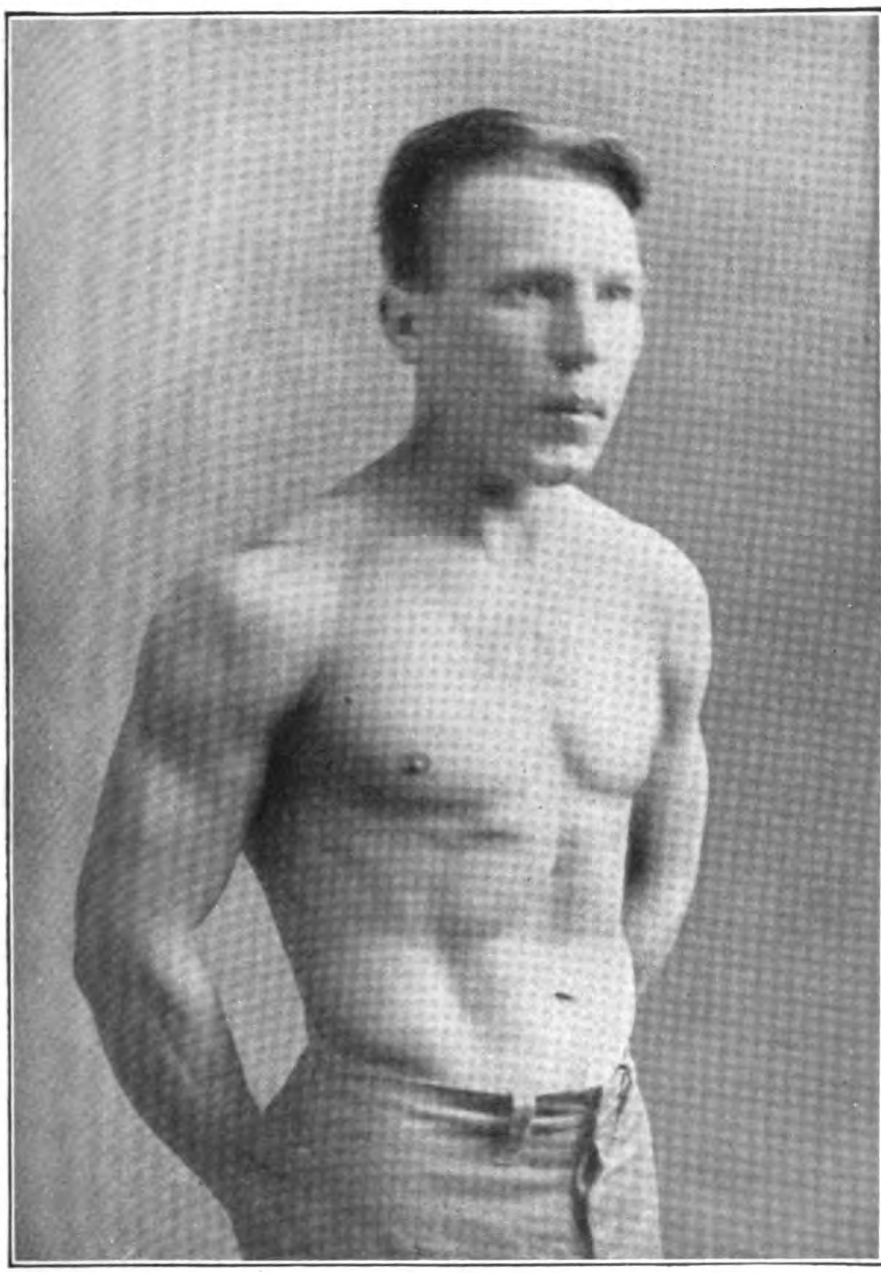
Everyone knows that a person becomes soft, flabby and weak if the muscles are not used. Inactivity or stagnation means loss of tone in the muscles and a weakening of the circulation. But this softness or weakness is even more deplorable where the internal structures are concerned. Fortunately, most forms of muscular exercise, and particularly those which call for endurance, and thereby require prolonged extra work on the part of the internal machinery, have the incidental effect of strengthening and toning up all of the vital organs. Not merely the heart and lungs are put to extra effort, but the liver, kidneys and digestive functions are similarly stimulated.

All of these organs, however, are more immediately affected by special exercises that involve internal muscles. One should remember that the biceps, the leg and back muscles and the others of which we are commonly aware, are not the only muscular structures of the body. The heart is essentially mechanical and muscular in nature. The entire alimentary canal is largely muscular

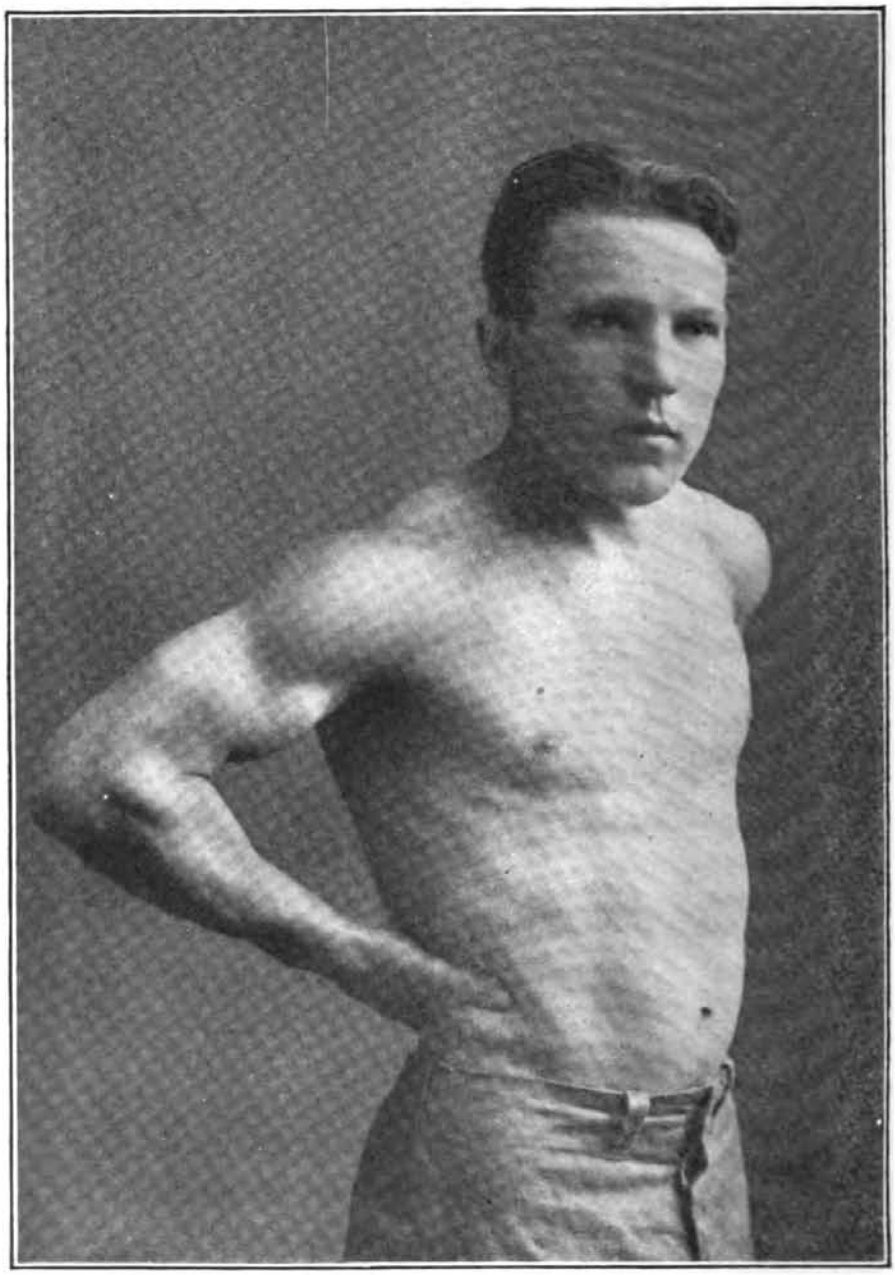
in make-up. Swallowing, for instance, is a purely muscular action. There are tiny muscles in the blood vessels. There are innumerable muscles throughout the body of which one ordinarily is never conscious.

But the most prominent and important of these is the diaphragm. It is a broad, flat, muscular structure something in the form of an inverted bowl. Or you can think of it as a soup plate upside down. It forms the floor of the chest cavity, containing the heart and lungs, and it is also the ceiling or roof of the abdominal cavity, containing the stomach, liver and other viscera. The diaphragm is the chief instrument in breathing. By the contraction of its muscular tissues, the diaphragm is flattened downward, thus enlarging the upstairs room, or chest cavity, and drawing air into the lungs. In other words, breathing is a muscular action depending chiefly or primarily upon the diaphragm, though also upon the chest muscles and upper chest expansion when large quantities of air are needed, as in times of unusual effort.

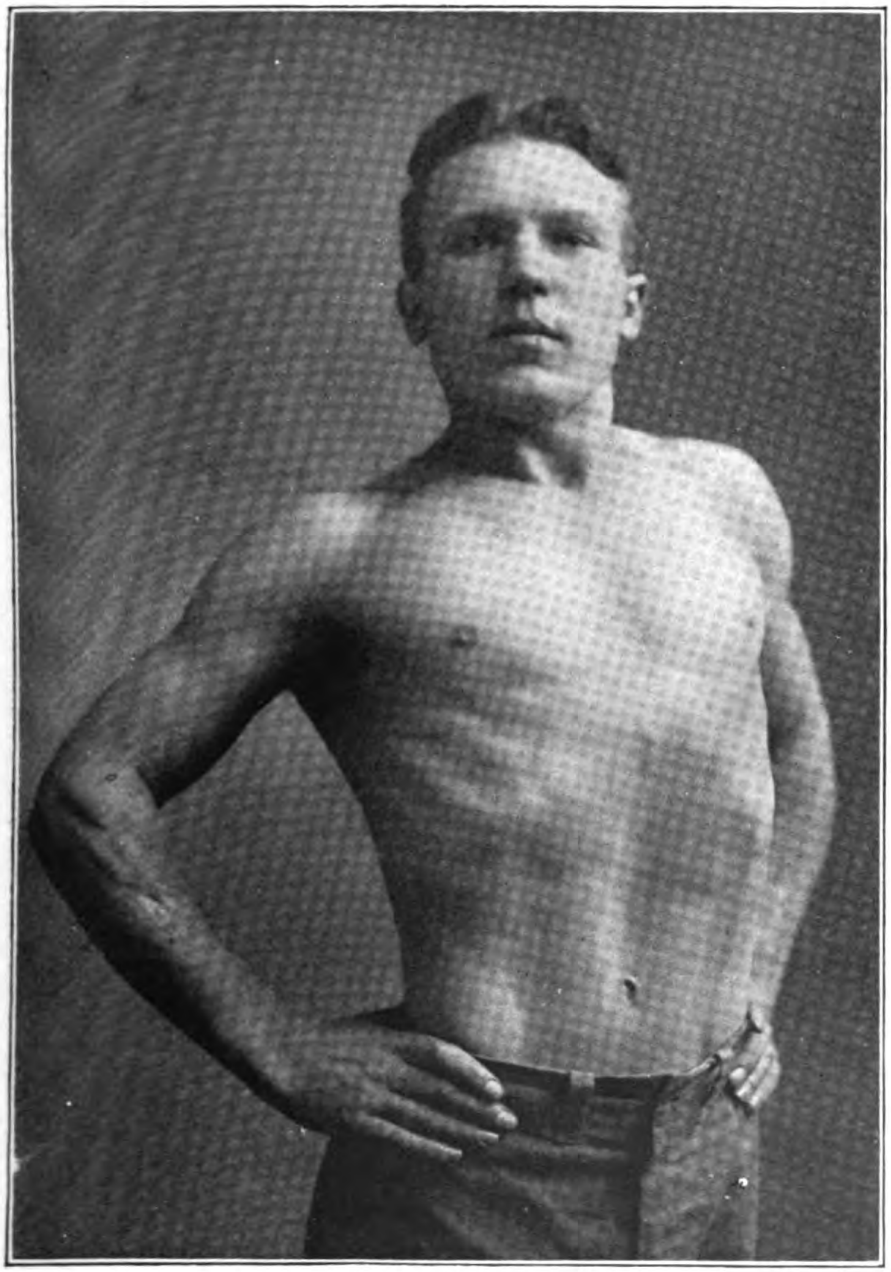
It is a simple enough matter, therefore, to exercise and strengthen the diaphragm just as one may strengthen and exercise other muscles of the body. You can tense or harden your biceps and you can thereby "feel" the sense of muscular strength and vigor in this large muscle. In the same way you may learn to contract or tense the diaphragm and thereby secure the feeling of muscular strength in this great internal muscle. Indeed, it is possible to cultivate in this muscle a condition of strength in this respect that is perhaps equal to the vigor of the powerful muscles of the arms and legs.



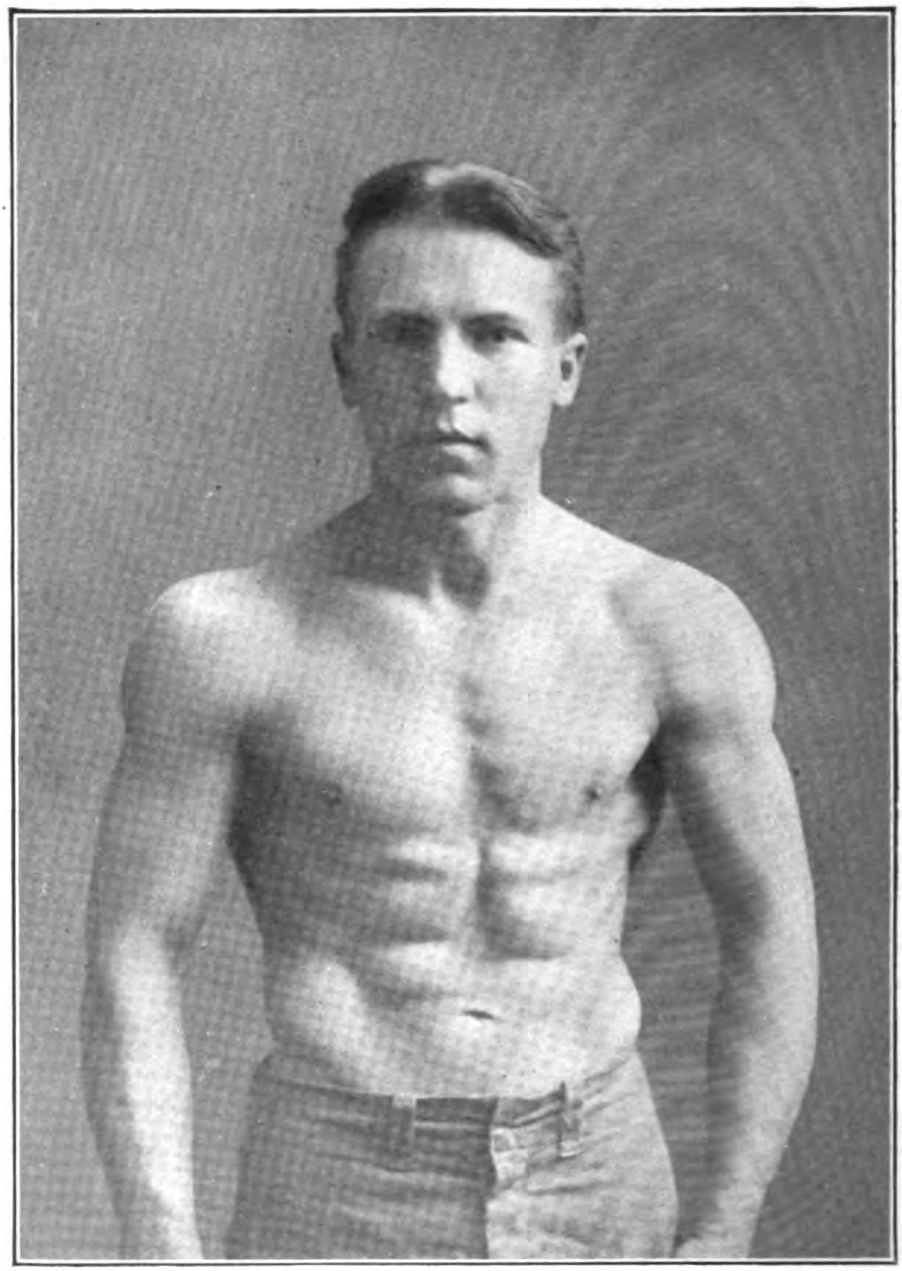
The first step in strengthening the diaphragm is to secure control of it. By exhaling slowly through the almost closed lips, that is, blowing gently, you will develop the muscle sense which will tell you where the diaphragm is. Then blow harder.



To make sure of correct diaphragmatic action in breathing, place your hands at sides and back, as illustrated. You will be able to feel the expansion of the body not merely in the abdominal region, but through the back and sides.



Bending slightly backward, inhale and exhale without action of the chest walls, but by diaphragmatic effort only, expanding and contracting in the region of the stomach and waistline.



Following the preceding exercise, bend very slightly forward and contract the muscles of the stomach vigorously. This will involve not only the external muscles, but internally the diaphragm.

The first thing necessary is to learn diaphragmatic breathing. It should really not be necessary for you to learn this, inasmuch as it is natural for everyone to breathe in this manner. That is the way you breathe when you are asleep or otherwise unconscious of your inhalations and exhalations. Nevertheless, in order to gain voluntary control of the diaphragm it may be necessary for you to practice conscious diaphragmatic breathing; that is, the use of the diaphragm under the control of the will. This has often been taught in connection with instructions on deep breathing.

Deep breathing is a splendid habit. One who takes vigorous bodily exercise will naturally be induced to breathe as deeply as necessary through the exercise. Under conditions of inactivity, however, the habit of deep diaphragmatic breathing can be cultivated by consciously inhaling and exhaling a number of times at intervals throughout the day. Having once gained control of the diaphragm through this conscious breathing, so that you can feel its muscular contraction, you can proceed to increase the vigor of these contractions and by this method gradually strengthen internal muscles.

One of the best exercises for the purpose, the first one illustrated, consists in blowing the breath through a small opening in the lips or, in other words, forcing the breath out against resistance. Blowing a cornet would serve the same purpose. Pucker your mouth as in whistling. The smaller the opening in the lips the more vigorous the effort in forcing the breath through it. You will "sense" the element of internal muscular effort, although the external muscles are also involved in blowing.

Another good way to gain control of the diaphragm is found in connection with inhaling the breath. Place the hands on the small of the back with thumbs at the sides, so as to feel the expansion of the body in this region. In proper diaphragmatic breathing the expansion at the waistline is not only noticeable in the abdominal region, but may be felt at the sides and in the back. The entire body at and just above the waistline is enlarged.

When you can keep the upper chest still and feel this expansion at the sides and back while inhaling, you will know that the diaphragm is being put into full action—and that you are breathing diaphragmatically.

It is now a simple matter when inhaling not merely to draw in the breath, but also to contract the diaphragm more vigorously, which gives a bearing-down sensation in the region of the stomach. By continued practice and increased control you can learn to make this contraction very powerful indeed until you experience a sense of great strength in this region.

There is one advantage in taking exercise of this kind in that it can be practiced in the company of others without anyone being the wiser. The exercise is all out of sight—beneath your clothing—and there is not necessarily any movement in the outlines of the body as a whole. The best plan is to go through these simple exercises several times, each at various intervals, during the day, or whenever you think of it. The presence of other people does not matter.

The most simple exercise of expelling the breath forcibly and contracting the diaphragm downward with the inhalation may be attempted as soon as you get a

fair degree of muscular control. Then, instead of simply using the downward pressing impulse of the diaphragm, you may make the effort to push forward or outward with the stomach, alternating with the drawing of the stomach inward or backward as far as possible. These exercises will naturally involve the co-operation of the external muscles, but these also should be kept in as vigorous a condition as possible. Firm muscular walls in this region of the body are conducive to internal strength.

In these diaphragm contractions there is involved a considerable amount of massage of the digestive and other organs in the abdominal cavity. The liver is massaged and stimulated, for instance. All parts are "waked up." There is an increase in the circulation, not only of the muscles, but all of the tissues adjacent to these muscles.

CORRECTIVE EXERCISES

By BERNARR MACFADDEN

EXERCISE is valuable not merely for muscular development and strength building, but as a remedial and corrective measure for various bodily defects. The truth is that practically all setting-up exercises are corrective in their influence. The man or woman who takes no special systematic exercise is likely to develop habits of bad posture which tend to become permanent until the body is actually deformed. Even sports and games do not always insure a perfect or symmetrical development. One may engage in base-ball and a variety of other games which are beneficial from a strength building or constitutional standpoint and still may remain round shouldered and continue in habits of faulty posture. It is for this reason that systematic exercise intended to straighten and "set up" the body is of value even to the athlete. It is for this reason that sports and athletic games cannot entirely take the place of systematized exercise.

There are a number of conditions, however, which deserve special consideration from the standpoint of corrective gymnastics, such as flatfoot, flat chest, round shoulders, spinal curvature and other forms of deficient development. Probably the better plan of presentation is to consider each of these by itself.

FLATFOOT:

This subject is mentioned first partly because it is a good example of the curative value of specially selected

exercise, and partly because of the large percentage of persons suffering from more or less difficulty of this kind. Flatfoot proved to be one of the chief causes for rejection among candidates for army service. In some instances no less than twenty per cent of the rejections for army service were due to flatfoot and weaknesses of the feet.

There is no necessity for flatfoot, even among those who are over-weight. It is curious that the American Indians are practically free from this complaint. Likewise it has been found that the barefoot races, or those using only sandals or moccasins, scarcely know what it means to have flatfoot or any weakness of the feet.

Flatfoot consists in a weakening and breaking down of the arch of the foot, which is composed structurally of a number of small bones held in place by ligaments and muscles. This arch forms a natural spring in the foot. The arch forms chiefly the center and inner side of the foot, the outer edge of the foot being so constructed as to come in contact with the ground along its entire length.

Flatfoot is the result of abuse or wrong use of the feet. The causes are lack of walking, wrong walking, long standing, wrong standing and improper foot gear.

The first and most important exercise for preventing and also for correcting flatfoot consists in walking with the toes pointing straight forward instead of turning outward. The old military drill position of standing with heels together and toes separated at a wide angle is a misuse of the feet. In some modern armies even the standing position at military drill has been changed so that the feet are held parallel with each

other, toeing straight forward and a few inches apart. This is ideal, both for standing and walking.

In toeing straight forward when walking, the weight of the body is thrown very largely upon the outer edge of the foot, thus relieving the strain upon the arch which forms the inside edge. In toeing out there is an unusual strain upon this arch. You can demonstrate this in half a minute by walking across the floor both ways in your bare feet. Do not turn the toes in. Simply toe straight ahead. It will then be noticed that in rising upon the ball of the foot, the ankle swings slightly outward. This is characteristic of the normal action. In nearly all cases the mere habit of walking with toes pointed forward and especially placing the weight on the outer edge of the foot will quickly correct any tendency to flatfoot. In addition to this, the exercise while standing of bending the ankle inward, that is to say, raising the inner edge of the foot from the floor and shifting the weight to the outer edge of the feet, is most effective. Also the exercise of rising high upon the toes when the feet are either parallel or the toes slightly turned in will be extremely beneficial. Also the effort of turning the toes downward and doubling the feet inward in a manner corresponding to the doubling of the fist would help greatly in strengthening the muscles and ligaments concerned.

Of course one should first of all secure common sense shoes in which the inside line allows the big toe to point straight forward, and in which there is plenty of room for all the toes. Ask any shoe dealer for his best "common sense" shoe. Artificial arch supports are not necessarily helpful. Sometimes they are detrimen-

tal. They act as a crutch and tend to accentuate any weakness. In other cases they act unfavorably by pressure on the weakened parts. If they truly give relief they may be used for a short time until special exercises have strengthened the feet and made them unnecessary.

Long hours of standing upon the feet is, of course, detrimental, especially when toeing out. Walking, however, is always favorable. It strengthens the feet, especially when toeing straight forward. If one must stand for long hours as in the work of a policeman, waiter, shop salesperson or housekeeper, the frequent shifting to the outer edges of the feet, turning the ankles in, and rising upon the toes will relieve the strain and prevent what otherwise might produce a tendency to flatfoot.

Except in the most extreme cases of hopelessly broken down arches, these exercises will bring about a very rapid, complete and permanent cure of flatfoot. In those cases where artificial support seems to be desired, it may often be secured by binding or strapping the feet with wide adhesive plaster.

SPINAL CURVATURE:

A curvature of the spine may be the result of disease, but it is more usually due to faulty posture, and to the muscular weakness which in turn is usually the basis of poor posture. The ideal treatment consists in exercise and correct position in standing, walking, sitting and sleeping. In serious cases mechanical braces may be necessary to support or straighten the back, but the objection to such devices is that through artificial support they still further weaken the muscles of the back. There-

fore, even if one uses plaster casts or mechanical braces, he should devote a certain amount of time each day to exercises which strengthen the back muscles, so that in time the artificial supports can be discarded.

Practically all back stretching, back bending, and spine twisting exercises are valuable to restore the spine to its normal lines. The spine stretching movements are especially valuable. In the case of a lateral curvature to one side, the emphasis should be placed upon bending movements that tend to straighten out this curve.

If there is a lateral curvature to the left side, it is well to cultivate the habit of sleeping on the right side so that the very weight of the body would tend to straighten this curve. Sleeping on the left side would tend to aggravate it. In such a case also, in addition to special exercises for the back and for good posture given elsewhere, the frequent practice of stretching the right arm upwards and the left arm downwards will have a valuable corrective influence.

ONE SHOULDER DROOPING:

It is a very common thing to see men and women with one shoulder lower than the other. Sometimes this is even accompanied by the bending of the head a little to one side. This condition is invariably the result of bad position in sitting and standing, sometimes the result of one's occupation. And it is usually accompanied by more or less spinal curvature. For instance, if the right shoulder is lower than the left, it usually goes with a curvature of the spine to the left. In such a case all forms of exercise for the back and shoulders, including

stretching movements, and special care in good posture will be necessary. The ideal exercise is the continuous stretching of the right arm and shoulder upward while pulling the left arm and shoulder downward, or vice versa, if the other shoulder is the lower.

ROUND SHOULDERS:

This is a very common defect, purely the result of faulty posture. Improperly constructed desks at school and long hours of work at a desk are commonly conducive to this condition. All exercises that tend to bring the shoulders back, or even which tend to raise the arms or the chest, are conducive to an improvement in this condition. The mere injunction, however, to hold the shoulders back is not sufficient, for the root of the evil is more fundamental. It lies in an improper position of the spinal column itself. The upper part of the spine is bent too far forward, or in other words, the dorsal curve is too marked. Exercises for bringing the head back, thereby straightening the spine and raising the chest, will do more in overcoming round shoulders than any exercises for the shoulders themselves. All movements of bringing the arms backward and upward will help, for all such movements are corrective of poor posture.

FLAT CHEST:

A flat appearance of the chest does not always indicate any structural deficiency, inasmuch as it may be due to poor posture and the bringing forward of the shoulders such as to give the chest a flat appearance. Upon securing a correct military carriage, the same

chest no longer appears flat. In other cases, however, there is a real lack of development of the chest itself. The main requirements are deep breathing and posture exercises. A special discussion of exercises for the chest will be found in another section.

PIGEON CHEST:

The condition known as "pigeon chest," sometimes called "chicken breast," is usually a real deformity of the chest produced by the breast-bone projecting too far forward, or by the ribs being attached to it at an angle instead of according to the normal conformation which gives one a satisfactory breadth and roundness of the chest. This is a condition usually overcome without much difficulty, especially in childhood or youth, by the practice of athletic sports. Especially the practice of deep breathing, filling the chest full of air and expanding it as much as possible, many, many times each day for a numbers of years, will so improve this condition that it will eventually give one a normal conformation of the chest. The practice of sleeping on the chest is excellent, tending to press the sternum or breast-bone back into its normal position.

PROMINENT ADAM'S APPLE:

While there is nothing abnormal about the so-called "Adam's apple," which is merely a projection of the upper end of the trachea, or "wind-pipe," containing the larynx and vocal cords, yet in some cases of lack of neck development its prominence is more or less unsightly. A prominent Adam's apple usually goes with a deep bass voice. But all-around exercises for the

neck, tending to build up the muscles and other structures of the neck, will so round out the throat as a whole that the Adam's apple no longer appears prominent.

Bow-Legs:

It is very difficult or perhaps impossible to remedy bow-legs after complete growth has been attained, though possibly by persistent pressure applied each day on the outside of the legs some change may be accomplished. A very heroic treatment consists in breaking the bones and straightening out the curve so that upon healing the legs will be straighter, but very few of us desire to have our bones broken purposely, even for such a result.

It is comparatively easy, however, to remedy bow-legs in infancy and childhood, especially if the child is well nourished. The fact is that most cases of bow-legs are due to food deficiency. Many babies become bow-legged upon first learning to walk, but if they are fairly well nourished the bend in the legs will disappear naturally in the process of growth. A bow-legged child of one year may have perfectly straight legs at the age of three or four. If the child suffers from "rickets," due to poor food, however, it would be difficult to overcome this condition even by corrective measures. If the baby has bow-legs the best treatment is to stroke and rub the outer side of each leg, in other words, pressing inward and thus tending to straighten the curve. Too much pressure is not necessary. Moderate stress will accomplish results. Another plan to straighten the legs is to hold the heels together and then press the knees together in this position with the legs straight. It is all very simple.

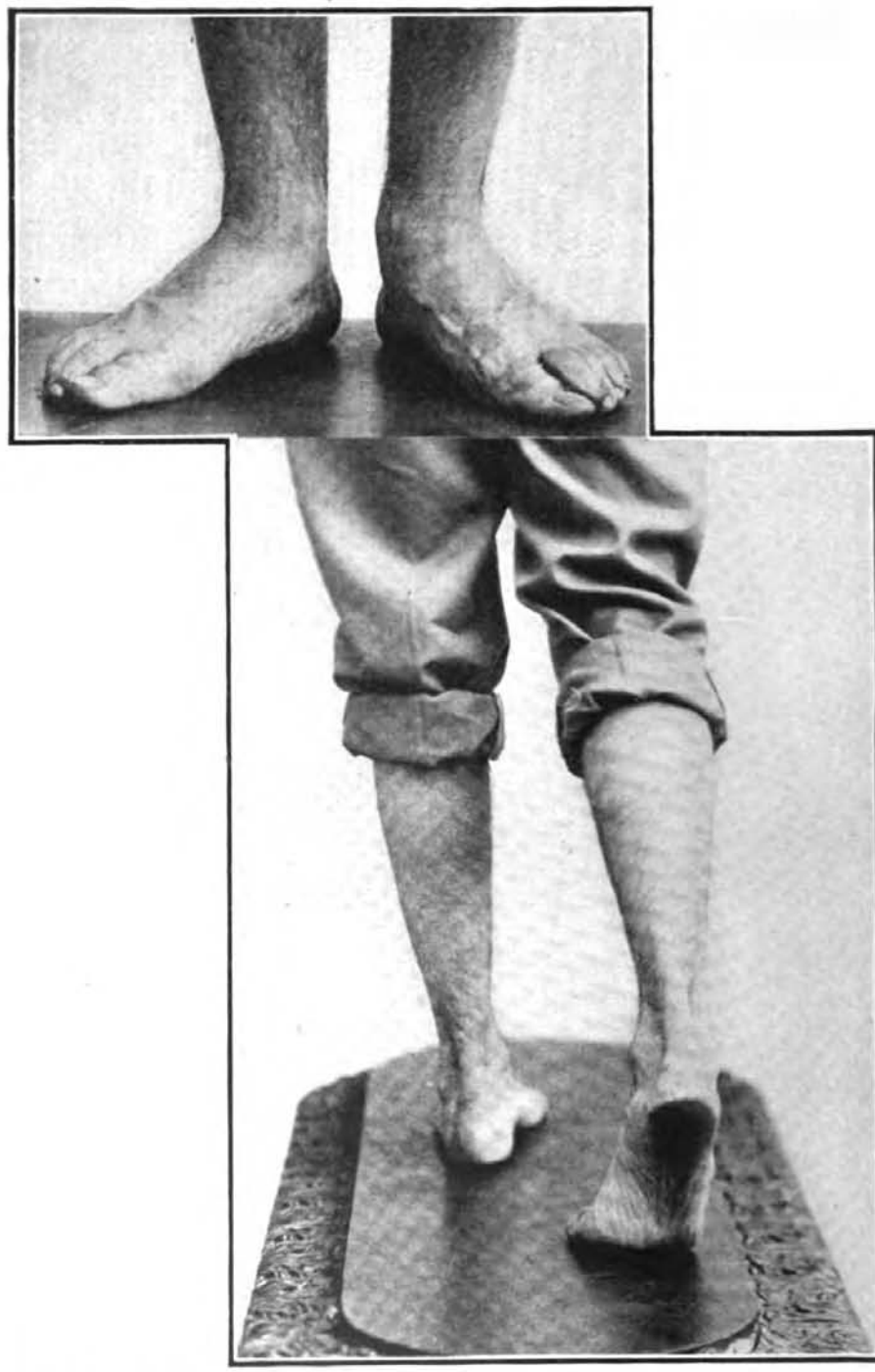
KNOCK-KNEES:

The condition usually known by the name of "knock-knees," in which the lower legs bend outward somewhat from the knees, is just the opposite from bow-legs, except that the bend or defect is chiefly at the knee joint. This is fairly common among women, and it may be said that in a certain measure it is more or less a natural condition among them, due to the different feminine bodily structure. The greater relative breadth of the hips in women makes it inevitable that when the knees are brought together there will be a slight measure of this knock-kneed condition. It is not unbeautiful and should occasion no concern. In an exaggerated case the treatment, which of course is more effective in childhood, consists in pressing the knees outward with the ankles strapped together. One may wedge a pad between the knees in such cases. Also knee-bending movements during which the knees are pressed outward are effective.

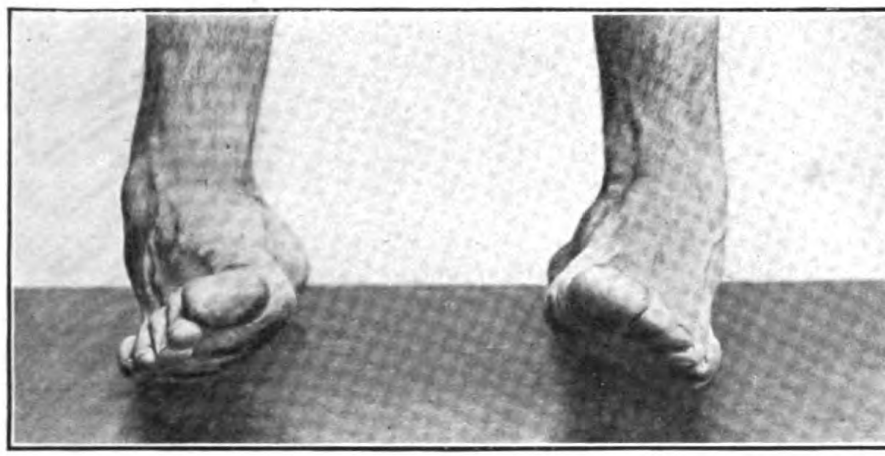
PROTRUDING ABDOMEN:

It will be found that most bodily defects which are not inherited or the result of accident, are due largely to a lack of development. General muscular exercise will always have a corrective influence. For instance, there is a condition, known as Enteroptosis, which involves a sagging down or displacement of the stomach, liver and other organs, crowding the abdominal region and producing a protruding abdomen. Exercises which strengthen the abdominal walls will tend to prevent this, through giving firmness to all the parts. But what is even more important is correct posture. If the body is held erect, the chest normally raised, the abdomen

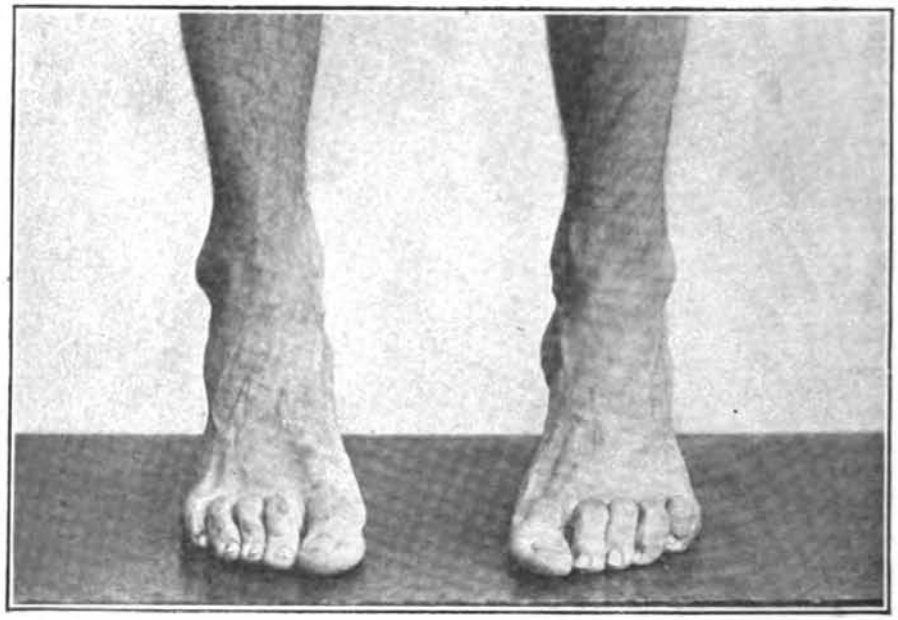
CORRECTIVE EXERCISES
FOR
FLATFOOT



The upper photo shows not only the incorrect position in standing and walking, but also a pair of abnormal feet, showing the breakdown of the arches along the inner edge as a result. The lower photo shows not only correct position in walking, but also a pair of normal feet. Note the strong healthy arches on the inside line of the foot. In this stride the feet are toeing straight forward, but when rising on the toes the heel swings slightly outward, giving it a toeing in appearance.



This is the ideal exercise for the correction of flat foot, shifting the weight of the body from the arch on the inside line to the outer edge of the foot. Practice this movement many times daily.



This exercise of rising on the toes should be performed toeing straight ahead or even toeing slightly inward and preferably shifting the weight to the outer edge of the balls of the foot in doing so.

will be more or less retracted and all of the organs will be carried in their normal position. Under such conditions they can function best. It will be seen, therefore, that both strength of the abdominal muscles and good posture are desirable.

BODILY DEFECTS IN GENERAL:

Practically all ordinary deficiencies can be overcome by persistent exercise. If the calves are too light, concentrated and persistent dancing exercise will build them up. If the ankles are too heavy, active movements such as running, rope skipping, dancing and jumping will be effective in removing the superfluous fatty tissue. The bones cannot be reduced in size.

If the back is weak, exercise will strengthen it.

If the legs become tired through mere standing and walking, more energetic exercise such as running or carrying a load up stairs will so strengthen these muscles that being on one's feet will no longer be sufficient to tire them. Deep knee-bending exercises would be especially recommended.

Exercise for various parts of the body will prove the salvation for thousands of victims of the war in helping them to get control of parts more or less paralyzed or of parts in which wounds have produced partial disablement. Massage and manipulation are not as effective as active exercises, when such can be employed. Cases of this type, however, usually require special consideration at the hands of experts in this line.

STRENGTHENING THE HEART

By BERNARR MACFADDEN

Editor's Note:—The instructions for strengthening the heart given in this chapter are intended only for those who have weak hearts, not for those afflicted with organic disease of the heart. See special chapter on heart disease in Division III. The following applies in cases of tobacco heart, nervous heart and the minor functional disturbances.

IF there is any part or structure of the human body that should be strong, with a plentiful reserve of strength, it is the heart. This is our most vital and important organ. It is this that the hunter, the soldier or the assassin tries to strike with murderous intent. One can not live a moment without the incessant, untiring labor of this strong and faithful servant. But aside from this continuous service, under ordinary conditions of life, it is the heart that has to stand the brunt of all those emergencies and crises in life which call out all of one's powers of resistance.

Not only does the heart bear the heaviest burden in all activities that call for great physical endurance, but also under conditions of extraordinary excitement or mental and emotional strain, such as one sometimes has to face in either personal or business life, it is this central organ that is most severely taxed. It is not only the athlete who needs a strong heart, for the wounded man at the hospital under the influence of an anesthetic, the woman passing the crisis of motherhood, the business man at the climax of his career, or anyone else during the periods of stress and trial, either physical or mental, needs a sound and powerful heart more than anything else.

The need of strength in the heart is shown by the fact that Nature has ordinarily made this organ exceedingly powerful, as it must be suited to its work. Even a so-called "weak heart" is an organ of very remarkable power, for even if not capable of unusual strains, it nevertheless does a prodigious amount of hard, continuous and exacting labor in the ordinary course of a quiet life. Indeed, one would really never grow up if the heart were truly weak.

What is the heart? It is nothing more nor less than a muscular pump, and a double pump at that, containing four chambers and such an arrangement of valves that it is mechanically one of the most perfect pumps ever known. The pumping action is accomplished by means of an energetic contraction of the muscular tissues in its walls, thereby compressing the chambers and forcing the blood out into the arterial system. It contracts or pumps in this way, on the average, seventy times a minute, or one hundred thousand eight hundred times a day, and over thirty-six million times a year. We will write it out in figures if you wish so that you can see what it looks like: 36,000,000 times a year. Your heart is only about the size of your fist, and yet all the blood in your body passes through it in three minutes on the average. The total amount of work done in a single day is equal to lifting one ton one hundred thirty feet high. Just carry a ton of coal upstairs one hundred thirty feet if you wish to understand what this means.

But this is only the ordinary work of a man's heart. Under stress of great physical activity or strain of any other emergency, the demands upon this organ are greatly intensified, or even multiplied, and it is to pro-

vide against trouble on these occasions that one should specially prepare himself by strengthening this organ. Strength of the heart is measured not only by length of service, during a healthy, long life, but by quality of service, as shown particularly in the ability to meet all demands without any sense of strain.

But how can the heart be strengthened?

How can any part of the body be strengthened? By exercise of the right kind. It is true that there are cases of general bodily weakness due to continuous over-exertion, in which rest is necessary to restore strength. This rule sometimes applies to the heart as well, but this does not alter the fact that as a general proposition exercise of the right kind affords the one effective means of strengthening this organ.

It is also true that in the case of a weak heart, exercises may be so employed as to be injurious. Some persons refrain from vigorous physical training partly through fear of this result. At least this possibility shows the profound effect of exercise upon this organ. However, granting the danger of this result in some instances, it must be clear that anything which is so powerful in its influence can also be used effectively—if correctly—as a means of strengthening and improving the heart.

One should, therefore, not be too much afraid of properly directed activity. Remember that it is the most incessant activity of childhood that builds up such strength and vigor of the heart that under normal conditions it may be good for one hundred years of uninterrupted service. At least some mild physical activity is absolutely necessary if one wishes to strengthen this

organ, for it is truly impossible to secure such results if one is unable to take any exercise whatever. Of course one can not get away from the fact that under any circumstances the heart must keep up its work of circulating the blood, even when the body as a whole is in a state of rest, and so might be said to secure a certain amount of exercise. This work, however, should not be regarded as exercise, for it is only the extra exertion that creates a demand for greater strength and which consequently has the result of building greater strength than we can call exercise. In view of such increased activity, the ordinary work of the heart may even be regarded as rest, for this organ, and one who has engaged in no physical activity of any consequence for a considerable time may even be said to have rested the heart during that period. If this is continued too long, the heart will become weak, just as the body as a whole becomes soft and lacking in tone. In extreme cases, degeneracy of various organs and structures may occur, including the fatty degeneration of the heart, of which we frequently hear.

The extra or increased activity of the heart, which we may regard as exercise for this organ, may be induced now and then by muscular exertion, but also by cold water bathing. In fact, anything which quickens respiration and the heart action may be regarded in this light. Where the heart is weak, however, such methods should be employed with the greatest care. The man or woman with a seriously weakened heart should never attempt a cold plunge or cold shower, owing to the tax upon the circulatory system thus created, but by commencing with sponge baths, using only tepid or cool

water, and by very slowly and gradually decreasing the temperature of the water, or adopting a more stimulating form of cold bathing, such as the shower or dip with proper modifications of the temperature, the heart can usually be strengthened in very much the same way it would be improved by carefully selected exercise. Indeed, the best plan would be to combine such a program of cold bathing carefully begun and intelligently carried out, with an appropriate scheme of exercise. If one has the average or normal heart, cold bathing can be taken up in a more effective manner from the very beginning so that marked results may be secured.

The same moderation should be observed in taking up exercise to strengthen the heart, as should likewise be employed in commencing physical training of the body in general. One should not make a sudden change from habitual inactivity to extreme or violent exercise. There should be a gradual increase of activity until one reaches the amount of daily exercise that is best suited to his requirements. Where the heart has been rested for periods and is unaccustomed to any unusual tax, it is not wise to subject it suddenly to any prolonged or violent strain through too strenuous indulgence in athletics or gymnastics. This question of moderation in the beginning and gradual increase of activity is one of the first principles of successful exercise, no matter what part of the body may be concerned.

Naturally any muscular exercise for any part of the body, by making increased demands upon the respiration and heart action, constitutes exercise for the heart to a certain extent. Violent muscular effort may create such demands as to strain the heart. The ideal

form of exercise for the heart, therefore, consists of some form of light endurance work which calls for only moderate muscular exertion and a moderate increase of the heart's activity, but which, when continued for some little time, has a beneficial effect of permanently strengthening this organ. In other words, what we term constitutional exercise rather than strength-building exercise constitutes the ideal form of training for the strengthening of the heart muscles. I speak of moderate activity because this is suited to the needs of the average man. Extreme strength in the heart is developed by those athletic pastimes which call for endurance in some strenuous activity. Long distance running, therefore, boat racing, wrestling, boxing and highly energetic exercises of this type, developing the maximum of endurance, place the greatest possible demands upon the heart. Weight throwing, involving momentary efforts with intervals of rest, do not build endurance like the sustained exertion of running. It is because of these demands upon the heart that what is known as "athlete's heart" is often developed. It must not be understood that the athletic heart is necessarily a weak heart. In a few instances the athletic heart is also a strained heart, but if this is not the case the athletic heart is simply an enlarged, more muscular and altogether more powerful heart than that of the average man. If the athlete continues to exercise and keeps healthy, instead of suddenly discontinuing, his heart will continue to be healthy.

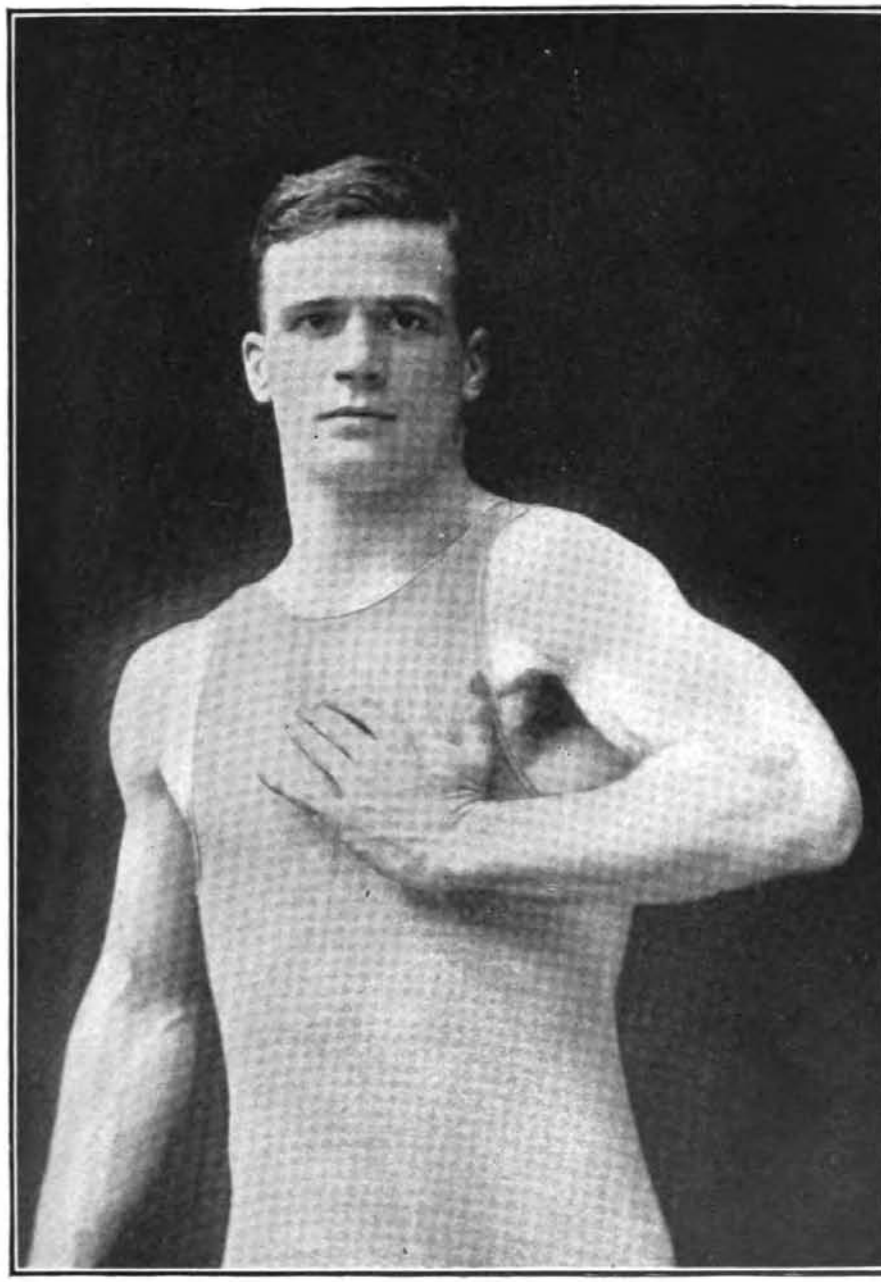
Naturally these extremes, while not unsuited to well-trained young manhood, are not appropriate for the means of the average man or woman. In such cases, however, endurance work in some moderate form of

activity, such as walking, mountain climbing, horseback riding, rowing for pleasure, easy swimming, golf, tennis, dancing, would be admirable for this purpose, though they should never be carried to the extent of extreme fatigue.

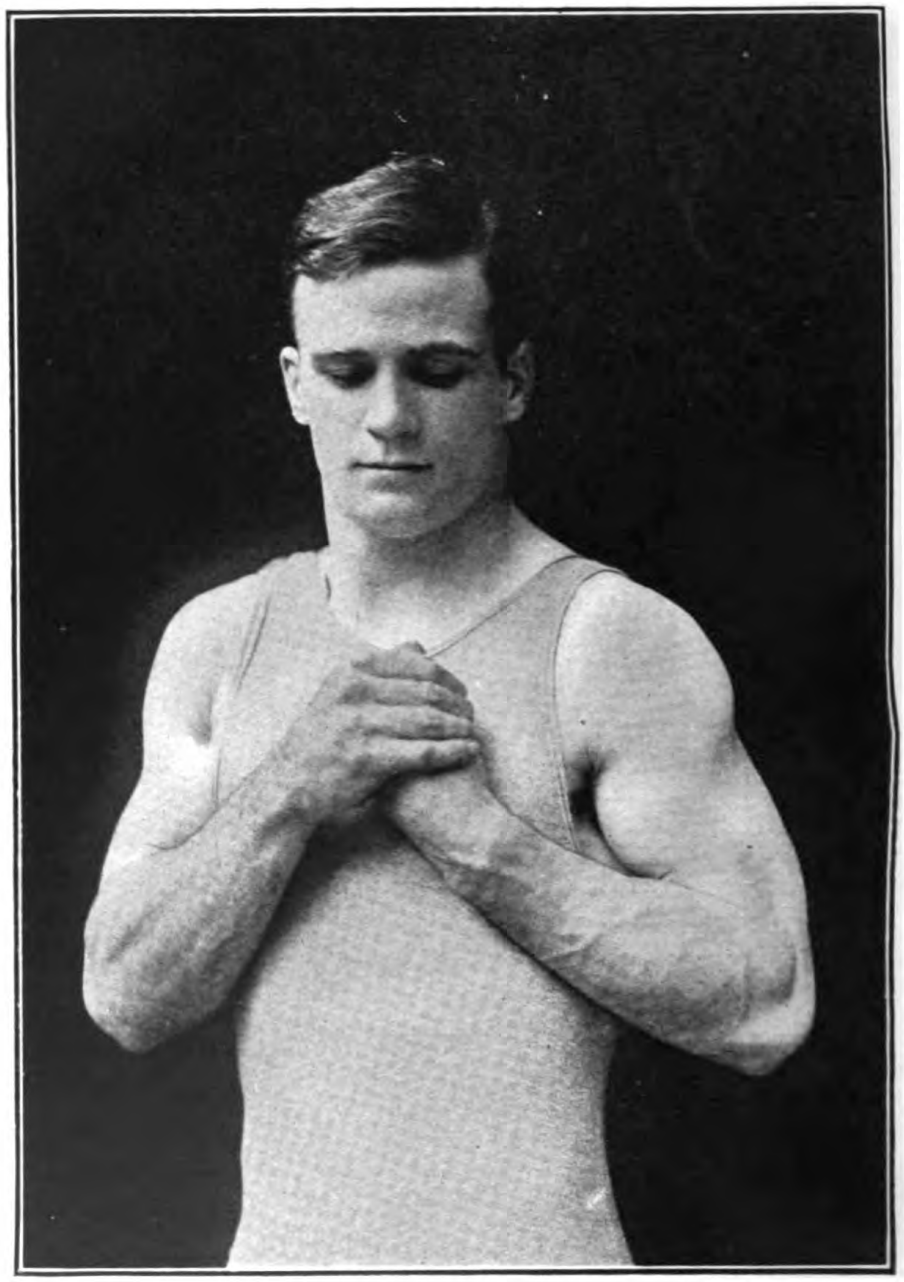
The exercises which I am illustrating are designed to directly strengthen the heart through a form of massage, which is thus applied to it. The comparatively moderate exertion involved in these pressure movements will exercise the heart to a certain degree, but the degree of pressure brought to bear upon this region of the chest at various points will directly invigorate all of the tissues within this part of the chest and naturally the heart in particular. These pressure movements have the advantage that they are suited to the requirements of those who could not undergo any amount of vigorous exercise for the heart. I might say that the same plan of pressure could be adopted to the entire chest, covering the sides and thereby invigorating the lung tissues.

You need have no fear of injuring the heart, not only because it is an elastic muscular structure in itself, but because it is protected to a degree by being placed in a bag containing considerable fatty tissue and consisting of a double layer of membrane which enables it to contract and relax without friction. The pressure applied and relaxed at short intervals will serve the purpose of massage.

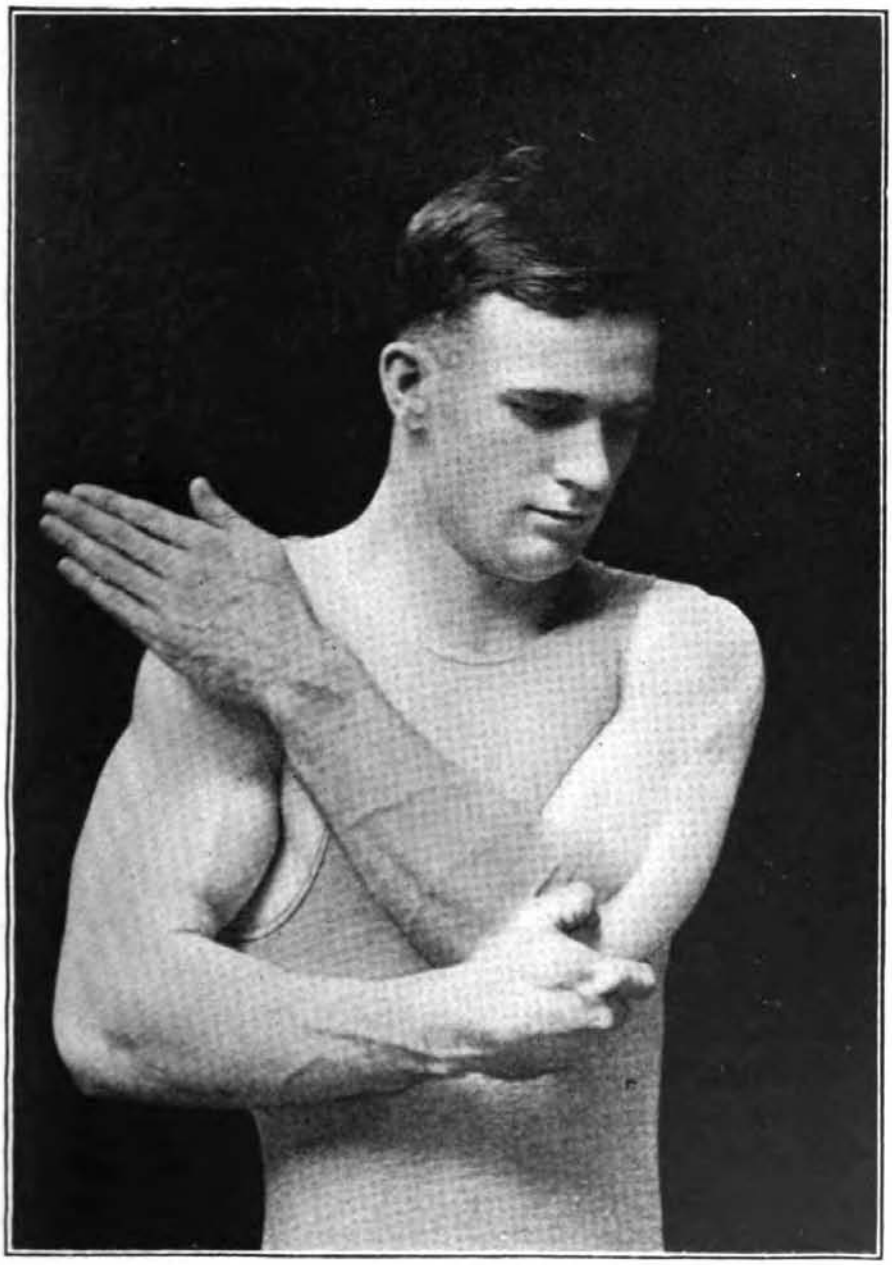
Another effective local treatment for the heart consists in chest expansion exercise. Even though your normal breathing is diaphragmatic, or abdominal, as sometimes called, nevertheless the chest should not be cramped or flattened. There should be plenty of room



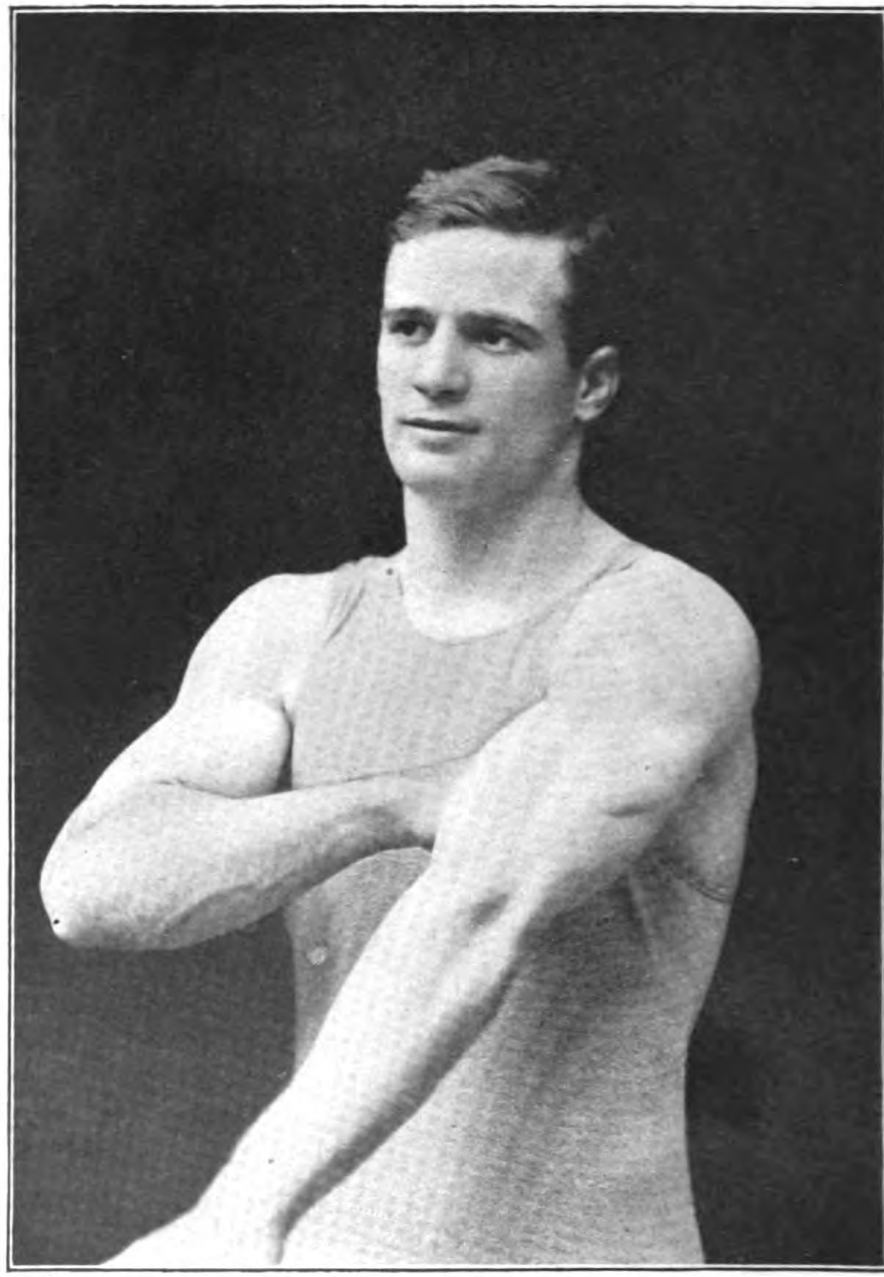
Massage of the heart can be accomplished in practically only one way, and that is by pressure applied at various points upon the chest wall adjacent to the heart. By bringing the elbow forward from the position shown, gentle pressure may be applied.



This is another method of exerting pressure, the left fist being reinforced by the strength of the other hand. With each pressure shift the position of the hand round about the heart region.



This is still another method of massaging the heart through chest pressure. Pressing the upper arm against the left chest with the help of the strenth of the other arm, as illustrated, shift the position upward and downward through a range of several inches.



The right fist placed upon the left side of the chest may be pressed inward, over and round about the heart region, with the help of the left arm, as shown. This treatment should be applied gently at first; later more vigorously.

in the chest for the heart and lungs, and the expansion and contraction, not for breathing, but for the effect upon the heart, offers another form of direct massage of this organ. Of course a good carriage of the body with a normal fullness of the chest naturally means freedom for the heart and is favorable to its welfare.

Another form of moderate exercise for the heart is found in the practice of deep breathing. This breathing exercise may be combined with the chest expansion and contraction means suggested. Breathing exercises naturally increase the supply of blood sent to the lungs, and this involves a degree of accelerated heart action, thus providing mild exercise for this organ. This is especially recommended to those who are not in a condition suited to vigorous physical training. If there is any doubt as to the condition of the heart, it is always wise to have it examined. Remember that in many cases of suspected heart trouble there is nothing wrong with this organ. At the same time, where there is some organic trouble affecting the valves and involving a certain amount of leakage, it is important to avoid any special strain. In such cases it is important to proceed carefully with exercises, although this does not mean that an improvement can not usually be brought about. Remember also that in many cases heart trouble is functional in character or of nervous origin. In this case the building up of the general health and the improvement in the nervous condition will remedy the trouble. A person suffering from heart trouble of nervous origin needs systematic and regular exercise. Tobacco is a common cause of heart trouble and should be carefully avoided.

The most perfect way to rest the heart is not only to avoid muscular exertion, but to lie down. In the horizontal position the heart is relieved from the task of forcing considerable columns of blood upward, as is necessary in the upright or vertical position. When sitting down, furthermore, a measure of rest for the heart is secured by placing the feet upon a footstool or—even better—upon a desk or table. The return of the venous blood, at least so far as the legs are concerned, is then facilitated through the force of gravity. It is not through perverseness, but through instinct, that comfort-seeking persons are inclined to place the feet upon the table. It means real rest for the heart and a measure of relaxation for the limbs. These methods of resting the heart are especially important where there has been any heart strain. In the case of a very weak heart, also, it is sometimes advisable to perform such exercises as may be desirable, in a reclining position. This affords a measure of rest so far as the ordinary work of the heart is concerned, and the exercises performed in that position do not then involve so much of a tax upon the heart.

Naturally any muscular exercise for any part of the body, by making increased demands upon the respiration and heart action, constitutes exercise for the heart to a certain extent. Violent muscular effort may create such demands as to strain the heart. The ideal form of exercise for the heart, therefore, consists of some form of light endurance work which calls for only moderate muscular exertion and a moderate increase of the heart's activity, but which, when continued for some little time, has a beneficial effect of permanently strengthening this

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HOW MASSAGE RESTS AND RESTORES

By THORWALD ANDERSON

WHEN father comes in after a hard day's work on the farm, he wants rest.

But how can he rest most quickly, and most completely?

Remember that rest is not simply a negative state, but an extremely positive affair. It is not a mere suspension of activity. It represents a form of very important activity in the sense of rebuilding and recuperating. It is as much a manifestation of life as those other forms of activity which may have made what we call "rest" necessary.

Therefore, it is not sitting down that father most needs to rest him. Likewise it is not sleep.

Even newspaper and slippers will not do much good. What father most needs to relieve him of the fatigue and stiffness following his day's work is massage.

The same about mother. Perhaps she too is all used up after a hard day's work, washing, scrubbing, sweeping, doing dishes, standing on her tired, aching feet, and what-not. What does she need? She needs a little light, fast exercise for one thing, exercise of a corrective nature to counteract the effect of her work in dragging the shoulders forward, cramping the chest and bending the back, after the manner of general housework. A little stimulating exercise under such conditions is refreshing.

But also, for her fatigue, she needs massage. It will rest one probably quicker than anything else that you

can imagine, although a warm bath will also do a great deal in the same way. It might be a good plan, if convenient, to take the bath first.

It is in this respect that the athlete is wiser than the worker. It is customary for the athlete to enjoy a thorough "rub down" following his exertions. It is true that the worker does not usually exert himself to the same extent as the athlete, and may not so nearly reach the muscular fatigue limits, but he is often more or less stiffened from his work and he needs the restful effect of massage just the same.

Even when self-applied, massage before retiring is valuable to the physically tired man or woman. Immediately following any great or prolonged exertion, massage is even more important and far more restful than sleep. Perhaps one should not compare the two, for sleep is always an indispensable part of life, but when there is any pronounced degree of muscular fatigue, one has to deal with a condition in which the tissues are choked and stiffened through the presence of accumulated waste material, or "fatigue-poisons." And rest in such a case consists primarily in the relief of this condition through the removal of these poisonous products. To go to sleep under such conditions without the preliminary help of massage is far from conducive to satisfactory recuperation. During sleep the circulation becomes less active, and the task of removing these obstructing waste-poisons from the muscular tissues proceeds very slowly, so that one is likely to awaken without sufficient relief from the sense of stiffness and from the condition of fatigue poisoning which this stiffness indicates.

Massage, on the contrary, has the effect of driving these waste products out of the tissues through the quickened circulation, thereby relieving the stiffness and making it possible to gain far more benefit from the sleep that follows.

But it is not merely muscular fatigue that is relieved in this way. Even in a case of mental fatigue massage is refreshing, for the reason that it causes the poisonous products incident to exhausting brain work to be more quickly oxidized and removed from the body.

It would be going back to the A, B, C's of the subject to show that the immediate effect of massage is to increase the circulation in the tissues, through the kneading and manipulation of the parts. The important point for present consideration lies in the fact that massage has an internally cleansing effect. It is simply in this cleansing process, that is to say, in the removal of the fatigue poisons, that the restful effect of massage is produced. It is this condition of cell cleanliness, tissue cleanliness or freedom from obstructing and poisoning waste products that makes it possible for the muscles, the brain or any other part of the body to function most perfectly. It is only under conditions of this cell cleanliness that a muscle possesses its full strength. As a matter of fact, among athletes it is customary to enjoy a rub down before any strenuous exertion, as well as after, for the reason that the massage accomplishes this very effect of removing any accumulated waste products, overcoming any tendency toward stiffness and leaving the muscles in a supple and favorable condition.

Experiments have shown that after a muscle has been thoroughly fatigued by continuous repetition of a

certain movement, a few minutes of massage may so restore its condition that subsequently the same effort may be repeated an even greater number of times. Experiments of this kind have shown very forcibly the value of massage, not only in restoring strength, but in promoting endurance.

One important thing for every physical culturist to learn is that exercise has a restful effect under certain conditions. This refers particularly to light, quick forms of exercise, which are stimulating in character and greatly accelerate the circulation. One who has been doing slow and tedious work of a kind that tends especially to stiffen the muscles will usually find the quickest relief, not in complete rest, but in light, quick exercises. You may be surprised to find how refreshing it may be. Massage is often more perfectly suited to this purpose, and it is the only treatment for great muscular fatigue.

Aside from this, massage may to a certain extent take the place of exercise in one who is convalescent or confined to his bed for any other reason. It promotes active circulation and keeps the tissues healthy. It does not have the positive strength-building value of exercise, but it offers the nearest possible substitute and will not only keep one in good condition, but will help a delicate person to build up healthy tissues. For extremely nervous persons it will often be more advantageous than exercise for this purpose, for the reason that it does not involve any material drain on the nervous forces of the body. Exercise not only calls for activity of the muscles and increases the circulation in them, but it consumes a certain amount of nerve force, and thus tends to exhaust the nerve cells and nerve centers.

Massage, on the other hand, likewise stimulates cell activity and increases circulation in the muscles, but without any drain on the nerve centers. On this account it is of particular value to those suffering from any degree of nervous exhaustion. For those who are anemic, also, it is of very great value as a means of stimulating the formation of new blood cells.

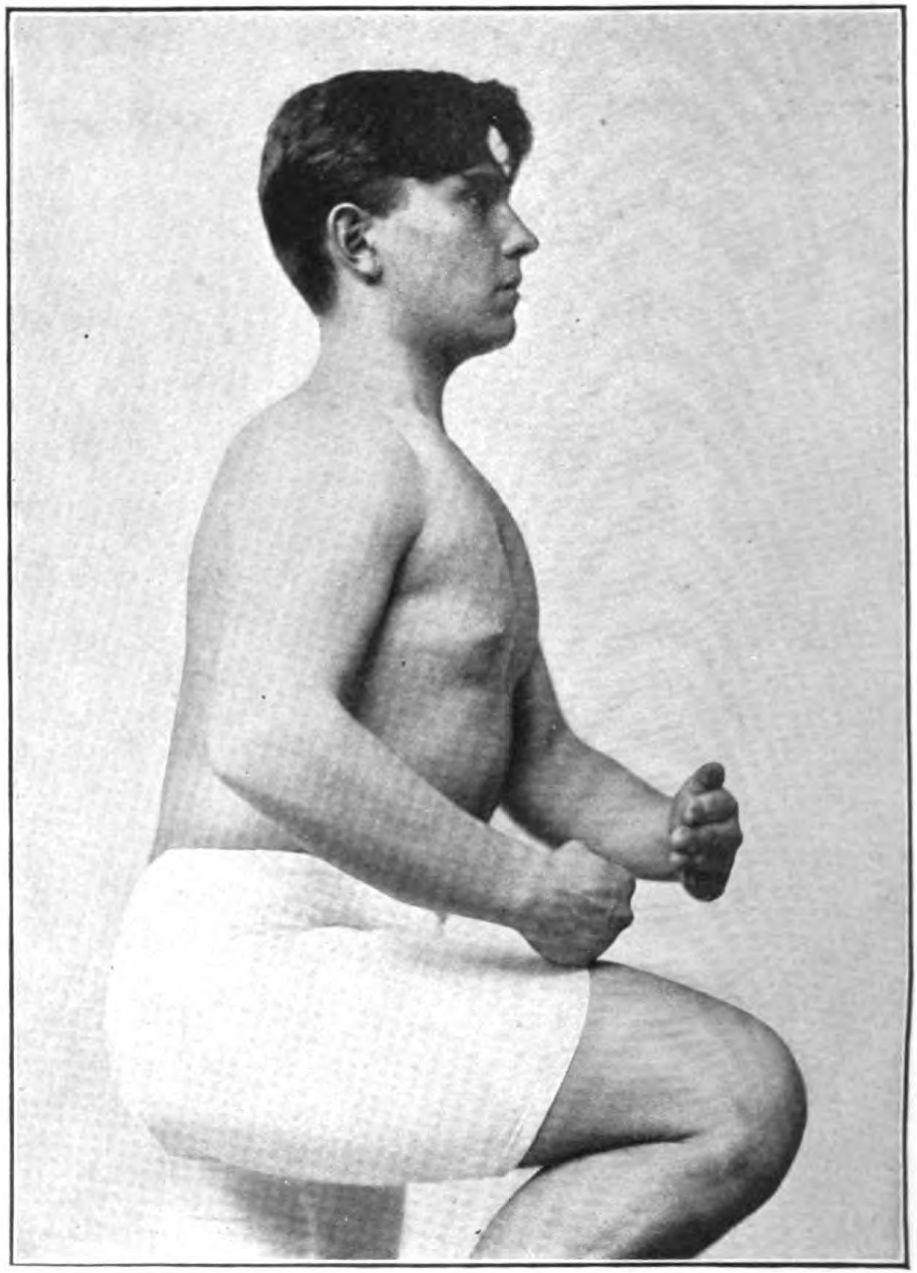
Without going into the details of massage manipulations, it may be said that deep massage has to do chiefly with the muscular structures or the internal organs, producing the restful effect for the former that we have indicated, or stimulating the latter to more vigorous functioning. It is not so well understood, however, that the nervous system is greatly influenced by some forms of massage, most notably those forms of vibration applied to the spine powerfully to stimulate the nerve centers, and also the light stroking or friction treatment of the surface of the body. Light stroking movements have very little effect upon the underlying muscles, but have a very marked influence upon the skin and the connective tissue immediately beneath it. It is this type of massage that is most effective so far as the face is concerned, and in the improvement of the texture of the skin, but it is also precisely this form of massage that is most valuable in its effect upon the nervous system, because of the countless numbers of tiny nerve endings located in the skin.

Anything which affects the surface of the body is inclined to have some influence upon the central nervous system. Various forms of bathing illustrate this principle, as for instance, in the soothing effect of a neutral bath in a case of great mental excitement or mania.

In all massage movements the direction of treatment should be upward or toward the heart. In the arms, for instance, strokes should proceed from the wrists to the shoulders.

This is an example of "friction," a circular movement applied to the trunk of the body, both arms moving in a circular action.

A stroking massage treatment applied to the throat and chin, useful for overcoming double chin in those too stout.



A simple but effective form of deep massage is found in percussion, or "tapotement," often best applied by a chopping action, using the outer edges of the hands, with a flexible wrist movement. Apply gently, never too stiffly.

Light stroking movements over the surface of the body have a similar sedative or nerve quieting effect. Nervous headaches have often been remedied, not through "magnetic healing," but purely through the reflex nervous effect of the light stroking of the forehead. The experienced masseuse, after deep massage of any part of the body, commonly finishes up with a few light strokes over the part. This has a pleasing effect upon the nerves.

The question of the application of massage is one that often offers a problem where an experienced masseuse is not available. The more expert the administration, naturally the more effective and beneficial the treatment. But it is not necessary to be an expert in order to produce material benefit through massage, though it is always well to devote a certain amount of study to the anatomy of the body in order that one may understand just what he is doing, and the manner in which his manipulations will affect the internal parts. For instance, in rubbing, it is well to know that upward strokes upon the limbs, that is to say, toward the heart, are more effective in improving the circulation and relieving fatigue. It is a simple matter, however, for anyone to learn the more simple forms of massage, such as stroking, kneading, circling movements with slight pressure, rolling or twisting upon the limbs, percussion or tapotement, and vibration. For home purposes it is often a good arrangement to have some member of the family specialize in massage for the benefit of the others, possibly for some domestic compensation in the way of other family advantages. On the other hand, it is well in all cases for one to acquaint himself with simple methods of self-application of massage.

Where facial massage is concerned, it is well to remember that mild treatment is more satisfactory than that which is too vigorous or energetic. It is not desirable to place too much stress upon the connective tissues underneath the skin through excessive pulling and stretching. It is simply desirable to improve the circulation.

A similar word of caution is desirable in reference to the application of massage in general. It is neither necessary nor desirable for the operator to apply it with too much strength. Above all things, massage should be comfortable. If it is so vigorously applied that it "hurts," it is more likely to be harmful than beneficial. Moderate kneading and gentle manipulation will be quite effective enough in producing results in the way of improved circulation and increased cell activity, without the abusive treatment of the tissues sometimes indulged in by the amateur under the delusion that through the expenditure of his own strength he is giving just that much "strength" to his victim.

For the surface tissues, the contact should be very light. The square, mechanical type of hand is best for the purpose, being usually firm of grip and well adapted for the work, but anyone who knows how can give massage successfully.

The forms of treatment employed in massage are covered by the following general terms: *Effleurage,* including all stroking movements; *Pétrissage,* involving pressure or kneading movements; *Friction,* or small circular movements; *Tapotement,* covering all tapping or percussion movements. And finally, *vibration,* a form recently become popular.

Effleurage is chiefly intended to affect the skin and superficial tissues, and consists of light, stroking movements with the finger tips. Upon the arms and legs these strokes are upward, and as long as possible. Short strokes are irritating. On neck, chest and back they are downward. The fingers are not lifted on the return, but glide back lightly without losing contact. Effleurage is very soothing to the nerves, and when given lightly is very useful in treating sprains, neuritis and the like, which will not permit of deeper manipulation. Effleurage may also be given with the palm of the hands instead of with the fingers, as on the trunk of the body, or with the thumb and fingers as on the arm. It may also be applied with some pressure, in which case it partakes of the nature of pétrissage. Pétrissage enables one to reach the deeper tissues and is the most valuable form of massage. Chiefly, it consists of kneading, gently but firmly gripping the muscles and other soft tissues. Practically speaking, the tissues are stretched and lifted away from the bone, making them more pliable and elastic, and greatly helping the circulation. The venous blood is forced out of the tissues so that it may be replaced by the fresh arterial blood. There should be a momentary compression only, with an instant of relaxation, then a fresh grip, moving along slightly toward the heart, which, on a limb, means upward. Pétrissage is given with the fingers and thumbs, with fingers and the heel of the hand or ball of the thumb. It is best to have the entire palm in contact when the part of the body treated permits. In handling a limb, both hands are used, one on each side, rolling, squeezing and kneading the tissues.

There are two or three other special forms of pétrissage, what is known as *fulling* being of these the most valuable. This consists of placing the palms of the hands one on each side of a limb, and by rapidly moving them back and forth, as when rubbing the palms together to warm them, imparting a rolling movement to the muscles and tissues. This is very effective on thigh and upper arm. Then there is a *wringing* movement, taking hold as a woman does to wring water out of a cloth, and twisting the tissues, but not too strenuously. *Pincement* is a variety of petrissage intended for the skin and superficial tissues, and consists of lightly pinching and rolling the surface flesh between the thumbs and tips of the fingers.

Friction is a variety of massage that involves pressure, but not the lifting of the tissues characteristic of pétrissage. It consists of a circular movement imparted usually by the thumbs, in small circles, though the tips of the fingers or palm of the hand may be used. The name may be misleading as seeming to indicate friction upon the skin, such as might be expected from stroking or rubbing improperly done, but it really applies to the moderate friction of the tissues under the skin consequent upon the circular movement. These circular manipulations, it must not be forgotten, should be progressive. That is, they should move upward, the circles overlapping each other so that the treatment covers the parts thoroughly. The contact with the skin should be firm, so that there is no slipping over the surface until the hand is moved slightly forward for a new contact. This form is used chiefly on and around the joints, where kneading is not possible, and also wherever

the surface tissues are thick and matted or tight. Good on the scalp, for instance, especially where the skin does not move freely over the skull. *Finger kneading* is a sort of combination between friction and pétrissage, moving the tissues in large circles with the pressing tips of the fingers. A similar treatment may be applied with the heel of the hand or the closed fist, as over the abdomen or kidneys.

Tapotement includes all percussion treatments, and is extremely effective in influencing capillary circulation. Care should be used that it is not done too severely. It should be done quickly, using both hands alternately, and with a free, flexible movement of the wrists. It includes slapping, which is done lightly, with the fingers only; the flail, which is very much the same thing done with the back of the fingers; tapping, done with the finger tips, and very useful in treatment of head and chest; hacking or chopping, a more vigorous application done with the ulnar edge of the open hand, just as one would chop meat, very good on the thighs, back and the like; beating, which is similarly done with the ulnar side (opposite the thumb), of the closed fist; and clapping, done with the whole palm of the hand, but with the palms hollowed something like a cup. All of these forms are executed with a movement that is from the wrist only, and are very effective following deep kneading. It is often advantageous, after thorough massage of a part of the body, to wind up with effleurage for a few moments, for its quieting effect, in case there has been any nerve irritation.

Vibration is a form not used in a general massage treatment as a rule, but very useful in reaching internal

parts, as in the trunk or neck. Good along the spine. It is applied by placing the fingers upon the body and imparting to them a vibrating or trembling movement, such as that suggested by the hand of a telegrapher, only rapid and steady. The hand must not slip on the skin. A very effective movement is one similar, in which the tissues are grasped and raised from the bone, as it were, and the vibratory motion then imparted.

This form of vibration, administered in this way, is of course a true form of massage. However, vibration of any kind, no matter how imparted, partakes somewhat of the nature of massage, and on this account mechanical vibration instruments, of which there are a number on the market, all have more or less merit and are capable of accomplishing more or less benefit. In some cases this benefit is very marked. Such vibration treatment cannot take the place of a good, thorough massage of the body, but on the other hand, vibration may sometimes reach internal structures that are not easily influenced by hand massage, just as electricity in turn may penetrate to parts which cannot be reached by either massage or mechanical vibration.

There is one virtue in self-massage which is not to be overlooked, namely, the muscular exercise involved in its application. It combines the active and the passive.

Massage in cases of obesity should take the form of pétrissage and pincement entirely, and should be very thorough in this one direction.

Varicose veins, when present, should not be touched directly, but the general circulation through the other veins is improved by massage of the adjacent parts of

the limb, and the varicose condition relieved in that manner.

One secures a better contact with the skin if no lubricant is used, but wherever desirable, olive oil or cocoanut butter may be recommended.

The same thing applies to the use of a liquid, such as witch hazel, which is commonly used for the "rub downs" of athletes. Its use is gratifying in the rubbing which follows a hard athletic contest because it is cooling, which is true of any other preparation containing alcohol, or the use of plain alcohol, but it is not necessary for massage.

CAN ONE GROW TALLER?

By BERNARR MACFADDEN

ONE condition which thousands of men and women would like to overcome is that of being too short.

Being tall seems to be a very common ideal, even though there is no special advantage in being much above the average height. It only means length of bone, and this of course, means undesirable weight of bone in proportion to the entire body weight. People who are too tall have too much heavy timber to carry. They are not usually as active or capable of action as those of moderate height. Indeed moderate height is far better than being either too tall or too short.

Those who worry about their lack of stature should remember that many of the greatest men in history have been short or of moderate stature, from Napoleon to Lloyd George. In any event, the supreme essential is vitality rather than height. Have you energy? Have you endurance? You may find that you are much better off in this respect than some friend of yours who has excessive length of bone. Tall people usually have long legs, which seldom means that they have better legs. Long-legged people have not even an advantage in running, as is often supposed. A short-legged man can usually out-sprint his lanky competitor.

If you are naturally short it is because you represent short ancestors. Very seldom is one under normal height because of poor feeding or illness. Many sickly persons intended by nature to be tall grow up to be six

feet or more, irrespective of health. The thing they lack is not stature, but vigor.

The subject of stature from the standpoint of heredity is based upon Mandelian principles. If your parents are tall you are likely to be tall, but it may still be possible for you to be short if you have had one or two short grandparents, representing families characterized by short stature. You are as likely to take after any one grandparent in this respect as you are to take after one of your own parents. At that, it is all a matter of chance. In a family of ten children having two tall grandparents and two short grandparents, the chances are that five of the children will be short and five tall, though there might of course be a considerable variation of height between the tall and the short in such a family. And that is about all that can be said on the subject from the standpoint of heredity.

In considering the possibility of making one's body taller the first important fact is that the height depends first of all upon the skeleton, or in other words, upon the growth and condition of the bones.

There are really three factors which determine the complete stature of any individual, namely, the length of the legs, the length of the trunk and neck, determined by the length and condition of the spine, and the height of the cranium, which varies materially in different people. As a general thing, great variations in height are chiefly due to the differences in the length of the legs. The length of the spine is more nearly uniform, not often varying very much from the general average of twenty-eight inches; at least there are not such frequent and such marked discrepancies as in the length of the limbs.

In other words, one does not observe the same inequalities of height in a seated group as in the same number of people standing. One who may be utterly shut out of the view of a street parade when standing in a crowd on the sidewalk, might yet be able to see the stage quite perfectly when seated in the theater. Those interested in boxing are only too familiar with the well marked differences in "reach," or length of arm, but the variations in the lower limbs are usually even more marked. It is really a fortunate thing that discrepancies in height are in most cases chiefly due to the latter, inasmuch as it usually leaves the short man in possession of a body trunk which is just as long and as good, and has just as much room for fully developed and vigorous vital organs as his tall friend or competitor. In other words, the short man may have just as much vitality and physical power as the other, or he may even have a great deal more in some instances. Some of the greatest men in the world have been short.

An increase in height between the ages of twenty-two and twenty-six is not the rule, by any means, but if one is below his own normal height, or the height intended for him, when he reached twenty-one or twenty-two, then with good health and proper care of himself he may expect to grow during the next few years. A great many people grow in other respects between the ages of twenty and thirty, broadening out the entire frame, gaining in vitality and strength, particularly in endurance, wearing larger gloves, larger hats and larger collars, all the result of a natural growth and not of fatty accumulations, though the latter are also only too common. One is seldom completely mature physically,

certainly not mentally, before the age of thirty years.

Therefore one should take especially good care of himself during this entire third decade of life, which, however, is the very period so often selected for the very wildest of dissipations. The reason why so many people feel that they had so much more vitality during their early youth than at any time after is because they have at that time lavishly and wastefully spent the energy which might have been reserved for the later decades.

Many men shrink in stature from the time of their first flush of youth up to the time of their death. This is not merely the result of the compression of the cartilages of the spine, but of the gradual deformation of the bones themselves. The modification of the lower jaw bone in age is a conspicuous example of this gradual yielding of the bone structure to the stress that is placed upon it. In those of good health and healthful habits the bones are very slow indeed to alter their conformation, while under unfavorable circumstances the deterioration in this respect that should come only with extreme age may be realized early in life. Severe physical strain, continued from day to day, will also have its effect, and we have seen weight-lifting "strong men" decrease in height (in appearance at least), in the course of a few years.

There is no doubt that nutrition and other conditions that affect the general health of the body have much to do with the height, and these influences are particularly important during the formative period of growth, and up to the age of twenty-five years or over. We should strive to follow a thoroughly wholesome diet and thus

maintain a well-nourished and vigorous condition of every part of the body. The man whose frame is emaciated, whose cheeks are hollow and colorless, whose muscles are shrunken and wasted, certainly can not hope that his bones are properly nourished and kept in perfect condition. But outdoor life, exercise, sleep and other important vital requirements may be equally as potent as diet in maintaining the resisting power and strength of the bones, and thus also influencing the stature. I emphasize the importance of all these constitutional measures because any attempt to improve the stature by special methods must fail so long as these fundamental influences and requirements of bodily welfare are neglected.

The question of sufficient sleep is particularly important, and deserves emphasis because the habit of staying up late at night is one of the most prevalent and at the same time one of the most destructive of American vices. It is only in sleep that the tissues can recuperate perfectly, and the horizontal position is not only favorable for regaining any shrinking of stature, but absolutely necessary therefor. It is a matter of common knowledge that candidates for police appointments or other desirable positions requiring a certain definite stature, sometimes stay in bed for two or three days previous to their examination in order to stretch out a bit and make a slight temporary gain in height that will enable them to pass. If this is true of a slight temporary gain, it is clear what a positive influence must be found in a sufficient term of sleep each and every night, year in and year out.

A great deal has been said in regard to the compres-

sion of the cartilages of the spine, which would thereby tend to shorten the trunk of the body, and there can be no doubt that this is one factor that tends to make many persons shorter than they should normally and properly be, though it must be said that this compression or flattening of the cartilages is largely due to the unfavorable constitutional influences already mentioned, while their improvement will depend in the same way upon more sleep, better nutrition, exercise, open air life and other conditions generally conducive to health. The stretching measures commonly advocated would naturally be of value in this connection, but should not be depended upon without the assistance of the desired constitutional improvements. To put the cartilages of the spine in perfect condition would mean a gain in height, which, though limited, would nevertheless be well worth while. The improvement from this particular source would depend largely upon the question as to what extent the flattening of the cartilages and the general decrepitude of the body are responsible for the lack of height. In a vigorous and very healthy young man, whose spine is in apparently good condition, this may have little or nothing to do with his lack of stature, and in such a case stretching, in itself, would have practically no effect. If it is true that the lack of stature in his case is due to the shortness of the lower limbs, which as we have seen is most frequently the case, while his sitting height is as good as the average, then he need not hope for more than slight improvement through any attention that he may give his backbone. The stretching measures will be of great value in other cases, and particularly in those who have not always enjoyed the most vigorous

health, or who may have gone beyond the period of youth.

Very many fail to realize their normal height simply because of improper bodily carriage. By slouching, the spine gradually bends more and more, and this is probably the reason why in some cases an actual growth of the body between the ages of twenty and thirty fails to result in increase in height. Certainly this has much to do with the decline in height as one grows older. By carrying the body erect and getting the spine in proper alignment, one may make a considerable difference in his appearance and an unmistakable increase in stature. This is largely a matter of muscular energy, and, if one is inclined to carelessness in carriage, special attention should be given to strengthening the muscles of the back and to establishing the habit of standing, walking and sitting erect. The extreme military position is not desirable, for the forcible pulling in of the abdomen is unnecessary. The abdomen and waistline should be free, so that diaphragmatic breathing may be carried on freely. But the chest and shoulders should be carried where they belong. A simple movement to correct a slouching carriage is to stretch the arms high over head, bring them down sideways to the side, and then retain the position of the torso thus acquired. This movement may be repeated frequently through the day, either sitting or standing.

Other stretching exercises are valuable by way of improving the stature in all cases where it is below normal, or below that intended by Nature for the individual. They will be useful largely because of their favorable constitutional effect, rather than because of any tendency to stretch the cartilages of the spine, though such

stretching will also be very beneficial in many cases. Such exercises should be persisted in faithfully if good results are desired. They will tend to improve the carriage and to strengthen those muscles upon which will depend a permanent improvement in this respect.

Other artificial or mechanical means of stretching the body may be useful, though all around spinal treatment will be specially valuable. Remember, however, that no improvement in height from any of these measures can be expected where the spinal column is already of full length and normal and perfect in every way. And remember, also, the importance of sleep, all around outdoor exercise and a diet that will provide the most perfect nutrition. If there is any deficiency in the latter respect, a fast may be useful to strengthen the digestive organs and improve the assimilative powers, also providing for the building up of new and more healthy tissues in all parts of the body, including bones and cartilages.

THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART ONE

EXERCISE

SECTION THREE

EXERCISE FOR WOMEN

THE FEMALE FORM—IDEAL AND REAL

By L. E. EUBANKS

WERE one to fare forth and ask every woman one met what she should weigh and measure at her height, one wouldn't find one in one hundred who could answer correctly. Some know their height and weight; but few have correct ideas on proper proportion and fewer still appreciate their possibilities and understand the best methods for improvement.

Before taking up "ideal" measurements, it may be interesting to glance at woman as she is—at the *average* as she is found in everyday life.

Some authorities claim that the average American woman is 5 feet 5 inches in height. On the other hand, Dr. Dudley H. Sargent, an eminent authority in such matters, gives 5 feet 2 inches. Personally I think it is not less than 5 feet 3 inches (without shoes), and I should state the other measurements about as follows: Height, seated, 34 inches; neck, 12.5; upper chest, 31.5; waist, 25; arm, extended, 10.3; forearm, 9.2; wrist, 6; hips, 36; thigh, 21; calf, 13.5; weight, nude, 120 pounds; lung capacity, 152 cubic inches.

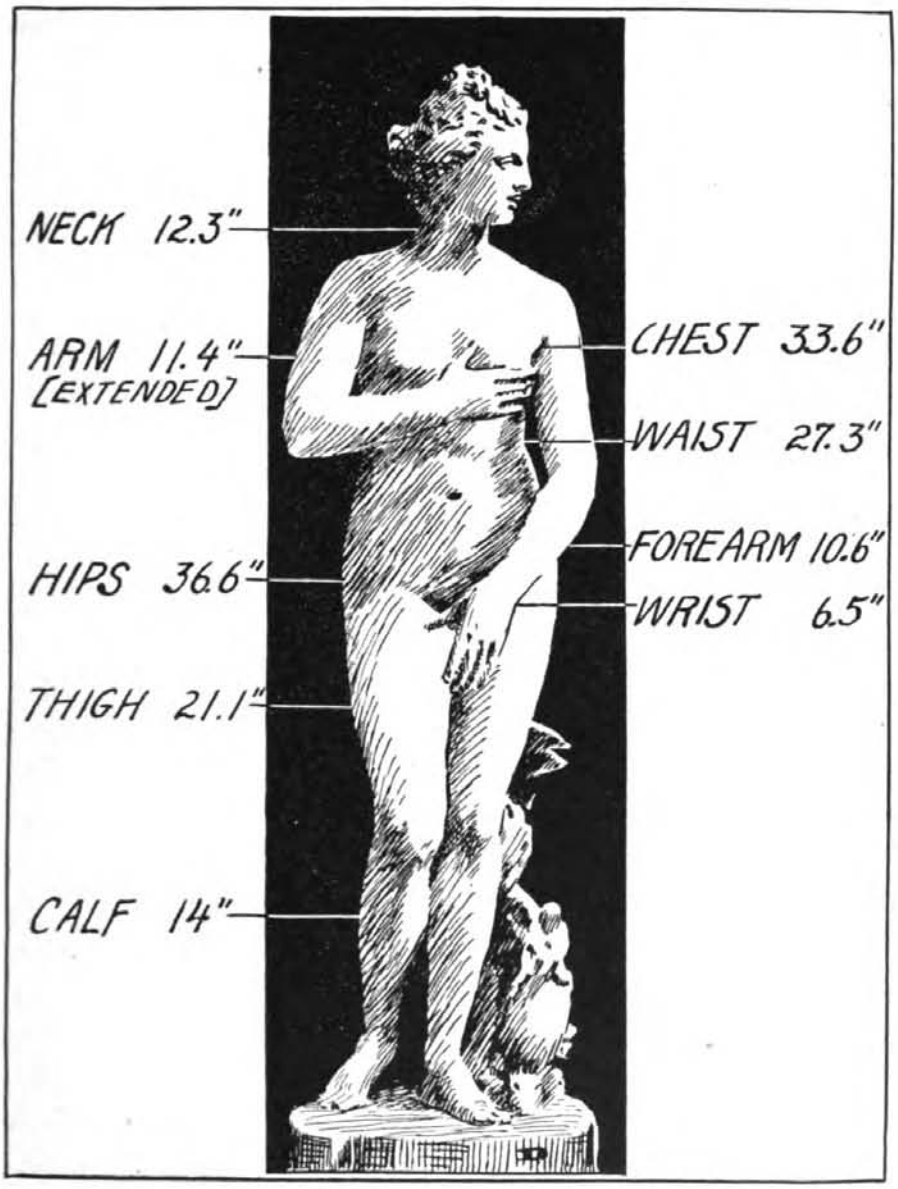
In the University of Washington the following average figures were compiled from the measurements of some 200 "co-eds": Height, 5 feet 3 inches; weight, 121 pounds; breadth of shoulders, 14 inches; breadth of chest, 10.4; breadth of waist, 8.2; breadth of hips, 11.3; depth of chest, 6.9; depth of abdomen, 5.9; girth of chest (lower), 27.6; girth of waist, 25.4.

In strength and endurance the average woman is far below what she should be. I believe the chief reason for this is that she accepts her condition as natural. But such is not the case. Where women are trained, when they step from the beaten track and try to acquire that vigor that Nature intended them to possess—in these cases we see wonderful things accomplished. Compare the ordinary run of women to the circus acrobat or trapeze performer, and then say that women cannot become strong! With rational modes of dress and proper exercise, women make records in athletics that compare very favorably with men's.

Woman is farthest behind her brother in breathing power and waist strength. The average man is a full one hundred cubic inches ahead of the average woman in the lung test, and her strength of back, abdomen and side compares to his even less favorably. In grip power she gains some little, showing an inferiority of only 28 or 29 pounds, and in leg strength she is not so very far behind.

Now to discuss ideal figures. Tastes differ so widely that only basic principles meet general approval. It is agreed that proportion is the first desideratum, and that a figure may be perfect at 5 feet or at 6 feet. Obviously the only unit of value must be drawn from the figure measured; you could not abstract a standard from the measurements of a woman 5 feet 6 inches (however perfect her figure) and apply it to her sister of 5 feet. Thus far painters, sculptors and physical culturists agree.

The unit chosen is the head; the perfectly proportioned woman should stand seven and a half times the



Measurements of the classic Venus de Medici. These proportions are often approached or practically duplicated by women in real life, so that the classical ideal can be identified with feminine perfection in actual life. These proportions, if not these measurements, may apply in the case of a figure from 5 feet 3 inches to 5 feet 7 inches in height. There are, naturally, variations in the length of the lower limbs, arms, torso, neck and head which may, however, not materially affect the circumference measurements indicated on this diagram.

height of her head. Other tests of height, popular but scarcely so well established, are: ten times the length of her face, nine times the length of her hand and from six to seven times the length of her foot. Her arm span should be equal to her height.

But when we get this far opinions begin to diverge. The matter of girths is the bone of contention, and will be as long as there is such a thing as individual taste. Agreement on this would still leave the final question of what particular height is ideal. Only in the light of these qualifying facts and with the understanding that the bony structure must always be considered, can this subject be discussed numerically.

Contrary to general belief, ideally built women do not have extremely tapering lines. Men, ordinarily, are too cylindrical; the waist is too big for the size of the chest, the biceps is not enough larger than the forearm, etc. But too many women have bodies like an inverted cone; the waist, often naturally small and weak, is reduced yet further by the mode of dress, and the bust is allowed to become abnormally large. The hips are generally too big for the thigh and the latter nearly always too big for the calf. To sum up, most women require more muscle in proportion to their fat. Fat literally makes fat, for it prevents radiation—being a poor conductor of heat; so the larger parts of the body continue to gain more rapidly than the smaller ones, finally destroying all proportion. Then we find 24-inch waists with 40-inch busts; 25-inch thighs with 13-inch calves; 14-inch upperarms with 5.5-inch wrists.

Some muscular development is absolutely essential to bodily beauty. Nothing else can produce those de-

sirable curves and give the proper relation of limb to joint. In the fat-burdened leg there is almost no hint of a knee joint between the huge thigh of 25 or 26 inches and the spindling calf of 13. In a well-formed, athletic woman a 13-inch calf would accompany a 20-inch thigh. Compare the two and you will be astonished at the latter's superiority. Similarly, many women are too small in the forearm. Frequently, in cases inclined to fat, we see upper arms, straight, measure three inches more than the forearms. Half that difference would be about correct in average heights.

General opinion places the ideal height for women between 5 feet 3 inches and 5 feet 7 inches. At 5 feet 3 inches the measurements of the Venus de Medici which follow are regarded as perfect: Neck, 12.3 inches; chest, 33.6; waist, 27.3; arm, extended, 11.4; forearm, 10.6; wrist, 6.5; hips, 36.6; thigh, 21.1; calf, 14. This figure is usually termed "small and plump." For 5 feet 7 inches an English authority gives these measurements: Neck, 12 inches; bust, 36; waist, 24.5; upperarm, 11.5; thigh, 22; knee, 15; calf, 14; ankle, 8. This is a decidedly slender type.

I think the beautiful figures of various women whose proportions place them between the types just given indicate that neither extreme is correct. Miss Emma Newkirk, who won *Physical Culture's* contest for the most perfectly formed woman, has a beautiful figure, presenting the following measurements: Height, without shoes, 5 feet 4.5 inches; weight, nude, 136 pounds; neck, 12.5 inches; bust, 35; waist, 25; arm, 10.5; forearm, 9; wrist, 6; hips, 36; thigh, 23.5; calf, 14.5.

Another finely developed woman, one who possesses most remarkable muscular strength, is Miss Minnie Kirbotson, of Leeds, England. Her measurements are: Height, 5 feet 5 inches; neck, 13.75; bust, 37; waist, 27; thigh, 24; calf, 14.5; angle, 8. This woman stands the head test and hand test mentioned above. Also, her arm span and height are equal. Miss Kirbotson's feats with weights certainly refute the old belief that women cannot be strong. Using both hands she lifts to arms' length above the head a barbell of 120 pounds three times; same lift, 90 pounds, twelve times. With right hand or left, 75 pounds, twice; same lift, 50 pounds, eight times.

The measurements of Miss Beatrice Marshall, the famous model, are remarkably good. Height, 5 feet 4 inches; weight, 125 pounds; neck, 13 inches; bust, 34; waist, 25; arm, 10; forearm, 9; wrist, 6.5; hips, 37; thigh, 24; calf, 14.5.

My own opinion, based upon much observation and years of study, is that the perfect woman should stand 5 feet 4 inches, without shoes, and weigh about 130 or 135 pounds, nude; height, seated, 34.5 inches; arm span, 64; neck, 13; bust, 36; waist, 26; biceps (contracted with elbow extended), 12; forearm, 10; wrist, 6; hips, 37; thigh, 23; calf, 14.5; ankle, 8.5; lung capacity, 225 cubic inches.

But the little lady of 5 feet and her tall sister of 5 feet 8 inches rebel against ostracism. Where do we come in? they ask. The chart below is the answer. These figures were prepared after careful examination of the requirements in leading American institutions, and are widely accepted as authoritative. Personally

I do not approve them in every detail, but, on the whole, they are a good guide.

CHART OF IDEAL MEASUREMENTS

Height	Weight	Neck	Chest	Waist	Biceps	Forearm	Wrist	Hips	Thigh	Calf
5 ft.	100	11.5	27	22.75	9.5	7.75	5.5	32.25	19.5	12.25
5 ft. 1 in.	106	11.75	27.25	23	9.75	8	5.5	33	20	12.5
5 ft. 2 in.	112	12	28	23.75	10	8.25	5.75	34	20.75	13
5 ft. 3 in.	118	12.25	28.75	24.5	10.5	8.5	6	35	21.5	13.25
5 ft. 4 in.	125	12.5	29.5	25.25	10.75	8.75	6	36	22.25	13.75
5 ft. 5 in.	132	12.75	30.5	26	11	9	6.25	37	23	14
5 ft. 6 in.	140	13	31.25	26.75	11.5	9.25	6.5	38	24	14.5
5 ft. 7 in.	156	13.25	32.75	28	12	9.5	6.5	40	25	15
5 ft. 8 in.	166	13.5	33.5	29	12.5	9.75	6.75	41	25.5	15.5

HOW WOMAN COMPARES WITH MAN

By CARL EASTON WILLIAMS

IS woman really "the weaker vessel," or is it true that "The female of the species is more deadly than the male," as suggested in Kipling's poem?

Is there any physical basis for the doctrine of sex equality? Or shall we, with a riper judgment, ultimately conclude that the word "equality" is a misleading term, as applied to the respective qualities of men and women? Instead of asking whether the sexes are unequal, would it not be better to ask if they are different, and in what respects? For it is entirely possible for them to be radically different, without either having any basis for the claim of superiority.

At present there are very marked physical distinctions between the two sexes. Every one knows that the men of civilized countries are taller, broader, heavier, and muscularly stronger than the women of the same races. But at once the question arises as to whether or not these differences are fundamental? Are they real, or artificial? To what extent are they the result of the conditions under which women have lived and the narrow limitations of their activities in the past? And again, why does it happen that men are the larger and more powerful? Why not the women? In some species, it is the female that is the stronger. The female eagle is much larger and more powerful than the male. In some forms of insect life the male is insignificant by comparison. As a familiar example, think of the queen

bee, and of the drone, who is promptly put to death at the end of his honeymoon. Would it be possible, then, under other conditions of life, different environment, different activities, for women to have developed the larger and stronger bodies? Will the world ever see women of the same height, weight and strength that the men possess?

The truth probably is that the two sexes are evenly balanced. Both originate from the same source, and with the same inherent spark of vitality. But they are specialized in two different directions, men in the direction of muscular power and speed and endurance, and the women in the direction of those qualities which fit them for bearing and rearing children.

From the moment of birth, men have the advantage in size and muscular energy, even if not in vitality. Boy babies are slightly larger at birth, on the average, than girls, and they maintain this lead continuously except for a couple of years about the time of puberty. They are likely to learn to walk earlier, at the age of five years are usually a little taller and heavier than girls, and maintain this lead in growth until about ten years old, but for the next five years the girls grow more rapidly. From about twelve to fifteen years the girls are both heavier and taller. It is a significant fact, however, that even during these two or three years the boys continue to have the advantage in strength and speed. Whether this is the result of the greater devotion of the boys to vigorous games we can not say, though considering other factors it seems unlikely. From the age of fifteen the boys again take the lead, growing most rapidly at or about their sixteenth year. Girls grow more slow-

ly from the fifteenth to the twentieth year, at which time they reach complete growth, or nearly so, while young men continue to grow on an average until the age of twenty-three. At least, this marks the end of active growth, though men usually grow very slowly in strength of bone and tissue, and to a slight extent in bulk, for several years thereafter. The result is that though a man has a marked advantage over a woman at the age of twenty, in stature and muscular energy, he has a much greater advantage over her when he has reached the age of thirty.

An average of many figures indicates that woman is about eight per cent shorter than man. The average weight of the woman of average height is given by modern insurance companies as one hundred and twenty-six pounds. The average weight of the man of average height is one hundred and fifty-three pounds. This difference in weight of twenty-seven pounds seems quite striking, but as a matter of fact it is not as great a difference as would be the case if the weights were apportioned according to the linear measurements. The arithmetically minded reader can figure this out by cubing the height of man and that of woman; he will find that if woman were built in the same proportions as man she would be not twenty-seven but thirty-five pounds lighter, which would make her weight only seventy-seven per cent of man's weight. It may be argued that the height alone is not a fair measurement and that woman should be relatively shorter and thicker than man. This is true if we admit that woman should carry more fatty tissue than man.

In tests of quickness or speed, boys invariably have

proven the faster to move. In tests of fatigue, or endurance, a significant fact is to be noted, namely, that while women appear to have exceptional endurance in ordinary work, at what one might term a natural speed, or natural exertion, yet in the case of unusual speed or exertion, they become fatigued much more quickly than men. This is in line with the fact that among savages the men undertake those tasks which call for spurts of violent exertion, and exceptional physical power and speed, with periods of complete rest, while the women are occupied with those labors which call for a more continuous, but less strenuous expenditure of energy. In a word, it seems that women are fitted for those forms of physical exertion which would least interfere with their maternal functions.

It would seem then, that the masculine constitution is specialized for the more strenuous physical tasks, while that of woman is specialized for child-bearing. And that, after all, is the most important work of the world. There is only one bodily measurement in which women exceed men, and that is the girth of the upper thigh. Relatively, women are stronger here than in any other part. And this measurement is affected largely by the structure of the hips. Women are proportionately much larger in the hips, but in the actual measurements men are larger than women. Women's hips are larger only relatively.

But if men have the greater muscular strength, women have the greater hold on life, if that means anything, right from the start. The mortality at birth is much greater among boys. There are more boys born than girls, but their mortality during the first couple

of years is also much greater. The mortality is about the same from the third year to the thirty-fifth, and from that time on women have altogether the best of it. Many more of them reach an extreme old age. They are not so much subject to degenerative diseases of the arteries, and they do not so often die suddenly.

It is not to be forgotten that among some savage races the women seem to be muscularly as powerful as the men, and in some cases average the same size. This has been found to be the case among the Patagonians, the Pueblo Indians, and some races of India. The Guiana Indian women, in South America, have often been noted as apparently as strong as their "lords and masters." Among the Andombies on the Congo, some of the Papuans, and in a few other cases, the women have been said to be even stronger than men. This result, however, often seems to be brought about by the special training of the women in their work, particularly where they serve as burden bearers, carrying very heavy loads, while the men live in comparative idleness. However, it must be said that among these savage races the anatomical distinctions between the sexes are not nearly so marked as in the cultured races. As we have already said, sex seems to be a less influential factor in the lower animals. The men and women of the lower human races actually look much alike. Viewed from the rear, it is often difficult to tell whether a figure is male or female. The savage women generally have narrower hips, even approximating those of the men, whereas the broad pelvis and the conspicuous hips of the civilized woman are a pronounced feminine characteristic. The broad pelvis is the mark of the higher human evolution.

Altogether, the further evolution of the human race seems to promise, not that the two sexes will become physically more and more like each other, but that they will become even more distinctive, if anything, in certain respects. This does not mean that one will be superior to the other, but that there will be, if anything, even more difference. The pelvis, again, for instance, which is bound to be a vital factor in the further evolution of the human race, because of its relation to the birth of infants with larger heads, will probably tend to become even broader than it is. A fair proportion of still-born children are those with exceptionally large brain development.

At any rate, irrespective of the stature and strength of primitive women, and of those to come, there is no doubt that the women of today are at a disadvantage in the matter of size and muscular power. But that they are at a disadvantage in the matter of vital qualities does not follow.

We have noted the precocity of growth in women, as a result of which they reach puberty a little sooner than men, and finally attain their complete growth much earlier. This would seem to be a provision for the conserving of vitality, which in the case of men is expended in the continued growth of bone and muscle, this vitality then serving the woman through her childbearing period, with all of the demands then made upon her constitution. We have also noted her greater susceptibility to fatigue when put to the exceptional use of muscular energy, but this also would seem to be a provision for guarding against too great a drain upon her reserve of vitality. At the same time, she has a greater resistance to disease, generally speaking.

In a word, there is compensation for woman for the smaller stature which she is given. It is the gift of maternity, and for this she pays the price of lesser muscular bulk and power. But it is a price that she can well afford to pay. The only question that arises is whether or not she pays too much. The civilized woman seems to pay a price out of proportion, but probably it only seems so. The extremes of weakness that we see on every side certainly do not represent the price she pays for being a woman. These extremes are merely the natural result of her inactive and unhygienic life. She should pay the price of maternity only to the extent that Nature decrees. But in any case this price should never include sickness, if she lives a life that will raise her to a vigorous physical standard.

For another thing, the burden of excessive maternity promises soon to be a thing of the past. Instead of bearing twenty children, most of them to die off, the future mother will bear two to four, all of whom will live. This change will probably mean much in the way of strength. As a matter of fact, women are improving physically. They are living a broader life and a healthier life, they are building up their bodies and learning how to realize their possibilities. Of late years women have been getting out of the home into the broader industrial world. The question is, here, as to whether this fact of men and women working together in the industrial world will ultimately tend to produce men and women whose physical characteristics are more or less similar to each other? Or are these distinctions the inevitable outgrowth of the fact of sex?

There is no question that lack of exercise, a restricted

sphere of life, idiotic fashions and errors in dress generally, indoor life and many other factors have been instrumental in making women disproportionately weak. The extreme of frailty is certainly not a sex characteristic. Given the same opportunities as men, the same indulgence in sports and outdoor life, woman will undoubtedly cease to be the very fragile thing which she has come to be regarded. She will become healthy, normal, vigorous. But even at her best she will not attain the muscular bulk and stature of men, and this physical limitation, it would seem, is a definite sex characteristic.

The probability is that when one attempts to ascribe the physical differences of men and women to the influences of the labors and environments of each in the past, he is inclined to forget the profound influence of sex, which becomes more and more marked as organisms rise in the scale of life.

EXERCISE FOR WOMEN—WHY AND HOW

By DOROTHY PEARL BUCHANAN

MILLIONS of women in this country, young women, middle-aged women and old women, get considerable exercise with a broom every day of their lives.

But what kind of exercise?

A great proportion of women are prepared to tell us that not only through the use of the broom, but in many other ways, they find a great deal of exercise in their housework. But again, what kind of exercise?

The truth is that many millions of these same women who do plenty of housework each day are anything but inspiring examples of the possibilities of physical culture.

Every once in a while some newspaper writer who specializes on advice to the lovesick and other similarly inspiring topics, breaks into print with the statement that housework is the best possible exercise for women. If this were true, ninety-eight out of every hundred women in your town would have figures the beauty and symmetry of which would either equal or surpass that of Annette Kellermann herself.

In reality, the deficiencies in the way of bodily beauty of the great majority of women, and particularly of houseworkers, present a condition that is as needless and scandalous as the tremendous percentage of physical defectiveness among the men who applied for service in the army and navy. The fact is that as a rule the longer a woman has done housework and the more of

it she has done the worse she looks. Obviously, then, housework is not true physical culture.

There is a fundamental difference between work and exercise, even though there are certain varieties of work which constitute ideal exercise, and even though too much exercise or too much of one kind of exercise may take the form of work.

Work carried to a certain point tends to build and maintain a certain amount of strength. Beyond that point it is exhausting. Exercise is far more effective for building the body and developing strength because it is especially designed for the purpose and, within proper limits, is refreshing and invigorating instead of exhausting. It tones one up and gives increased energy instead of consuming it.

Work commonly overtâxes certain muscles or groups of muscles while neglecting others. Exercise brings into play the neglected muscles, correcting any special weaknesses or defects and giving the entire body a uniform development of strength and symmetry.

Exercise promotes the flexibility of the spine and of all parts of the body, raising the chest, improving the carriage and imparting tone and vigor to internal as well as external parts. Work, on the contrary, is usually conducive to poor bodily posture, with stiffness and rigidity of all parts, and this particularly applies in the case of housework. Nearly all of the physical activities of housekeeping are of a nature to bend the back, drag the shoulders forward, cramp the chest and give one that drooping, tired out appearance that immediately suggests the need of something in the nature of "setting up exercise."

Now it is true that so far as the use of a broom is concerned, ordinary sweeping provides a certain amount of exercise that is far better than no exercise at all. For instance, any woman who has experienced the physical degeneration incident to years of an easy and stagnant life, avoiding physical activity of any kind whatever, and who has therefore grown stout and soft, will be benefited by effort of any kind—even vigorous sweeping with an ordinary broom. For in such cases even poor exercise is better than no activity at all. And this is why housework, with all its failings from the physical culture standpoint, may be recommended to large numbers of women.

But, from the standpoint of true body building, and especially from the standpoint of the corrective influence of systematized physical training, sweeping and other forms of housework represent a miserable substitute for real exercise. The muscular activity is limited in form. It is of a nature to cramp rather than to expand the chest and is productive of such clouds of dust in the atmosphere and ultimately such deposits in the lungs as to offset any possible benefit from the muscular exertion.

The more action one is able to put into his or her exercises, whether in free movements or in any other form of training, the greater the benefit. No movement should be performed in a half-hearted way. Each movement should be done with a pronounced stretch of the muscles involved and with the expression of as much energy as may be justified by the type of exercises involved. Five repetitions of any movement executed with energy and spirit would be more effective than

twenty-five repetitions performed in a perfunctory manner.

For purposes of exercise, an ordinary bathing suit is usually ideal if one must wear anything. The body should have complete freedom for every possible movement, bending or stretching.

As to the kind of exercise needed by women, it may be said that almost any type of general body building exercise is suitable for either sex. At the same time, since massive muscular strength is not a natural characteristic of womankind, it follows that the best type of exercise for women is not that which is conducive merely to the building of unusual muscular strength.

Inasmuch as grace of movement is a natural characteristic of womankind, harmonizing with the greater inherent beauty of the sex and the flexibility or elasticity of body which is especially desirable, it follows that exercises conducive to these results are to be preferred.

Next to health and strength, grace is one of the most important of physical characteristics. This, not merely because it makes one's movements more agreeable to those who behold them, but because it promotes activity and strength with only a pleasurable and helpful expenditure of physical energy. The awkward man or woman often puts into a task requiring no effort a degree of physical exertion that should enable one to perform twice the same amount of work.

Nearly all wholesome physical exercises, properly performed, tend to develop grace in the individual. But dancing tends to bring about this result far more effectively than do most forms of exercise, and has also the advantage of providing an agreeable amount of

diversion while effecting physical improvement. While exercise lacking diversion may be just as effective in its results, the tendency to favor those forms of exercise that are diverting as well as helpful, is well known and readily explicable.

Now competitive exercises make a strong appeal to many who could not be induced to engage in ordinary forms of exercise merely intended to improve or develop the physique. This is also true of class gymnastics. The social element and certain of the most marked impulses of man, tend to make such forms of exercise popular and effective.

But none of such forms of exercise provide the marked tendency to develop grace that does dancing.

Dancing is primarily a light, graceful and helpful form of physical exercise. It is an excellent thing to master the intricacies and the various steps of each dance so that its performance will afford pleasure to spectators, but this is secondary to the physical benefits that one is to acquire through the dancing. It is not essential that one acquire the most intricate steps and the involved technique that exceptionally skilled exponents of certain dances sometimes exhibit.

This is particularly true of some of the more vigorous folk dances that have developed and survived in many nations because their performance involves a degree of strength and activity. It is the athletic aspects of such dances in which we are interested so far as this discussion goes.

Folk dances have not the formal character of our ordinary forms of social dances. They are more vigorous and require more sustained effort.

Can one conceive a more striking or compelling form of exercise than that of a group of skillful folk dancers performing with skill and with vigor, the evolutions and steps that make up their native forms of folk dances with bodies full of grace and fire, rhythmically swinging through the curious, strenuous and sometimes fascinating movements of the dance?

The dances favored by nations who have developed characteristic forms of folk dancing are made up in great part of movements that have a marked athletic significance, and that actually involve muscular effort. It is these particular movements that render certain folk dances especially enjoyable and beneficial—to say nothing of the vigor that is lent to them by such movements, and that consequently make the dance attractive to the spectator.

The Highland Fling, a dance in high favor among the hardy Highlanders and the people of Scotland in general, is a dance that involves movements demanding exceptionally vigorous physical work.

The Sailor's Hornpipe is another dance well known and not difficult of performance that contains a number of vigorous steps of an athletic nature, but that tend to promote grace. By selecting a few of the most useful movements of this dance, one can attain many athletic and grace building exercises.

Of late years Russian folk dances have become very popular. This particular sort of dance is an especially useful method of acquiring physical strength and endurance, and while at the outset it may appear more difficult than other forms of dancing, it will well repay one for the time one may expend in mastering its in-

tricacies and will develop the strength and endurance essential to its accomplishment.

In many instances it will be far more convenient and just as helpful to select a few movements from a dance that may be depended upon for producing a marked degree of physical development, and for the body in general—even though so situated that it is impossible to find a single companion to become interested in dancing. These movements may then be performed as exercises, rather than as steps of the dance, and one can obtain all of the benefit that the dance will afford, minus the social diversion only.

The chief advantage of dance movements lies in the necessity of performing them in a regular and rhythmic manner. When the rhythm of the dance demands that the leg or arm be extended, uplifted, or otherwise moved, it is necessary to repeat the movement in the same fashion in practically all dances, and this involves the same degree of physical effort in each instance.

To insure the performance of movements in rhythmic fashion, music, of course, is of great assistance. But it is by no means essential that even the most intricate dancing movements have the advantage of a musical accompaniment. All movements involved in dancing are performed on the basis of count. As a matter of fact, the most skilled exponents of dancing acquire the mastery of new movements by count and not by following actual music. Yet, if music is available, as for instance when one has a phonograph to supply it, it should be used for its value in making exercise pleasurable and attractive.

The most important point to keep in mind is that the

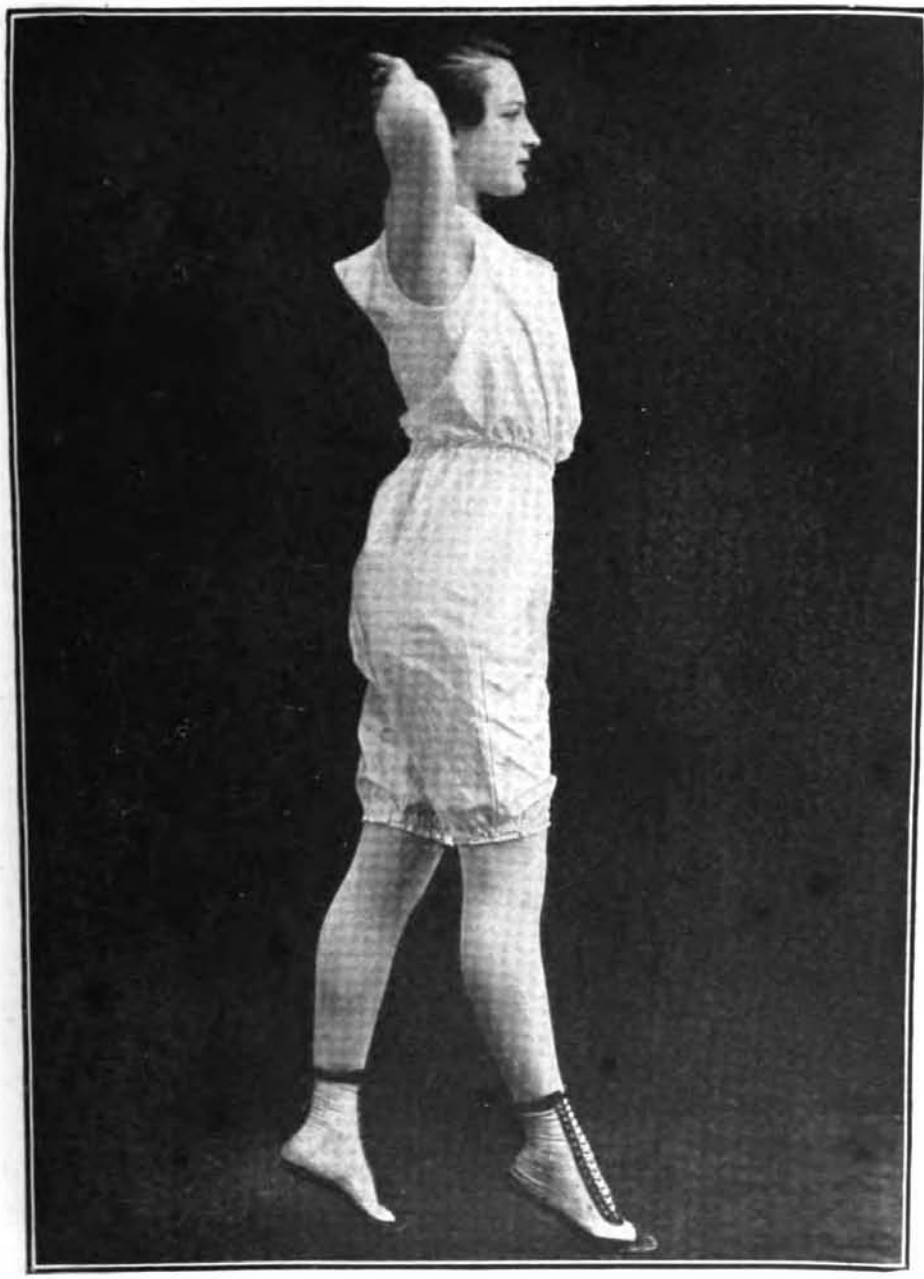
entire body be kept free and lissome, and that any tendency to stiffness or rigidity of the muscles of the arms, legs or torso must be guarded against carefully.

Dance movements and other forms of exercise as well should serve to bring into play the muscles of the trunk and arms as well as those of the lower limbs. In fact, one of the greatest advantages of any form of exercise is its tendency to promote activity and agility of the body in general.

Summarizing, finally, it may be said that women may advantageously regard various types of fancy dancing as ideal forms of exercise. And so far as possible they should also perform systematic exercises in the form of dancing.

Inasmuch as bodily grace and poise depend primarily upon carriage, this simple exercise for improving the posture is invaluable. Simply by bringing the head far backward as illustrated, the spine is straightened, the chest raised and the body beautifully poised. Do this dozens of times each day.

This "wind-mill" exercise will give you poise and graceful carriage. The arms are swung round and round, first in one direction, then in the other, in a forward plane. Be sure that the shoulders follow the arms with a body-turning or twisting action at the waist. Thus, the left shoulder is extended forward with the left arm and then the right shoulder in turn is extended forward as the right arm is swung over. An ideal spine-loosening, chest-raising shoulder exercise.



To develop poise in walking, assume the position shown with the hands clasped behind the head and then walk back and forth and around your room on the tips of your toes. Try it to music. This can be done in no other way than gracefullv.

With arms extended in front of the body, walk across the floor with knees straight, toes extended and a slight kicking action with each step, also swinging the arms up one or two feet with each step, as in the photograph.

ACQUIRING A QUEENLY CARRIAGE

By DOROTHY PEARL BUCHANAN

EVERY woman wants grace and poise. There is something in an erect and graceful bearing which suggests the majesty of a queen. Somehow this grace of bearing seems pre-eminently in harmony with the refinement and beauty which distinguish all women when at their best, and it is only natural that women should desire this quality even if only unconsciously or subconsciously.

In the matter of feminine attractiveness, graceful poise is, perhaps, next in importance to natural beauty of outline. That is because it is beauty. It is beauty in the sense that grace is beauty of movement. It is beauty of bearing, and no one can doubt that this quality is as vital a factor in womanly charm as symmetrical outlines and smoothly rounded contours.

Some women are naturally graceful and unconsciously well poised, just as certain types of people seem naturally more adept than others in the handling of their hands and bodily members. Some individuals seem to inherit a natural power of muscular co-ordination that makes them exceptionally agile and deft in their movements. It is the same with the quality known as grace. With certain types it seems to be more or less spontaneous.

And yet grace can be acquired. Physical poise can be cultivated. Even the most awkward woman can improve her muscular control and acquire a smoothness

of movement and a quiet dignity of bearing that will give her the carriage which we are accustomed to think of as queenly. We need not concern ourselves with the correctness of the term. It does not matter if many queens are stiff and ungainly. It does not matter if many dancers, tennis players and swimmers have far more of this queenly quality than some real queens. It is sufficient for our purpose that the adjective carries the idea.

Beauty of bearing can be acquired just as may be beauty of outline. The latter may be secured through the simple development of the body. That is a matter of exercise.

All women instinctively recognize the beauty and suggestion of womanliness in a figure that is kept trim and erect. If deficient in this respect they try to acquire poise artificially. This is one of the chief reasons for the wearing of corsets, namely, the maintenance, through this artificial support, of an erect posture. Unfortunately they choose the wrong way to secure the desired result. The corset weakens the body, in the first place, often very seriously impairing the health through the pressure upon delicate internal organs. In the second place, it fails of its own object because of the stiffness which makes real grace of bearing impossible.

The very first requirement of a graceful carriage is a complete development of the entire body. No one can carry herself well without a high degree of that quality which may be called muscle tone. And muscle tone is impossible without a satisfactory development and the condition of vigor which goes with it. You should understand that there is what may be called a

half-way state between complete relaxation of muscular tissue, such as prevails in sleep, and that powerful tension or contraction of the muscles involved in any exertion of strength. In other words, the muscles of the body when one is awake, even though not in action, are not entirely passive. They are in a somewhat active condition, a state of moderate firmness, and this is known as muscle tone.

This condition is emphasized when standing, walking or running, inasmuch as even those muscles which are not actively engaged in the effort have a certain degree of tension, giving one perfect control of every part of the body so as to keep it steady and well balanced and in harmony with the exertion of the moment. As soon as you recognize this quality in your own muscles you will begin to understand more clearly what we mean by muscle tone.

The woman who is well poised, who carries herself with a certain graceful smoothness of movement will be found to have this quality of muscle tone. It is your first essential. If you are soft, flabby, flaccid, toneless—not vocally, but muscularly—then the first thing for you to do is to follow persistently a system of all-around exercise that will strengthen and build up every part of the body. You will be ready to proceed more effectively with the cultivation of grace.

There are two important results that you should work for. The first is good posture, so far as the spine and upper body are concerned. The second is the faculty of moving with a certain freedom of action which belongs only to those who have learned to move with a "swing." Some persons move very stiffly; their

actions are angular, awkward. This means imperfect muscular control.

To some extent the difficulty is mental. Too much hesitation and too much restraint in one's movements will give this stiff and awkward quality. It is frequently the result of self-consciousness, often the manifestation of an exaggerated self-repression. It is only when these mental restraints are eliminated and one learns to move as naturally and freely as a child that one will regain something of the grace that characterizes the healthy and active child previous to the time when the element of self-consciousness begins to develop.

You will only learn to move with a swing, so to speak, when you have acquired the knack of avoiding unnecessary tension and stiffness in the muscles. Learn the secret of relaxation of those parts which are not directly involved in the movement in hand. Remember that you will never have complete control of your muscles until you have mastered them to the extent that you are able to relax them voluntarily. Tension is easy. Relaxation at will means control.

Erect posture is the primary element in good bodily poise. It is a very simple matter. And yet it is very, very uncommon. Erect posture is not only a factor in beauty; it is a very important factor in health. This is true not only because it means a normal condition of the spine with a healthy state of the nerve centers, but because of its influence upon the functions of all the internal organs. Nature intended these organs to occupy a certain position in the body. They do their best work only when they occupy these allotted positions. When they are crowded out of position or permitted,

through bad posture, to sag or fall several inches below, their efficiency is naturally interfered with. They are obliged to struggle against a severe handicap.

The erect posture, with the head held well up, the chest raised and the weight of the body distributed chiefly on the balls of the foot rather than on the heels, may be called the active position, as contrasted with the passive position in which the weight settles back upon the heels and the body, as a whole, expresses unreadiness for action or effort. The active, erect position, with the chest fairly full and high and the head erect, is the position of energy. It is the bearing of youth. It expresses energy, activity, life. Energy is always impressive. It means animation, ambition, enthusiasm. The erect position is the position of command. It is characteristic of the army officer. It suggests the spirit and dominance of his personality. But also it is demanded of the men in the rank and file of the army because it goes with the sense of courage.

The erect position is the position of pride. You remember the impressions made upon you when your favorite novelist tells you how the heroine "draws herself up to her full height." Pride, self-respect, a haughty demeanor, all implying a certain exaltation of spirit, are expressed in an erect bearing. It is for this reason that it is actually the bearing of a queen. Self-confidence, courage, joy, hope and other of the more positive, helpful and exalting qualities and emotions go with an erect bearing, whereas timidity, fear, dejection and grief are suggested by the heavily hanging head and generally drooping frame.

The mental factor, therefore, is extremely important

in the cultivation of grace and poise. Buoyancy of spirit will help to give you buoyancy of bodily movement. Therefore, try to have and feel these helpful thoughts and emotions. You will find that as you think them you will spontaneously assume the corresponding attitude. Even the physical act of assuming mechanically this strong, positive, hopeful attitude will help you to be all that this improved posture expresses. You will find yourself becoming cheerful, joyful, self-confident, courageous, self-respecting and even stronger willed. Don't forget that these qualities and the bodily posture correspond.

Coming back to the question of exercise for our present purpose. The universal tendency of the weak, the careless, and the lazy is to allow the head and shoulders to droop, the chest to flatten and the body generally to sag until the region of the waist and below becomes more prominent than the chest above it. There is nothing attractive in this attitude. It is the full and prominent chest that gives beauty to the human torso.

Parents and teachers have commonly over-emphasized the position of the shoulders and their relation to the carriage of the body. Children are instructed to "hold their shoulders back." But the real fault lies in the position of the spine. If the upper spine is held erect, which means an erect position of the head, the entire body will naturally and inevitably assume correct lines. The mere backward bending of the head, as in one of the exercises illustrated, will have the effect of drawing up the chest and, at the same time, causing the pulling inward and upward of the region of the stomach and abdomen. This may mean a slight exaggeration in

the curve in the small of the back. If so, don't let that worry you; it is because this curve is a part of a well balanced and erect bearing. If at any time you find your posture faulty, the mere backward stretching of the head will incidentally improve your entire carriage. There are other arm exercises, such as stretching the arms above head, that raise the chest and improve the alignment of the spine, which accomplish the same result.

Much attention is naturally given to the military drill position. This is thoroughly well founded physiologically as well as psychologically. It sets a man up. It will do the same with a woman. It should not necessarily mean a strained position of the body. The chest should not be lifted to an exaggerated degree. What it really means is simply the proper balance of the body from the waist up in such a way that there is the least strain, with every part in a position to function most perfectly.

In the practice of exercises for the cultivation of grace, any form of dancing will usually be advantageous, but it will be best if this can be done always in flat-heeled or low-heeled shoes. This will help you to gain the buoyancy and grace of movement which can only be secured when the weight of the body is carried lightly on the toes or balls of the foot. When high-heeled shoes are worn, the appearance is that of stepping upon the toes, whereas the protruding heel really makes it inevitable that too much weight is borne by the heel. In walking in French shoes one proceeds by stamping her heels, as it were, upon the floor or sidewalk. Graceful walking is impossible under such conditions. But

if you go barefooted or wear low-heeled shoes, so that you can raise the weight upon the toes, you will at once find that freedom, ease and grace of movement are natural and even spontaneous.

Normal bust development as expressed in the masterpiece of great artists is shown in this characteristic sculpture. The excessively large bust is neither indicative of vitality nor promising in respect to functional capacity.

THE BUST—HOW IT MAY BE DEVELOPED

By DR. C. S. CARR

FIRST and foremost, I believe that nature works for practical ends. Busts are not merely ornaments, as the average woman seems to think, but are provided by nature for a practical purpose. Their development naturally begins with the beginning of sexual life. As long as the sexual instinct exists in a natural way, the busts will develop correspondingly. However, if the sexual instincts are disturbed, either by disappointment, disease or unnatural mode of life of any sort, the development of the bust will be arrested.

There is a vital connection between the busts and the sexual life. Blood vessels and nerves connect the two functions very intimately. Anything happening to the sexual organs is very apt to produce, by sympathy, changes to the bust. This fact is brought to the attention of the physician almost every day.

The maternal instincts of a girl begin to manifest themselves in one way or another about the age of sixteen. If she is living a natural and free life, these instincts will become more and more imperious, and if she is surrounded by conditions that permit her to follow these instincts—if she becomes a happy mother at an early age—the busts take care of themselves and need no attention so far as their development is concerned. That is what nature provided them for. But, if on the other hand she is surrounded by circumstances of life that compel her to squelch her maternal instincts, instead

of finding a congenial mate and fulfilling the functions for which she was intended, nature will begin to withdraw from the sexual function the energy that belongs to it and utilize it in whatever function the girl is performing. If she is teaching school, clerking in a store or doing housework, or anything else that takes her energy, and she lays aside all thoughts of maternity and sexual impulses and conjugal love—all these things put in the background and in the place of them the pressing duties of commercial life are substituted—the busts will either not develop at all, or what development has occurred will come to a standstill, or probably be gradually lost.

Now these remarks state that case as it really is. The breasts have a normal function, and if that function is not performed the chances are that their development will either cease or go backwards. Well, what can we do about it?

There are a few things that can be done. The girl should carefully avoid trifling with subjects that relate to sexual matters. To arouse sexual feelings and passions by reckless contact with the opposite sex, by reading vicious books, or by looking at suggestive pictures, all these things tend to prematurely arouse sexual functions which if they do not have their natural expression will react to the damage of the whole sexual apparatus, which includes the development of the busts.

Second, by avoiding pressure of the nerves and blood vessels that are necessary for the normal development of the bust. The mammary arteries and some important nerve trunks that supply the breasts come from below. They must pass up from the pelvis to the thorax through

the slim portion of the body. Any tightening of the clothing, or corsets about the slim portion of the body, tends to cut off the circulation of blood that naturally supplies the breasts. It also benumbs the nerves that carry sensation and vital force.

Much has been said about tight lacing, but I seldom see any reference to one damage which tight lacing produces, and that is the shrinking of the busts. This is almost inevitable. There are women who lace tightly and yet have a well-developed bust. They accomplish this by relieving themselves of the tight lacing as soon as possible, so that they spend at least twelve or fourteen hours a day with perfect freedom and ease about the stomach.

I am often asked, "Does mechanical manipulation assist in the development of the busts?" My answer is that it depends altogether upon the manipulations. The ordinary mechanical means have little or nothing to do with the development of the glands which constitute the breasts. The pectoral muscles underneath the breasts undoubtedly can be thickened and developed by manipulation, by massage and the like, but the mammary glands that give shape and bulk to the breasts cannot be developed in that way. If they are developed at all it will be by mechanical means that excite vital processes through the action of the vascular and nervous systems. This is brought about naturally by congenial marriage. It can often be entirely accomplished by the use of a very simple device which will be described later. As in the development of any other part of the body, mental influences play a large part. This is especially true in the development of the busts.

Any woman who has the care of a growing baby that she really loves, fondles the baby and in a large measure becomes the baby's mother, which arouses within her wholesome maternal feelings, and her life with the child closely resembles the life of the mother, such an exercise is vastly more likely to develop the breasts than any manipulation that could be devised.

The bust developers such as are applied to the breasts hoping to enlarge them, may possibly improve the skin, and as before stated, develop the muscles of the chest, but every girl who reads these lines and has ever tried any of these breast developers will recognize I am telling the truth when I say they nearly always disappoint. Perhaps they always do.

I wish to impress it upon the minds of the girls that the development of the breasts is a vital process which depends upon the emotions and feelings vastly more than it does upon any exercise or manipulation.

The muscles of any part of the body can be made to enlarge by simply exercising, but the enlargement will be much more lasting and rapid if the exercise is done in the natural way, that is, some wholesome function or work is performed instead of mere artificial exercise. Then the development of the muscles comes about much more satisfactorily if it is associated with exhilaration of mind and that satisfaction of the senses which one receives when doing some wholesome work.

The busts, unlike the muscles, are more largely supplied by the organic nervous system, and are much further removed from any artificial effort toward their development. One single emotion of the right kind will send the blood surging to the busts, as no remedies could

possibly do. These emotions, if they are wholesome and proper, operate as a natural tonic that cannot be imitated by any drug or treatment. Such a tonic causes the breasts to enlarge and beautify themselves without any self-conscious effort.

It is a notable fact that in the lower walks of life, where the girl is not kept in school beyond her sexual development, is married early and the sexual functions are allowed to govern her conduct, that the breasts are greatly developed, often in excess of natural beauty. The reason is a vital one, rather than a self-conscious one. It is Nature's attempt to supply what is needed.

That woman who has no use for her breasts and who is living a life that is wholly incompatible with natural instincts and sexual impulses, the chances are the normal development of the busts will not take place, although she may spend hundred of dollars for remedies.

In most cases the busts are sufficiently developed when a girl is sixteen, seventeen and eighteen years old, after which age, if she remain unmarried, the busts will begin to shrink and lose their development. The same thing has happened to the bust that happens to any other organ. Disuse favors atrophy.

In the natural order of things, maternity would have occurred early enough to prevent the loss of the busts. The development of the busts is greatly dependent upon the maternal instincts. The tendency of the day is to postpone marriage much beyond the age demanded by Nature. Hence it is that there are a multitude of women who are well developed in all other respects, but find to their chagrin that the busts are gradually disappearing.

In the days when I practiced medicine they did not have the conveniences for artificial feeding of babies that they have today. It matters little at this time whether a mother is able to nurse her child or not. The average trained nurse, by the assistance of artificially prepared foods, can attend to the wants of the infant so well that it is regarded as no great loss if the mother is unable to nurse the baby.

But in the days when I began the practice of medicine, it was highly important that the mother should nurse the baby. The life of the baby generally depended upon it. Therefore, if a new mother was found with an under development of the breasts, a breast pump was at once supplied.

Many a time I have seen a wonderful transformation occur by the application of the breast pump. The breast was small and shriveled and the nipple undeveloped and drawn in. The application of the breast pump would soon work a wonderful change. A woman with scarcely any breasts at all would soon find herself in possession of a well-developed bust, and able to nurse her child satisfactorily.

This will apply to the unmarried woman exactly as to the married woman. An ordinary breast pump applied once a day will do very well to begin with. It should be applied cautiously at first so as not to create any soreness of the nipples. But in order to accomplish the development of the busts, a larger instrument may be necessary. The very largest dry-cup, with a specially strong rubber bulb, will do the work much more thoroughly. A glass vacuum apparatus, made on purpose for bust development, would in some particulars be more

sure to produce results, although as said before, the ordinary breast pump will do very well. Indeed, it will bring about a development of the busts quite astonishing. The special instrument just alluded to may be used only in cases where the smaller breast pump does not prove effective.

Personally I am a believer in early marriages. The function of these maternal organs is prevented by delayed marriages, and the result is not only the loss of the figure, but many times an absolute inability to perform the functions of a mother after the child is born.

There are many reasons, economic and social, why marriage is postponed, and an increasing number of cases where marriage is permanently ruled out. In such cases, except in very fleshy people, the breasts are usually sacrificed. This can only be corrected by partial restoration of the function of the breasts, as described.

At first it may seem too easy to be real. Curiously enough, those who make use of this very simple means of developing the bust, seem unwilling to admit it even to their nearest friend. Thus it is that the only real bust developer in existence is kept practically a secret, while the hundreds of alleged bust developers, which cost a great deal of money, are kept before the public mind by all the tricks of modern advertising.

In attempting to use the breast pump, however, we should consider some details. First, the nipple should be moistened with oil. Perhaps cream would be the best form of oil. It should be warm and well rubbed in. The vacuum cup or the breast pump should also be warm. This furnishes the warmth and the moisture necessary.

In introducing a suction by operating the rubber bulb, the nipple can be observed through the glass cup, and too much force should not be exercised at first. If it is operated gradually it will be noticed that the nipple begins to enlarge and look red, and the surrounding area will soon be the same. The treatment may be continued gently for ten or fifteen minutes each time. If it is done twice a day so much the better. After the treatment, it is well to gently knead and rub the whole breast, in order to distribute the congestion which has occurred in the region of the nipple.

It is not generally known that the nipple of a female breast contains erectile tissue. It is only when the erectile tissue of the nipple is excited to action that we can be sure that it has received exactly the right sort of stimulation. Therefore this should be looked for while the breast is being treated. The vacuum treatment will tend to provoke this, as well as the application of the warm lubrication.

But what I want to impress upon the mind of the reader is that it is only through the nervous mechanism of the breasts that the proper physiological forces can be brought to bear in the matter. The result will not be in accordance with the amount of force used, but it will be in exact proportion to the amount of gentle stimulation and excitation which produces a pleasurable glow in the breasts.

I am aware that this is a very delicate subject, and it is with some diffidence that I am attempting to describe it with sufficient detail to lead to success on the part of the reader. Properly understood and applied, this procedure ought not to completely fail in any instance.

There are, however, some further precautions that I ought not to omit. In the natural development of the breasts in a normal girl we have a mental condition that is peculiar to the girl. It is the age of love and good feeling. Unless something interferes, the nervous system of the girl is thrilled with affection and maternal feelings. She knows nothing of hatred and jealousy. Her feelings are mobile and friendly. She loves her dolly. She fondles the kitten. She converts everything she possibly can into a pet. This keeps her brain and nervous system in a continual glow of physical life.

Her love is innocent. It has no sinister purpose behind it at all. It ebbs and flows under the influence of the most chaste impulses, just as nature intended. But it has the effect that nothing else can imitate, in charging and surcharging the generative organs with magnetism and nutrition needed for their marvelous development. All this is especially true of the breasts. Therefore the mental conditions cannot be overlooked.

Let no woman expect results without complying with conditions. A mind filled with jealousy and hate disturbs the nervous system in exactly the way as to defeat development of this sort. The breasts shrivel. The nipples draw in and become atrophied under the influence of spite and rancor and hatred. In the case of the woman who scolds from morning to night, who finds fault, resorts to punishment and brute force, or indulges in secret envy and malice, even though she gives no expression to it, nature will withdraw from her one of her charms, a well rounded bust.

That woman who has preserved within herself the modesty and sexual timidity that was her charm in early

maidenhood, that woman who has so preserved her maidenhood, both physical and mental, that a blush comes as easily to her as it did when she was sixteen, such a woman is in possession of a natural tonic for the busts that no chemist can ever hope to imitate. That capillary congestion which we call a blush does not stop when it touches the cheek or reddens the pink and white throat. It spreads downwards and pervades the deeper tissues, bringing with it a dose of red, warm blood, to which the mammary glands and nipples respond with alacrity, and from which their integrity is constantly maintained.

Oh, lovable and loving woman, if you only knew the secret of your beauty you would no longer go hunting about among the attractive labels at the drug store for some elixir to restore you the curves and rounded beauties you have lost. You would turn from all these and go within yourself, search among your own sensibilities and womanly impulses for disused and misused powers of love, to coax back once more into activity their life-giving virilities.

Love something, as you used to when you were a bouncing, beautiful girl. Mother something, as you would have done had circumstances permitted. Be somebody's sweetheart. Keep near to you the budding maturity and innocence of young girls like you were once. Listen to their story. Sympathize with their tragedies and triumphs. It is in this direction that you will find Nature's pharmacy stored with specific remedies.

The rantankerous, hard-fisted, scowling woman who hates a thousand times as much as she loves, can hope to be nothing else but what she really is, a slab-sided, flat-chested creature, fit only for war and turmoil. To just

that degree that a woman gives way to unwomanly feelings, to just that degree that she loses her grip upon the tingling feelings that made her so interesting when she was a girl, to just a corresponding degree that she loses these things will she lose her physical development.

Love and more love is what the woman needs who desires to be beautiful. Not the love of unrequited sexual passion that withers and brings no healing, but the love of beauty and service that brings complete satisfaction by its own indulgence. Not a sexless love either, but a bountiful love that takes in all creation, calls nothing unclean, makes nothing unholy by its touch, shrinks from nothing that nature endowed her with.

This can be done even though the pathway that she has chosen for herself has not led to wifehood or motherhood. If she had ears to hear or eyes to see she would hear the voices of lonely ones crying for her, or see the hands of deserted ones reaching out for her, furnishing ample opportunity for the bestowal of the richest, the warmest love of which she is capable.

HOW TO DISCARD CORSETS

By DOROTHY PEARL BUCHANAN

DO you wear a corset? If so, why? Do you need one? Again, why?

If you don't need one, there is no good reason why you should wear one.

If you do need one, it is high time that you make a study of the physical condition that seems to make it necessary. And improve it.

In the first place, no woman needs a corset, either for comfort or appearance, unless she is in a muscular condition that she ought to be ashamed of.

When a woman says that she depends upon her corset or that she cannot get along without it, she means that she is too weak to hold herself erect, or as some say, "to hold herself together." Just fancy for a moment the desperate necessity of holding oneself together by a semi-rigid encasement of this kind, otherwise she might become separated or fall to pieces! ! !

In a natural and normal condition, a woman does not need a corset any more than a man or a child needs one. She can stand erect not only on her own legs but on her own backbone. A woman has just as many muscles as a man, muscles which are designed to move the body and its parts in the same way, muscles which enable her to preserve the bodily posture in the same way.

Every woman is given by Nature a group of muscles about the back, waist and abdominal region, which form

a powerful corset when they are normally developed. They give this part of the body tone and firmness. They enable her to maintain an erect position and preserve the trim, clean outlines which are characteristic of every normally vigorous person of either sex. It is only when these muscles about the lower trunk are weakened and atrophied that there seems to be any excuse for the artificial substitute that puts a woman into a class with the insects and the shell-fishes.

When you facetiously call a man a lobster, you forget that the term would more fittingly apply to the corseted woman, because her body is enclosed in a protecting shell. Vertebrate creatures, including ourselves (when uncorseted), have their supporting bony structure inside, with the organs and muscles internal. The body of an insect is a shell; its legs are pipes with the muscles inside. The same with a crab. Consequently, when the scornful and corseted suffragette witheringly denounces "mere man" as a "poor insect," she overlooks the one thing that would tend to put either one or the other into the entomological or the shell-fish classification. We must admit, however, that many suffragettes are included in the progressive group of women who practice physical culture and do not wear corsets.

The corset is an artificial, unnatural device, and therefore bound to react injuriously upon the wearer. The weak woman depends upon it to hold herself up, but largely because this very corset has made her weak. Few healthy girls in the fresh young years when they commence to wear a corset need any prop or support of this kind. It is a mistake ever to commence its use. But if one is already addicted to it one should reform.

It is true that the corset styles of recent years have been a very great improvement upon the pinched waist, hourglass types which prevailed for so many decades. At least there has been a certain amount of freedom for the bust and even some for the waistline. Nevertheless, there is still some constriction of this part of the body in many instances, and in practically all cases there is an abnormal and injurious pressure upon the abdomen. With this direct backward pressure, it is questionable if nearly as much harm is not accomplished at times as with the former squeezing of the body at the waistline, particularly since the extreme flattening of the abdomen directly compresses the delicate pelvic organs.

It is curious how corset fashions change. The old ideal of the pinched-waist meant a bulging and over-emphasis of the hips and even of the abdomen. Later there came the ideal of the hipless figure, in which the supreme effort was made to cause the hips to disappear. But now that woman may have hips and waists, the abdomen must vanish completely. It must be subjected to a flattening that is out of all semblance to any normal human contour.

Why cannot a woman be permitted to have a normal and natural figure, such as one sees in the firm and well built athletic girl, or such as one may find portrayed in the masterpieces of sculpture? The abdomen should neither protrude on the one hand nor should it be flattened inward. In the symmetrical, perfectly developed body, properly carried, the abdomen is naturally retracted to the proper degree, becoming inconspicuous because it occupies its natural position. It should not appear to have been cut off. It should present the nor-

mal moderate convexity which Nature gave it, and without protruding.

We may as well admit frankly that in this very question of the protruding abdomen lies the great fundamental trouble of large numbers of women, and by reason of which they feel that a corset or girdle of some kind is necessary. It will be said that the naturally retracted abdomen is ideal, but that in actual individual cases the abdomen becomes too prominent, at least after the age of twenty-five or thirty, and needs some artificial restraint. The complaint is thoroughly justified, but the usual treatment in the form of a corset is not. In the first place, the difficulty lies partly in the accumulation of fatty tissue, and in the second place in faulty posture.

With many women there seems to be a natural tendency for fat to deposit itself about the hips and abdomen, but so far as the latter is concerned, the process is greatly hastened by the degeneration of the muscular structures of this part. Exercise for the abdomen will maintain these muscles in a vigorous condition, and prevent the excessive formation of fatty tissue hereabout. Furthermore, these muscles, if properly developed, give tone to this part of the body and naturally prevent any sagging or bulging.

What is even more important, however, is the question of correct posture. This assumes the very greatest importance as soon as the corset is removed and one relaxes into the slouching position which causes the abdomen to become prominent. For this reason, the woman accustomed to corset wearing should of all others give special attention to exercises for strengthening all these parts and for acquiring good posture.

Remember that the straightening up of the body, involving the raising and expanding of the chest, naturally brings with it the drawing inward and upward of the abdomen, also the arching of the curve of the back. On this account, for the purposes of exercise, it is well to exaggerate these positions so as to get the full action of the muscles concerned, and thus help to establish the correct standing or sitting position.

Careless and faulty posture inevitably leads in the course of time to a condition known as enteroptosis. This means simply a prolapse of the bowels, with the sagging down also of the liver, stomach and other organs, several inches below the normal position. This naturally means a very great crowding of the lower abdominal cavity and the protruding of this region.

It will be seen that in a condition of this kind exercises for building up the abdominal walls and also for improving the posture are vitally necessary. The purpose should be to restore all of these organs to their proper position. Reclining exercises will help in this respect, especially if performed upon an inclined board. Place an ironing board with one end on the floor and the other on a chair, or the side of a bed, fixed securely, so that it will not slip. Then perform the standard reclining exercises with the feet at the upper end of the board.

Strengthen your body and learn to carry yourself well, which is largely a matter of keeping the head up and back, and you will find no further need for the corset so far as bodily support is concerned. Many women will declare that a corset is necessary in order to support the clothing properly. But this is not the case if the pre-

sentable little frocks and other one-piece dresses now so popular, are used. The fact is that if you build up a perfect figure of your own, you will make a much more attractive appearance than you possibly could by putting on your clothes over an artificial shape, such as even the best corset could give you.

The question arises as to whether or not the women of the future will wear corsets. There are reasons for thinking that the future will bring great changes along these lines. Referring to the history of corset wearing, Milo Hastings writes:

"The first historic allusion to the corset and its use was by the poet Homer, who tells that Juno borrowed a girdle from Venus with a view of wearing it to keep Jupiter's love from growing cold."

Later Greek writers explain matters without making personal allusions. The ladies, it seems, wore cloth bands or girdles, one to support the breasts and one to support or draw in the "stomach" and sometimes a third one between these two.

The Roman ladies also used the waist and breast bands. The following lines are from Tarentus, a Roman dramatist, born 560 B. C.:

"The pretty creature isn't at all like our town girls whose mothers saddle their backs and straight lace their waists to make them well shaped."

Four centuries later Galen, a Roman M. D., started the anti-corset crusade, which has faithfully trailed the garment through two thousand years of history.

In medieval times the first plan of waist restriction was with stout cloth jackets, which laced up the front. One picture of such dates from the year 1048. Joan

of Arc was wearing a very slouchy looking one when she posed for the picture that now hangs in the Metropolitan Museum of Art.

The word "corset" is first recorded in a manuscript of 1265. A writer of the following century says:

"The women have contracted a vitiated taste and not being content with their form as God hath made it, provide a corset or bodice—a stiff, unnatural disguisement—for making themselves look small."

Things went on from more to most, and culminated during the reign of Catherine de Medici in France and Elizabeth in England.

On what instinct of human nature rests this desire to make the human trunk as stiff and unbending as a lobster's thorax I know not. But it is indisputable that for two and one-half centuries the object of the corset was not only to make the waist look small, but to make it straight and stiff, and the shape of an inverted cone.

The English adopted the steel corset-covers of the De Medici pattern but made further improvements. Instead of deriving the principle of smallness from a lace fabric, and of stiffness from a separate steel cage, they had vertical stiff bars of steel, whalebone, sole leather, etc., sewed into a fabric bodice.

And then came the French Revolution, and in the effort to destroy every vestige of the memory of the tyranny of Royal Courts that had decreed fashions as well as laws, corsets and the huge skirts that usually accompanied them, were discarded overnight. The return was to the classic garb of Greece, the waistline was moved up just beneath the breasts in the directoire gown, and the passions for long bodices and small waists were forgotten.

Truth crushed to earth shall rise again—so did corsets.

No sooner had they sent Napoleon to St. Helena and restored the monarchy until waists grew small again—and busts and hips grew large.

So the corset came back and "the span" again became the standard of elegance for a lady's waist.

As in other phases of social life, the present generation has seen an acceleration of evolution in dress. In the eighties and nineties the ideal effect of the corset was to give big round busts and hips. "Shape" in a woman came to mean an excess of fat squeezed upward and downward until it gave the hourglass effect when observed from either front or side view.

Then came the "straight front." It was not the old ideal of straightness which descended in every direction to a waist line, below which sudden flaring of starch and wicker work left all to the imagination. But the recent "straight front" is an effort to eliminate the waist line in front and put it all in the rear. This required a mannerism of carriage, as well as lacing, and many a small boy amused his comrades by learning the straight front walk.

The straight front introduced something new into the corset world—the idea of "shaping" the hips. The first plan was merely to lengthen the corset downward; then followed the hip corset which leaves the breast scot free and makes only nominal the restriction of the waist. And so came the effort to reduce the apparent size of the hips which a hundred generations of women have spent untold millions of wealth and incommensurate suffering in trying to enlarge.

And last of all, a fashion in carriage has been added

which is a reversal of the tactics of the last decade and consists of a wild ambition to wear the hips in front.

The opposition to corsets has been bitter for a thousand years. In the earlier times it took the form of bans and edicts of a political and religious nature. In the eighteenth century the chief form of attack was satire. Medical and health writers of all times have heaped criticism on the corsets. Bleeding of the lungs, abortion, curvature of the spine and consumption were commonly laid at their door.

I am optimistic that the days of the corset are about numbered, and here are my reasons for believing that it may be so. I shall state them in the reverse order to my idea of their effectiveness.

1—The continued hygienic preachment against the corset is accumulative in its effects as it increases in argumentative value when publicly considered, whereas the arguments for the corset, that are overwhelmingly powerful in the brainless sex rivalry of an old-fashioned boarding school, become absurd when discussed by men and women meeting on common intellectual ground.

2—The increasing popularity of athletics, and the study of eugenics will combine with the anatomically based arts, to increase the non-sex (or more properly the addition-to-sex) interest in women's bodily development.

3—The intellectual and economic emancipation of woman will work for the elimination of the corset, as a restriction of physical work and play—for the same reason that a similar emancipation of Turkish or Chinese women would eradicate face veiling and feet binding.

THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART ONE

EXERCISE

SECTION FOUR

RECREATION AND ATHLETICS

PLAY A VITAL NECESSITY

By CARL EASTON WILLIAMS

BETWEEN play and amusement there is a marked difference. Play may be said to be an active form of recreation, while amusement is generally passive. Amusement is rather a matter of mental entertainment, while play more commonly combines both mental and physical activity, often with special emphasis upon the latter. True, certain forms of play, as in some familiar household or social games, may be almost entirely mental in character, but even such play involves active participation of some kind rather than the passive or receptive mental interest to be found in something that only amuses. To play is to occupy oneself in some way, for amusement or pleasure; to engage in any exercise or sport or diversion, as the dictionary says, to take part in a game, or to sport or frisk. It means more than mere amusement, even though it may amuse. Both play and amusement are of value for purposes of recreation, but play has a positive constructive value because of its being a form of activity, whereas amusement only affords relaxation and involves recreation chiefly in the sense of recuperation.

So that while amusement, through its relaxing and recuperative influence, may have a certain health-preserving value, play may have an educational, body-building, strengthening and otherwise constructive character that is lacking in the former. In adult life we are perhaps too often satisfied with mere amusement when it

would be much more to our advantage if we could retain throughout life the youthful habit of play. But we will come back to that later.

Play on first thought appears to be a form of spontaneous activity entered into for the sake of pleasure. But we find that it means much more than that. To many of those who have never thought about it, play seems to have little meaning except as it is something to be distinguished from work. It is casually looked upon as merely "having fun" in contrast with work. But to the young it is really the serious business of life, even though they do not take it seriously. It is their work, in a sense, for it is as necessary a part of their life as the real work that they will have to do when they grow up.

Play for the children is really a serious business, but they enjoy it because it answers to the demands of the instincts implanted in them for this purpose. They enjoy it, too, because it is self-activity, just as we grown-up folks can also enjoy work that we choose to do instead of being compelled to do, and which is self-expression for us just as spontaneous play is self-expression for the child.

I do not mean that children are always happy in their play, or that they play only because it makes them happy. Sometimes it does not, if they have not happy dispositions, but they play just the same. As a general thing children are happy when at play, if they are normal. But the point is that they do not play simply for fun, but because the impulse is in them to play, to be active, to use their muscles and their minds, and in that way to learn how to use them.

Play has one advantage that work in its very nature can never possess, and that is the element of interest. The very eagerness with which a boy enters into a game is the means of teaching him application and concentration. Under such conditions he can concentrate as he never could in any laborious work imposed upon him. Even so-called interesting work, so long as it is work and not play, cannot make the same appeal or claim upon his attention that some voluntary activity would provide. In a game that he loves he will learn to master and direct all his forces toward some particular object. And so when he is ready later on to take up his life work he will know how to pitch into it with a similar degree of energy and application. Boxing, athletics and all vigorous outdoor games not only train the muscles, but they develop concentration, quick thinking, clear perception, self-control, team work, courage and persistence.

Probably the best training can be secured through systematized play. The only trouble is that with too much directing it may cease to become play. However, there is a natural tendency toward systematized play with the growth of civilization, and also as children grow older. Some of the games of young men and young women are highly organized and complicated, as forms of play, and call for a considerable degree of skill, muscular co-ordination and clear, quick thinking. Baseball and American college football are highly organized, for mere sport. Some dances, also, call for much co-ordination and skill. One cannot master them without some effort, and they are more enjoyed by those who can do them than are the simpler dances just because they represent a forward step in the field of play. Classic danc-

ing and folk dancing can be especially recommended for developing the body and acquiring muscular co-ordination, not forgetting that developing co-ordination really means brain building in the most literal sense.

The dances in ancient Greece, in this way, were of great educational value. Dancing may be regarded as an ideal form of systematized play in its best sense.

There are still tremendous possibilities in the way of play for educational purposes that have not been opened up, and what the future may bring forth in this direction we can have not the faintest idea. But in the meantime, much can be done with familiar sports and exercises, and the greatest success will naturally be found in the practice of a great variety of these, thus developing all the muscle groups and acquiring more perfect co-ordination, with the incidental training of the brain centers. Just as soon as one exercise or game is mastered another should be taken up.

It is quite true that systematized physical exercise will produce definite results in strength building and the correction of bodily defects that aimless play cannot readily accomplish. Military powers have demonstrated this. But play need not be aimless. It should usually be possible to get the same results through properly directed play. In ancient Sparta play was practically forbidden and boyish spirits were suppressed. Rigid training and discipline were the rule. As a result Sparta was strong from a military point of view, but probably no one will claim that she developed men and women in the best sense. She produced only soldiers, which meant highly trained butchers. And with all that, the military record of artistic Athens was just as

good. We may be fairly sure, also, that the Spartan children did play in secret when they got the chance.

How did it happen that our "cave man" ancestors of a hundred thousand years ago, and their own remote ancestors of a half million years before them, managed to get along without the aid of a modern drill-sergeant? The cave man's children simply played their way up into strength and symmetry, building the sound constitutions that we have inherited from them. The trouble is that we have the softness of civilization and therefore need special physical training, while the cave man did not. Our children develop bodily defects through improper benches and seats at school, the confinement of school and home and the lack of sufficient outdoor, natural play. And that's why we need physical culture. The cave man had it naturally.

Manual training is without question one of the most valuable features of the modern school. It trains the hand and the brain at the same time and has a definite value as a preparation for life. But while it may look a good deal like work, many of the boys and girls regard it as much more in the nature of play, at least as compared with their other studies. Manual training is more or less "fun" to many young people, just as the four-year-old girl finds play in trying to sweep with her tiny broom. Many things regarded as work can be made play. In any case, every child should have plenty of freedom for active play, for both the physical and mental benefits to be secured from it. And as for the purely mental studies with which all children in our schools are now compelled to struggle, usually with indifferent success and ultimate forgetfulness, I am of the very humble

opinion that after a healthy and well balanced brain has been built up these subjects can be taken up and mastered very quickly and easily.

And now for the question of play for grown-up men and women. It will be seen from what has been said that there is not the same biological necessity for play in adult life that there is in childhood. Throughout the animal world play is not generally the rule in maturity. The full-grown animal is concerned with the realities of life. His activities are the real thing, the very kind of thing for which his play has prepared him, and he is likely to be quite busy enough getting a living and protecting himself. The mother cat may play with her kittens a little bit, but it is notable that as a rule grown-up animals play very little or not at all.

And yet with men and women—particularly in civilized life—the case is somewhat different. It is true that when we reach complete maturity we have, like the animals, largely outgrown the biological necessity for play in its true sense. But owing to the strain upon our higher intellectual faculties we experience a certain craving for mental relaxation. We feel the necessity for rest of these brain centers, especially if we do mental work, and so we seek not play but amusement. It is true that this amusement may take the form of play, and it is well when it consists of some physical recreation, but just the same millions of men and women are satisfied with mere amusement, to the almost complete neglect of their physical welfare. It is not the play impulse but simply the desire for relaxation that actuates them. Vaudeville and "photo plays" are popular, for instance, because they are a very successful means of bringing

about this mental relaxation, irrespective of the poor ventilation frequently found with them.

It may be said that the higher brain centers or the intellectual faculties, having been the most recently acquired, are the most quickly exhausted. And so strong is the demands for mental relaxation on this account that many men turn naturally to narcotics in order to bring it about. Some profound students of the alcohol problem have concluded that use of intoxicants is due primarily to this craving for relaxation. Tobacco has the same effect, even while ultimately destructive in its influence. It is only unfortunate that more people do not realize that this relaxation can be much more effectively secured in other ways, as in the type of natural outdoor games which brings us back to something like the non-intellectual activities of primitive man.

If play in childhood is of so much value in building muscular vigor, strong nerves and healthy red blood, then is it not just as valuable in adult life as a means of keeping strong and healthy? Of course it is. That we do not realize it more keenly, all of us, only shows how stupid we are in many ways. It does not matter that animals do not play much when grown up, and that savages do not naturally turn to play to any extent after maturity, except in the matter of dancing and such play as may arise from the sex impulse, for they have the serious physical activities of life to take the place of play and keep them in condition. But the civilized man works largely with his brain instead of with his body. With him the business of hunting and fighting no longer takes the place of the childhood form of activity, and so he needs something in the nature of continued play

to keep him vigorous and sound. Even his instincts prompt him in this direction to a certain extent, and many men naturally turn to fishing and hunting, horseback riding, golf and walks. In the human race complete maturity is reached, contrary to legal assumptions, at an age nearer thirty years than twenty, and the play instinct is still active in many cases between the ages of twenty and thirty years, as shown by the natural love of athletics and sports at that age in normal and healthy young people, but after thirty there are not many men who keep on playing just because they are impelled to play. Some do so who have found out the pleasure of doing so. Probably many more would do so were it not for securing the relaxation they crave through the use of tobacco, alcohol or some other narcotic.

But so long as we look for relaxation of any kind, why not make it a special practice to make use of the innumerable physical recreations that are open to us? Sports and games mean mental relaxation as well as physical building up, and thus serve a double purpose. When we have all learned to continue to play ball and other games, swim, ride, run and dance, after we are thirty or forty the same as before we are twenty, we will have a race of people enjoying all the vigor and health that primitive man is supposed to have had, in addition to the culture that we have attained in other respects. And if we cannot get out on working days to make use of the fields and hills for the purpose, why cannot we use our houses, with windows open, for the same purpose, even if we are restricted to gymnastics, fancy dancing and rope skipping in our own bedrooms?

As to what kind of play is best, that will depend

largely upon the individual and his occupation. Temperament has much to do with it. What may seem play for one may not be play for another. One whose work is sedentary especially needs physical activity, while one who does vigorous manual labor may well be satisfied with games of a far less energetic nature. The latter will probably get the best results from a little fast, light exercise for purposes of exhilaration and more active circulation, and will very likely profit by a little study and mental recreation of an interesting, instructive character. And we should not forget the old saying that change of occupation is recreation.

Our children for a considerable time during their growth appear to have all the interests and even the mentality of the primitive man, and it is for this reason that boys enjoy games suggestive of hunting and warfare. Of course the warfare is really carried on in the imagination, but imagination is the strongest characteristic of childhood. Forms of play based upon the impersonation of animals are simply related to this interest in hunting. It may seem that the running, chasing, hiding and seeking, wrestling and games suggestive of warfare do not altogether apply to the adult requirements of civilized life, at least not so closely as the play of the bear cub does to the coming demands of his own maturity, but it seems to be necessary for the individual like the race to pass up through the conditions of primitive life represented by such vigorous physical activities before reaching a higher mental development. Besides, it is this very type of play that develops the bodily strength and resistance that is probably even more necessary to withstand the stress and strain of civilized

life than the more natural existence of the savage.

Nature during the thousands of years has developed the instinct of play. Don't interfere with it too much lest you defeat her purpose.

MUSIC AND EXERCISE

By CARL EASTON WILLIAMS

IN undertaking to help you in the matter of exercise there are two things that one can do. One is to suggest and describe new movements, telling you what to do to accomplish certain results in physical training. The other is to help you to make your exercise attractive and interesting.

The latter service is always the more valuable. Any influence that will cause you to want to exercise is worth more than pure instruction.

Take your exercise to music! This is the best suggestion that any one can offer. It is the one most effective method in the world by which you can make your exercise fascinating. There is nothing new in the idea. But it is one of the things that needs to be emphasized. As some one—you and I don't care who—has said, "The world needs not so much to be informed as to be reminded."

Too many people look upon exercise as a duty. Well, it is that, but it should be a source of joy as well. A great many people have at one time or another started to take a little daily exercise with the very best intentions in the world. After a little time it becomes tedious and monotonous. Before long it is slighted. Then it is neglected. And almost before one is aware of it, he has forgotten it entirely. That is, he or she has dropped it before it has become a well established habit or a fixed part of the daily régime.

The use of music in connection with one's physical training will change all this. It will make exercise more interesting and perhaps more beneficial, but it will also cause one to wish to exercise. It will make play of what otherwise might have seemed like work.

The value of music in this connection is well recognized in many large gymnasiums and physical training schools in which entire classes go through gymnastic drills to music. In the Boston Young Men's Christian Union, gymnastic dancing is specialized in, including walking, running, jumping, attitudes, steps, gestures, and evolutions. But if music is of value in large classes it is equally valuable to the individual in his own home. One can not play the piano for himself and exercise at the same time, but a phonograph or an electric piano will supply the music in a manner which for mere dancing purposes is almost as satisfactory as an orchestra. A good phonograph is preferable, because it offers a reproduction of the playing of first class musicians. It is the musical impulse and the rhythm which is important. At least one can sing to oneself.

Music is the most stimulating influence in the world. It has a bracing and energizing quality. It puts spirit into the soldier on the march and has a refreshing influence upon any one of tired and jaded spirits. In the three days' go-as-you-please race in Madison Square Garden, years ago, when the competitors were wearily trudging around the track, the effect of the band striking up was almost electrical in character. On the instant every one of the tired contestants would break into a run.

Merely to hear the sound of music gives one the

dancing impulse—an inclination to move the feet or the hands or the body in time with the rhythm of the music. To make your exercise attractive, therefore, start your music first and then as you feel the swing of it you will find pleasure in going through your exercises. Make it a part of your daily schedule.

You can either follow the practice of taking ordinary, standard exercises to the accompaniment of music or you can do special dancing movements. All dancing movements partake of the character of exercise. It does not matter materially what type of exercise you use. Those illustrated are merely by way of suggestion.

It is not merely that music is stimulating, but there is every reason to believe that anything that is done in rhythm is more easily done and better done. Just what the explanation may be from a physiological or scientific standpoint does not materially matter. There is good evidence, however, that this is a definitely established fact. Men have discovered this in connection with many forms of work. Did you ever see the stake-drivers of a traveling circus hammering in the pegs with a rhythmic, musical swing? Did you ever see a group of men heaving at a pulley rope by which some heavy weight is lifted into the air? It is not merely that all pull together at the same time. There seems to be a certain value in the very force of the rhythm.

The chances are that if many kinds of factory work were done to music and executed in some form of rhythm there would be less fatigue and greater efficiency than is now the case. Of course, this is only a speculation on my part, but I believe it is a subject that would be well worth further investigation. I do know that many

young people who are anything but strong can stand a great deal of exercise when it takes the form of dancing. A thin, anemic slip of a girl who would be all tired out if she walked one or two miles on the street will go to a ball and dance several miles to good, lively music, and scarcely feel tired at all. And it does her good. The real reason why she sleeps late the next morning is because she was up late. But the rhythm of the dance seems to multiply her endurance and make her capable of far greater effort than usual. This has been noted the world over in connection with the dances of all nationalities and races, including the savages. Perhaps it explains to some extent the surprising physical endurance of some of the acrobatic dancers of our music halls and variety theaters. The music and the rhythm seem to make one's strength go farther. That is why music ought to be helpful in connection with those forms of work that can be done in rhythmic time. At any rate, the accompaniment of music makes a great difference in the spirit and energy with which you go about your daily exercise.

It does not matter materially what type of music one uses for the purpose so long as it offers the desired time and inspiration. Such selections as Brahms' "Hungarian Dance No. 5," Mendelssohn's "Spring Song," Chaminade's ballet music, "Hearts and Flowers," any schottische, gavotte or other good dance music will be very suitable. It is even a good plan for the sake of interest to vary the musical selections employed. Variation in music will in itself be found stimulating, though you may find that certain selections are best fitted for particular purposes.

Simple dancing exercises can be enjoyed especially by the young children. If the music is supplied and they are taught easy little steps they will regard them as the most attractive form of play in the world, and will take to them as naturally as a duck takes to water.

But we old folks are only grown-up children, after all, or at least we ought to feel like that so far as our spirits and our capacity for fun and happiness are concerned. We can enjoy doing dances and exercises with the youngsters—if we have any. Music is very stimulating in connection with doing little stunts and feats. And when everybody is peevish and irritable and scrappy, as children of all ages are likely to be sometimes, about the best thing that one can do is to turn on the music and start some exercise or fancy dancing. It's a good way to make everybody happy.

If you know how to do even the simplest dancing steps, just remember that it is an exercise as well as a dance. It's the next thing to "road work," and would be just as good if you did it outdoors. Try ten minutes of it or more to make your blood circulate, and enjoy it with music.

A great many people who think they do not have any time for exercise are very fond of music and spend perhaps some hours each week in its enjoyment. Very good. Then why not avail yourself of a little of this time to combine some exercise with the music? You don't have to take your physical training on getting up in the morning. You can do it at ten P. M. just as well. Some prefer the evening for the purpose. The only objection to late evening exercise is that in some cases it is so stimulating as to interfere with quickly go-

ing to sleep. That is a consideration that should not be lost sight of. However, in probably many more cases, exercise in the evening has a refreshing and restful effect following a day of nervous and mental strain. And especially is this so if the exercise is taken to the accompaniment of music.

ATHLETIC TRAINING—RIGHT AND WRONG

By CARL EASTON WILLIAMS

THERE are many things about training that all amateur athletes should know. There are some things that champions still need to know. And there are many things about training that even the non-athletic ought to know.

The same principles of attaining physical fitness that apply to the athlete also apply to the man in the street. Athletic competition only emphasizes the importance of what we call "condition." A contest is an emergency in which it is necessary that the athlete should be at his very best. The professional or business man is blind to the same necessity, although the emergencies and crises of his life may require even more urgently the best possible physical condition.

Few persons realize what physical fitness means to the non-athletic. For purposes of ordinary life, one does not need to be constantly ready for a physical struggle of any kind. But an almost athletic condition is none the less desirable, because it means vigor and energy. No one can have strength in an athletic degree and superior endurance unless all of his organs are right. Endurance and energy are the best evidence of internal strength. When one is in fine shape from an athletic standpoint, he knows that not a single organ or part of his system is weak or out of gear. And to know this means a great deal.

I am a firm believer in the value of athletics. I am an equally firm disbeliever in the alleged harmfulness of competition in the average case. Too much is said about the dangers of athletics. There is a type of mind that can see only the unusual and extraordinary case of harm through over-exertion, and overlooks the thousands of instances of physical benefit. The late "Mike" Murphy, America's foremost athletic trainer, whose personal experience over a period of thirty years probably brought him in touch with a larger number of athletes than any other man in his line, in his book on "Athletic Training" makes the statement: "I have never known a single athlete whom I have trained or with whom I have worked, either in professional or amateur athletics, who died from what some physicians term the athletic heart." On the other hand, Mr. Murphy claimed to have known of any number of cases in which weaklings have been made strong and robust through athletic pastimes.

Athletics should be not only interesting but beneficial. They are a valuable form of physical education. But it is necessary to know how to train. When a champion is "off form" there is some good reason for it. There is something about training that he does not know. If you are interested in sprinting, you may have had the experience of running well one day and running poorly another, perhaps contrary to expectations in both instances. There were reasons for your condition in both instances.

There are two phases of athletic training. One relates to what we call "style," including the element of skill in hurdling, pole vaulting, jumping, hammer

throwing and the like. The other phase of training relates purely to physical condition, that is to say, to the combination of strength, energy and endurance which make it possible for one to use his skill effectively. We will discuss only this aspect of training here.

We will pass by the subject of diet. That which is best to maintain strength and health in ordinary life is also best for athletic purposes. Certainly it is not wise to make any sudden changes in one's food on the theory that training calls for a special diet. At the same time, all dietetic abuses should positively be discontinued. And it is well to remember that one should not attempt to do any hard athletic work except on an empty stomach, that is to say, not within three or four hours after eating. The general health requirements, such as bathing, sleep and fresh air, are taken for granted.

The most important point for the novice to consider is his general physical development. There is no greater mistake than for a raw-boned, undeveloped boy to attempt the violent strain of competition with only a few weeks of forced training to prepare him for the event. One should first spend several months in systematic physical culture to strengthen the muscles, tendons, ligaments and all of the structures of the body.

Before specializing in any branch of athletics, you should try to become a good all-around man. You will then be able to specialize more successfully. If interested in running, you should develop your upper body as well as your legs. For sprinting, indeed, it is absolutely necessary to have a strong upper body. Successful sprinters are invariably men of superb build throughout. If interested in pole vaulting or weight throwing,

it is especially important that you should first gain a perfect development of the upper body, preferably through wrestling and work on gymnastic apparatus.

I can not say too much in favor of a preliminary course of cross-country running, no matter what your intended specialty. If you plan to take up track athletics in the spring of the year, you should start cross-country work in the fall and continue through the winter. It will give you the foundation of endurance and organic strength that you need. Even cross-country work should be taken up gradually. The best plan in the beginning is to jog easily until tired, walk a short distance, then run a little more, and so on. You will soon find that you can run two or three miles at an easy pace without being tired.

Assuming that the young athlete is in sound physical condition in the early spring, a period of specialized training of eight to ten weeks is sufficient to get him in shape for competition. It is not wise to continue hard training longer than this. The unusually vigorous work involved in preparing one for the greatest effort of which he is capable, cannot be continued the year round without a rest. In other words, one cannot expect to retain his highest form continuously because the hard training required would be too exhausting. After two or three months of it one needs a rest. If you wish to undertake athletic contests from time to time throughout the year, the best plan is to keep in fairly good form with short periods of training, of perhaps three or four weeks at a time, and intervals of rest of from one to three weeks.

Going "stale" is the dread of all athletes. It is sim-

ply the result of excessive training. The nervous system has been exhausted. There is loss of energy, loss of appetite, inability to work and sometimes difficulty in sleeping, all signs of nervous depletion. At the first indications of going stale, the athlete should stop all exercise and sleep as much as possible. But there is no need of going stale if one trains properly.

Over-training is the one almost universal tendency of all young athletes. It is the natural result of the enthusiasm and ambition of youth. Don't be afraid, therefore, that you will be under-trained. The amount of work required varies with individuals. The heavy and phlegmatic types will require a longer period of training and can stand more work than the wiry, nervous type of athlete.

Practically all athletes follow the plan of training every day. But it does not follow that this is always the best plan. It may suit your case, or it may not. Where one's training calls for hard and exhausting work to develop unusual endurance, it may be best to train every other day. In yet other cases, it may be found advantageous to do hard work and light work on alternate days.

We must remember that there are two phases of conditioning. On the one hand there is the work or effort necessary to increase strength. And in the second place there is the element of recuperation, which is equally as important. Unless recuperation is absolutely perfect following one's exertions, he will not benefit or improve as he should. It is in just this respect that many athletes go wrong.

If you are doing a small amount of fast work, as in

training for the sprints, daily training will be best, for the reason that you will be able to recuperate perfectly in twenty-four hours. But if you are training for a ten-mile run, a wrestling bout which may extend over an hour or two, or a twenty-round boxing match, you will have to do a great deal of hard work in order to prepare yourself for the prolonged exertion of the contest. To do so much hard work every day would be exhausting. You may need perhaps two or three days in order to recuperate from your exertions in training. Therefore, in some instances, a schedule of training two or three times a week might be more satisfactory than daily work in preparing for events that require great exertion and prolonged endurance.

The result of muscular exertion is the production of waste known as fatigue-poisons. Stiffness and soreness of the muscles are due to an excess of these waste-products. If you find yourself slow in a contest, it does not necessarily mean that you have not done enough training. It may mean that you have done too much, and that your tissues are still choked with these waste-poisons. They deprive you of your strength and speed. You may then find that if you train less frequently, allowing for more perfect recuperation in the intervals between your exertions, you will improve much faster.

It is for this reason that track athletes rest one or two days or even more before a race. It enables them to accumulate energy. And any stiffness incidental to hard training is allowed to wear off. The athlete enters the contest with his muscles literally clean and fresh.

In view of this, it is very curious indeed that practically without exception professional boxers insist on do-

ing the very hardest training up to the very day before a contest. When you see an ordinarily brilliant and clever boxer fail to do himself justice, when he seems slow and lacking in his customary energy, it is far more often the result of over-training than of under-training. A rest of two days would probably have made all the difference in the world. A rest of a week is sometimes advantageous. Championships have been lost through this simple mistake in training.

It is true that boxers continue the severe training grind up to the last day partly because of the necessity of "making weight," that is to say, scaling down to a stipulated weight on the day of the contest. But there is no advantage in overworking up to the last day, thus choking the body with fatigue-poisons and making the muscles slow and stiff, when a reduction of the food supply or even a complete fast of one or two days would more easily take care of the weight question. A fast of a day or two will not weaken a well-nourished athlete. It would be far better to enter a contest with an exceedingly empty stomach but with muscles clean and fresh than to be well fed but with muscles slow and stiff from fatigue. In any case, warm baths and massage will go far to relieve such stiffness.

Running one hundred yards properly requires a tremendous amount of strength and energy. One should not attempt it during the first three or four weeks of training. A few starts each day, and running perhaps one hundred and fifty yards at a good swinging stride, or "three-quarters speed," would be sufficient for a day's work in the beginning, with some easy jogging.

Thorough bodily warmth before attempting any ath-

letic exertion is important, especially in the early spring, when the weather is raw and chilly. It is well to do considerable jogging or dancing in a good sweater, and clad in warm trousers, to get the muscles thoroughly warmed up before attempting any sprints. This warming-up also applies to competition.

There is danger of serious injury from violent use of the muscles when cold and stiff. It is also important when sprinting hard to slow down easily, to avoid strains. Don't pull up short and try to stop quickly.

The daily practice of hurdling or broad-jumping is not always the best preparation for these events. Success really depends on speed, and this is best gained by the daily practice of sprinting, trying the hurdles or the jumps only two or three times a week. In the same way it is not desirable to undergo the strain of pole vaulting every day. Exercise on gymnastic apparatus can often be advantageously substituted for the pole vaulting. Any strain calls for complete rest.

In training for distance work, there are two elements to be considered, strength and endurance. Speed depends upon strength, and also develops strength. For this reason the distance runner should do a certain amount of fast work. One should not expect to run the distance for which he is training each day in practice. His purpose should be merely to do such work from day to day as will enable him to run that distance at his best on the day of the prospective competition. If one is training for a mile run, for instance, he should start out to build endurance by running at a fairly comfortable pace a distance considerably greater than a mile. But also, perhaps on alternate days, he should do some fast

running. To run a quarter of a mile much faster than the speed at which one expects to run a mile race, will tend to develop the strength to maintain the mile pace easily. After three or four weeks of training, one may be able to run a half or three-quarters of a mile at a pace approximating that which he must expect to follow in running the mile race. It is in this way that one gradually works up to the ultimate condition of fitness for competition. Similar principles of training apply to other distances.

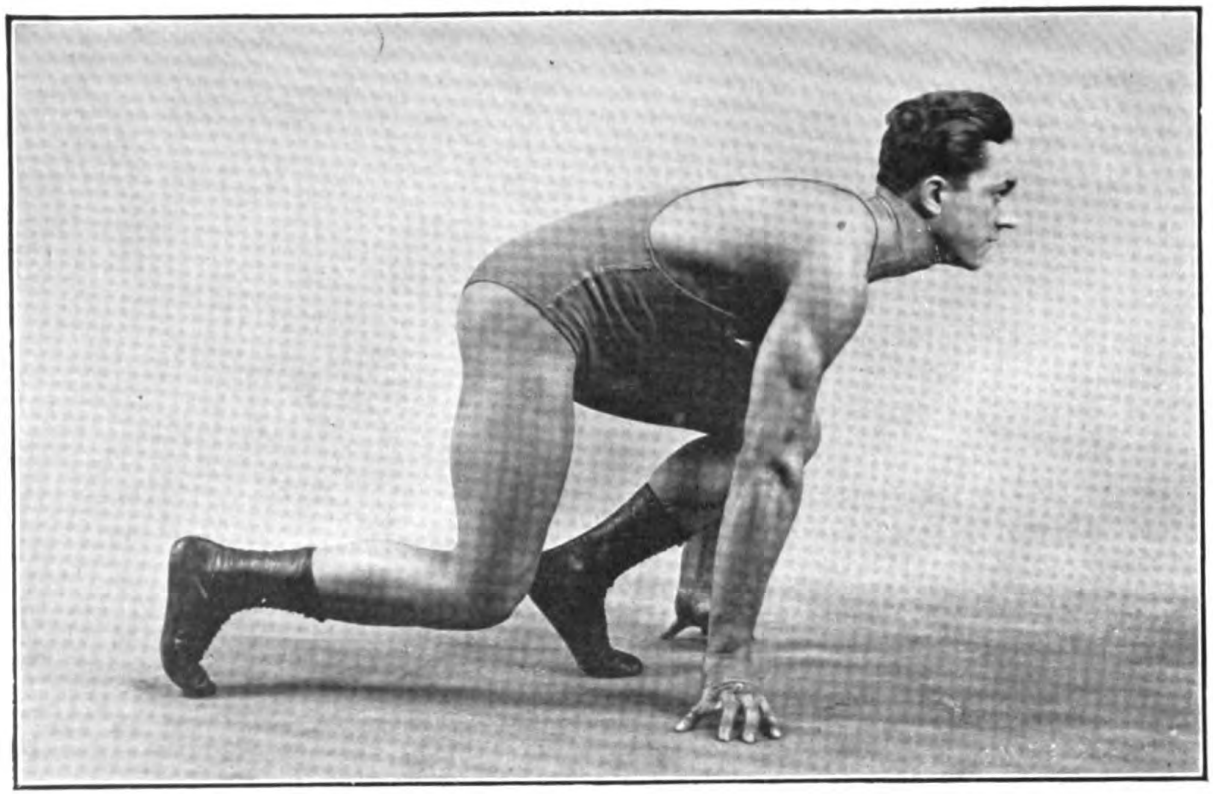
So far as Marathon running is concerned, it would be much better for the average athlete to cover this distance by installments. Spread your Marathon over a week, taking three or four miles each day. Marathon running is a wonderful *test* of endurance, but a very poor way to attempt to *build* vitality. It is too great a drain upon the system. A few miles of cross-country running will be found an ideal means of building stamina and manhood. Cross-country work is commonly found to be a means of gaining weight. But Marathon running is too much of a good thing. Only those of mature years and long experience in distance running should attempt such a distance, for it will not hurt them.

It is a good plan for the young athlete to "make haste slowly." Don't imagine that you are going to accomplish wonders during your first season. As a rule, it takes three or four years of training and sometimes even longer participation before one begins to approach the best possible form of which he is capable. Do not force yourself too much. By so doing, you will only defeat your own purpose.

Particularly is this true in connection with boyhood

athletics. Too much competition and training in high school may even prevent the realization of one's best possibilities in later years. Boys of sixteen or seventeen should not take athletics too seriously. They should only "play" at the game. Never mind the records. For boys under fifteen, it would be better to run sprints of only fifty yards, rather than one hundred. In relay races, teams of four boys should run only a half mile. Boys in their growing years should be content to grow. They should play all kinds of active games, and they should also participate in athletics to the extent of having as much fun as possible. But they should not try to compete against seasoned athletes.

Athletic sports are so valuable a means of maintaining bodily vigor and energy that they should be continued into middle age. The greatest mistake of the athlete is suddenly to break off his activities and settle down to an inactive, sedentary life. The man or woman once muscularly well developed finds it a simple matter to retain this development. We should not only approve of athletics for the youth of the country, but we should strive for an ideal physical condition of mature men.



The correct running start is essential in many forms of track athletics. The position shown is ideal for "getting set," the weight being supported not only by the front foot, but to a large extent by the arms, leaving the rear leg relaxed for the "push off."

SPORTS THAT BUILD MANHOOD

By THOMAS LLOYD SWIFT

WHY is baseball our most popular game? Why do we like to play it, and like to see it?

Millions of boys and men play ball each year. Tens of millions are fans. They play it by proxy. Why?

There are two main factors in the game of baseball. There is exercise. And there is mental relaxation.

Perhaps one may question the latter statement. The intensity of interest, the high-strung excitement, the absorbing concentration in the progress of the game, may not appear to be a state of relaxation. And yet it is because the interest in the game is so engrossing that it affords the most complete mental relaxation so far as the other brain centers are concerned.

The game of baseball has a highly dramatic quality in so far as there is developed a state of almost breathless suspense, owing partly to the partisanship of the spectator and the element of conflict between the opposing teams. Which side will win? Will the one team hold its lead? What will happen next? Will he hit it? Will he reach home? But punctuating the suspense of the contest at uncertain intervals is a series of stirring and sensational episodes full of speed, action and intense exertion upon the part of highly trained and skilled athletes. Apart from the exercise involved, and the natural pleasure for the spectator in observing the demonstrations of skill, agility and strength on the part of the

players, there is this element of drama that accounts very largely for the fascination of the great American game.

All this means mental relaxation. The mind, for the time being, is given up largely to feeling rather than thinking. There is partisanship, excitement, enthusiasm, discouragement, hilarious joy, and withering scorn for the umpire. Now, emotion is far more primitive than thought. A creature that can not think may be able to feel a great deal. And the mere shifting of the mind from the field of thought to the realm of the emotions involves a relaxation of those higher brain centers which are so often compelled to work overtime by the requirements of civilization. In other words, baseball, with all its frenzy of feeling, means relaxation for the thinking brain, and is welcomed as such by the tired business man or professional worker.

Psychologists of the present day have pointed out that those activities which we regard as play and recreation are invariably allied with the life pursuits of primitive man. These activities rest us because they are easy. They involve no nerve strain. The higher intellectual faculties are of more recent development and are more easily fatigued. But the brain centers employed in primitive activities are well established. They are well developed in children. And the minds of children are on a level with those of the savage. Consequently, the man of today finds recreation in sports which practically duplicate the life history of the man of long ago.

The primary features of a baseball game represent three fundamental forms of activity in the life of primitive man; namely, running, throwing and striking. The

savage who did not excel in all three of these branches of physical endeavor was a very poor representative of his kind. Whether in baseball or in other games, all children naturally take a special interest in striking, throwing, and running. Baseball in these respects reawakens in us the old life of our long-removed forefathers.

It is true that the element of skill adds to the interest of a ball game, but apart from this the mere physical activity is of a kind that one will enjoy. The exercise is also of a character that is valuable for building up an all around athletic body. Take any young man who is unusually good in baseball, and you can depend upon finding a good, all around physique. It takes muscular efficiency and co-ordination of a high order to play baseball well, but continued practice in the game will also build the muscular power and perfect control of all parts of the body that characterize the men in the big leagues.

Consider merely the throwing of the ball. At first thought one may suppose that he simply throws a ball with his right arm, and that it requires only a good, strong arm. But this is not true. The person who attempted to throw with the arm alone would make an exceedingly poor performance. You need only to study the action of a good pitcher to appreciate the extent to which the muscles of the trunk of the body are brought into play. So far as the arm alone is concerned, the muscles of the upper chest are very largely involved in bringing this member forward. But the great force of the throw is derived to a large extent from the twisting or turning action of the entire trunk, as the right

shoulder swings forward in the act of throwing. Considered from the standpoint of the backbone alone, the rotation of the spine in the act of throwing is such as to loosen up the vertebrae and to keep this remarkable structure supple and active. Study the action of a good throw in your own person. Study out the muscles involved and the amount of action for the entire body, and you may be surprised to realize just how much exercise is involved in it.

Very much the same thing may be said of batting. One's first impression is that he wields a bat mainly with the arms, but this is far from true. In the case of batting, the trunk of the body is even more effectively employed than in throwing. In fact, if ever you desire a good exercise for the spine in the form of rotating the vertebrae and vigorously using the muscles of the trunk, an imitation of the batting action could scarcely be improved upon.

The running involved in a baseball game is the very best kind of exercise for the reason that base running means sprinting. It calls for concentrated exertion of the muscles of almost the entire body. Running is primarily an exercise for the legs, but one does not run with the legs alone. At least in sprinting there must be vigorous co-ordination of the muscles of the upper body, including the arms. Each muscle-group must contribute its part towards realizing the amount of power and muscular swing involved in good running.

The stopping and catching of a ball involve a further development of muscular co-ordination. It means bending and stooping, reaching to one side or the other, or, as the case may require, perhaps leaping high into the

air. All of these things provide a variety of activity for all parts of the body, which tends to develop an exceptionally capable all around physique. There is no finer group of men in the world than American professional baseball players.

There is another feature of the exercise involved in a ball game that is extremely important, and that is the physiologically advantageous distribution of one's exertions throughout the course of the nine innings. While the activity of each player when in action is strenuous and fast, nevertheless there are intervals of relaxation which permit of easy recuperation, so that one may continue at his best throughout the entire game and finish without unusual fatigue. There are some forms of sport, as in basketball for instance, in which the activity is fast and continuous. Such work, although favorable to endurance, may be found exhausting to one not well trained for it. Baseball, however, makes no such demands upon one. Even if not in the pink of condition, one can "get away with it." One of the first principles of scientific physical training is found in the alternation of contraction and relaxation of the muscles. In baseball, there are moments of the utmost activity for each player, but there are also intermittent periods of inactivity, either while he is waiting for his turn at bat or when in the field waiting for something to happen. These rest intervals keep the player fresh. They make possible the high attainment of energy, co-ordination and skill which is found in professional baseball.

There is only one way to get the greatest benefit from a ball game, and that is to get into the game yourself. It does not matter how poorly you play, so long

as you are able to get the exercise and the fun. If you can do no better, do a little ball playing in your back yard or the empty lot near by. Don't think that you must be a near-professional in order to get the enjoyment and benefit. It is better to be a "dub," and to play such a game as you can, than only to go and *see* the experts play.

This is not said to condemn the baseball fan. It will do you good even to see a ball game; first, because of the fresh air secured, and second, because of the mental relaxation already mentioned. Just the same, the eighteen men on the diamond are getting more out of it than you are at that (physically as well as financially). It is a good plan to see the crack players once in a while, for you will then enjoy playing the game yourself all the more, through your stimulated interest. On the other hand, if you actually dabble in the game yourself, you will enjoy all the more keenly the experience of playing the game by proxy when the professional players line up.

Now as to football—is it worth while? It is a rough, strenuous, body-bruising, and sometimes even bone-breaking game. It is the most vigorous and violent form of activity known in modern life, outside of war. It is indeed even more exacting than war in its demand for rugged strength and superb physical condition.

Football is our one great national autumn sport, of all-absorbing interest to young America. Meanwhile, thousands of parents are forbidding their sons to play it, and many schools are considering its abolition. What, then, should be the attitude of the young man and of his parents towards this gruelling game?

Irrespective of the dangers—such as they are—the occasional abuses, and any other drawbacks associated with a game of this kind, there must still be something extraordinarily vital in football to enable it to gain the hold upon the nation that it has attained. There must be some qualities of a fundamental and irresistible nature to give this pastime its all-absorbing fascination.

First of all, football has all of the qualities of speed, physical activity, strenuous exertion, skill, dexterity, and the interest of competition which enter into so many other pastimes and make them attractive and popular. But football has also the element of the heroic. It places a special premium upon the qualities of courage, fortitude, pluck and other elements of character that go toward the making of that which is best in manhood. Football is not a game for the physical weakling, but also it is not a game for the moral weakling. The youth with a "yellow streak" has no place upon the gridiron. It is a game which calls not only for physical hardihood, but also for that hardihood of spirit which constitutes a nation's greatest asset. It is a game "for men only"—real men—men in the making.

It is true that football involves to some extent the risk of one's skin, both literally and figuratively. It is quite true that football players sometimes actually do leave small patches of their cutaneous surface upon the field. It is even true that in exceptional cases a bone may snap. The objection to football chiefly rests in these possibilities and dangers. But just there also is to some extent the merit of the game, so far as its spiritual and moral influence is concerned. It is this very element of risk, however slight, that makes this a

game that calls for courage, that develops spunk, that helps to build the finer elements of our young manhood.

It is true that the risk is not a great one. It should not be too great in any form of sport. But it is there, and every football player knows it. It can not be said that young men enter into this game unconscious of the slight element of danger. They know it just as keenly as their parents. But they ignore it, and in so doing they show the stuff that men are made of. Scraped skin will grow again. Even broken bones will mend in a few weeks. And even though one suffers a temporary inconvenience of this kind, yet the total value from a physical standpoint, to say nothing of the character-building influence, is such that the physical gain will far outweigh the hurts. On the other hand, the delicate flesh, the tender skin and the frail body of the effeminate youth who shrinks from football, has probably a far greater chance of being destroyed through the wasting processes of disease than the football player has of coming to any truly serious injury through rough usage of this kind.

In a way, the question of football crystallizes the question as to whether a soft, sheltered life is to be preferred to the school of "hard knocks" in the building of either the body or the character. The question is paralleled by the comparative methods of training in each of two young children we have known, between two or three years of age. Both could walk, both wanted to run. Percival's mother said, "Don't run, Percy, you'll fall." Tom's mother said, "Go out now, Tommy, and run all you like," and she turned him loose to chase over the rocks and ditches with the bigger boys. Tommy bruised

his limbs, but became sure-footed, sturdy and self-reliant. Percy became weak-kneed, timid, a cry baby, and so uncertain of footing that one day he fell downstairs and broke his arm.

Football is not a thing foisted upon the American youth by some outside influence. One great truth about it is that it is purely an expression of the spirit of American youth, and it is an occasion for national congratulation that this should be so. When we have reached a state of white-livered, jelly-spined, characterless national spirit such that our young people no longer plunge instinctively into strenuous, hardy and red-blooded pastimes of this kind, then indeed will we have occasion to complain of the character of our sports. The young man who is physically rugged and fitted for a pastime of this kind, but who is afraid of a little rough sport, should be ashamed of himself. And the parent of a stoutboned, robust youth who shrinks from the amateur hardships of the gridiron would have good reason to be ashamed of his offspring.

The same consideration applies to a certain extent to athletic training in other branches of sport. Dyspeptic doctors, flat-chested professors, anemic clergymen and weak-kneed editors everywhere are in the practice of condemning athletics. "Athletics will enlarge the heart," they say, ignoring the fact that the typical athletic heart is only a bigger, more powerful and better heart than that of the average man. Also, you may hurt yourself or strain yourself in one way or another, according to these wise ones. "Don't run, Percy, you'll fall." But what, indeed, would become the standard of American life if ideals and counsels of this kind could be

forced upon our young people? Into what kind of a nation would we develop? Is it not rather our national duty to encourage all forms of interest and activity that promote the building of greater physical hardihood and vigor?

If my son at the age of twenty is organically sound, and yet unable to run a few miles cross-country, or unable to make a creditable showing in a wrestling bout, boxing bout or game of football, I shall feel thoroughly ashamed of him, and will regard myself as having failed grievously in my responsibilities as a parent.

It is not simply that football appeals to the primitive in us; not alone that it awakens within our natures something of the supposedly outgrown spirit of physical struggle and combat developed in our cave-man and stone-age ancestors. Such considerations may indeed be somewhat explanatory of the interest in the game. But the real value of football lies in the fact that it fosters the elements of courage, heroism, pluck, self-restraint, discipline, the power of quick thinking, decision, initiative, persistence and other qualities of mind and spirit which are as necessary in modern life as ever before. There is too great a tendency to regard our sports as merely channels of physical exercise. Their educational influence in the building of character, in developing some of the more valuable qualities of the mind and spirit, is too commonly overlooked.

LEARNING TO SWIM

By G. H. CORSAN

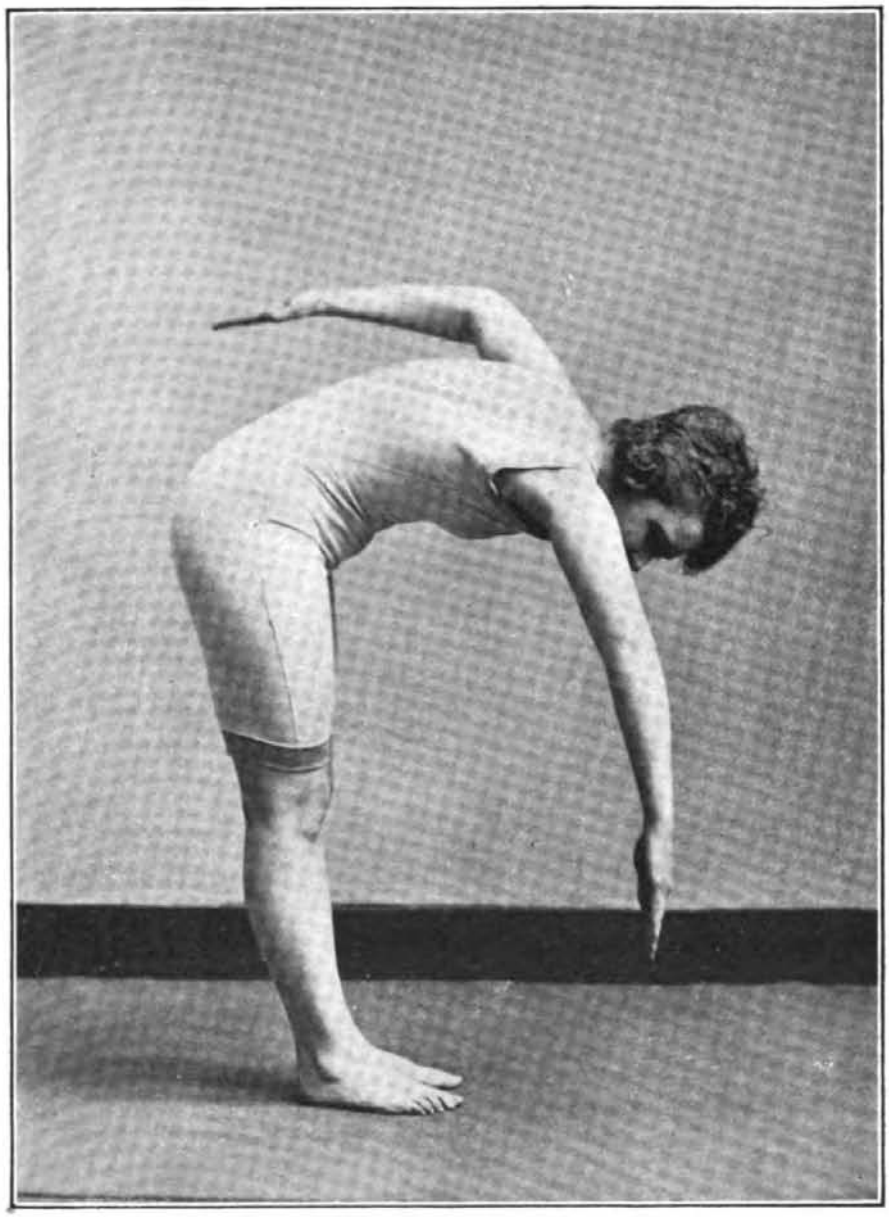
MEN and monkeys are the only animals that have to learn to swim. All other mammals, from a mouse to a moose, can do it without learning. This is because they keep up a running motion in the water, with their bodies on a horizontal plane, whereas men and monkeys try to climb out of the water and grasp at the atmosphere. Swimming, however, once learned, is just as easy for human beings as it is for mice and moose, and it is not difficult to learn.

The art of swimming is really very simple. There are only three things to learn, the arm work, the leg work and the breathing. The trouble is that most beginners want to acquire all three at once. This is as if a person learning to play the piano should try to play a musical composition before he had mastered the notation or learned the control of his fingers. Neither a musician nor a swimmer can be made in that way. But if you tackle the details of the natatorial technique separately, they will give you but little trouble, and you will soon be able to combine them and swim with grace and style, also with speed and safety. In that case you need never fear that the statement will be made of you that you lost your life because you were an expert swimmer, an absurd idea that one meets frequently in the newspapers. No expert swimmer ever lost his life in the water except through chilling to death, or starving to death, or

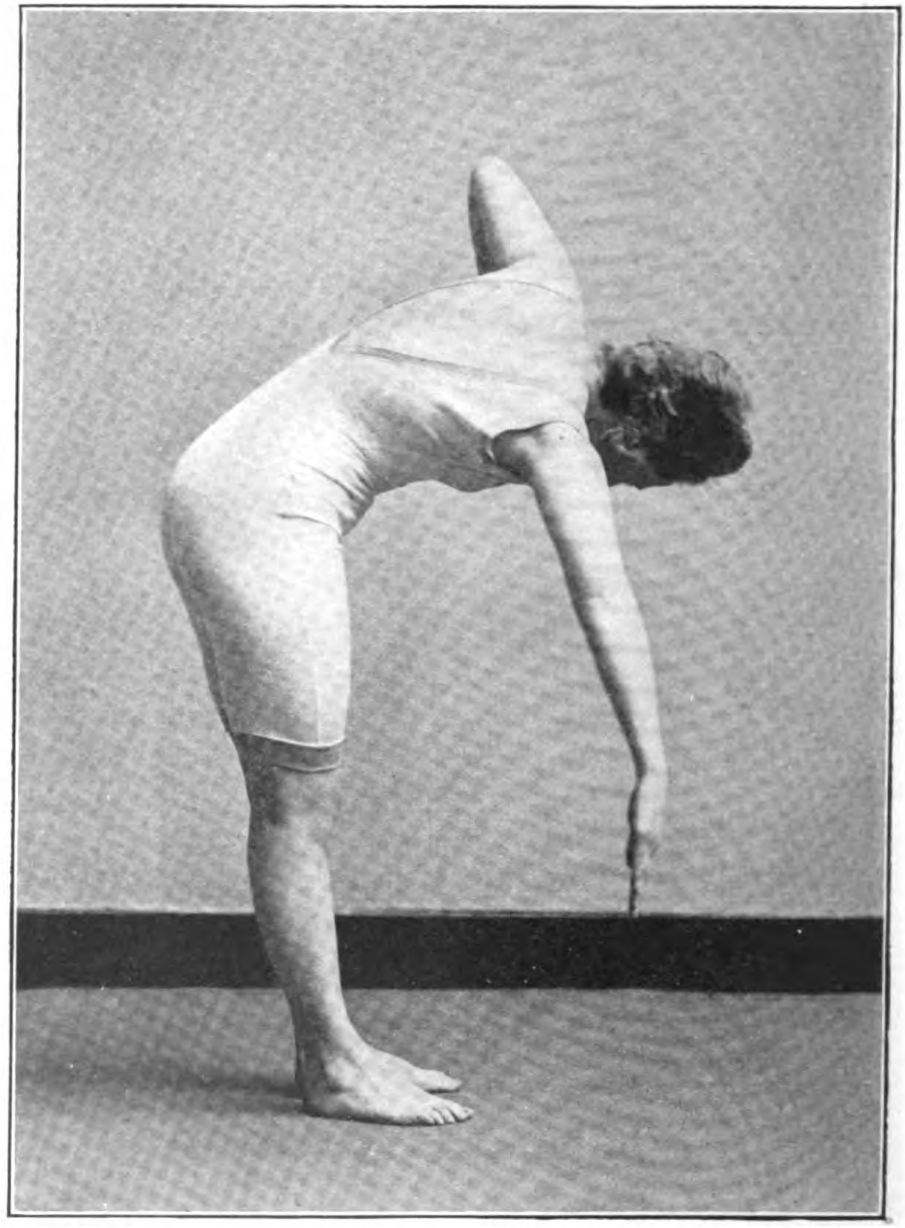
through some accident that had nothing to do with the loss of his ability to keep afloat and propel himself through the water. I believe that Captain Webb was thrown into the air some fifteen feet and came down on a rock on his head, an accident which would have killed him on land just as surely as in the water. It is possible, too, that he may have been smothered in the foam of the Niagara rapids. But occasionally I am inclined to suspect that he did not fully understand the art of rhythmic breathing, for as long as the swimmer can get air and avoid taking water into his lungs he is safe.

The first thing for the swimmer to do is to overcome his fear of the water, and this is the least of the difficulties which we have to overcome. Men fear the water for the same reason, largely, that the horse fears the automobile, because it is unfamiliar to them. The first time a horse sees an automobile he cannot even tremble with fear. He is rigid. The next time he trembles, and the third time he trembles less, until at last you can hardly keep him out of the way of the machines. It is the same way with fear of the water, if it is properly approached.

In the old days, many a father made the terrible mistake of throwing his boy into the water to make him swim. The practice is not extinct even today. If the father by accident throws the boy in horizontally, he will set up a violent dog paddle and struggle out of the water; but if the youngster is unfortunate enough to be thrown in perpendicularly, with his feet down, then you may be sure that when he has grown to be a gray-haired old man he will still tremble over that experience of his boyhood. Only a lazy father would seek thus to make a swimmer of his son. It requires mental effort to in-



Learn your swimming strokes first on dry land. This is the "crawl," the ideal modern stroke. Bend forward horizontally from the hips. The figure shows the right arm being brought back and the left arm being brought forward. (See next photo.)



In performing the crawl stroke, be sure that the elbow is drawn forward in advance of the forearm and hand, as in the preceding photo. This shows the left arm in the midway position. (See next photo.)

spire a pupil with confidence and turn him into a swimmer.

Fear of the water can be easily overcome, even in the most nervous, by the following method: Put a pair of water wings at the waistline, and get into warm, shallow water about two feet deep. Put the hands on the bottom, and then dog-paddle along the shore, every now and then putting the face under the water and blowing the air out of the lungs through the nose, the eyes being kept open. Keep the legs straight-stretched and together, then wiggle them in a kind of fish-tail action, making the water boil at the feet but not thrashing it. This is the Australian crawl kick or stroke.

The water wings I always use because they force the pupil into a horizontal position. In fact I generally place two pairs of water wings at the waistline. This forces the face to the water and the feet to the surface where I want them. It also gives the pupil confidence, for no human being, skillful or unskillful, can sink two pairs of water wings, and if the elbows are spread wide the subject cannot upset. The pupil is thus enabled to center his mind on the learning of the technique of swimming, the wild movements which the frightened beginner so often makes on first acquaintance with the water being eliminated. In learning the flutter kick, or crawl kick, a pair of water wings may be placed at the waistline and another in the hands in front lying flat on the water. In the old method of swimming in which the swimmer pushed against the water, instead of scooping it rearward, the pupil would sink when the wings were taken off. But when the crawl stroke is used no such difficulty is experienced. When the water wings are re-

moved the pupil simply experiences a sense of relief, as the body glides through the water much more freely without the wings than with them.

I am continually being asked, "How long will it take me to learn the crawl stroke?" As human beings differ to an extraordinary extent both in structural parts and in capacity, this question can never be answered off hand. Some, in fact the majority, may learn in one week, or six continuous days, and there does not exist anyone who cannot learn in a month. I do not say that at the end of the week, or at the end of the month, all will be able to swim; but they will know how it should be done and will require nothing more but practice. Some may require days of practice, some weeks, some months. The hardest thing to overcome is structural awkwardness. Give me any day a stupid weak man to teach swimming rather than a stupid strong man. Many of the greatest athletes are very poor swimmers, for swimming is a rhythm, not a strenuous muscular action. That is one of the reasons why women often excel men in the water swimming being the one sport in which a woman can hold her own with a man.

Everyone should start swimming under a qualified coach, and no one is qualified to teach swimming if he teaches it merely for a living. The teacher must not only want his pupil to swim but be determined that he or she shall swim. This only must be the consideration in his mind, and not the fact that he will be paid for his work whether the pupil swims or not. But teachers are not picked up on every street corner, the idea that anyone who can swim can teach others to do so being an absurd mistake.

The mass system, in which many individuals are taught at once, in place of the old system of teaching one individual at a time, is a method that I have employed.

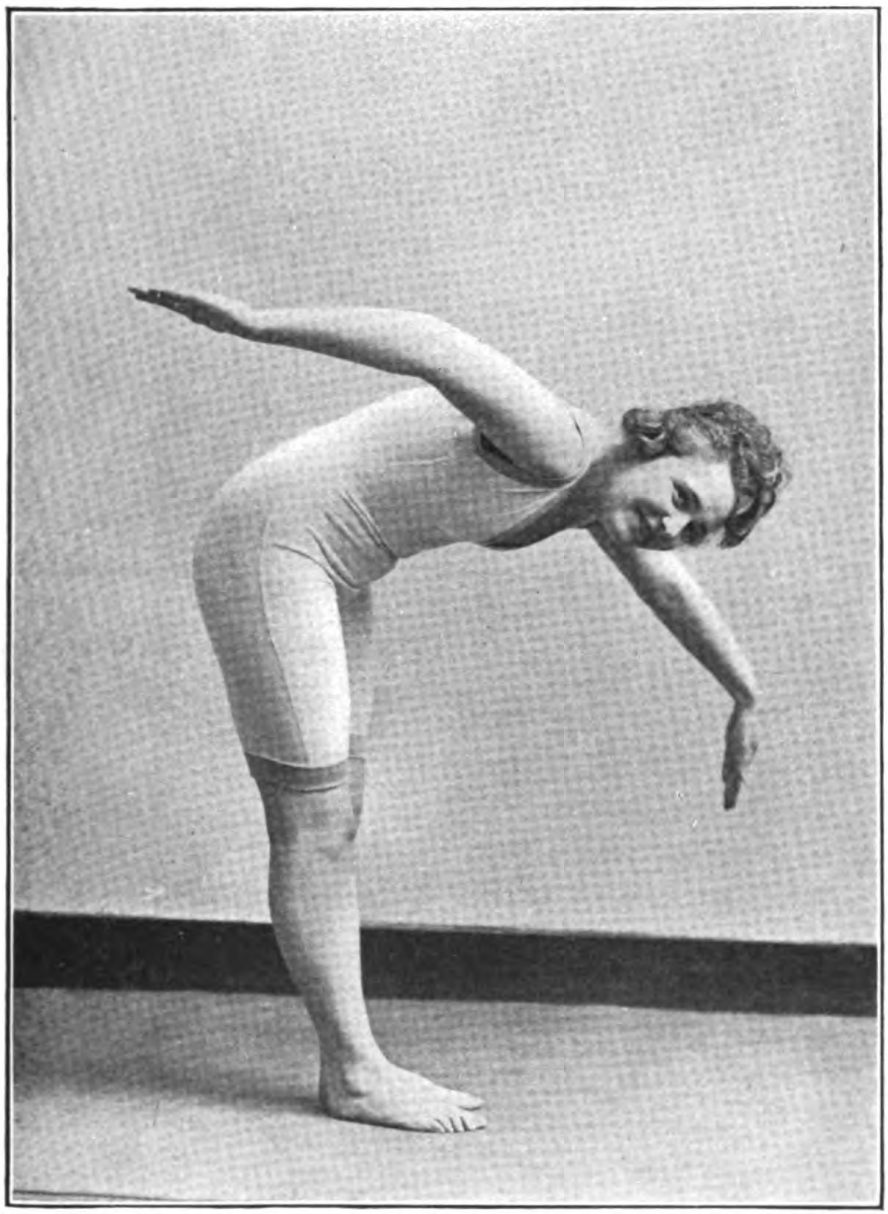
I find that if the water is warm, if the water is clear, and if the water is shallow, the team in mass will lose the fear of the water much sooner than if placed in the water singly. Three and a half to four feet is the ideal depth. The temperature of the water I must have warm. Eighty-one degrees is my preference. This makes complete relaxation possible, and relaxation is one of the secrets of the art of swimming.

At the whistle the class can stand up and listen to the directions of the teacher, and the pupil who is still blowing air into his water wings can look on and learn from the mistakes of the others. On entering, the class will first learn breathing as follows: Stand up, open the mouth, take in air. Close the mouth, bend the knees and going down into the water exhale all the air through the nose, still keeping the mouth tightly closed. Stand up, open the mouth, take in air and repeat. The time for taking in air should be one second; the time for exhaling, ten seconds.

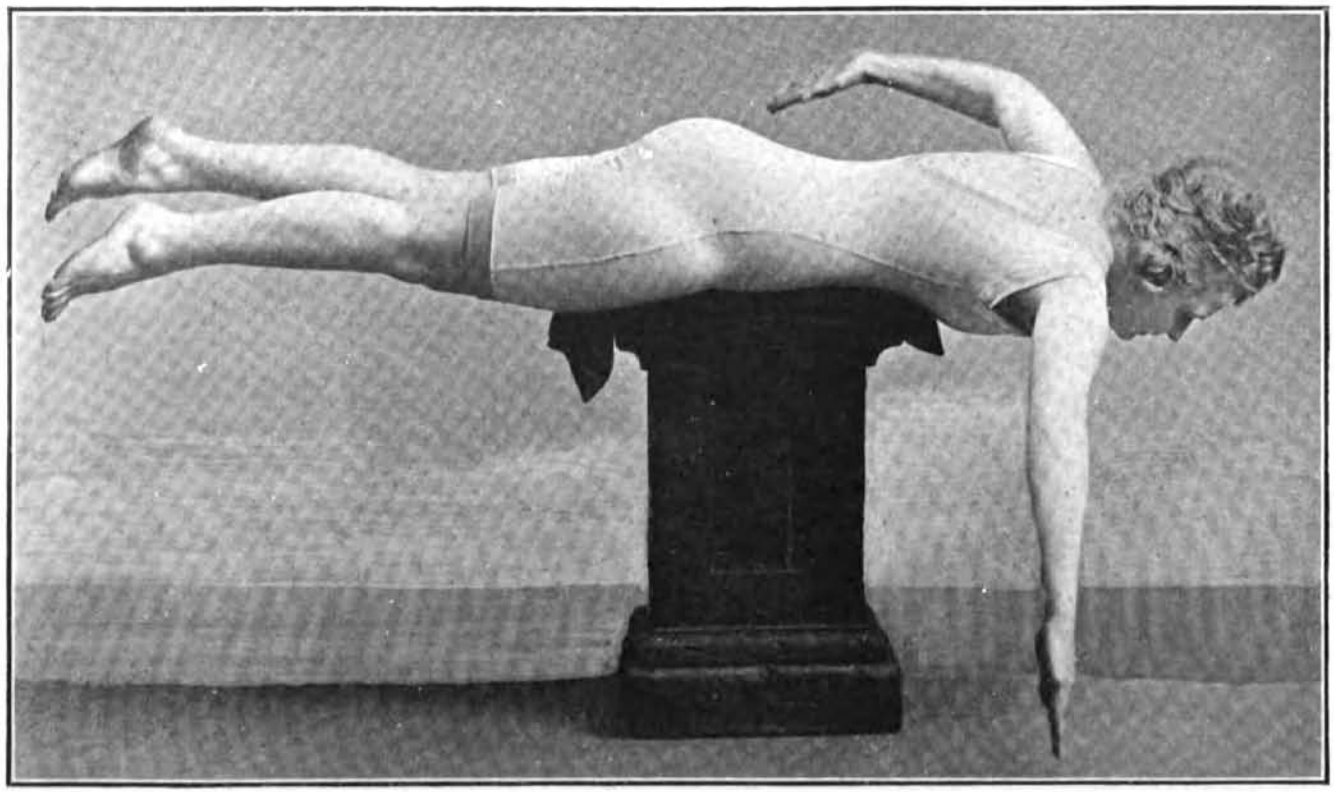
This system I have called rhythmic breathing, and it is the basic principle of the art of swimming. Failure to practice this kind of breathing is the cause of most drowning accidents, especially those commonly ascribed to cramps. A pain in the leg cannot possibly drown a person. He simply chokes to death because he does not breathe properly. When a drowning man pops up for a second to the surface of the water he will try to do two things—breathe out and breathe in; whereas if he had

breathed out when he was under water all he would have had to do at the surface would have been to breathe in; and, as you have seen, breathing in takes only one second. You will readily understand, of course, the tremendous danger of breathing in under the water.

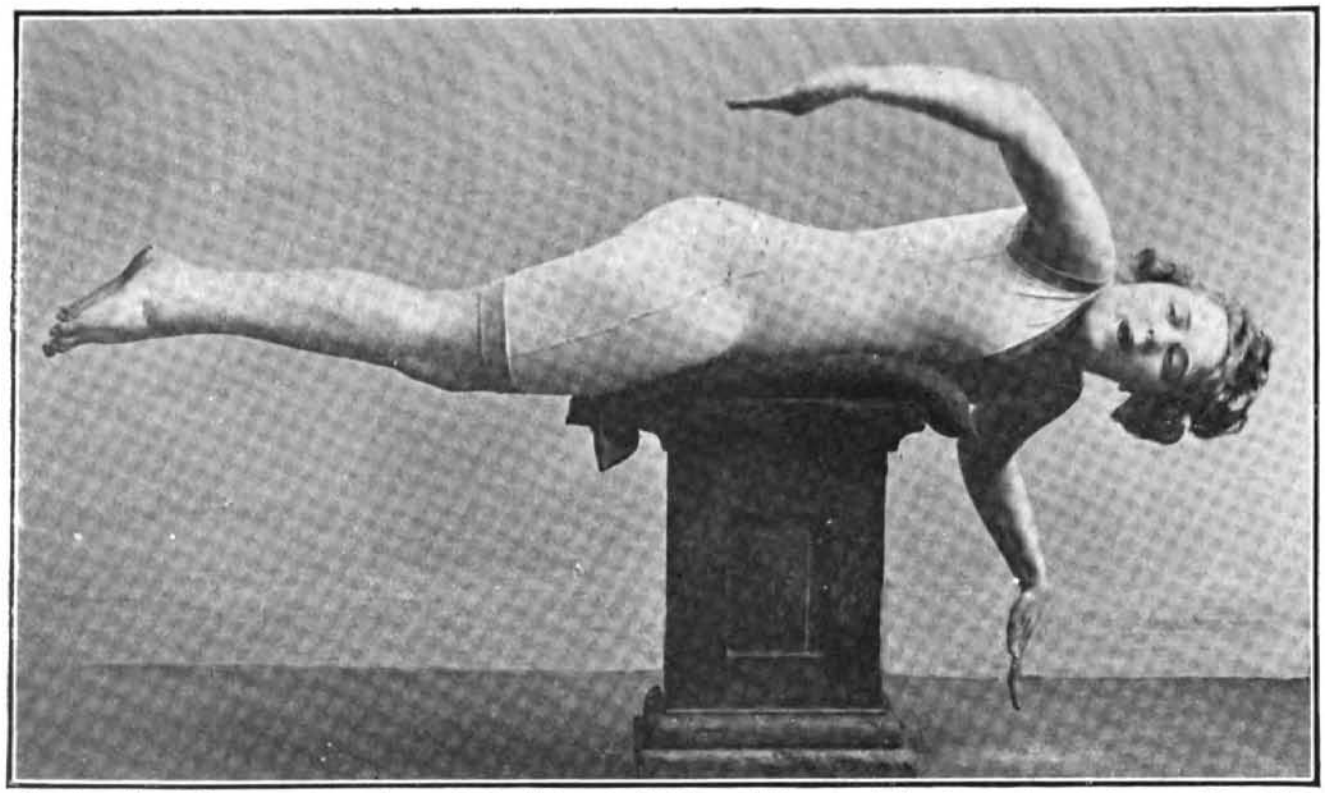
The arm work is the hardest single detail in the art of swimming, and it is a very good plan to start the pupil on the hardest work. The arm work for the Australian crawl and the trudgeon stroke is identical. The life-saving methods of swimming on the back, such as sculling, the broad stroke on the back and the alternate over-arms on the back, are to be taken up later on. For practice on arm work the legs are held straight together and allowed to drag. This is a difficult thing for the person who has already acquired some ragged leg action, and, by the way, ragged leg action is very often the cause of the drowning of so-called expert swimmers. Having the water wings at the waistline, as I have said, enables the pupil to center his mind upon the arm detail and get possession of his legs. The Australian crawl shoulder drill is the most difficult technical action to learn in the whole art of swimming, but most fortunately it may be practiced at home in the parlor or the kitchen even better that it can be in the water. The more it is practiced the better, for the pupil will find that long after his fear of the water has passed away his shoulder and arm action are still ragged and imperfect. The action in the shoulder drill is continuous, quiet, long, slow, wide, deep, and entirely confined to the shoulder muscle, except for a wrist and forearm bone twist. The arm action is the antithesis of the leg action. Those who are very tight at the shoulders and experience a difficulty



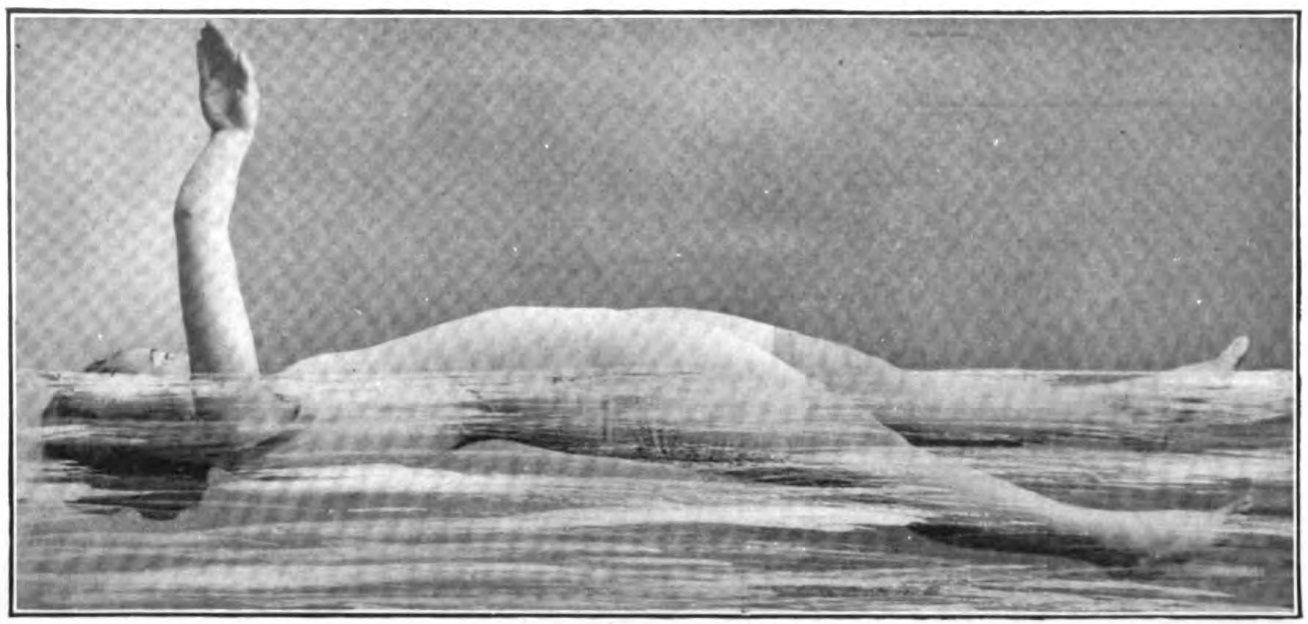
Showing the finish of the right arm drive, with the left arm commencing the drive, and the right arm about to be brought forward. Study the positions carefully.



The dry land practice of the crawl swimming stroke in the horizontal position, showing the same arm action, right arm in the drive, left arm brought forward, elbow first. This also shows the "flutter kick," toes extended. (See next photo.)



Showing the right arm recovering and the left arm driving. This especially shows the turning or side-rolling **of the head to catch a quick breath of air. Ordinarily the face is submerged, the head being turned sideways for a quick breath through the open mouth.**



This is a new crawl back stroke with which back swimming records are now being made. The "flutter kick" is used as in tne ordinary crawl. This shows the recovery of the right arm, the arms working alternately. (See next photo.)

in performing the motions are muscle-bound and should go through the exercises day after day for months, if for no other reason than for health's sake, for a bound, tight muscle is a dead muscle, and no one should carry dead tissue on his frame.

The most valuable all-around stroke is without doubt the trudgeon. It is the stroke to swim long distances with. It is the stroke you play water polo with. It is a speed stroke in which you may hold your head out of the water and observe the surroundings. The racing style of trudgeon only differs from the pleasure style in the fact that while racing you swim with your head and face down in the water all the time, having the body on a perfect horizontal.

The Australian crawl stroke, or flutter kick, when taken in the open air and in pleasant, warm water, is a most healthful exercise for men and women, boys and girls, but is especially advantageous to the half-invalid woman who is suffering from prolapsus or displacement, inasmuch as it is performed not so much by knee action, as stated so frequently, but by the action of the muscles above the pelvis and the upper thick muscles attached to the trunk, such as the psoas magnus or large loin muscle which is attached to the front of the lower part of the spine and the top of the upper leg bone. Also the abdominal muscles are so brought into play that the pelvic organs are not only immensely strengthened but are forced back into their normal position. Some years ago certain French savants made quite a name for themselves by making invalid women run on all fours, such exercise, with the body horizontal, being the only form of exercise which tends to restore the pelvic organs to

their normal position. One can readily see how undignified and unpleasant this exercise must have been and how much more interesting and beneficial the Australian crawl stroke is. Again, the flutter kick, as well as the arm work of the crawl, induces very deep breathing. It opens up the bottom of the lungs and gets the stale, tubercular atmosphere out of the lower cells, thus renovating the whole lung cavity.

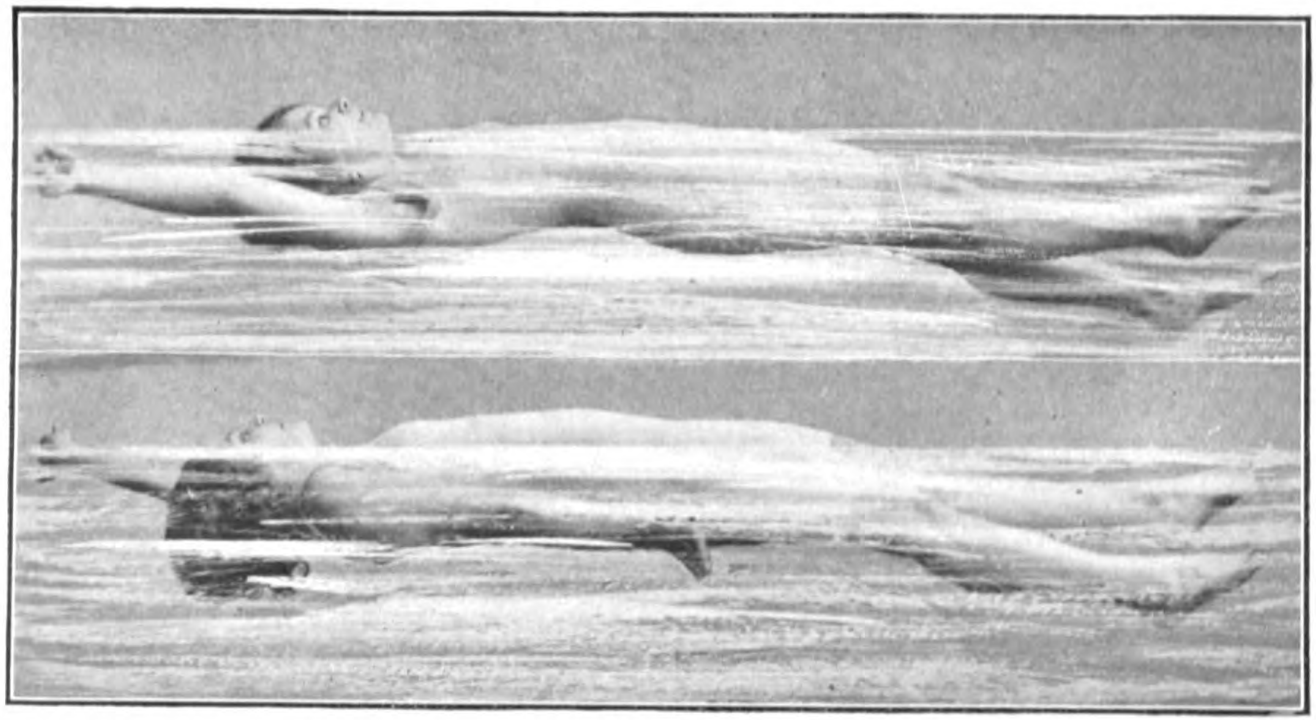
The scissors kick is one of the main pillars of the art of swimming. The side under-arm, the English over-arm, the Russian style and the trudgeon strokes are all dependent upon a good scissors kick. The trudgeon stroke is a long-distance racing stroke as distinguished from the crawl, which is the sprinting, or short-distance, racing stroke. The scissors kick is much more restful than the flutter or crawl kick, so that it is absolutely imperative for every swimmer to learn to do it correctly. The old-style scissors kick in which the upper leg was thrown out far in advance of the median line is not the style I teach. I have the upper leg almost straight, limping up a little at the knee, with the ankle at full stretch like that of a toe dancer. The ankle of the under foot may or may not move, but the upper ankle must always be kept at full stretch. Should the pupil be right-handed, he should swim with the left side down, the skillful arm being uppermost; if left-handed, with the right side down, also with the skillful arm uppermost. Thus, should he wish later on to play water polo, he will have the skillful arm uppermost with which to throw the ball. At the moment that the ball is thrown, a powerful scissors kick is given. There are other reasons why the upper arm should be the skillful arm, while

there is no reason whatever why a person should swim with the right side down in order to protect the heart from a little extra pressure. This is simply imagination. In throwing the water polo ball, the powerful scissors kick raises the player high out of the water and enables a strong over-arm, round-arm or back-hand throwing. Only a cork of a man can throw the ball, while still in the water, more than a very short distance; if he wants to throw it seventy-five feet, the scissors kick is absolutely necessary. The under leg is the main guide when swimming with the scissors kick. It is thrown back, the knees separating from before, backward and never from right to left, and a powerful kick being delivered with the top of the under foot, frequently making a big wave. The scissors kick uses the largest muscles in the body and that explains why it is a restful style of water locomotion. In fact, one can go to sleep in the water and work the trudgeon stroke hour after hour, using the scissors kick, breathing in rhythmically with the kick and out on the drift, swinging both arms over the water alternately so that the kick is given with the pull of the under arm, for in the trudgeon there is a slight lean on one side.

The illustration given shows a rope stretched taut the length of the pool about a foot above the water. The lower hand is placed flat against the wall and thus holds the body out on the horizontal, on the side. The mind is thus enabled to center on this one detail—the scissors kick. In the illustration the pupils are taking their first lesson in the scissors kick and the reader will notice that some are more skillful in assuming the proper position than others. The mistake which most swimmers

make in trying to do this kick is that of throwing the upper knee and foot too far forward. The upper leg should be held almost straight and just make a whip-like snap to meet the under leg's strike. The narrow and not the very wide scissors kick is correct.

In conclusion it may be permissible to point out that the benefits of the delightful art of swimming are very far from being generally appreciated, and that the trouble of acquiring it is abundantly worth while, even if one is so unfortunate as to have to do it after having attained adult life. It not only affords a safeguard against dangers which are every summer borne in upon us by an appalling and unnecessary loss of life, but it combines the benefits of physical exercise with the stimulus of cold water in contact with the skin, which is one of the most valuable of all stimulants. The Romans used to speak with contempt of those who had neither letters nor swimming, but in these days we are apparently satisfied with letters alone, for we build our schools without swimming tanks.



The upper position shows the complete recovery of the right arm and beginning of the right arm drive; the lower, the completion of the right arm drive and the beginning of the left arm drive.

LIFE SAVING

By ANNETTE KELLERMANN

FORTY-FOUR per cent of the deaths by drowning are due to the unskilled efforts of one person to help another. These deaths can be avoided by popular education in proper methods in rescuing.

When a cry for help is heard, unless the case is one in which not a second can be spared, one should not attempt to rescue while fully clothed. At least the heavier outer garments and the shoes should be removed. The few seconds required for this will be adequately compensated for in the greater speed the rescuer will be able to make when once in the water.

One should never try to swim up-stream to a drowning person, as valuable time is lost in fighting the current. Running is much faster than swimming, therefore one should run up-stream until he reaches a point well above the person in trouble. He can be throwing off his clothes as he runs.

The victim should always be approached from the rear. He has much less opportunity in this way, if he has become crazed with fear, to clutch his rescuer and drag him down, thus hindering the work of rescue, if not actually causing both to lose their lives. This advice holds good whether the victim seems rational or not; one never can tell what a drowning person may do.

In case it is a question of seconds or one must work in crowded quarters and must approach from the front, the breast stroke should be used, and the victim's wrist

should be suddenly grasped by the right hand. Then he can be immediately pulled on his back into a towing position.

If the victim is quiet, he should be spoken to encouragingly, and assured that he is no longer in danger. He must be made to understand the necessity of doing all he can to aid in his own rescue. Once his confidence is gained, the matter of the actual rescue becomes comparatively simple for the experienced swimmer.

If the victim is a tired swimmer needing assistance or suffering from cramp, or even a non-swimmer who knows what to do or is rational enough to follow instructions, the proper method is for the victim to place his hand extended at arm's length on the rescuer's shoulder, and sink his head as far as possible in the water. This position gives the rescuer the fullest use of arms and legs for the breast stroke. This position is, however, exceedingly dangerous to the rescuer if there is any doubt as to the victim's self-control, for from this position he can climb upon the rescuer's back and get a leg-lock around the body, which is one of the most difficult holds to break.

If the victim is not struggling, the rescuer should turn him on his back, taking his head between his hands so his palms cover the ears, and his fingers point toward the top of the victim's head. Then he should lie well back so that both bodies will be in a nearly horizontal position, and swim toward shore, using the frog-kick.

If the victim is struggling frantically, he should be quietly and quickly approached from behind. If possible, let the rescuer grasp him by the arms, pressing the fingers into his biceps. When the arms are pressed

sharply back, his legs will come up, and in this position he can be easily controlled if firmly held, and towed ashore by swimming on the back with the frog-kick.

In spite of all precautions, the drowning man may clutch his rescuer, so as to endanger both their lives, and it is necessary, accordingly, to know these clutches and be able to break them. In some of the pictures which illustrate this article, a woman is shown as the rescuer, and a man as the victim to indicate that the weaker person can break the grip of the stronger, if the proper method is known.

When the victim grasps the rescuer by both the wrists, the latter should bend his arms first downward, then outward and upward. The result will be to twist the victim's wrists and put so severe a strain on his thumbs that he will be forced to release his hold. The pain is too severe to be endured, even for a moment.

If the victim grasps the rescuer by one wrist with both his hands, the latter should draw away from him, put his foot against the victim's chest and push. As the legs are much stronger than the arms, it will be readily seen that the hold must break.

If the victim gets his arms about his rescuer's body from the front, the latter should draw up the knees with a sudden movement, as close as possible to the abdomen, and then kick out straight forward with both feet. This movement will break the strongest body hold as it is leg strength against arm strength. If the rescuer should be gripped in such a manner that he cannot easily get his feet free, he may place his left hand in the small of the victim's back, with the palm of his right on the point of the victim's jaw, and index and middle fingers

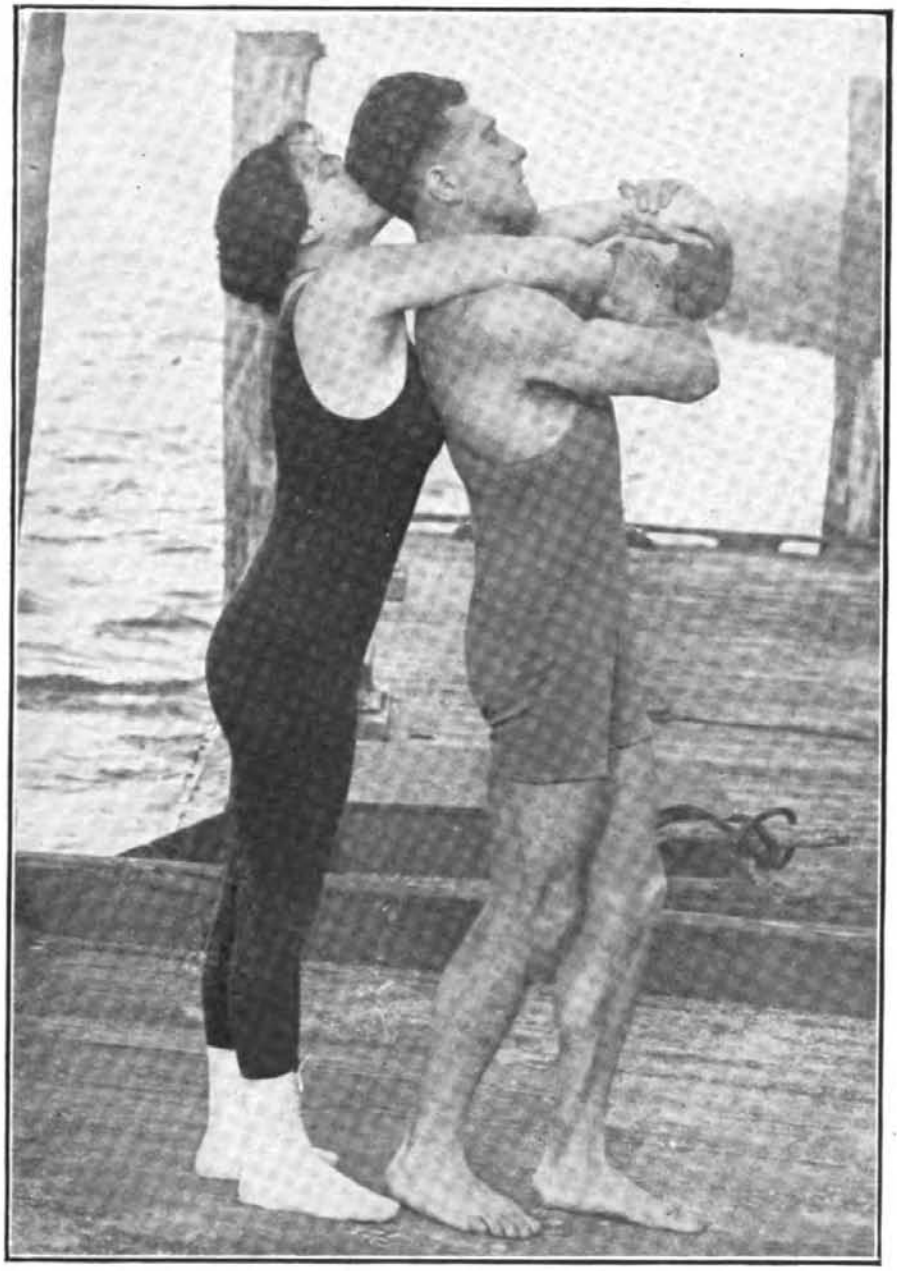
squeezing his nostrils, then push away with right and hold firmly with left hand. Or he may bend the drowning person's head back by pushing back his forehead and giving him a quick, sharp jolt on the point of the chin with his fist.

It is child's play to slip out of a strangle hold, if one but knows this very simple method. The rescuer first brings his arms upward and outward with a quick jerk until they are on a level with his shoulders. Simultaneously with this movement of the arms, the head is brought forward and downward with a snap, turtle-fashion, and the strangler suddenly finds his arms about nothing but water. It makes no difference how strong he is.

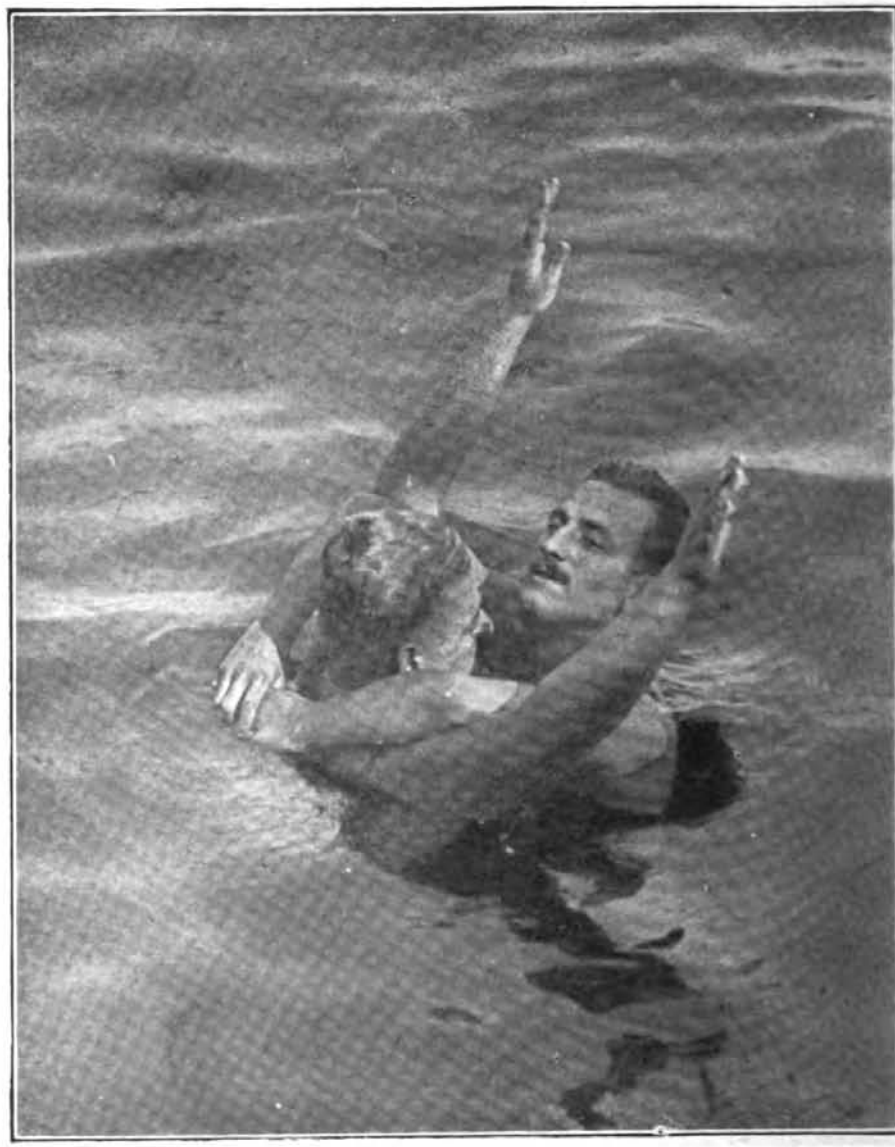
The shoulder hold is one of the most dangerous because the rescuer's arms are pinioned against his sides. To break this hold he must raise his arms above his head. This causes the drowning person's arms to slip about the rescuer's neck, and he can then drop out as from the strangle hold.

The strangle hold from behind is more dangerous because more difficult to break. The rescuer should let his feet sink until his body is in a vertical position, and tread water for a moment to bring both heads well above water. Then after grasping the wrists of the victim, let him drop his head forward as far as possible and then throw it back with all the force he can command. If this blow does not stun the victim, the rescuer should bend back one or two of his fingers until the pain forces him to release his grip.

The body hold from behind is perhaps one of the hardest of all the holds to break. If it is an arm hold



Life-saving sometimes requires strenuous and heroic measures. This photo not only shows how a life-saver frees himself from the frantic strangle hold of a drowning person by the right use of the hands, but also how to use the head to make him or her let go.



When a drowning person seizes his rescuer by or around the shoulders, the hold may be broken in this manner, slipping from under.

This shows a method of breaking a wrist hold, using an outward twisting action. A terrorized drowning person will defeat the life-saver's attempt at rescue unless his or her own grip is broken.

This shows an excellent one-arm hold for life-saving use, the rescuer swimming with the other arm and legs.

only, the rescuer may be able to push the encircling arms downward over his body to the lower abdomen, and proceed shoreward swimming with the breast stroke. The face of the victim, however, will in this position be submerged most of the time, and he will therefore soon be likely to loosen his grip, giving you an opportunity of securing a more satisfactory hold, preferably one of the towing holds.

The body hold from behind with leg grip is the most dangerous of all the holds. The victim tries to climb upon the rescuer's back, forcing the latter beneath the water. The rescuer may free himself by turning and placing one hand over the victim's face and pressing the nostrils tightly, at the same time pushing him away. With the other hand he should grasp one or more of the drowning man's fingers clutching in front of his abdomen, and bend them back. When the pain of his bent fingers becomes too great for the victim to endure, his legs will loosen and the rescuer can kick free. If it is a leg hold around the body where one can reach the victim's foot, the ankle of one foot should be grasped in the left hand, using that hand as a vise, and the foot ground in a circular motion with the right hand.

If the victim is in a state of insane fear, it is useless to try to reason with him, for quick and decisive action, even though it involve a certain measure of violence, is essential. In extreme cases of violent and persistent struggling, when the rescuer knows that he has a hard swim before him, the only thing left to do is to render the victim unconscious. This may be accomplished by a right or left hook to the point of the jaw, or by the solar-plexus blow, delivered just below and a little to

the right of the heart. This latter is, however, a little difficult to deliver under the water with the required force.

A variety of methods may be used to tow a drowning person ashore. Probably the most common is to drag the victim along by the hair, swimming either on the side with the single under-arm stroke, or on the back, sculling with one hand, and using the feet in the ordinary frog-kick. The rescuer can also swim face downward, using the breast stroke with his free hand. This method is very slow, however, as the body of the subject trails behind and interferes with the effective use of the swimmer's feet. Moreover, if the victim's face is not kept above water, he may be drowned while being rescued.

This last risk may be avoided if the victim is a woman by passing her hair between the teeth. The victim's head then rests face upward against the back of the rescuer's shoulder and is well out of water. It is of the utmost importance to keep the face of the drowning person above water, even though the rescuer's becomes immersed part of the time, as the victim cannot control his breathing as can the swimmer. A steady stroke should be used in swimming and all jerking and tugging avoided.

When the swimmer is strong enough to execute it by far the safest way of carrying a drowning person is to place the chin of the victim in the hollow of the elbow while the head is grasped in the same hand. In this position the drowning person is on his back and cannot interfere with the work of the rescue. But the chief advantage of the position is that the person "carried" in this manner has his face well out of water.

TEACH YOUR CHILD ARTIFICIAL RESPIRATION

By RICHARD P. KELLY
Supervisor of Physical Training, Tacoma, Wash., Public Schools

"HONEST injun, teacher, would you be willing to have any one of your pupils, the only one present, to try what could be done for you if *you* were taken out of the water apparently drowned?" I say "any one" for fate will not necessarily pick your brightest pupil to uphold your reputation as a teacher when an emergency comes. Oh, yes, perhaps you have read in a book and discussed what to do in a drowning emergency. But when the time comes the pupil who will be sure to do all that can humanly be done will be one who has actually performed the operation on a living schoolmate, brother, sister or friend.

There is nothing new in this lesson. All the information it contains can be found in any modern school hygiene or manual of first aid. The Schaeffer or prone pressure operation for resuscitation in cases of drowning, gas asphyxiation, or electric shock can be taught to any boy or girl ten years of age or older by any parent or teacher, however inexperienced, who will take the trouble to study the operation and the time to teach it. Probably nine mothers or fathers in ten who read this page will find by inquiry that their children have not been taught this method in school, and nine teachers in ten will have to admit that they have not taught it as a matter on which life may depend should be taught.

What I propose is that every mother or father who reads this page ask his boys or girls tonight if they have ever actually practiced this operation. If they say they have, reinforce the work of their teacher, who must have been a good one, by having them demonstrate it to you, checking their procedure in all essential details.

If the boy says he "knows how," but has never actually "done it"—don't accept book learning in this case unless you would be willing to have a theoretical operator stand between *you* and death—let him take this chapter for the teacher to read, and ask her if his class or school cannot have this kind of a lesson.

Teacher, I hope you have seen this first. Tomorrow is the day for the lesson if it doesn't rain. You want one day to look the explanation over and if possible practice the operation on a pupil or friend. And meanwhile you want your pupils to ask at home what father and mother know about resuscitation. Hygiene isn't taught as it should be unless you have the homes interested in what you are teaching and helping you teach, for hygiene isn't knowing, it is living and doing.

When the pupils come back tomorrow with their information, I hope the first one you ask may be one who knows the Schaeffer or prone pressure method of "what to do." If not, you may hear a lot about lifting the patient to "get the water out," "working the arms," drawing out the tongue, wiping the mouth, and many other details. All of these things used to be done, but they take too long, and there are too many of them, and the operator, especially an inexperienced one, is likely to forget some essential details which will make the whole operation ineffective. Tell the pupils that a

Doctor Schaeffer of Edinburgh was commissioned by the British government to find the best method of all, and that he found one which was not only the most effective but the simplest and easiest. This method has since been adopted by our army and navy, by the Red Cross societies of many countries, and is the one taught in all modern public schools. To avoid confusion in the minds of pupils no other method should be taught to them, at least before they have finished high school.

In Tacoma we now plan to have pupils in all grades from the fourth up actually practice this operation at least once a year. And after every such lesson every pupil is advised to practice the resuscitation on a brother or sister or friend at home, in the presence of the parents, so that they will know that he knows it and, incidentally, so that the parents themselves will know it. After our lesson last spring many of the pupils reported that their fathers and mothers had actually got down on their knees and practiced too. Why not? It is worth something to be sure, isn't it, mother? And when your boy sees that you think it is worth while he is not going to fail when the time comes, is he?

I believe that two dates annually should be set aside in every school when this lesson is repeated, only as the years go by the teaching should all be done by the older pupils of the school, who know the operation so well and believe so thoroughly in the value of knowing it that they will insist upon the lesson being given and see that it is correctly given even if a new teacher has come to the school. The reason for having fixed dates every year is that what may be done any time is sometimes never done; the reason for repeating the lesson from

year to year is that it cannot be too well known and that there will probably be pupils present each time to whom the operation is new. In the Tacoma schools the lesson is given to all the pupils from the fourth grade up through the high school the first week in October and the first week in May. In October the memory of the summer experiences near the water is still fresh in the pupils' minds; the May lesson is in time to anticipate the first drowning accidents of the summer to follow. Do not omit the lesson because there is no water for swimming near your school. Your pupils will not live all their lives in an inland district.

The operation, which can be easily understood by a reference to the illustrations, is performed as follows: To start respiration, lay the patient face down on a level place. Turn the head to one side and rest the cheek or temple on the back of the wrist so the mouth and nostrils will be out of the dirt. If there is a breeze blowing turn the face in that direction, but that is not essential. Kneel beside the patient below the waist, or better kneel astride of the legs between the hips and the knees. Place your hands on the small of the patient's back in such a way that the thumbs are extended across the back toward the backbone, and the fingers are spread over the sides near the lower ribs.

It is because the correct placing of the hands is so essential to the most effective performance of the operation that practice upon a living person is necessary. The teacher should examine carefully to see that all the pupils have their hands correctly placed.

Begin. Swing your weight forward with a gradually increasing pressure, until you are pressing with the

thumbs and squeezing with the fingers as much as possible. Count five slowly during this operation. Now straighten up quickly, releasing the pressure suddenly, but without removing the hands from their position on the back, and count five while the pressure is released. Repeat this from ten to fifteen times a minute, without pausing between the movements, until help comes, *or for at the very least one hour.* Persons have been restored after several hours of artificial respiration, and after they have been in the water some time.

The foregoing is the essential part of the process. Note how simple it is. Yet hundreds of lives are lost every year because people who might easily have given the resuscitation successfully had never heard of it, or did not dare to attempt it because they had never practiced it.

Begin the artificial respiration as soon as possible after an accident. Every second counts. Do not wait to get the patient too far from the water; do not wait to remove the clothing, or for anything else. If you are the only person present and you have to choose between performing the operation yourself or going for help, by all means use the operation. If there are others present besides the operator, a doctor should be sent for.

The first thing needed in the case of asphyxiation or shock is to start the breathing, which at the same time starts the heart action. The next is to restore the normal warmth of the body. While one person is working for the respiration, others if present can be wrapping the patient in blankets or coats, applying hot water bottles to the feet, and rubbing the arms and legs vigorously toward the heart. Teachers, see that your pupils explain

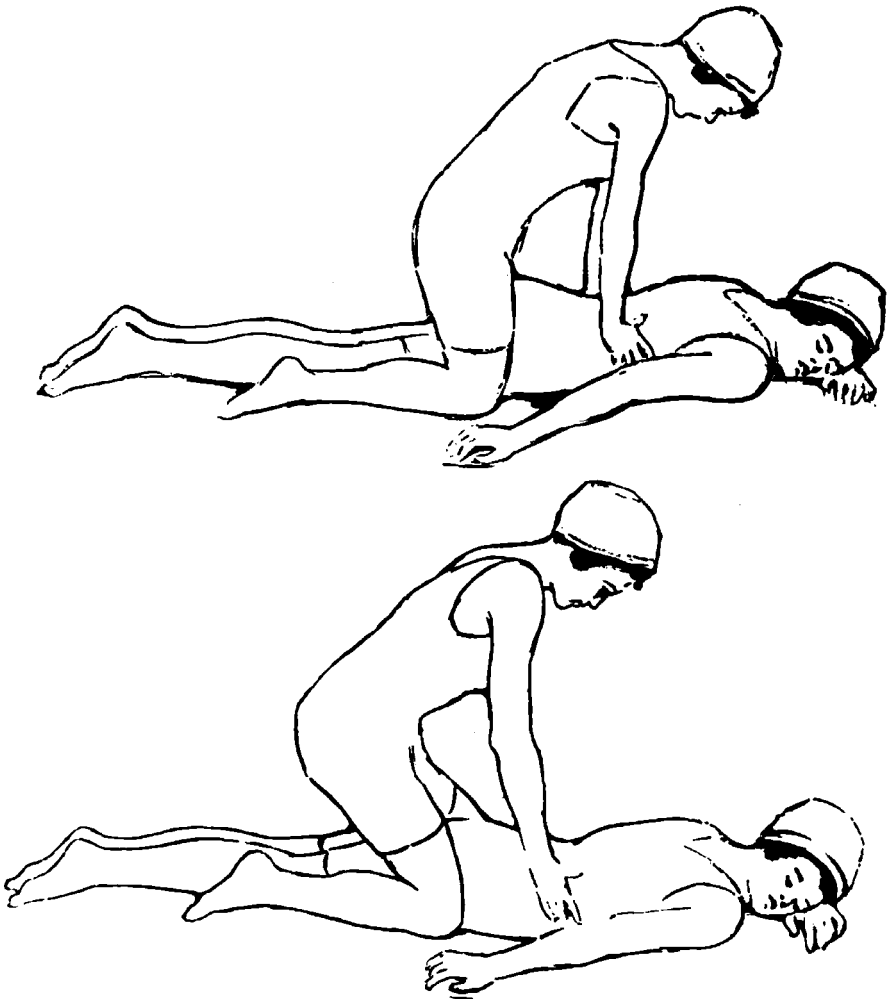
to you why they should rub *toward* the heart. It gives you one of the best opportunities you will ever have to teach about the venous circulation. In case of an accident away from civilization, large stones can be heated in a fire, wrapped in cloth or paper so they will not burn the skin, and applied to the arms and legs. If conditions are such that you can have your pupils build a fire and prepare and use the stones or bricks, they will never after forget that warmth is valuable in cases of shock.

It is not believed advisable to instruct grades one to three in the operation, but it will be of value for them to know it, and it is suggested that they be allowed to watch the lesson and told to tell their parents about it. In many schools the semi-annual lesson is made an event to which the parents are invited.

When the pupils are taken out for the lesson, they march in twos until they have reached the proper place, when number one gets down on the ground and number two acts as operator, and when all of the number twos have performed the operation to the satisfaction of the instructor the partners exchange places. This is an essential detail. Every pupil should perform the operation, and every pupil should have the feeling of the pressure and its effect upon his breathing.

As in the conduct of a fire drill, the pupils should first be made to feel that this is something which may sometime be a matter of life and death, and that they should keep their minds in a serious and receptive attitude.

Teachers, if your textbook in hygiene proposes any other method, amend it by substituting this.



Artificial respiration. Place the victim on their stomach, face turned to one side, upper head on forearm to allow water to drain from the mouth. Placing hands on the back just above the waistline, alternately lean forward, pressing the air out of the lungs, then lean back, relaxing pressure. Continue in this way, allowing three seconds to each movement, or twenty inhalations per minute.

Parents, if this resuscitation is not taught in your school, you can teach it in the home. It may never be needed. But it can be taught in fifteen minutes. And a result of this fifteen-minute lesson may be a useful life saved.

The Olympian System

of

Physical and Mental Development

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Part Two

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THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART TWO

CONTENTS

DIET

SECTION ONE

ESSENTIALS OF NUTRITION

CONTENTS

The Olympian System of Physical and Mental Development consists of Charts, Instructions, Text Material and Discussional Lectures as follows:

THE CHARTS

General Chart for Daily Normal Exercise.

Charts for Men	*Charts for Women*
Spine Flexibility.	Back and Spine.
Strengthening the Stomach.	Abdominal and Digestive.
Chest and Shoulders.	Overcoming Weaknesses of Women.
Arms and Legs.	Arms and Shoulders.
Agility and Flexibility.	Bust and Chest Development.
Advanced Strength Building.	Flexibility for Grace and Poise.

Three Charts of Instructions for the above.

TEXT MATERIAL IS GROUPED AS FOLLOWS

PART ONE EXERCISE	Section One—Physical Training. Section Two—Constitutional. Section Three—Exercise for Women. Section Four—Recreation and Athletics.
PART TWO DIET	Section One—Essentials of Nutrition. Section Two—Hygienic Eating and Food Preparation. Section Three—Curative Diet.
PART THREE PHYSICAL FITNESS	Section One—Keeping Young. Section Two—Health Guarantees. Section Three—Dodging Disease. Section Four—The Body Anatomical.
PART FOUR EFFICIENCY	Section One—Improving the Human Race. Section Two—The Body. Section Three—Personal Attractiveness. Section Four—Practical Psychology.

DISCUSSIONAL LECTURES

The Olympian System sustains the member's enthusiasm by informal lectures or discussions. These discussions bear directly upon the texts and help the member to clearly understand the fundamentals of right living. Like a lecturer or class leader they are at the member's mental elbow every month during the course, increasing his (or her) desire to be a complete success.

First Month	(a) The Foundations of a Successful Life. (b) Prolonging Our Youth.
Second Month	(a) Necessary Normal Exercise. (b) Correct Diet.
Third Month	(a) Attaining Standards of Perfect Physique. (b) Correct Standards of Beauty.
Fourth Month	(a) The Prevention of Disease. (b) Strengthening Weak Organs.
Fifth Month	(a) Keep Your Ideal Weight. (b) Recreation in Relation to Efficiency.
Sixth Month	(a) Eugenics. (b) Parenthood and Child Training.
Seventh Month	(a) Energy Building and Efficiency. (b) Practical Psychology.
Eighth Month	(a) Character Building. (b) Personality Building.
Ninth Month	(a) Mentality Building. (b) Success Building.

THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART TWO

DIET

SECTION ONE

ESSENTIALS OF NUTRITION

YOU ARE WHAT YOU EAT

By CARL EASTON WILLIAMS

IF there is one eternal principle or foundation of health, it is correct diet. Life and health depend absolutely upon sustenance, but this does not mean "plenty" of meat, bread and other things. It is not so much a question of eating enough of any kind of food, but rather of eating the right kind of food, and sometimes of eating it the right way.

You are what you eat. And if what you eat is wrong, you cannot possibly hope to be right yourself.

It is said that "familiarity breeds contempt." The things with which we are too familiar do not arouse any interest. Food is such a common, everyday affair, that we do not consider it important enough to try to understand it. And yet it determines not only the degree of our strength and energy, but even the question of whether or not we are going to be sick or well.

You cannot be a better man or woman than the food that you are made of will permit you to be. If you do not eat at all you will starve to death in the course of a number of weeks. Your ability to last through a period of starvation depends entirely upon how well-nourished you may happen to be at the beginning. But if you do not have the right kind of food from day to day, you are partially starving all the time. Even though you may keep alive you will not have the right quality of life. You will not be fully alive. You

will be half-dead. Your body and your brain will be handicapped. You will not be able to do half as much work as you should do, and you will not be able to do a good quality of work.

Hard work has no terrors for the man who is in fit condition. A strong man, full of nervous energy, loves hard work. An effort is not an effort when you have strength. Striving and battling in the affairs of the world are only play for the man who has health and energy. It is an effort or a struggle only for the individual who is lacking in strength. But there is no reason why you should lack strength. You can have it almost by the mere act of desiring it, because your desire will prompt you to do the simple things necessary to gain and retain strength. The Olympian System will teach you very simply these various requirements.

If your friend should ask you to tell him the most important factor in health, what would you say?

If you thought it all over you would say to your friend, "The right kind of food."

Food is the foundation of life and health for three reasons:

First, it is the "fuel" supply of the human system. Food is the source of energy and heat.

Second, it is building material. Broken-down cells and tissues are built up by the elements secured from food.

Third, it preserves the chemistry of the body. It is this third factor that has been neglected in old-fashioned books on the subject of diet. You must keep the body in a state of chemical balance, or a condition in which it is able to utilize the "fuel" elements

and building material contained in one's food. Many writers on the subject of diet still place too much emphasis on the question of fuel requirements, whereas the fact is that one is most unlikely to fall short on that score, but he is exceedingly likely to go wrong so far as the quality of his food and its chemical make-up are concerned.

Fortunately, it is not necessary to be a chemist or to have even an elementary understanding of chemistry in order to appreciate the basic truths on the subject of correct eating. All that you will need and all that will be attempted to give you in these chapters is an understanding of the A B C's of diet. The endeavor is to give you the "first principles," so to speak, and if you have learned even these first principles as understood today, you will actually know more about food than the scientists of fifteen years ago knew about the subject.

Mother Nature figured out the chemistry of food long before we did, and if only we follow her she will prove to be a safe guide and will not lead us astray. The more closely we follow Nature in the selection of our foods the more perfectly satisfactory will be our diet, as you will be convinced after a study of the succeeding chapters. Civilized peoples have drifted far away from Nature, and to the extent that we have done so we have suffered.

Some of us have erred in this respect more than others. Some families even without having studied the subject, maintain a diet of such a variety of foods as to cover all requirements, and such families enjoy good health, resistance to disease, and traditions of long life.

We frequently find in one family the children are naturally healthy, sound and strong, whereas in the family next door the children appear to be "naturally sickly," recovering from one illness only to be taken down shortly after with some other ailment, and thus, if they survive long enough, covering the whole gamut of diseases mentioned in the old-fashioned almanac. Why this difference?

While it is true that factors of heredity have much to do with this and that some children have a better start in life than others, nevertheless in most cases this difference in family health is chiefly the result of their respective habits of living. Among the various conditions of life, the character of the diet is the most important.

The question of knowing the truth about foods, which, after all, is a very simple matter, as you will find, has an importance that may even be measured in terms of money. We speak of this because money is a subject that touches most people very closely. The importance of food may be measured in dollars and cents, not so much through the money spent in its purchase as through the question of the amount spent in doctor bills, and that lost through unfitness for work due to illness. But the loss of time and the loss of the joy of living incident to sickness are not all. It is too often a question involving even loss of life. Keeping well is the chief part of the gentle art of keeping alive, and the food you eat has everything to do with that.

FUNDAMENTAL DIET PRINCIPLES

By CARL EASTON WILLIAMS

RECENT years have seen a pronounced change in the points of view from which food science is taught. Modern teachings are far more practical and helpful for the reason that they include consideration of certain vitally important factors which in the past were completely or practically ignored. In the past foods were classified practically in two divisions, the fuel foods or energy producers, and the protein or tissue-building foods. Authorities therefore classified foods in the three groups of protein, fats and carbohydrates. Albumen is perhaps a more expressive term than protein.

The protein or nitrogenous foods might be classified as "meat," covering not only flesh and fish, but also such albuminous foods as eggs, milk, cheese and even the vegetable proteins of such as nuts, beans, peas and lentils. Carbohydrates, of course, include sugars and starches.

In statements of the composition of different foods the old authorities not only specified the proportions of protein, fats and carbohydrates, but they also condescended to include a reference to an insignificant amount of "ash," just as if that were too trivial and too small in quantity to amount to anything. Therefore, while mineral matter was mentioned in the tables of food analysis, it was really ignored so far as dietetic considerations were concerned.

We now know, however, that these tiny percentages of "ash" or mineral matter in the various foods are of supreme importance in maintaining harmoniously the normal chemistry of the body, and just because the mineral salts comprising this so-called ash are supplied only in small quantity, it is all the more vital that they should not be wasted or entirely lacking. To a large extent the deficiencies of the refined foods used in civilized communities are due to the fact that these mineral elements are either partly or almost wholly missing, having been wasted through faulty methods of food preparation.

It must be understood that while only a small fraction of the human body is comprised of iron, phosphorus, potassium and other minerals, these tiny quantities are tremendously important. It must also be understood that the human body and foods suitable for our consumption do not contain these elements in a mineral form, but as living tissue, or in what is known as an organic form as contrasted with the inorganic or strictly mineral character of these elements when they have not been organized into living matter through the processes of plant life.

In other words, this part of one's food is not "ash" at all in the true sense of that word. Some of these elements in their inorganic form are very poisonous. Mineral phosphorus, for instance, is a poison to the human body. And yet phosphorus in its live, organic form as found in food and living creatures is absolutely necessary to the welfare of the body. The same is true of iron, magnesium and other of the mineral salts indispensable to life. Iron is commonly prescribed in its mineral form as medicine, on the theory that it will

build up the body. The theory is fallacious, however, owing to the fact that the inorganic iron cannot be assimilated. It is available for use in the human system only after it has been transformed into living matter in the form of plant life and thus prepared for our use. (The question of the supply of mineral foods in the diet will be taken up for special consideration.)

But while the value of mineral salts in the diet has been appreciated for many years by progressive students of food science, it is only recently that the authorities have learned the importance of another factor. This factor is very illusive, inasmuch as the chemist or laboratory worker has not yet been able to place his hands upon or to see, even with his microscopic eyes, these substances or qualities to which have been given the name of "vitamines." We only know from the study of certain foods that the vitamines are there because of their results, and we know that in other foods they are absent because these results are not forthcoming. Vitamines, in short, may be regarded as the substances or qualities which make our foods life-giving. Perhaps their purpose or function is to enable us to make use of the other elements or properties in food. There is much mystery attached to their exact character and how they operate in the human system. But there is no doubt or mystery in regard to the fact that their presence in food is absolutely indispensable to our health and life. Hence, since we know what substances contain vitamines and what do not, it is possible to make such a selection of the foods which comprise the diet that one may enjoy vigorous and continued good health all through life.

TISSUE BUILDING AND "FUEL" FOODS

By CARL EASTON WILLIAMS

THE energy with which we move and think, and with which our organs perform their functions, is derived from food. Food is just as certainly consumed in the body to produce heat and energy as fuel is consumed in the furnace of an engine to produce the energy that it generates and transmits.

In addition to this fuel requirement, so to speak, food is necessary for building purposes, not only during the period of growth, but to repair the breaking down of tissue cells in the course of everyday life.

The great tissue-building food-substance is protein. But while protein will serve also as a fuel, that is, a source of heat and energy, the special fuel foods are found in fats and carbohydrates.

The word protein is used generally to express the group of nitrogenous foods. Albumen, casein, fibrin, gluten and gelatin are included in this class. In the minds of many people protein is practically synonymous with lean meat or muscular tissue, and this is, in fact, a fairly clear conception. Perhaps the best example of pure albumen is the white of egg. An egg, therefore, is an ideal muscle-building food, supplying the building material necessary for a man who does hard manual or athletic labor, breaking down many muscle cells, and thus requiring considerable of this building material. The form of protein found in cheese is usually called casein. In grains it is gluten. Gelatin is a nitrogenous substance obtained from bones and fibrous tissue.

The use of the general term protein makes for simplicity in discussion. The great sources of protein food are meat, fish, poultry, eggs and milk in the animal world, and in the vegetable world, nuts, legumes, comprising peas, beans and lentils, and to a lesser extent, all grains and seeds.

Fats include both animal and vegetable oils. The fat of meat is a familiar example. Milk fat, whether in whole milk or in the form of cream or butter, is the most precious form of fat used as food by the human race. There is also considerable fat in the yolk of an egg. In the vegetable world nuts are found to contain a considerable quantity of wholesome, palatable fat. Olive oil is an example of a valuable vegetable fat. The cereals, that is, whole wheat, corn and others, contain small percentages of fat. Indeed, all seeds have a certain amount of fat, and in some cases this may easily be extracted for human consumption, as in the case of cottonseed oil, or for other uses.

The carbohydrates, like fats, are non-nitrogenous. They comprise starches, sugars, dextrin and the various foods containing starch and sugar. Bread, rice and tapioca are familiar examples of starchy foods. Whole grains, such as wheat and oats, are about three-quarters starch, and are therefore classified as carbohydrates, even though they contain a certain percentage of protein. All candies and syrups are, of course, carbohydrates. Fats have double the fuel or energy value of carbohydrates. One could not, however, entirely substitute fats for carbohydrates in the diet for the reason that considerations affecting the ease of digestion would make this inadvisable.

Most presentations of diet have concerned themselves in the past with the balancing of these food elements, protein representing the tissue-building, and fats and carbohydrates the heat and energy-producing factors in the diet. These foods are all organic, containing carbon as one of the elements, but a certain amount of inorganic matter is used in the system, such, for instance, as calcium carbonate or lime, which makes up about three-fifths of the bones.

In addition to these elements the diet must, as noted elsewhere, contain a sufficiency of the salts of iron, calcium, potassium, sodium, magnesium and others. To be available as foods these salts must be the living, organic combinations developed through plant life. The crude, dead, inorganic minerals, even in the same chemical formulas, would act as poisons. There are also certain vegetable acids as acetic, citric, malic and tartaric.

In the selection of a healthful diet it is not merely enough that the tissue-building and fuel food elements are present in sufficient quantities, or that they should balance each other in a proportion corresponding with the requirements of the body in each direction, but it is also most important that the quality and character of these foods should be considered. Herein lay the great error in dietetic computations in the past. It was formerly supposed that such and such quantities of protein, fat and carbohydrates would fill all human requirements. Now we know, however, that one form of protein is not necessarily as good as another, nor one fat as good as another, and that especially in the field of the carbohydrate foods one may secure either a satis-

factory blood-making, health-building diet on the one hand, or devitalized and hopelessly deficient foods on the other. Where the carbohydrates are represented by foods as supplied by nature or in their natural form, as in the case of whole grains among the cereals, or unrefined sweets, such as honey and fresh maple or cane sap, only health-building results can be secured. But when these foods are refined, as in the making of pure white flour, polished rice, white granulated sugar or refined syrups, the chemistry of the human body is bound to become disturbed, resulting in serious derangements of health.

In the same way, fats vary in their values, even though their fuel value may be almost identical. Otherwise cottonseed oil would be as valuable as beef fat or butter. It appears, however, that certain forms of fat, particularly milk fat, contain certain elements which are conducive to growth and life, whereas others are deficient in this respect. This point is taken up in another place in the discussion of vitamines.

Likewise among proteins there is considerable difference between the food value of animal and vegetable proteins. In some cases there is no question that meat is an unsatisfactory food, not so much because of the nature of this protein, but because of other associated factors. Milk and eggs, however, are classed as animal foods of exceptional value. They will usually take the place of meat, fish or poultry in the diet. And while one may secure a supply of protein from vegetable sources, such as legumes, grains or nuts, and preferably should secure a part of his protein supplied from such sources, nevertheless it is contended by authorities that

the vegetable protein is not so quickly available for the needs of the human system as that of meat, milk or eggs. The question has even been raised as to whether or not beans, peas, nuts, wheat, oats and other grains are truly meat substitutes.

A certain amount of energy is expended in the digestion and assimilation of food. If the vegetable proteins require a greater expenditure of energy than does meat in order to convert them into a form in which they are available for tissue-building, then they are somewhat less satisfactory for this purpose. That is perhaps one of the reasons why so many people claim that they do not seem to be able to get along without meat, though if they used milk and eggs as a substitute they would probably have no such complaint. This is a question, however, which will also be taken up more fully in another place.

The character of one's occupation necessarily determines to some extent the proportion of tissue-building and fuel foods. A man who does a great amount of hard muscular work will not only require a greater amount of fuel, so to speak, but will break down a larger amount of muscular tissue and will require a greater amount of protein. It should be said, however, that even protein may be used as a source of heat and energy.

COMPOSITION OF ORDINARY FOOD MATERIALS

ACCORDING TO ATWATER AND BRYANT

KIND OF FOOD MATERIAL	Inedible Refuse of Purchased Material	EDIBLE PORTION						
				AVAILABLE NUTRIENTS				
		Water	Unavailable Nutrients	Protein	Fat	Carbohydrates	Ash	Fuel value per lb. =453.6 Grams
ANIMAL FOODS								
Beef (fresh)	%	%	%	%	%	%	%	Calories
Brisket	23.3	54.6	2.1	15.3	27.1	...	.7	1475
Chuck	16.3	62.7	1.8	17.9	17.1	...	.7	1095
Flank	10.2	60.2	1.9	18.3	19.9	...	.7	1225
Loin, lean	13.1	67.0	1.2	19.1	12.1	...	1.0	900
Loin, medium	13.3	60.6	1.8	17.9	19.2	...	.8	1185
Loin, fat	10.2	54.7	1.9	17.0	26.2	...	.9	1470
Neck	27.6	63.4	1.6	19.5	15.7	...	.7	1065
Plate	16.5	54.4	2.2	16.0	27.6	...	.6	1510
Ribs	20.8	55.5	2.0	17.0	25.3	...	.7	1430
Round, lean	8.1	70.0	1.0	20.7	7.5	...	1.1	735
Round, medium	7.2	65.5	1.6	10.7	12.9	...	.8	950
Round, fat	12.0	60.4	1.6	18.9	18.5	...	1.0	1175
Round, second cut	19.5	69.8	1.3	19.8	8.2	...	.8	750
Rump	20.7	56.7	2.0	16.9	24.2	...	.7	1380
Fore shank	36.9	67.9	1.4	19.8	11.0	...	.7	865
Tongue	26.5	70.8	1.3	18.3	8.7	...	.8	740
Shoulder and clod	16.4	68.3	1.5	19.0	10.7	...	.8	840
Fore quarter	18.7	60.4	1.8	17.4	20.3	...	.7	1220
Hind quarter	15.7	59.8	1.8	17.8	20.5	...	.7	1240
Side, lean	19.5	67.2	1.3	18.7	12.5	...	.9	910
Side, medium	17.4	59.7	1.8	17.6	20.9	...	.7	1250
Side, fat	13.2	47.8	2.5	15.7	34.6	...	.5	1805
Liver	7.0	71.2	1.2	20.4	4.3	1.7	1.2	620
Suet (unrendered tallow)	...	13.7	4.3	4.6	77.7	...	.2	3440
Hind shank	53.9	67.8	1.4	20.3	10.9	...	.7	875
Beef (preserved and cooked)								
Dried and smoked	4.7	54.3	3.5	29.1	6.2	...	6.8	850
Brisket, corned	21.4	50.9	3.2	17.8	23.5	...	4.2	1370
Flank, corned	12.1	49.9	2.7	14.2	31.4	...	2.2	1635

Kind of Food Material	Inedible Refuse of Purchased Material	Edible Portion						
				Available Nutrients				
		Water	Unavailable Nutrients	Protein	Fat	Carbohydrates	Ash	Fuel value per lb. = 453.6 Grams
Animal Foods								
Beef (preserved and cooked)	%	%	%	%	%	%	%	Calories
Plate, corned	14.5	40.1	3.7	13.3	39.8	...	3.5	1980
Rump, corned	6.0	58.1	2.2	14.8	22.1	...	2.8	1250
Canned, boiled	...	51.8	2.2	24.7	21.4	...	1.0	1415
Canned, corned	...	51.8	2.7	25.5	17.8	...	3.0	1275
Boiled beef (cut not given)	...	38.1	2.7	25.4	33.2	...	.7	1930
Roast, cooked	...	48.2	2.4	21.6	27.2	...	1.0	1410
Loin steak, cooked	...	54.8	2.0	22.8	19.4	...	.9	1290
Tripe, pickled	...	86.5	.6	11.3	1.1	...	.2	275
Veal (fresh)								
Breast	21.3	66.0	1.5	18.9	13.3	...	.8	950
Chuck	18.9	73.0	1.1	19.1	6.2	...	.8	650
Cutlets (round)	3.4	70.7	1.3	19.7	7.3	...	.8	710
Flank	...	68.9	1.3	19.9	9.9	...	.8	825
Leg	14.2	70.0	1.3	19.6	8.6	...	.9	760
Loin	16.5	69.0	1.3	19.3	10.3	...	.8	830
Neck	31.5	72.6	1.1	19.7	6.6	...	.8	680
Rib	24.3	72.7	1.2	20.1	5.8	...	.8	650
Shank	62.7	74.5	1.0	20.1	4.4	...	.8	590
Fore quarter	24.5	71.7	1.2	19.4	7.6	...	.7	715
Hind quarter	20.7	70.9	1.2	20.1	7.9	...	.8	740
Side	22.6	71.3	1.2	19.6	7.7	...	.8	725
Liver	...	73.0	.9	9.7	5.0	...	1.0	410
Lamb (fresh)								
Breast or chuck	19.1	56.2	2.0	18.5	22.4	...	.8	1335
Leg	17.4	63.9	1.7	18.6	15.7	...	.8	1050
Loin	14.8	53.1	2.2	18.1	26.9	...	.8	1520
Neck	17.7	56.7	1.9	17.2	23.6	...	.8	1360
Shoulder	20.3	51.8	2.2	17.6	28.2	...	.8	1565
Fore quarter	18.8	55.1	2.0	17.8	24.5	...	.8	1410
Hind quarter	15.7	60.9	1.8	19.0	18.1	...	.8	1160
Side	19.3	58.2	2.0	17.1	21.9	...	.8	1285
Lamb (cooked)								
Chops, broiled	13.5	47.6	2.5	21.0	28.4	...	1.0	1640
Leg, roast	...	67.1	1.4	19.1	12.1	...	.6	905
Mutton (fresh)								
Chuck	21.3	50.9	2.4	14.6	31.9	...	.7	1665
Flank	9.9	46.2	2.6	14.7	36.4	...	.5	1860

Kind of Food Material	Inedible Refuse of Purchased Material	Edible Portion						
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Animal Foods								
Mutton (fresh)	%	%	%	%	%	%	%	Calories
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Loin	16.0	50.2	2.4	15.5	31.4	...	.6	1660
Neck	27.4	58.1	2.0	16.4	23.4	...	.7	1335
Shoulder	22.5	61.9	1.7	17.2	18.9	...	.7	1160
Fore quarter	21.2	52.9	2.2	15.1	29.4	...	.7	1570
Hind quarter	17.2	54.8	2.1	16.2	26.7	...	.6	1475
Side	18.1	54.2	2.1	15.8	27.5	...	.7	1500
Mutton (cooked and canned)								
Leg, roast	...	50.9	2.1	24.3	21.5	...	.9	1410
Corned, canned	...	45.8	3.0	27.9	21.7	...	3.2	1495
Tongue, canned	...	47.6	3.1	23.7	22.8	...	3.6	1045
Pork (fresh)								
Chuck, ribs and shoulder	18.1	51.1	2.3	16.8	29.5	...	.7	1605
Flank	18.0	59.0	1.9	17.9	21.1	...	.8	1265
Loin, chops	19.7	52.0	2.2	16.1	28.6	...	.8	1555
Ham	10.7	53.9	2.1	14.8	27.5	...	.6	1480
Shoulder	12.4	51.2	2.3	12.9	32.5	...	.6	1660
Side	11.5	34.4	3.2	8.8	52.5	...	.4	2440
Pork (pickled, salted and smoked)								
Bacon	7.7	18.8	4.8	9.6	64.0	...	3.3	2950
Ham	13.6	40.3	3.6	15.8	36.9	...	3.6	1905
Shoulder	18.2	45.0	3.8	15.4	30.9	...	5.0	1640
Salt, lean ends	11.2	19.9	5.1	8.1	63.7	...	4.3	2905
Salt, fat	...	7.9	5.4	1.8	81.9	...	2.9	3565
Pigs' feet, pickled	35.5	68.2	1.4	15.8	14.1	...	.7	920
Pork (cooked)								
Ribs, cooked	...	33.6	3.1	24.1	35.7	...	1.7	2020
Steak, cooked	...	33.2	3.3	19.3	43.1	...	1.1	2245
Sausage								
Bologna	3.3	60.0	2.4	18.1	16.7	0.3	2.8	1085
Frankfort	...	57.2	2.3	19.0	17.7	1.1	2.6	1160
Pork	...	39.8	3.1	12.6	42.0	1.1	1.7	2080

Kind of Food Material	Inedible Refuse of Purchased Material	Edible Portion						
				Available Nutrients				
		Water	Unavailable Nutrients	Protein	Fat	Carbohydrates	Ash	Fuel value per lb. =453.6 Grams
Poultry and game (fresh)								
Chicken, broilers	41.6	74.8	1.0	20.9	2.4	...	.8	520
Fowl	25.9	63.7	1.6	18.7	15.5	...	.8	1040
Goose	17.6	46.7	2.5	15.8	34.4	..,	.6	1800
Turkey	22.7	55.5	1.9	20.5	21.8	...	.8	853
Animal Foods								
Poultry and game (cooked and canned)	%	%	%	%	%	%	%	Calories
Capon	10.4	59.9	1.7	26.2	10.9	...	1.0	995
Turkey, roast	...	67.5	1.3	17.1	10.9	.8	2.4	855
Plover, roast, canned	...	57.7	1.7	21.7	9.7	1.6	7.6	985
Quail, canned	...	66.9	1.6	21.1	7.6	1.1	1.7	780
Fish (fresh)								
Bass, black, whole	54.8	76.7	1.0	20.0	1.6	...	.9	470
Bluefish	48.6	78.5	1.0	18.8	1.1	...	1.0	420
Codfish, dressed	29.9	58.5	.5	10.8	.2	...	.6	225
Cod steaks	9.2	79.7	.9	18.1	.5	...	.9	385
Flounder, whole	61.5	84.2	.7	13.8	.6	...	1.0	300
Haddock	51.0	81.7	.8	16.7	.3	...	.9	345
Halibut steak	17.7	75.4	1.1	18.0	4.9	...	.8	570
Lake trout	48.5	70.8	1.3	17.3	9.8	...	.9	765
Mackerel	44.7	73.4	1.3	18.1	6.7	...	.9	650
Weakfish	51.9	79.0	.9	17.3	2.3	...	.9	445
Whitefish, whole	53.5	69.8	1.4	22.2	6.2	...	1.2	710
Shell-fish (fresh)								
Long clams, in shell	41.9	85.8	1.0	8.3	.9	2.0	2.0	240
Round clams, in shell	67.5	86.2	.9	6.3	.4	4.2	2.0	215
Oysters, in shell	81.4	86.9	.8	6.0	1.1	3.7	1.5	235
Oysters, solids	...	88.3	.6	5.8	1.2	3.3	.8	225
Clams, round, solids	...	80.8	1.0	10.3	1.0	5.2	1.7	340
Crabs, hard shells	52.4	77.1	1.4	16.1	1.9	1.2	2.3	425
Lobster	61.7	79.2	1.1	15.9	1.7	.4	1.7	400
Fish (preserved and canned)								
Cod, salt	24.9	53.5	6.8	20.9	.3	...	18.5	430
Cod, salt, boneless	1.6	55.0	5.5	24.9	.3	...	14.3	510
Halibut, smoked	7.0	49.4	5.0	20.1	14.3	...	11.3	1015
Herring, smoked	44.4	34.6	5.2	35.8	15.0	...	9.9	1360
Mackerel, salt, dressed	19.7	43.4	5.0	16.8	25.1	...	9.7	1415
Salmon, canned	14.2	63.5	1.9	21.1	11.5	...	2.0	915

Kind of Food Material	Inedible Refuse of Purchased Material	Edible Portion						
				Available Nutrients				
		Water	Unavailable Nutrients	Protein	Fat	Carbohydrates	Ash	Fuel value per lb. = 453.6 Grams
Sardines, canned	5.0	52.3	3.1	22.3	18.7	...	4.2	1250
Lobster, canned	...	77.8	1.3	17.6	1.0	.4	1.9	400
Clams, canned	...	82.9	1.0	10.2	.8	3.0	2.1	290
Oysters, canned	...	83.4	.8	8.5	2.3	3.9	1.1	340
Animal Foods								Calories
Eggs	%	%	%	%	%	%	%	
Eggs, uncooked	11.2	73.7	1.1	13.0	10.0	...	.8	695
Eggs, boiled	11.2	73.2	1.2	12.8	11.4	...	.6	755
Dairy products, etc.								
Whole milk	...	87.0	.5	3.2	3.8	5.0	.5	310
Skimmed milk	...	90.5	.3	3.3	.3	5.1	.5	170
Condensed milk, sweetened	...	26.9	1.2	8.5	7.9	54.1	1.4	1460
Cream	...	74.0	1.1	2.4	17.6	4.5	.4	860
Cheese	...	34.2	3.4	25.1	32.0	2.4	2.9	1885
Butter	...	11.0	4.9	1.0	80.8	...	2.3	3410
Oleomargarine, etc.	...	9.5	5.7	1.2	78.9	...	4.7	3335
Lard, cottolene, etc.	...	...	5.0	...	95.0	...	...	3985
Animal Foods								
Miscellaneous								
Gelatin	...	13.6	3.2	88.7	.1	...	1.6	2125
Calf's-foot jelly	...	77.6	.3	4.2	...	17.4	.5	410
Vegetable Foods								
Cereals, etc.								
Barley, pearled	...	11.5	4.0	6.6	1.0	76.1	.8	1630
Buckwheat flour	...	13.6	3.5	5.2	1.1	75.9	.7	1600
Buckwheat, self-raising	...	11.6	4.9	6.7	1.1	71.5	4.2	1545
Corn (maize) flour	...	12.6	3.6	5.8	1.2	76.3	.5	1625
Corn (maize) meal	...	12.5	4.0	7.5	1.7	73.5	.8	1625
Corn (maize) preparations:								
Cerealine	...	10.3	4.2	7.8	1.0	76.3	.4	1655
Hominy	...	11.8	3.8	6.8	.5	76.9	.2	1625
Hominy, cooked	...	79.3	.9	1.8	.2	17.4	.4	375
Oatmeal and rolled oats	...	7.8	5.6	13.4	6.6	65.2	1.4	1795
Oatmeal, boiled	...	84.5	.9	2.3	.5	11.3	.5	285
Rice	...	12.3	3.7	6.5	.3	76.9	.3	1610
Rice, boiled	...	72.5	1.1	2.3	.1	23.8	.2	505
Rye flour	...	12.9	3.6	5.3	.8	76.9	.5	1610
Entire wheat flour	...	11.4	4.5	10.7	1.7	70.9	.8	1645
Gluten flour	...	12.0	4.6	11.0	1.6	70.1	.7	1630

Kind of Food Material	Inedible Refuse of Purchased Material	Edible Portion						
				Available Nutrients				
		Water	Unavailable Nutrients	Protein	Fat	Carbohydrates	Ash	Fuel value per lb. = 453.6 Grams
Graham flour	...	11.3	4.7	10.3	2.0	70.4	1.3	1640
Wheat flour, patent process:								
Low grade	...	12.0	4.5	10.9	1.7	70.2	.7	1635
Bakers' grade	...	11.9	4.2	10.3	1.4	7.7	.5	1640
Vegetable Foods *Cereals, etc.*	%	%	%	%	%	%	%	Calories
Wheat flour:								
Family and straight grade	...	12.8	4.0	8.3	1.0	73.5	.4	1615
High grade	...	12.4	4.0	8.7	.9	73.6	.4	1620
Wheat preparations:								
Breakfast foods	...	9.6	4.5	9.3	1.6	74.0	1.0	1670
Macaroni	...	10.3	4.5	10.4	.8	73.0	1.0	1640
Macaroni, cooked	...	78.4	1.3	2.3	1.4	15.6	1.0	405
Spaghetti	...	10.6	4.0	9.4	.4	75.1	.5	1640
Noodles	...	10.7	4.2	9.1	.9	74.3	.8	1640
Bread:								
Brown	...	43.6	2.8	4.2	1.6	46.2	1.6	1035
Corn (johnnycake)	...	38.9	3.5	6.5	4.2	45.2	1.7	1170
Rye	...	35.7	3.4	7.3	.5	52.0	1.1	1160
Graham	...	35.7	3.4	6.9	1.6	51.3	1.1	1185
Whole wheat	...	38.4	3.2	7.5	.8	49.1	1.0	1125
White wheat	...	35.3	3.3	7.1	1.2	52.3	.8	1195
Biscuit, soda*	...	22.9	4.7	7.2	12.3	51.8	1.1	1655
Rolls	...	29.2	3.6	6.9	3.7	55.8	.8	1360
Toasted bread	...	24.0	4.1	8.9	1.4	60.3	1.3	1390
Crackers:								
Boston (split)	...	7.5	5.0	8.5	7.7	69.9	1.4	1830
Milk, cream	...	6.8	5.0	7.5	10.9	68.5	1.3	1920
Graham	...	5.4	4.8	7.7	8.5	72.5	1.1	1900
Oyster	...	4.8	5.4	8.8	9.5	69.3	2.2	1905
Soda	...	5.9	4.9	7.6	8.2	71.8	1.6	1870
Water	...	6.8	5.0	8.3	7.9	70.6	1.4	1850
Cakes, cookies, etc.:								
Bakers' cake	...	31.4	3.3	4.8	4.1	55.8	.6	1335
Coffee cake	...	21.3	3.8	5.5	6.8	61.9	.7	1580
Gingerbread	...	18.8	4.3	4.5	8.1	62.1	2.2	1620
Sponge cake	...	15.3	4.4	4.8	9.6	64.5	1.4	1735
Drop cake	...	16.6	4.5	5.9	13.2	59.2	.6	1805
Molasses cookies	...	6.2	4.7	5.6	7.8	74.0	1.7	1855
Sugar cookies	...	8.3	4.5	5.4	9.2	71.6	1.0	1865
Ginger snaps	...	6.3	4.7	5.0	7.7	74.3	2.0	1845

* Made from wheat flour, raised with baking powder.

Kind of Food Material	Inedible Refuse of Purchased Material	Edible Portion						
				Available Nutrients				
		Water	Unavailable Nutrients	Protein	Fat	Carbohydrates	Ash	Fuel value per lb. = 453.6 Grams
Wafers	...	6.6	4.8	6.7	7.7	73.0	1.2	1855
Doughnuts	...	18.3	4.8	5.2	18.9	52.1	.7	1895
Pie, pudding, etc.:								
Pie, apple	...	42.5	3.1	2.4	8.8	41.8	1.4	1215
Pie, custard	...	62.4	2.2	3.2	5.7	25.7	.8	795
Pie, squash	...	64.2	2.4	3.4	7.6	21.4	1.0	800
Vegetable Foods								
Cereals, etc.	%	%	%	%	%	%	%	Calories
Pie, pudding, etc.:								
Pudding, Indian meal	...	60.7	2.5	4.5	4.3	26.9	1.1	785
Pudding rice custard.	...	59.4	2.1	3.2	4.1	30.7	.5	825
Pudding, tapioca	...	64.5	1.0	2.8	2.9	28.2	.6	715
Sugars, starches, etc.								
Sugar, granulated	...	...	...	...	...	100.0	...	1790
Sugar, pulverized	...	...	...	...	...	100.0	...	1790
Sugar, brown	...	...	...	...	...	95.0	...	1700
Sugar, maple	...	...	...	...	...	82.8	...	1485
Molasses	...	...	...	...	...	70.0	...	1255
Maple syrup	...	...	...	...	...	71.0	...	1270
Cornstarch	...	...	...	...	...	90.0	...	1715
Tapioca	...	11.4	.1	.3	.1	88.0	.1	1685
Sago	...	12.2	1.4	7.7	.4	78.1	.2	1665
Vegetables								
Asparagus, fresh	...	94.0	.7	1.8	.2	3.3	.5	95
Asparagus, cooked	...	91.6	1.0	1.7	3.0	2.1	.6	195
Beans, Lima, green	55.0	68.5	2.7	5.3	.6	21.6	1.3	525
Beans, Lima, dried	...	10.4	6.7	12.8	1.4	65.6	3.1	1565
Beans, string, fresh	7.0	89.2	1.0	1.7	.3	7.2	.6	180
Beans, string, cooked*	...	95.3	.5	.6	1.0	1.9	.7	90
Beans, white, dried	...	12.6	7.5	15.8	1.6	59.9	2.6	1530
Beans, baked	...	68.9	2.8	4.8	2.3	19.6	1.6	565
Beets, fresh	20.0	87.5	1.0	1.2	.1	9.4	.8	205
Beets, cooked*	...	88.6	1.2	1.7	.1	7.2	1.2	170
Beet "greens," cooked*	...	89.5	1.2	1.7	3.1	3.2	1.3	220
Cabbage	15.0	91.5	.7	1.2	.3	5.5	.8	140
Carrots, fresh	20.0	88.2	1.0	.7	.4	8.9	.8	200
Carrots, evaporated	...	3.5	6.9	5.8	3.2	76.9	3.7	1700
Cauliflower	...	92.3	.7	1.3	.5	4.7	.5	135
Celery	20.0	94.5	.6	.8	.1	3.2	.8	80
Sweet corn, green	61.0	75.4	1.8	2.3	1.0	19.0	.5	445
Cucumbers	15.0	95.4	.4	.6	.2	3.0	.4	75

* With butter, etc., added.

Kind of Food Material	Inedible Refuse of Purchased Material	Edible Portion						
				Available Nutrients				
		Water	Unavailable Nutrients	Protein	Fat	Carbohydrates	Ash	Fuel value per lb. =453.6 Grams
Eggplant	...	92.9	.6	.9	.3	4.9	.4	120
Lettuce	15.0	94.7	.5	.9	.3	2.9	.7	85
Onions, fresh	10.0	87.6	.8	1.2	.3	9.6	.5	215
Onions, cooked*	...	91.2	.8	.9	1.6	4.8	.7	175
Parsnips	20.0	83.0	1.2	1.2	.5	13.0	1.1	290
Peas, dried	...	9.5	7.6	17.3	.9	62.5	2.2	1508
Peas, green	45.0	74.6	2.2	5.2	.5	16.7	.8	430
Vegetable Foods								Calories
Vegetables	%	%	%	%	%	%	%	
Peas, green, cooked*	...	73.8	2.5	5.1	3.1	14.4	1.1	490
Potatoes	20.0	78.3	1.4	1.7	.1	17.7	.8	370
Potatoes, cooked, boiled	...	75.5	1.7	1.9	.1	20.0	.8	415
Potatoes, mashed and creamed	...	75.1	2.0	2.0	2.7	17.1	1.1	475
Pumpkins	50.0	93.1	.6	.7	.1	5.0	.5	110
Radishes	30.0	91.8	.7	1.0	.1	5.6	.8	130
Rhubarb	40.0	94.4	.6	.4	.6	3.5	.5	100
Squash	50.0	88.3	.9	1.1	.5	8.6	.6	205
Spinach, fresh	...	92.3	1.0	1.6	.3	3.2	1.6	100
Spinach, cooked*	...	89.8	1.1	1.6	3.7	2.7	1.1	235
Sweet potatoes, fresh	20.0	69.0	2.1	1.3	.6	26.2	.8	545
Sweet potatoes, cooked*	...	51.9	3.0	2.2	1.9	40.3	.7	885
Tomatoes	...	94.3	.4	.7	.4	3.8	.4	100
Turnips	30.0	89.6	.8	1.0	.2	7.8	.6	175
Vegetables (canned)								
Asparagus	...	94.4	.6	1.2	.1	2.8	.9	80
Beans, baked	...	68.9	2.7	4.8	2.3	19.7	1.6	555
Beans, string	...	93.7	.7	.8	.1	3.7	1.0	90
Beans, lima	...	79.5	1.7	3.0	.3	14.3	1.2	335
Sweet corn	...	76.1	1.7	2.1	1.1	18.3	.7	430
Peas, green	...	85.3	1.4	2.7	.2	9.6	.8	235
Succotash	...	75.9	1.8	2.7	.9	18.0	.7	425
Tomatoes	...	94.0	.5	.9	.2	3.9	.5	100
Fruits, etc. (fresh)								
Apples	25.0	84.6	1.6	.3	.5	12.8	.2	260
Apricots	6.0	85.0	1.5	.9	...	12.2	.4	240
Bananas	35.0	75.3	2.7	1.0	.5	19.9	.6	400
Blackberries	...	86.3	1.5	1.0	.9	9.9	.4	235
Cherries	5.0	80.9	2.0	.8	.7	15.1	.5	320
Cranberries	...	88.9	1.2	.3	.5	8.9	.2	190
Currants	...	85.0	1.7	1.2	...	11.6	.5	230

* With butter, etc., added.

Kind of Food Material	Inedible Refuse of Purchased Material	Edible Portion						
				Available Nutrients				
		Water	Unavailable Nutrients	Protein	Fat	Carbohydrates	Ash	Fuel value per lb. =453.6 Grams
Figs	...	79.1	2.2	1.2	...	17.0	.5	330
Grapes	25.0	77.4	2.4	1.1	1.4	17.3	.4	390
Huckleberries	...	81.9	2.0	.5	.5	14.9	.2	300
Lemons	30.0	89.3	1.2	.8	.6	7.7	.4	180
Muskmelons	50.0	89.5	1.1	.5	...	8.4	.5	160
Oranges	27.0	86.9	1.4	.6	.2	10.5	.4	210
Pears	10.0	84.4	1.7	.5	.4	12.7	.3	255
Plums	5.0	78.4	2.2	.8	...	18.2	.4	345
Vegetable Foods								Calories
Fruits, etc. (fresh)	%	%	%	%	%	%	%	
Prunes	6.0	79.6	2.1	.7	...	17.1	.5	325
Raspberries, black	...	84.1	1.7	1.4	.9	11.4	.5	270
Strawberries	5.0	90.4	1.0	.8	.5	6.8	.5	160
Watermelons	60.0	92.4	.9	.3	.2	6.0	.2	125
Fruits, etc. (dried)								
Apples	...	28.1	7.5	1.3	2.0	59.6	1.5	1190
Apricots	...	29.4	7.7	3.7	.9	56.5	1.8	1130
Citron	...	19.0	8.3	.4	1.3	70.3	.7	1340
Currants	...	17.2	8.6	1.9	1.5	67.0	3.8	1315
Dates	10.0	15.4	8.8	1.6	2.5	70.7	1.0	1415
Figs	...	18.8	8.7	3.4	.3	67.0	1.8	1290
Raisins	10.0	14.6	9.1	2.0	3.0	68.7	2.6	1410
Prunes	15.0	22.3	8.3	1.6	...	66.1	1.7	1230
Fruits, etc. (canned)								
Apricots	...	81.4	1.9	.7	...	15.7	.3	295
Blackberries	...	40.0	6.1	.6	1.9	50.9	.5	1015
Blueberries	...	85.6	1.6	.5	.5	11.5	.3	240
Cherries	...	77.2	2.3	.9	.1	19.1	.4	365
Crab apples	...	42.4	5.7	.3	2.2	49.0	.4	985
Peaches	...	88.1	1.3	.5	.1	9.8	.2	190
Pears	...	81.1	1.9	.3	.3	16.2	.2	310
Strawberries (stewed)	...	74.8	2.6	.5	...	21.7	.4	400
Nuts								
Almonds	45.0	4.8	10.9	17.8	49.4	15.6	1.5	2685.
Butternuts	86.0	4.4	11.4	23.7	55.1	3.2	2.2	2805
Chestnuts (fresh)	16.0	45.0	5.9	5.3	4.9	37.9	1.0	990
Cocoanuts	49.0	14.1	9.2	4.8	45.5	25.1	1.3	2460
Filberts	52.0	3.7	10.7	13.3	58.8	11.7	1.8	2930
Hickory nuts	62.0	3.7	10.6	13.1	60.7	10.3	1.6	2980
Peanuts	25.0	9.2	10.7	21.9	34.7	22.0	1.5	2255

CHEMICAL AND MINERAL FOOD REQUIREMENTS

By CARL EASTON WILLIAMS

ONE does not need to have any extensive knowledge of chemistry to realize the fact that the processes of life in the human body have a chemical basis. It is true that the body chemistry is not like that of the apothecary shop, inasmuch as living tissues are concerned, but even organic life is based upon certain chemical processes. That is why it is not sufficient to have merely enough muscle-building food and enough fuel food. The chemistry of the body, which is delicately adjusted and finely balanced, must be provided for. If the foods eaten do not supply the elements necessary for the normal chemical adjustments the health must necessarily suffer, and if the deficiencies in diet are too great even life itself is terminated.

As an actual fact, even from the standpoint of building material one requires a certain amount of organic mineral matter. The blood, for instance, contains a considerable proportion of organic iron and if the food does not supply this the blood becomes impoverished. In the same way the blood and other tissues of the body require, even though sometimes in minute quantities, the organic salts of calcium, magnesium, sodium, potassium, phosphorous, clorine, iodine, silicon, flourine and other minerals. The following is a table of foods, showing the contents of the more important of these salts.

(This table was prepared by Graham Lusk from data presented by Sherman and Gettler.)

ASH CONTENT OF THE EDIBLE PORTION OF SOME COMMON FOODS

	Iron	In 100 Grams Fresh Substance					
		Calcium	Magnesium	Sodium	Potassium	Phosphorus	Chlorin
Beefsteak, lean	3.8	8	24	67	35	22	50
Eggs	3.0	67	9	15	14	16	100
Milk, whole	0.2	120	11	51	142	94	120
Cornmeal	1.1	...	...	...	...	...	...
Oatmeal	3.7	93	127	81	380	380	35
Rice, polished	0.7	8	27	21	68	89	50
Wheat flour	1.5	26	30	69	146	86	76
Wheat, entire grain	5.2	44	170	106	515	469	88
Beans, lima, dried	7.2	71	187	245	1743	336	25
Beans, string, fresh	1.6	...	...	...	...	...	...
Cabbage	0.9	49	14	20	243	27	13
Corn, sweet	0.8	...	...	...	...	...	...
Peas, dried	5.6	100	145	118	880	397	40
Potatoes	1.2	11	22	19	440	61	30
Spinach	3.8	...	...	...	...	...	...
Turnips	0.6	64	169	59	332	51	40
Apples	0.3	10	8	15	125	13	4
Raisins	3.6	57	9	141	830	126	70

You may notice, for one thing, the difference between the ash content of wheat (white) flour and the entire wheat grain. But beyond the need of these organic minerals from the standpoint of building material, it is also necessary to preserve the chemical balance of the body through the consumption of foods that will maintain the alkalinity of the blood and various glandular secretions, even while permitting the production of acid digestive juices.

Normal and healthy blood is alkaline in nature. A state of constitutional acidity is absolutely incompatible with health. For this reason the diet should contain a

sufficiency of what are known as "base-forming foods" to offset those foods which have an acid-forming tendency, and also to counteract the various acids formed by the chemical processes involved in metabolism or the cell activity incident to life.

The body may be compared to a laboratory, so to speak. Sulphuric acid, phosphoric acid, uric acid, carbonic acid, lactic acid and other acids are constantly being formed in the body, but under conditions of health they are immediately neutralized by the alkalis or so-called bases provided by nature. If the diet is deficient in these base-forming elements these acids have the effect of oxidizing and destroying the tissues, a process which, if continued, will utterly break down the health and end in disaster.

It may seem a curious thing to say that among the base-forming foods are many acid fruits. This is true because the food acids found in fruit are very different from the acids produced by chemical action in the system. Moreover, the mild food acids in fruit are largely neutralized by the saliva, which is alkaline, and in the end they help to establish the alkalinity in the blood because of the invaluable contribution of the base-forming elements.

Perhaps it is not necessary to explain how acids and alkalines neutralize each other. It is a matter of elementary chemistry. A common example is the combination of baking soda and sour milk, or the mixing of cream of tartar and baking soda in baking powder. These familiar combinations are used in every kitchen for the raising of the batter or dough in the making of biscuits, muffins and other products of the kitchen.

If you burned your hand with a powerful acid, the best treatment would be an immediate application of an alkali, for instance diluted ammonia. This will neutralize the acid. Or if, by mistake, in taking a drink in the dark you were to take several swallows of ammonia before you knew what you were doing, the best possible thing would be to immediately drink diluted vinegar, lemonade or some other mild food acid to form a combination with the ammonia that would render it harmless. The combination of an acid with an alkali forms a neutral salt.

For instance in your biscuit you do not taste the sour milk or the cream of tartar. The acid has been neutralized by the alkali. The term "base" has been applied to alkalis probably because they form a base or ground work for the operation of the acids.

If the diet presents a properly balanced supply of natural foods there will always be a sufficiency of these bases or alkalis to maintain the alkalinity of the blood, saliva and various secretions and fluids. But if the diet is deficient in these elements there results a condition in which the tissues of the body are saturated with irritating acid fluids and secretions. This condition has been called "acidosis." It is held that acidosis is the basis of many diseases which of late have even been called "deficiency diseases"—due to food deficiencies.

Practically all of the refined foods are to be listed among those of acid-forming tendencies. In the milling of wheat, the germ and the outer covering are so thoroughly removed that practically little is left other than the pure starch. The minerals and the vitamines are extracted and a diet of this starchy material, as in the

use of white bread, cakes, pastries and the like, will produce acidosis, followed by scurvy, rickets and nervous disorders. It is held that neuritis, beri-beri, pellagra, pernicious anemia, neurasthenia and probably rheumatism and many other disorders are the result of acidosis and general food deficiency. In other words, in many forms of illness the right kind of food will serve as the very best kind of medicine and perhaps that explains why the sick person so often desires and relishes fresh fruit. The most valuable foods, from this standpoint, are the base-yielding foods such as milk, buttermilk, fruits, green salads, vegetables and the yolk of eggs. Among these, oranges, apples, raisins and potatoes may be especially mentioned.

Meat, fish and pure proteins are acid-forming in their tendency and therefore in the diet necessarily need to be balanced by a plentiful supply of vegetables or fruit. Canned vegetables will not answer the purpose.

The chief acid-forming foods are refined starches, refined sugars, meat, fish, white of eggs and cheese.

Whole-wheat bread contains in the germ and bran the necessary base-forming elements which counteract the acid-forming tendencies of the starchy parts. For which reason one could live fairly well and sustain health on an unmixed diet of whole wheat.

Mention of the acid-forming tendency of lean meat may give rise to the question as to the health of the carnivorous animals maintained on a flesh diet. The explanation is that wild animals of the carnivorous variety do not merely content themselves with devouring the muscular tissues, but consume the blood, bones and all of the organs and tissues of their prey, even includ-

ing the skin and hair. Even the domestic cat will devour a mouse without leaving a grease spot on the kitchen floor. In this way the bone-forming material and other elements are secured from the bones, organs and other tissues of the prey. In this way also the bases are secured to neutralize the acids. This explains why the dog that is fed merely lean meat from the table goes foraging in the garbage pails and elsewhere in search of the missing food elements. This also explains the love of the domesticated dog for a bone.

However, men and women do not eat the entire animal, but merely the muscular and fatty tissues, pretty well drained of blood. The bases are lacking and consequently a heavy meat diet has an acid-forming tendency in addition to the dangers incident to excessive protein. It is usually the heavy meat eater, who is often a "high liver" generally, that suffers from gout, rheumatism or kidney disease.

There is, accordingly, a scientific reason for the practical combination of potatoes with meat. The potatoes, if used in sufficient quantities, will supply the bases. As a matter of fact, there was a time when for centuries scurvy was a widespread ailment throughout all Europe. The introduction of the potato as a popular and universally used food brought about the practical elimination of this disease. Most people regard the potato as a starchy food, which, in the main, is quite correct. But it cannot be compared to white bread or polished rice, because of its supply of base-forming elements. In time of potato scarcity it is customary to substitute rice, spaghetti or "noodles" to balance the serving of meat at dinner. But the results are not the same, except

when "natural," unpolished rice is used. Noodles or polished rice may be a "starch" substitute for potatoes, but not a chemical or "mineral" substitute.

Much light is thrown upon the subject of scurvy by the experiences of Arctic explorers. In the past most expeditions into the Far North have suffered seriously from this disorder, and it was long supposed that it was due to the lack of fresh meat, or possibly to the climatic conditions. We now know, however, that the sufferings experienced were purely the result of food deficiency, in a qualitative and not a quantitative sense. Whole expeditions have collapsed because the life had been taken out of the food supply.

Contrasted with this, was the experience of Donald B. McMillan who returned in 1917 from a four years sojourn in the Arctic, during a part of which time he had been given up for lost. But thanks to his wisdom in the selection of foods, McMillan and his party suffered no inconveniences whatever.

"Four years of eating whole wheat biscuits, whole wheat bread, chocolate, dehydrated fruits and vegetables," he said, "surely ought to constitute a very thorough test of the nutritive value of these foods. Just such a prolonged test has convinced me that I could live indefinitely even in the Arctic upon such foods.

"When I was with Peary on his trip to the North Pole in 1909 it was the common experience of all of us to suffer from bleeding intestines.

"Peary believed in beef, suet and raisins, tea, ships biscuits, (white flour) and condensed milk. He took with him 10,000 pounds of white flour, 1,000 pounds of coffee, 800 pounds tea, 10,000 pounds sugar, 7,000

pounds bacon, 10,000 pounds white biscuit, 100 cases condensed milk, 30,000 pounds pemmican, 3,000 pounds dried fish. (Pemmican is a concentrated dried food compound, first used by North American Indians, now usually composed of dried, pulverized beef, fat and raisins or sugar and other dried fruits.)

"I took with me 5,000 pounds whole wheat biscuits, 2,000 pounds whole wheat flour, 1,080 pounds dehydrated vegetables, equivalent to 10,000 pounds fresh vegetables, including potatoes, rhubarb, turnips, spinach and onions; 12 cases assorted dehydrated soup, 19 crates yellow-eyed beans, 12 crates pea beans, 150 pounds Scotch green peas, 200 pounds yellow split peas, 1,000 pounds dried apples and apricots, 608 pounds prunes, 300 pounds raisins, 900 pounds chocolate, bitter and sweet, 1,000 pounds brown sugar, 42 cases baked beans, and assortment of nuts, dates, figs, lime juice and grape juice, and a small assortment of canned peaches, pears, cranberries, apples, cherries, plums, corn, peas, tomatoes and squash."

The reason why those living at home on conventional foods do not experience scurvy and other deficiency diseases to the extent that explorers used to is because at least a certain amount of fruit, fresh milk and eggs commonly enters into their diet. Even at that there is usually a considerable deficiency in this regard because of the extensive use of white bread. Undoubtedly, large numbers of people are on the very borderline of scurvy or of some breakdown in health. One should endeavor not merely to keep inside of this borderline, but as far away from it as possible. A diet of natural foods will enable one to do this.

VITAMINES—THE LIFE-GIVING QUALITIES IN FOOD

By CARL EASTON WILLIAMS

YOU may not find the word "vitamine" in your dictionary. But although the word is new, the vitamine itself is as old as plant or animal life. The term is new because scientists only recently discovered the illusive but important substance to which has been given this name. The fact is that scientists have not yet discovered vitamines in the sense of seeing or actually finding them. We know of them not by seeing them, but because of what they do when present and fail to do when absent. In other words, we are acquainted with them only through the process of deduction and for lack of a better or more explicit name we call them vitamines.

Vitamines are sometimes spoken of as "accessory substances" and sometimes as "accessory food factors." The latter expression is preferable because we do not even know that vitamines are substances in the ordinary sense. Vitamines may simply be certain qualities, properties or powers resident in organic substances. We know that they can be destroyed, sometimes by drying and sometimes especially by heat. Without a doubt, the cooking of food and other forms of preparation do much to remove its life-giving value through the destruction of the vitamines. Apparently, however, some vitamines are not especially affected by heat.

The credit for the discovery of vitamines rests largely

with Dr. Casimir Funk, a Russian-American chemist of New York City. After repeated experiments and tests he succeeded in demonstrating the presence of these food factors that are beyond the power of the chemist to find.

Formerly chemists have analyzed our foods and found certain elements, but now it is shown that there are other factors present in foods which the chemist could not find, and that without a supply of these factors, whatever they are, food will not sustain life.

So far there have been classified two distinct types of vitamines. One type has been designated fat soluble A, apparently soluble in fats, particularly in butter fat or cream. The other has been termed water soluble B, and is found in both the plant and the animal world, for instance, in the whey of milk. Milk has long been known as a perfect food, and among the reasons for this is the fact that it contains both forms of vitamines. The water soluble B is also contained in eggs, meats, fruits, vegetables and greens.

These vitamines have sometimes been classified as "antineuritic" or "antiberi-beri," the lack of which is conducive to nervous disorders or paralysis of the nervous functions, and on the other hand, the "antiscorbutic" vitamines, deficiency of which occasion scurvy.

The fat soluble A is especially concerned in the promotion of growth and recovery from wounds. It is because of this vitamine in the fat of milk, and of course in cream or in butter, that milk is an absolutely indispensable part of the food of children. This is the explanation why children who are denied at least a certain amount of milk do not grow, but are inclined to rickets and scurvy. Butter will supply the deficiency

but butter substitutes will not. The question of the diet of children will be taken up in another place.

The study of the peculiar Japanese disease known as beri-beri was in part responsible for the discovery of vitamines. Beri-beri is a disease of the nerves, seemingly a form of nerve starvation conducive to paralysis of the functions of the nerves. It was found that epidemics of beri-beri coincided closely with an attempt to live largely on polished rice. Polished rice is ordinary rice with the outer coat removed through a polishing process, making the rice whiter and smoother. Polished rice is the rice universally used in the United States because it is more pleasing to the eye, whereas natural rice has a rough and light-brown appearance. In the process of polishing away or removing this natural coat, or what one may call the "bran" of the rice, certain of the food elements are, of course, taken with it, leaving the inner kernel of practically pure starch. The attempt to live exclusively on polished rice, therefore, means a deficiency of important food elements and will invariably produce disease of the nervous system and other derangements. You could produce this disease in your own body in a few weeks by living exclusively, either on polished rice or white bread, or on both. The disease can be produced in animals by the same method, and it was in part by the study of the effects of polished rice on pigeons that much was learned.

A very extensive epidemic of beri-beri in the year 1910 was quickly checked by the substitution of natural rice for the polished rice. Subsequent tests produced the same results. Pigeons fed on polished rice developed a form of paralysis called polyneuritis, which is similar

to beri-beri. The nerve tissues are undermined in such a way that the birds lose control of their muscles. They cannot fly. Other derangements of the body are in evidence. But the change to a diet of natural rice, or even more quickly the feeding of a liquid solution of the polishings or bran of the rice, will restore the pigeons to health, sometimes in a few hours.

Apparently, the coat of the rice contains the anti-neuritic vitamines, or water soluble B, which will effectually cure nervous diseases of this type. Dr. Funk obtained from rice polishings a crystalline product which when given even in small quantities was found to cure polyneuritis in birds, or beri-beri in human beings. Some authorities are now of the opinion that beri-beri is identical with some of the food deficiency diseases common in the United States, the nature of which is not always recognized, perhaps because the symptoms are less pronounced. If there is only partial starvation so far as the vitamines are concerned, one may perhaps experience neurasthenia and other nervous disorders without the complete paralysis which goes with beri-beri. Such cases, however, may not be far from polyneuritis or beri-beri.

Scurvy is another disease which at one time was exceedingly common. It is now quite generally known that orange juice is an ideal preventive of scurvy in babies. That is why orange juice is recommended as a part of the diet of babies fed on pasteurized milk. If the baby is fed on healthy breast milk or clean, fresh, raw cow's milk, however modified, scurvy and rickets are unknown. The boiling of milk is destructive of the vitamines and even the amount of heat required in pas-

teurization is apparently destructive of the antiscorbutic vitamine. Hence the fresh, clean, raw cow's milk is best, if the mother cannot nurse her baby, and in the cities certified raw milk is recommended. Pasteurized milk, however, must be supplemented by orange juice with more or less complete satisfaction in most cases.

Scurvy is a disease at one time widely prevalent throughout Europe, though, in later periods, known chiefly among seafaring men who on long cruises ate much salt meat and other preserved food, but little or no fresh food. The Arctic explorers in recent times have suffered much from scurvy, but it has been known that potatoes, fruits and greens will cure the malady almost miraculously. In fact, lemon juice, any fresh vegetable, or fresh milk or eggs will bring almost immediate recovery. The same is true of pellagra, according to the best medical and scientific findings of late years.

The antineuritic vitamines, or water soluble B are present in greater concentration in some foods than in others, being found in milk, eggs, fresh meat, vegetables, fruits and natural grains. But because bread is such an important part of the food of the world, it is of special importance to consider that the greatest food value of wheat is lost in the removal of the bran or outer coating. One may use white bread and survive because of the use of vegetables and many other foods in the diet, which supply that which is lacking in the white flour. But among many of the poorer classes, bread represents almost the entire supply of food, and in that case serious starvation and especially nervous complaints must necessarily follow if white bread is

used, whereas whole wheat bread will sustain life perfectly. Where children are concerned, whole wheat bread provides an almost ideal diet, especially with the addition of butter or whole milk.

Bearing upon this point we may quote from a bulletin of the United States Public Health Service (Reprint No. 471 from the Public Health Reports) entitled "The Dietary Deficiency of Cereal Foods with Reference to Their Content in 'Anti-Neuritic Vitamine.'" A copy of this report with more details may be secured by writing to The U. S. Public Health Service, Washington, D. C.

"Holst (1907), in experimental studies relating to ship beri-beri and scurvy, carried out a few experiments on pigeons with rye and wheat bread, baked with yeast or baking powder. The pigeons on wheat bread developed symptoms and nerve degeneration characteristic of polyneuritis. The addition of yeast to the wheat flour seemed to delay the onset of the symptoms, but did not prevent a gradual loss of body weight (30 per cent). The pigeons fed on rye bread or whole wheat bread, however, lived for four months without showing any abnormalities. Holst does not mention the kind of wheat flour used in his experiments beyond stating that it was 'the flour ordinarily used by Norwegian sailors in tropical waters.'

"Simpson and Edie (1911) describe a few additional experiments on the feeding of 'whole wheat' bread and 'white' bread to pigeons. On the 'whole wheat' bread the birds continued active and well, and two pigeons paired and successfully hatched the two eggs. The pigeons fed 'white' bread died after an average of 29

days with an average loss of weight of 26 per cent. Typical paralytic symptoms were observed in these animals and marked degenerative changes were found in their peripheral nerves. Several of these birds were treated when extremely weak with either yeast or beans. Great improvement in the condition of the birds followed this treatment.

"The reports of Little (1912 and 1914) concerning his five years' experience with epidemics of beri-beri in Newfoundland are very important, as they show that in this locality beri-beri was due to a diet limited to 'white' bread made from highly milled flour, molasses, a small quantity of fish, and tea. This author furthermore presents evidence to the effect that the substitution of 'whole wheat' bread for the 'white' bread was followed by a disappearance of the disease, in spite of the fact that the other dietary and hygienic conditions were apparently left unchanged.

"At Little's suggestion, Ohler (1914) carried out a number of experiments with chickens, in order to furnish experimental proof for the contention that a more or less exclusive diet of 'white' bread was the chief cause of the occurrence of beri-beri in Newfoundland. Fourteen chickens fed on 'white' bread, made from 'highly milled' flour with or without the addition of yeast, died within 28 to 40 days. Before death the birds exhibited symptoms of polyneuritis, and histological examination of the peripheral nerves revealed considerable degeneration. Five fowls fed on 'whole wheat' bread and two on whole wheat lived in perfect health for 75 days, when the experiment was discontinued.

"Similar experiments were carried out by Wellmann

and Bass (1913) and by Voegtlin, Sullivan, and Myers (1916)."

The value of the growth-producing vitamines, known as fat soluble A, was ascertained largely by a series of studies in which the rate of growth was taken as the basis of determining the sufficiency or insufficiency of a given diet. Experiments were conducted first with young rats, and then with other animals. Milk fat, whether taken in whole milk or in the form of cream or butter, was found to be the ideal food for the supply of these particular vitamines. In the case of children it is found that at least three cups of milk a day are required, particularly during the first five or ten years of life.

Various experiments have shown that foods rich in phosphorus are also richly supplied with vitamines, and yet it is demonstrated that it is not the phophorus, but the vitamines that are important, though the phosphorus has its purpose also. In the case of butter, for instance, the pure butter fat is separated from the other constituents—water, protein and salts—by centrifugalizing warm butter. This pure butter oil is practically free from phosphorus, but gives results just as satisfactory as those derived from the use of pure butter, proving that the vitamines are somehow identified with the butter fat. Egg yolk fat, codliver oil and kidney fat also supply these growth-promoting vitamines, whereas olive oil, cold-pressed almond oil, lard and certain other fats do not contain them. Oleomargarines therefore cannot wholly take the place of dairy butter, though they do supply heat and energy, being mere "fuel" foods. "Storage" meat fats are not satisfactory in this respect.

Now the practical part of all this lies in the possibility of selecting foods that will supply the vitamines in plentiful quantities. If certain foods do not contain them, the meal should be supplemented by other foods which do supply them. Canned vegetables are of limited value. The fresh vegetables are worth infinitely more in dollars and cents because of their actual food value in this respect. Dehydrated foods are to be recommended, therefore, as far more valuable than canned goods. Fresh fruits, greens and salads, soft boiled eggs, raw milk, whole grain breads or cereals, meat broths, slightly broiled meats and fish roe are especially valuable in this way.

The foods deficient in this respect are sterilized or preserved milk, white of egg, "highly milled" or refined grains such as white flour, polished rice and bread raised with soda, soupmeat and preserved meats.

Perhaps the most important conclusion to be reached after the study of the question of vitamines, just as after the study of every other phase of diet, is that fresh foods, as prepared by nature and consumed in as nearly as possible their natural condition, will best serve one's requirements in building health and strength. One may for a time continue to live without much ill effect even on an unsatisfactory diet, for the reason that the body naturally stores up vitamines against the time of need, but the supply will not last indefinitely if the diet is unsatisfactory, and disease must result. And if one should become ill, a knowledge of the vitamine-containing foods will provide one with a remedy far more effective than drugs, the latter in most cases not being effective at all.

As we said in the beginning, it is not definitely known whether vitamines are substances or merely properties, whether they are foods or whether they constitute some form of influence that will enable the body in some mysterious manner to make use of foods. There is even a possibility that what is meant by the term "vitamines" is simply the quality of life in natural, fresh food. Manifestly, this life is largely destroyed by heat in cooking, and sometimes by chemical action. One is apparently safe, however, if a considerable part of his diet is made up of natural, uncooked foods, in a palatable and available form.

QUANTITATIVE FOOD REQUIREMENTS

By CARL EASTON WILLIAMS

THERE is no doubt that if one could consnme just exactly the amount of food required by the body from day to day, this adjustment of the diet would not only affect the question of food economy very vitally, but would also simplify the problem of maintaining health. Some people probably eat too little under the abnormal conditions of civilized life. And certainly it is true that others eat too much, perhaps also because of the stimulating influences of civilized life and the artifices of food preparation and presentation. Obviously, one cannot maintain his best condition of health on too little food. Likewise, an excess of it is a burden to the digestive system and to the vital economy of the body in general.

The question of how much food one needs is determined in part by the weight of the individual and by the occupation or activity in which he is engaged. A farm hand necessarily requires more food than the operator of a typewriting machine. A piano mover will use up more energy than a bookkeeper. He should be able to eat twice as much. Apart from the fact that the appetite in a normal state of health should naturally be the best guide as to the amount of food needed, there has always been a large amount of interest among students of diet in ascertaining more accurately the amount of food necessary per day per man.

As a unit of measure, food scientists have devised

a system of computation based upon a unit of energy known as the "calorie." A calorie may be expressed in terms of either heat or energy, for one may be transmitted into the other, heat being, in fact, a form of energy. A calorie, in short, represents the amount of heat required to raise the temperature of twenty drops of water, which is one gram, one degree Centigrade. To raise one gram of water ten degrees would require ten calories. Or to raise ten grams of water ten degrees would require one hundred calories, and so on. Translated into terms of energy, it is found that one calorie of heat generated in a steam engine will produce enough energy to lift a load of three pounds from the ground one foot into the air, or what may be called three foot-pounds. In other words, a fairly exact estimate can be made of the number of calories necessary to do a certain amount of mechanical work.

To ascertain the value of any food in terms of its heat or energy producing capacity, an instrument known as the "calorimeter" is used. This instrument is something like a fireless cooker or vacuum bottle equipped with a surrounding of ice or ice water such that the interior of the apparatus is not affected by external heat. In the center, a container known as the "bomb" holds the food or other substance to be tested, perhaps one gram or a number of grams. This "bomb" is surrounded by a definite quantity of water, the temperature of which would naturally be raised by the burning of the food or other substance. The material in the bomb is then ignited and burned by electricity, with the result that the temperature of the surrounding water is raised and noted by a very sensitive thermometer extending into

the water. In this way it is found very exactly that butter, bread, meat, kerosene, cheese or any other substance has a heat-producing value of so many calories.

Of course it is already clear that food in supplying the heat and energy used by the human body is practically burned or consumed by chemical action, not just in the manner in which the combustion of fuel takes place in a furnace, but nevertheless, heat and energy are liberated by the chemical changes which take place in the cells of the body during muscular effort and in other processes of life. Fats yield, weight for weight, approximately twice as much heat as do carbohydrates, i. e., starches and sugars, or proteins. Therefore one finds that weight for weight, fats have a much higher calorie value than any other type of food.

The following brief table including a few of the foods more commonly in use, gives a general idea of the number of calories in certain well-known measures. For a more detailed statement of the calorie value of foods of all varieties, the extensive table giving the composition of ordinary foods should be consulted.

NUTRITIVE VALUES OF FOODS IN COMMON USE

Foods	Household Measure	Grams			
		Calories	Protein	Fats	Carbohydrates
Milk	A glass	160	7.5	0.5	12.
Thin cream	A tablespoon	60	.5	6.	.5
Butter	A pat or ball	80	...	8.5	...
American cheese	One inch cube	70	4.	5.5	...
Eggs	One	75	6.5	5.	...
Fish	A heaping tablespoon	105	11.	6.5	...
Meat, medium fat	One slice (5x4x¼ in.)	150	11.	9.5	...
Bread	One slice	70	2.3	.5	13.
Oatmeal (cooked)	A heaping tablespoon	35	1.	...	7.
Thick soup	A soup plate	160	5.5	4.5	24.
Rice (boiled)	A heaping tablespoon	40	1.	1.	6.

Foods	Household Measure	Grams			
		Calories	Protein	Fats	Carbohydrates
Potatoes	One medium.....	90	2.	...	20.
Peas (fresh).....	A heaping tablespoon	40	2.5	1.	5.
Lima beans.....	A heaping tablespoon	20	1.	...	3.5
Squash or turnip.	A heaping tablespoon	20	.5	...	3.5
Apple sauce.....	A heaping tablespoon	70	...	.5	16.5
Banana	One	100	1.5	.5	22.
Orange	One	70	1.	...	15.
Custard	A heaping tablespoon	55	2.5	.5	9.
Bread pudding...	A heaping tablespoon	80	2.	2.	13.
Rice pudding....	A heaping tablespoon	80	2.	2.	13.
Sugar	A heaping teaspoon..	33	...	...	8.
Cocoa	A heaping teaspoon..	50	2.	3.	3.5

It will be noticed that it is somewhat difficult to make comparisons between different foods because of the different units used in measuring, for instance, cheese, soup and potatoes. Therefore it may be more convenient in some respects to study a different presentation of the subject as in the following table, in which it is attempted to give the amount of each kind of food necessary to provide one hundred calories; in other words, taking one hundred calories as a unit of comparison.

100 Calorie Portions of Food

Apples	1 (large)	Crackers (soda)	3
Apricots	8	Cabbage	1 medium head
Asparagus	17 heaping tablespoons	Celery	30 stalks 5 in. long
		Corn	6 tablespoons
Bananas	1 (small)	Cucumbers	3 (small)
Bacon	2 strips	Cornmeal	3 tablespoons (uncooked)
Butter	1 tablespoon		
Buttermilk	1½ glass	Cocoa	2 tablespoons
Bread	1 slice	Chocolate	½ ounce
Beets	10 tablespoons	Dates	4
Chicken	2 small pieces	Eggs	1 (large)
Cream	4 tablespoons	Figs	2
Cream Cheese	1 piece 1 in. by ½ in. by 3 in.	White flour	2 tablespoons
		Grapes	1 medium bunch
Cake	1 piece 1 in. by 2 in. by 2 in.	Halibut	1 serving
		Ham	1 serving

100 Calorie Portions of Food—*Continued*

Honey	4 teaspoons	Peas	4 tablespoons
Lemons	2	Parsnips	6 tablespoons
Lettuce	50 medium leaves	Pears	1½
Lamb leg	1 slice	Raisins	36
Lamb chops	edible portion of 1 small rib chop	Rice	2 tablespoons (uncooked piece 1½ in. by 2 in.)
Macaroni	25 pieces 4 in. long	Steak	
Mushrooms	1½ cup	Starch (corn)	
Milk	¾ glass	Spinach (fresh)	4 tablespoons
Oatmeal	4 tablespoons (uncooked)	String beans (fresh)	18 tablespoons
Orange	1⅓	Sugar	8 tablespoons
Onion	2	Squash	2 tablespoons
Oysters	12	Tomatoes	5 tablespoons
Olive oil	2 teaspoons	Turnips	12 tablespoons
Pecans	35 halves	Tapioca	15 tablespoons
Potatoes	1	Walnuts	3 tablespoons
			5 halves

It will be noticed that it takes very little butter to make one hundred calories, but a considerable amount of asparagus or of lettuce.

Unfortunately, the weak point of the calorie system lies in the fact that it presents only a measure of the fuel value of the various foods. The most important fact in reference to many kinds of food is that their value does not lie in their energy-generating, or heat-producing character. If "fuel value" meant "food value" the calorie system would be an accurate means of estimating the value of a given diet. But inasmuch as food value in the best sense is a very different thing from fuel value, any attempt to base one's diet upon the computation of so and so many calories, is likely to lead one very far astray.

The fact is that many foods of the very highest value from the standpoint of vitamines and mineral salts, foods which are invaluable for their influence in regulating the bodily economy, stand very low in the scale of calories. On the other hand, many foods upon

which one could starve to death in spite of their energy-generating capacity, have a very high calorie value.

Many writers on food have been led far astray by their misunderstanding of the meaning and importance of the calorie system. For instance, a writer in one popular magazine made the statement that white bread was a more valuable food than whole wheat bread because in a food table it was placed very slightly higher on the calorie scale, this because white bread is almost pure starch and therefore practically all pure fuel. The so-called authority did not consider the fact that white bread lacks iron, phosphorus, calcium and other minerals, as well as the vitamines that are contained in whole wheat bread. Upon this basis a cake made of white flour, sugar and cottonseed oil, having an even greater calorie rating, would be supposed to be more nourishing than either white bread or whole wheat bread, in spite of the fact that one would quickly become ill and starve to death on an exclusive diet of cake made of these ingredients.

If calories were an indication of food value, then cottonseed oil would be one of our most valuable foods, and one could live on only a pound of cottonseed oil per day.

On the other hand, many foods, such as fruits, greens and vegetables, have a very low calorie rating, and yet are tremendously important in preserving the chemical integrity of the body and in keeping the various functions of the organs working efficiently, so that one can utilize the energy-producing elements in the diet. For instance, milk whey contains precious orgainc salts as well as the vitamines called water soluble B. Like-

wise, fresh vegetable soups have a low calorie rating, but are extremely valuable in maintaining the health. Fresh spinach contains, per pound, only 100 calories, lettuce 85 calories, tomatoes 100 calories, apples 260 calories and asparagus 95 calories, and these are all extremely valuable from the standpoint of the present-day knowledge of diet.

Compare these calorie ratings with those of granulated sugar at 1790 per pound, white bread 1195, soda crackers 1870, and oleomargarine 3335 calories, all of which are acid-forming foods upon which one could starve to death much more quickly than if he ate nothing at all, because of the acidosis from which he would suffer and from which he would be free under conditions of absolute fasting.

If one were to select a diet containing "sufficient" nourishment, upon a basis of the calorie system, he would probably very economically select a menu comprising white bread, sugar, oleomargarine, and possibly cakes made largely of white flour, sugar and some butter substitute made chiefly of cottonseed oil. Or perhaps he would add to this cornbread made with refined cornmeal flour. And the result would be a quick decline of health, with the development of scurvy, beri-beri, or other disease conditions due to dietetic deficiency.

To estimate a diet on the basis of the calorie system is something like the attempt of judging an individual's state of nourishment according to his weight as manifested in fatty tissue. For instance, a fat, plump child is often commented upon as being unusually "well-nourished." But it does not necessarily follow. Little Sarah may weigh twenty-five pounds more than she

needs to, and yet be very far from properly nourished. Fat is an indication that one is nourished only in respect to fat. It does not mean that one is nourished in respect to the elements that go to make up good blood and other tissues. It does not mean that the organs and glands are well supplied with material that enables them to carry on their various functions freely and efficiently. It does not mean, for instance, that one is well nourished in regard to iron, lime, or the various other elements required for health building. It means only that little Sarah, or perhaps it is stout Aunt Sarah, is well nourished in regard to adipose tissue. In the materials which go to make sound teeth, healthy bones, and strong, steady nerves, Aunt Sarah, or round, fat little sister Sarah may be woefully lacking.

It is for this reason that quantitative considerations of diet are of comparatively little importance. At least, they are secondary and are worthy of consideration only after the more vital essentials of human nutrition have been provided for.

There is another reason why computations of the diet in terms of the calorie system are not satisfactory. This is because of the natural variations in the assimilative powers of different individuals. Everyone knows of individuals who eat "not wisely but too well," practically stuffing themselves at each meal, and who yet remain as "thin as a rail." It is often said of such persons, that "It makes them thin to carry it around." Obviously, there is in such a case no relationship between the body weight or physical activity and the amount of food consumed. Such a man may eat like a hog and yet do very little work. In fact, he is capable of doing

very little work because of his habit of over-eating. In many cases a gain in weight is noticed as soon as the victim has reduced the amount of food that he consumes, for the reason that his assimilative powers improve when the system is no longer over-burdened.

On the other hand, everyone knows of instances of excess weight which seem to be natural or temperamental, almost irrespective of the amount of food consumed. Your excessively stout friend assures you that she really eats very little, and by personal observation you know that she eats not more than one-fourth as much as the "human rail" across the table. And yet, such is her power of assimilation, that every ounce of food swallowed seems to be converted into flesh, and much of it into the form of fat. Placing such a person upon the schedule of consuming so many calories per day, while theoretically ideal, does not work out in practice, as a matter of human experience.

Nevertheless, in spite of all of these criticisms and objections, the calorie system remains the only method by which one can make any estimate whatever as to the quantitative requirements of one's diet. If provision is made for a proper variety of food so that all of the requirements of nutrition can be observed, then the calorie system in determining the total quantity is really of some value. In other words, the diet must be estimated both on the qualitative and the quantitative basis.

A good plan, therefore, is to provide for a variety of food through selecting each day one or more articles from various groups. The Food Administration of the Department of Agriculture offered a very good sugges-

tion in this connection by the publication of a leaflet classifying foods into five different groups, on the theory that if one makes it a point to secure some food of each group each day, the selection will be certain to fulfill all of the requirements of a healthy diet. The following is the table presented in this particular leaflet.

CHOOSE *YOUR* FOOD WISELY

STUDY THESE FIVE FOOD GROUPS

Every food you eat may be put into one of these groups. Each group serves a special purpose in nourishing your body. You should choose some food from each group daily.

1. VEGETABLES AND FRUITS.
2. MILK, EGGS, FISH, MEAT, CHEESE, BEANS, PEAS, PEANUTS.
3. CEREALS—CORN MEAL, OATMEAL, RICE, BREAD, ETC.
4. SUGAR, SIRUPS, JELLY, HONEY, ETC.
5. FATS—BUTTER, MARGARINE, COTTONSEED OIL, OLIVE OIL, DRIPPINGS, SUET.

You can exchange one food for another *in the same group.* For example, oatmeal may be used instead of wheat, and eggs, or sometimes beans, instead of meat; but oatmeal can not be used instead of milk. Use both oatmeal and milk.

YOU NEED SOME FOOD FROM EACH GROUP EVERY DAY—*DON'T SKIP ANY*

This presentation of the diet question is extremely simple, and if followed, even by an uneducated person, would be of great value. It would insure a diet that is fairly well balanced in every respect. A specification of the value of natural, unpolished rice and whole wheat bread would have improved this table, as would also a reference to the value of brown sugar instead of white, or the advantages of raisins, dates and figs as against sugar and syrups. But these are details which might have been confusing. The lesson of the importance of

variety in foods is well conveyed. (More detailed discussion of this subject is given in the chapter on "How to Have a Balanced Diet.")

Granting that variety in diet is maintained, thus first ensuring a supply of all the food essentials, one may then consider the diet from a quantitative standpoint. It is found that persons in various occupations may consume anywhere from 1,800 to 5,000 calories. Indeed, a person of one hundred and fifty pounds engaged in very light activity is estimated to require upwards of two thousand calories per day. In one series of studies seamstresses were found to require from 1,800 to 2.100 calories. On the other hand, two men sawing wood were found to require upward of 5,000 calories per day. An investigation of the diet of fifty Maine lumbermen chopping and yarding logs showed a consumption of food totalling over 8,000 calories per day. This probably meant a consumption of food in excess of actual requirements. And yet, Professor Atwater showed in one experiment a metabolism equivalent to 9,300 calories in the case of a man riding a stationary bicycle for sixteen hours, this of course being altogether abnormal so far as ordinary human activities go. Two women, household servants, required from 2,300 to 2,900 calories while doing ordinary housework, and from 2,600 to 3,400 as washerwomen. Two tailors required from 2,400 to 2,500 calories, whereas two metal-workers required 3,100 to 3,200 calories. Carpenters required slightly more.

Summarizing the conclusions of various investigators, it may be said that a man doing light work is estimated to require from 2,400 to 2,700 calories; when

doing medium work, from 2,800 to 3,400, and when doing hard work, from 3,300 up to 4,200 calories.

Of course these estimates are far from acceptable as the last word upon the subject, inasmuch as other students have placed the food requirements in various forms of work at from two-thirds to three-fourths of the amounts indicated by these figures. Variations of temperament and assimilation have a great deal to do with the question. These figures, however, have a certain practical value in that the person who is eating heavily, or perhaps even very lightly, may form an estimate in calories of the food consumed each day. If much below or above the caloric allowances mentioned for light, medium or hard work, he may then conclude that either an increase or a decrease in the amount of food consumed is desirable. In such a case, if there is an excess, one should consider the advantages of decreasing certain kinds of foods. For instance, if one is eating a great deal of white bread, a starchy food, he should curtail that rather than the use of fruit. Or if an excess of meat has been the habit, then he would advantageously make a reduction in that direction rather than by curtailing the consumption of vegetables or green salads.

WHOLE WHEAT BREAD—THE STAFF OF LIFE

By CARL EASTON WILLIAMS

INASMUCH as bread is such a prominent part of the average diet, the kind of bread placed upon the table becomes a matter of serious interest.

Wheat is such an excellent and perfect food, just as Nature grows it, that it contains all of the food elements required by the human system in almost exactly the proportions needed by the body. It is not surprising, therefore, that even in early times bread was a matter of such importance to the human race as to become known as "the staff of life." Not only has this been true in historical times, but far beyond that, back in the stone age, wheat and corn were moistened, made into little cakes and roasted in the embers or heated ashes of a campfire, or perhaps baked upon heated stones into the form of rough biscuits.

But in the fine, smooth, white flour product which today masquerades under the name of bread, we have departed a long way not only from the form and substance of the old bread, but particularly from the blood-building and health-sustaining qualities of the original "staff of life." Wheat was a perfect food in its natural form, but as soon as civilized man began to tamper with it too much, endeavoring to refine it to the consistency of a pure white starch, as do the modern millers, he took the "heart and soul" out of the grain and made it a practically worthless food.

Not only do modern milling methods grind wheat flour much finer with the rolling process than did the old stone grinders, but the flour is also sifted through many very fine bolting cloths, which make it infinitesimally fine in texture and leave practically nothing but the pure starchy substance. The germ of the wheat is eliminated, together with the bran, but it is in the germ and in the bran that the most precious food elements of the wheat are contained. The only advantage that the modern patent flour has is found in its fineness and smoothness. And because of its prettiness and whiteness bread made of this denatured substance has come to be preferred by the unthinking p ıblic.

Not only is white flour—which, of course, means white bread, biscuits, crackers, cookies and cakes made with white flour—robbed of its important nutritive elements in the way of organic salts and vitamines, but it is an acid-forming food and its use is an ideal method of courting constipation. Without doubt white flour is the one greatest of all causes of this almost universal complaint. In many cases the only thing necessary to correct this condition is the substitution of a good whole wheat bread or graham bread for the white flour products so commonly used.

The problem is not altogether a new one, for the refinement of flour had already been carried so far in the early part of the nineteenth century that Alexander Graham, a New England student of dietetics, more than seventy-five years ago advocated a return to the use of the entire grain of wheat for the making of bread. From that day bread containing the bran of the wheat was known as graham bread. It does not follow that

graham bread is at present always a true whole wheat bread, for the reason that almost any mixture that contains a little bran along with cheap white flour is likely to be sold under the name of graham bread. A true whole wheat bread is one in which the whole grain is ground up, including the germ and bran.

Curiously enough, in spite of the obvious outrage on nature in this refinement of flour, and in spite of the loss of flavor, there have usually been until quite recently so-called scientific experts who have defended the use of white bread, for the most part on the basis of the comparative digestibility of whole-wheat bread and white bread. It is claimed that since a part of the bran is cellulose and fibrous matter, it cannot be digested, and is therefore useless from a food standpoint. Of course this premise ignores the value of this pulpy material as a mechanical stimulant to the digestive organs, and also the extraction of some of the mineral salts from the bran by the digestive juices.

These experts overlooked the fact that if more complete digestibility of any food were a criterion of its value, then pure white sugar would be an ideal food, in spite of the fact that one could starve to death very quickly upon a diet of pure white sugar.

There are really but two points in this seemingly formidable argument in favor of the exclusive use of white flour as a bread stuff. One of these has to do with the high gluten content of white flour, which is the basis of the extreme lightness of white flour bread.

The white flour advocate assumes that extreme lightness is the primary essential of good bread. Yet such extreme lightness of bread has very little hygienic sig-

nificance and none whatever for the man who properly masticates his food. It is a trick that pleases the eye and pleases also the baker for thereby he is enabled to make a pound of bread fluff up and look like a bigger loaf. Even in these days of the enforced printing of the net weight on food packages, the customer's scale is still in his eye and he will let go of a ten-cent piece quicker for a big loaf of bread than for a small loaf, though it have the same net weight.

So much for the first half of this seemingly scientific white flour argument, for it is merely an argument for selling air and could be as well used to sell beer that would raise a high "collar" if the foam were a bit more enduring. But the widely proclaimed facts upon which the white flour interests have rested their case for the last fifteen years is upon the digestive tests that prove white flour to be six per cent more digestible than bread made from the genuine whole ground wheat. These tests were originally made by Professor Snyder at the University of Minnesota and were endorsed and published by the United States Department of Agriculture. The advocates of whole-wheat bread do not dispute the facts as presented. What they do dispute is the conclusions from these facts. The facts are as follows: If one hundred pounds of whole wheat be ground and made into bread and fed to men (with milk to round out the diet), about eighty-seven per cent of the energy yielding substance of the bread is digested. If now this same one hundred pounds of whole wheat be milled by the patent process, seventy pounds will be made into white flour and thirty pounds be rejected as bran, shorts and germs and sold as cattle feed. Bread made from

the white flour will be ninety-three per cent digestible, or six per cent more digestible than the whole-wheat bread—this six per cent of increased digestibility being the corner-stone of the white flour argument.

But of our one hundred pounds of wheat, only seventy pounds were made into white flour bread. Of this seventy pounds, ninety-three per cent, or sixty-five pounds, is digestible. Hence with the rope of his own argument the white flour chemist hangs himself, when he sets out to prove the economy of white flour bread. By the facts which he himself presents us, we find that by the white flour route but sixty-five pounds of the one hundred pounds of wheat is utilized to produce human energy; whereas, if the wheat be ground as graham flour and made into bread, eighty-seven pounds of the wheat substance is turned into human energy.

White bread is six per cent more digestible, but the use of white bread means a loss to the nation of twenty-two per cent of the nation's wheat crop. But saving the nation's wheat crop is only one aspect of the problem. The mere statement that white bread is six per cent more digestible than the whole wheat bread seems a very effective argument in its favor, and one, indeed, which would be a very real argument if the ideal human food was one that would be completely digestible. Unfortunately for the white bread interests, the human digestive tract is not built with a view to utilizing completely digestible foods. There are certain physiological waste products that must be excreted by way of the intestines or self-poisoning and death would speedily ensue. With the natural primitive diet of man there was added to these poisonous physiological wastes a certain

residue of indigestible fiber, and the combination of both substances gave a sufficient bulk to permit of the mechanical functioning of excretion.

If now with our denatured and supercivilized food products, of which white flour is the chief offender, the total bulk of this intestinal residue be reduced until the bowels function improperly, the result is constipation, which is very properly described as the mother of diseases.

White flour bread is six per cent more digestible than the whole wheat variety and by mixing it most plentifully with other foods, and by overeating of all foods, and with the more or less habitual use of salts and pills, man manages to live. But its six per cent of increased digestibility is not a virtue and often proves a most serious fault.

So much for the quantitative argument showing the economy of the use of whole wheat, but this, indeed, is the lesser argument upon which the whole wheat advocate rests his claims. The white flour chemist says nothing of quality—or rather he assumes that the only element of quality in a breadstuff is the capacity for puffing up into a feathery loaf and enabling the baker to sell bubbles for food.

This "offal" which the white flour miller rejects is four-fifths, or eighty per cent, digestible. The one-fifth of it that is not digestible forms the cellulose or fiber of the bran which is Nature's remedy for constipation. But in the four-fifths of this same "offal" that the human system does digest is found those vital but little understood mineral elements and still less understood substances known as vitamines, which have of recent

years been proven to be so highly essential to the normal and complete nourishment of man or animal.

Far from being a fad resting wholly upon the teachings of a "dyspeptic New England food exhorter" (Graham) and dying out of the public attention, the whole wheat idea has within the last decade received the indorsement of the vanguard of the scientific world, who by the discovery of the rôle of vitamines and the cause of the deficiency diseases, have taken the entire question out of the realms of faddism and placed it in the forefront of science.

The comparison of the actual effects of whole wheat and white flour breads is in practice much modified by the fact of our highly complex diet. If the necessary bulk be added in the form of fresh vegetables, if the phosphorus contents be increased by milk and meats, if the vitamines be supplemented by fruits and vegetables, we can quite see how white flour bread takes its place in the diet with no immediately observable ill effects.

If on the other hand a people formerly accustomed to a mixed diet and the use of the white flour products be now reduced to a diet *almost exclusively of bread,* and this bread be made of coarsely ground whole wheat, it is not at all unlikely that the result would be an excessive looseness of the bowels.

The human digestive tract is built to function on a diet containing a moderate bulk of waste, and departure too far in either direction is a dangerous business. The ordinary civilized diet, containing large quantities of milk, eggs, butter, cheese, meat and potatoes, is deficient in non-digestible residue, and the substitution therein

of whole wheat for white flour bread normally results in the improvement of digestive action and the health of the individual. Perhaps a more important though not so readily observable benefit occurs from the increased proportion of mineral salts and vitamines; and lastly the use of the whole wheat increases by twenty-two per cent the digestible nutrition available in the wheat crop of a nation.

Not of the least significance is the evidence in favor of whole grain versus refined breadstuffs shown in the teeth of those races or classes of people in various countries living upon these different types of food. The evidence in this direction is both extensive and conclusive. For instance, examination of the immigrants who arrive at Ellis Island, New York Harbor, reveals the fact that peasants from Russia, Germany, Italy and Austria who have lived all their lives on the native "black bread," supplemented by vegetables and usually very little meat, have extraordinarily perfect teeth, whereas those from the cities of Europe and sections where white bread is commonly in use are all marked by the same display of missing or decayed teeth that is so universal among the American people. It is purely a matter of nutrition and primarily a question of bread.

The scandalous revelations of the conditions of the teeth of school children throughout our own country should carry a warning in this respect.

"After examining the teeth of not less than four hundred school children in my neighborhood here in the Bronx," says Dr. Louis Goldstein, of New York City, "I have yet to see a perfect set of six-year molars (the first four permanent teeth to appear in childhood).

These teeth in nearly every instance were decayed. I have never observed a perfect set of teeth in any American child and have but one adult patient showing extremely good teeth."

Of 1,694 children examined in six clinics in New York by Dr. A. Freedman Foot, eleven were found to possess normal teeth. "The six-year molars of nearly every child were broken down wholly or in part. In many instances the molars were decayed through the gums." Contrasted with this are the perfect teeth of some of our own American children who have been raised on whole-wheat bread and natural foods, as well as of those immigrants who have subsisted on the coarse "black bread" (rye or wheat) of some of the European peasants.

Dr. W. E. Andrews, of New York City, declares: "The teeth of Slavs, Bulgars, Russians, and Poles are ordinarily perfect. I have lately seen the grinders of an old Slav, sixty-one years of age, who works in a nearby coal yard. Not a tooth was missing. His childhood diet of black bread and fish had given him an indestructible tooth structure."

Dr. Chas. A. Dubois says "The elimination of starchy and sugary foods, including candies and syrups in the diet, is essential to the treatment of pyorrhea. There is no such thing as local tooth disease. The condition that leads to decay is always systemic."

Dr. F. A. Sterling, of New York City, declares, "Natives of Africa whom I have examined have possessed teeth in perfect condition, due entirely to their living on coarse, natural foods. I have observed that the nearer people are to primitive nature the better are

their teeth. Savages all have good teeth. The colored race, particularly those living on whole corn-meal and the unrefined sugar cane diet of the southern plantation, have good teeth. In one generation, in advancing from the southern corn-fields and canebrakes, the teeth of our colored children become very poor."

There is a wealth of evidence on this point, all emphasizing the fact that a satisfactory diet rather than external care in cleaning is the basis of healthy teeth. This is not to discourage the habit of brushing the teeth, which is taken for granted, though it should be supplemented by the use of dental floss in all cases. However, even brushing and cleaning the teeth will not counteract the effects of an unsatisfactory diet, and well cared for teeth often crumble. The teeth must have good building material, and this is found in whole-wheat bread. The use of white bread means starved teeth and therefore decayed teeth. Brushing the teeth is taught in the schools, but children will continue to suffer in this respect until they have also been taught the necessity for whole-wheat bread and until their parents have been sufficiently educated to provide for their nutritive requirements in this direction.

It has been demonstrated again and again in experiments that white bread is certainly not the "staff of life," inasmuch as no animal, human or otherwise, could live upon it. On the other hand, wheat or whole-wheat bread will sustain the lives of either man or animals in perfect health indefinitely. Not only has this been proven by laboratory experimentation, but you can prove it to yourself at any time that you wish to make practical tests with pigeons, chickens, mice, guinea pigs,

or other animals that you may be willing to have starve to death for you in order to convince you of the truth of this subject. Or perhaps you will be willing to accept the facts as obtained by government experimenters together with the conclusions secured in that way.

The facts are that if fed upon a diet of white bread or refined flour products, or upon refined corn meal or some of the breakfast foods, which are equally denatured, chickens, pigeons and other creatures will starve to death in from three to four weeks. Your two year old baby may be able to survive a certain amount of this starchy, pasty food, for the reason that it is also given an abundance of milk, cream, soft boiled egg and orange juice, together with baked potato and a little other vegetable food. But that same baby would be ever so much better off if whole-wheat bread or an honest whole-grain breakfast food such as shredded wheat, oatmeal or any other whole grain product were used instead.

A typical example of the various experiments that have been carried on in this field was that carried on at a state agricultural school in which fourteen chickens fed on white bread died within twenty-eight to forty days, exhibiting symptoms of polyneuritis and showing, after death, considerable degeneration of the nerve cells. Contrasted with this in the same experiment were five chickens fed on whole-wheat bread and two chickens fed on raw whole wheat, all of which were alive and in perfect health at the end of seventy-five days, when the experiments were discontinued. Other experiments along the same line have invariably produced similar results. You could prove this to your own satisfaction, but do not notify the Society of the Prevention of

Cruelty to Animals of your intentions. Most of us can make far better use of perfectly good chickens, inasmuch as the facts have already been proven.

Details of studies of this kind are given in a bulletin issued by the U. S. Public Health Service under the title "The Dietary Deficiency of Cereal Foods with Reference to Their Content in 'Antineuritic Vitamine,'" listed as Reprint No. 471 from the Public Health Reports. This may be secured by writing to the U. S. Public Health Service, Treasury Department, Washington. Following a detailed statement of elaborate experiments along these lines, with some rather complicated charts, the conclusions to be drawn from these experiments bearing particularly upon the question of the relative vitamine content of natural and refined foods, are stated in this bulletin in the following brief terms.

"(1) The results obtained in this investigation clearly show that for pigeons an exclusive diet of whole wheat or corn furnishes an adequate supply of antineuritic vitamine.

"(2) The antineuritic vitamine seems to reside in the peripheral layers and the germ of these seeds, whereas the endosperm is relatively poor in this substance.

"(3) If wheat and corn foods containing only a small percentage of the peripheral layers and germ of the seed are fed to pigeons and chickens exclusive of other food, polyneuritic symptoms appear on an average of three weeks after the beginning of the feeding period. The appearance of polyneuritis is preceded by a gradual loss in body weight. The birds can be relieved of their

paralysis in a striking way by the oral or subcutaneous administration of a highly concentrated preparation of antineuritic vitamine derived from 'whole-wheat' bread, yeast, ox liver, rice polishings, or beans.

"(4) The addition of yeast (in amounts used by bakers) in the preparation of bread from highly milled flour does not prevent the appearance of polyneuritis in birds fed on this food, but prolongs slightly the period of incubation.

"(5) The addition to 'highly milled' flour, or bread made from 'highly milled' flour, of a small amount of antineuritic vitamine preparation will correct this particular dietary deficiency, and will prevent the appearance of polyneuritis and the loss of body weight.

"(6) The total phosphorus content of corn and wheat foods is a fairly satisfactory index of the amount of antineuritic vitamine contained in these foods. In a general way, it can be said that a high total phosphorus content is an indication that the particular corn or wheat product is relatively rich in antineuritic vitamine."

The conservative tone of this statement is of course characteristic of scientific investigators.

Further evidence of a striking character was secured by a series of studies on the relative value of natural and denatured wheat and corn products in promoting the growth of young animals. This is a more striking test of food value. A mature creature may survive food restrictions for a considerable time, but in young and growing animals the limitations of imperfect food are very quickly made apparent. Experiments to ascertain the growth-promoting properties of foods have a special bearing upon their vitamine content.

These experiments were carried out on young albino mice, squabs and a few hogs, mostly in conjunction with wheat, but a few also with natural corn and refined corn products. We quote the summary as given in the same bulletin. The conclusions are drawn by the authors, Carl Voegtlin and C. N. Myers.

"(1) The 'highly milled' products are, without exception, inferior in dietary value, as regards growth, to foods prepared from the whole grain. It is rather surprising that such delicate organs as the gastro-intestinal tract of young mice can tolerate a diet containing a large amount of bran. This fact, however, does not necessarily mean that it is advantageous to include the bran in foods intended for human nutrition. On the contrary, the experiences with 'war bread' would rather indicate that persons with delicate digestion are subject to temporary digestive disturbances as a result of a change from 'white' bread to bread containing a considerable percentage of bran ('war bread'). On the other hand, from the standpoint of dietary completeness, a bread including all of the grain, with the exception of the superficial cellulose layer, is undoubtedly superior to the so-called white bread, made from 'highly milled' flour, and would not possess the above-mentioned objectionable features.

"(2) The 'white' bread used in these experiments was not adequate for maintaining normal growth, in spite of the fact that it was prepared with some evaporated milk and yeast. The most significant defect of 'white' flour is the deficiency in antineuritic and fat-soluble vitamine; it is also deficient in adequate protein and inorganic salts.

"(3) A wheat flour, containing a considerable part of the germ and superficial layers of the grain, supports growth of mice and pigeons especially well when supplemented with inorganic salts. The same is true of 'whole-wheat' bread.

"(4) 'Highly milled' corn grits, forming the exclusive food of young hogs, leads to failure of growth in these animals, whereas the whole corn kernel, supplemented by inorganic salts, promotes growth.

"(5) Newborn squabs are suitable animals for growth experiments.

"(6) No evidence of a toxic action of a whole wheat diet was obtained in the experiments on squabs which were fed on whole wheat meal, supplemented by a suitable salt mixture.

"(7) In the light of our present knowledge, it would appear that bread made from 'whole wheat' flour, or old-fashioned corn meal, should be used in preference to 'white' bread and 'highly milled' corn foods, whenever the diet is restricted to these cereal foods to the more or less complete exclusion of other foods possessing greater dietary values."

There is a good old American sentiment to the effect that "The best is not too good for us." This is a sentiment to be cultivated particularly in relation to food, inasmuch as diet has such a fundamental and important bearing upon life and health. It is not merely a question of eating to keep alive. The question affects not only one's length of life, but the quality of life. The day is coming when even the American public will have been so thoroughly educated in reference to food values that white flour, refined corn flour, polished rice and other

abominations of the commercialized food refiners will be things of the past, and the present day tortures of the body through wrong feeding and other errors that induce ill health will have been done away with.

LIFE-SAVING VEGETABLES AND SALADS

By CARL EASTON WILLIAMS

IT is not necessary to be a vegetarian to appreciate the dietetic value of vegetables and salads. Unfortunately, however, the importance of these foods is not sufficiently recognized. If you were to enter the average American home in which the subject of food has never been given special study, and asked the question as to what was the most valuable food consumed by the family, the chances are that in nine cases out of ten the answer would be "meat." In some cases the answer might be "milk," and so far as the young children are concerned that would be strictly correct.

Large numbers of people truly believe that a meal is not a meal at all unless it contains a generous proportion of meat. And yet scientific inquiry reveals the fact that meat can be more easily dispensed with without detriment to health than almost any other type of food, except of course the worthless and too much refined products of the flour mills.

The reasons why vegetables and green salads should occupy a prominent place on the daily menu need not be given here for the reason that they have been rather completely expressed in the chapters dealing with vitamines and the chemical or mineral requirements of the diet. The reader already knows that vegetables and salads contain a large percentage of water, very little protein indeed, and except for the potato and sweet potato, only moderate amounts even of starch. But

they do contain a wealth of mineral matter in organic form, as well as the indispensable vitamines already referred to. Besides this, vegetables contain a valuable supply of cellulose or pulpy material, which is invaluable in promoting activity of the digestive organs.

There is a very common notion that the use of meat, and particularly of red meat, is desirable for the building of good red blood for those who are pale and anemic. This in spite of the fact that practically all pale, leather-skinned and dyspeptic looking persons devour disproportionate amounts of meat. The truth is, however, that for those who are pale and anemic it is far more important to use plentiful quantities of greens, vegetables and fruits then an excess of meat. A milk diet is ideal in such cases, for milk contains every element necessary to perfect nutrition, but if one cannot adopt the milk diet, the generous use of vegetables, fruits and greens provides the best method of overcoming lack of color and the impoverished condition of the blood that it indicates. The making of good blood depends upon the supply of iron, potassium, magnesium, sodium, calcium and other organic salts. These and other minerals likewise enter into the composition of blood serum, saliva, pancreatic fluid, bile and other secretions of the body. Since these are richly supplied in vegetables and greens, it follows that these foods are of the greatest value in overcoming anemia and building health. Likewise these alkaline foods prevent acidosis.

It is the opinion of some authorities that anemia is to a large extent identified with intestinal putrefaction, the results of the latter being the absorption of poisons detrimental to the red blood cells. Since meat tends

toward intestinal putrefaction, the very attempt to eat red meat as a cure for anemia may even aggravate the condition. Fruits, vegetables and greens, on the other hand, tend to prevent intestinal putrefaction and thus preserve the blood and tissues of the body from the attacks of the poisons mentioned. Because of their pulpy residue, vegetables and greens have a mild laxative effect which is conducive to internal cleanliness and therefore indirectly a pure blood stream. It has been found that meat eating animals suffer far more with anemia than herbivorous animals. The lesson in its application to human requirements is obvious.

Inasmuch as the tendency of civilization is toward a diet of acid-forming foods, not only because of the use of meat, but because of the use of refined foods as pointed out elsewhere, it is especially important that one should make use of green salads and vegetables as a balancing factor in the diet. Even though one may use whole-wheat bread, unpolished rice, honey and brown sugar sugar instead of their denatured substitutes, yet these foods simply balance themselves. They will not counteract the acid-forming tendencies of meat and other foods. Therefore one should, if possible, eat a little "hay" each day—that is to say, lettuce, celery, watercress, green peppers, and onions together with tomatoes and other foods that combine well in salads, using preferably a dressing of olive oil and lemon juice. Lemon juice should be used always in preference to vinegar.

Soups and stews provide an excellent method of using vegetables, inasmuch as the juices are preserved in serving the soups, whereas they are too often drained

off and wasted when vegetables are boiled and served dry. Seasoning with butter and salt will not take the place of the food elements that are thrown away when the water is drained off. Where meat is used, an old-fashioned stew makes an ideal dinner, the meat being balanced by a considerable quantity of vegetables of various kinds with all the juices preserved. The world has underestimated the value of these vegetable juices. In some cases they are invaluable from a medicinal standpoint, as for instance, in a condition of rheumatism, neuritis or some other disorder in which there is an acid condition of the system. By using only the juices secured from the cooking of vegetables one has a fluid richly charged with base-forming food elements that will tend quickly to correct the acid condition of an ailing human system.

Granting the value and the desirability of the use of vegetables, the question remains as to how a variety of these may be secured except in the season when they are grown. Some vegetables such as potatoes, onions, turnips and carrots, can be preserved in a cool cellar, especially if covered with earth, and in many homes the only vegetable foods available through the winter consist of these, supplemented by peas and beans. While these are undeniably life-saving, yet a greater variety is desirable. The effort to secure this variety through the use of canned goods is not entirely satisfactory. The vitamines are largely destroyed during the process of canning, and without doubt the fresh vegetable is as much superior in real nutritive value as it is in taste and palatability.

For this reason the present day scheme of dehydra-

tion or the preservation of vegetables and fruits through drying promises to supplant almost entirely the canning of food in future. The process in many respects is simpler and the food preserved by drying is undoubtedly more attractive as well as more healthful. Dehydration makes for convenience of storage as well as easy transportation, for the reason that the bulk is reduced by seven-eighths to nine-tenths as a result of the elimination of the water.

Referring to the advantages of dehydration, Dr. E. F. Bowers, the distinguished medical authority, writes:

"Old Mother Nature put 87 per cent of water into beets; 91.5 per cent into cabbage; 87 per cent into onions; and 78 per cent into potatoes. She gave us only one pound of food to every fourteen pounds of water in spinach; one to twelve in carrots; one to thirteen in turnips. And she slipped 94.3 per cent of water into every pound of red-headed tomato.

"For our failure to understand the significance of water, and our neglect to get rid of it, is responsible for the loss of an average of fifty per cent of all the vegetables grown in the world.

"So when a half million dollars' worth of vegetables are dumped into grocers' garbage cans in New York City alone—as they were during a protracted cold spell—it can readily be computed just how much extra the community had to pay for its watered vegetables. For remember it is the water in vegetables and fruit that freezes.

"This is one of the most senseless and tragic wastes that the human race—with all its wild, weird extravagance—has ever been guilty of. The cost of the fifty

per cent of vegetables and fruit food that remain is doubled, just because we don't know what to do with water when it is tied up with a food.

"In every part of the country, every day in the year, an aggregate of hundreds of tons of indispensably valuable foodstuff is wasted. Indeed, it is worse than wasted, for during its period of decomposition it constitutes an actual menace to the health of the country.

"But more tragic still is the waste of the world's mineral resources—the besotted scattering to the winds of those things that make life possible on this planet—things that Nature creates only by slow, laborious processes, and which are yearly becoming more and more indispensable to the continued life and fertility of the soil.

"For example, scores of thousands of pounds of precious nitrogen, potash and phosphorus are dumped into the ocean, incinerated in garbage furnaces, or left to rot unsung—polluting the air and draining danger into the water supply.

"And this while the problem of obtaining fertilizer for our depleting soil is one of the most pressing that confronts agriculturists and economists today. A small proportion of all this waste is fed to hogs and thereby reclaimed. But so fractional is this amount, in comparison with the giant total of waste, that it is only a source of irritation to those who are future-looking enough to understand the true meaning of this senseless spoliation.

"The fundamental and foolish principles of marketing fruit and vegetables help greatly in bringing about this wastage. For Nature has a habit of ripening crops

planted at the same season, and in the same latitude at about the same time.

"Consequently, there is a seasonal surplus. There is more brought to market *at one time* than can be sold at a profit.

"The only solution we seem to have evolved thus far is to let our highly-watered vegetables spoil. Those that do not well lend themselves to storage over any long periods must go the way of all organic matter. One pound out of every two pounds of this precious foodstuff that cannot be bought at all by millions—because the price, even in times of most lavish and prolific harvests is prohibitive—is permitted or even encouraged to rot. And, so it would seem, the sooner and the more completely the better.

"Those who suffer the most by this wholesale rape of Nature are, as always, the innocent bystanders—in this case the constipated, cell-starved American public.

"It is notorious that in this land of plenty and reckless exploitation of natural resources there should be not thousands, but millions who don't know the taste of a green salad or succulent vegetable, or a ripe orange or grape-fruit, from one late summer or autumn until the next. Their winter-time conception of a vegetable is a boiled potato or a can of tomatoes.

"Hundreds of hotels, thousands of boarding houses, and scores of thousands of families—ignorant of the fundamental meaning of a 'balanced ration'—hold that peas or rice or beans are 'vegetably' enough to accompany a dish of pork or beef.

"They ignore—if indeed they ever knew—the fact that rice is a carbohydrate—a starch product, almost

identical with the potato or bread they already have—and that peas or beans are a sort of vegetable meat-hash, containing 22.85 per cent of protein (a nitrogen product, like meat) and 52.36 per cent of starch.

Starving on Food

"And all the while these millions are suffering from the lack of essential mineral salts—lime, potash, iron and other elements that enter largely into the composition of bones, teeth, nerves, and other cell structures.

"As a consequence we Americans have the most rachitic bones, the softest, poorest teeth, and the most unstable nerves of any civilized people. A perfect set of teeth is hardly to be found in a child, and among adults they are less frequently met with than are molars among hens.

"Vitamines, too, those unanalyzed and indefinable but tremendously important substances that contribute so much to the general physiological 'tone' of the body, are missing if lettuce, celery, apples and other uncooked vegetables and fruit are missing from the dietary.

"But most of all the 'hay'—the bulk, made up of the fiber and cellulose of vegetables—is lacking when vegetables and foods, low in actual food values, but rich in water, are lacking. This is the chief reason why the American is the most constipated biped on earth.

"And what constipation does to organic beings can be rightly understood only by medical men. For doctors know that almost eighty per cent of all the conditions they are called upon to treat would never have developed had the colons of their patients been properly evacuated every day.

"They know that it is the absorption of toxic products from the bowels into the blood that helps to produce—if it does not actually cause—much of the high blood pressure, rheumatism, nervous exhaustion, malnutrition, headaches, lassitude and lack of appetite, and the susceptibility to infectious and contagious diseases.

"So here is the problem. What is its solution?

"The solution is to do with carrots, beets, potatoes, turnips, cabbage, spinach, and other vegetables just what we have done with figs, dates, prunes, garlic, and other fruits and vegetables—only more so. Preserve them by separating them from the water they contain, and then add the water when and where it is needed.

"This is now a very simple matter. For a method has been elaborated whereby water is abstracted from these perishable products. They are 'dehydrated,' as the process is called, and given permanence.

"Great difficulties had to be overcome in order to accomplish this, and at the same time preserve the cell structure and their original food value intact.

"But it is now possible to reduce the water content in the vegetables so that there remains no more than twelve per cent of moisture. In this state of relative dryness the bacteria that cause decay can no longer thrive and multiply.

"In order to effect this desiccation the vegetables are first sliced or shredded. Then they are subjected to the action of heated air. Air at ordinary temperatures can 'take up' only a limited amount of water, owing to the fact that it has already saturated itself from its surroundings.

"Heated air, which contains less than its maximum

of moisture, extracts this moisture quite completely.

"The result of this treatment is that all the original flavor, or food value, of the vegetables or fruit is retained, while, at the same time, sufficient moisture will have been abstracted in order to insure the keeping qualities, this, provided that the dried material is packed in tin or glass containers, or in cartons that protect it from the moisture of the surrounding water-charged air. When heated air is referred to it is understood that the air must not be too hot. The food must not be baked or roasted. It only needs to be dried out.

"The time consumed in this process varies with the character of the vegetables treated. From two to five hours is the average time of exposure, depending upon the amount of liquid the material carries.

"The more 'watery' the vegetable the longer it requires to dry it thoroughly and uniformly.

"That the process is a complete success is attested by the fact that certain families have tried the desiccated substances in their homes, and have pronounced them equal in flavor to perfectly fresh farm products.

"Indeed, many have declared that the preserved vegetables were even superior to those they had been using. This is explained by the fact that the dried vegetables were dehydrated and packed within eight hours of the time they were picked, while the ordinary, or garden variety, bought from the grocer or market man, is frequently from two to ten days 'old' before it is used, and is therefore relatively stale and 'flat.'

"Vegetables dried by this heated-air process can be profitably sold much cheaper than can the same vegetables fresh from the market stands.

"For there is no seasonal surplus. All the material from the fat, wasteful years can be dried and marketed to meet the current demand—twelve months in the year—and thus maintain a general balance in these precious foodstuffs.

"Also much material that now goes to waste, as, for instance, potato culls (potatoes which have been spoiled by the spade) can, by this process, be utilized, quite as satisfactorily as could the fresh and uninjured fruit.

"This may be hard on the hogs. But they will be more than compensated for this loss by gaining, in centralized desiccating plants, all the garbage—in the form of peelings and other food debris—that, after fulfilling its high office as an urban incumbrance, is now dumped overboard from the scows, or cremated in reducing ovens. For each desiccating plant could maintain a flock of these scavengers that could spend all their spare time transforming themselves into potential material for ham, spare-ribs and breakfast bacon.

"Fruit windfalls offer another source of supply, at present neglected, for fruit must now be hand-picked in order to meet market requirements. The present loss from wind-fallen fruit is estimated to be almost fifty per cent of the total crop.

"Yet 'windfalls' can, by the drying process, be used quite as advantageously as can the fresh fruit. Indeed, powdered dried orange and other citrus fruits are reported to have all the fragrance of delicacy of the fresh varieties.

"It has been determined that a pound of dried carrots, onions, turnips, potatoes and cabbage, prepared

in a soup, furnishes sixty adults with all the vegetables they care to use at a meal.

"It is also interesting to know that a barrel of these dried vegetables, weighing one hundred pounds, provides vegetable soup stock for a battalion of six thousand persons, and that the raw, unprepared vegetables, which make up this combination, would fill thirty barrels, and would weigh approximately three-quarters of a ton.

"The tremendous importance of all this from the standpoint of diet and economics can hardly be overestimated. This has been rather carefully worked out by George T. Renke of New York, and other food and transportation experts, who have calculated that the saving in freight charges alone, following the sensible and utilitarian plan of leaving the water at home, and adding it to the dried vegetables in other countries would amount to nineteen millions of dollars annually.

"Mr. Renke estimates that one ship, loaded with desiccated vegetables, would carry as much actual food as would fifty ships, loaded with vegetable substance plus the eighty-five per cent or ninety per cent of water with which it was originally saturated."

There are other advantages to be derived from the universal practice of food dehydration; namely, that this would provide against conditions of famine, since there would be available at all times a bountiful supply of these valuable foods.

It is interesting to note that it was in large measure through a plan of dehydration and storage of food, that the German nation surmounted the food problem incident to the great World War. Perhaps this was a part of the preparedness program of the once great

military nation. At any rate, Germany had 425 dehydration plants in 1914 to take care of any surplus of food and preserve it for future use. In this manner thousands of tons of vegetables and fruits were made available during the war which otherwise would have been spoiled and wasted.

American methods of dehydration, however, represent a very marked improvement over that used by the Germans inasmuch as the German method called for the partial cooking of the food before drying, in this way robbing it of some of its nutritive value. The Germans first partly boiled the vegetables, thus losing some of the soluble extractives, after which the food was dried at a high temperature. Much of the color as well as the flavor of the food so treated was sacrificed. In the main the German plan called for the dehydration of an assortment of vegetables suitable for the making of soup, including greens, onions, carrots, potatoes, cabbage, spinach and beans. This combination, when dried, was called "Herbswuerst." Of course, when a nation is starving, "Herbswuerst" would be a great deal better than nothing. But the American plan of dehydration is far more satisfactory from the standpoint of flavor, nutritive value and the retention of the natural colors of the foods concerned, since we do not cook the food.

Dehydration is now carried on in the United States by means of rather extensive plants, although the same work can be done by a simple device in one's own kitchen. A small domestic dehydration plant can be purchased in the open market, but for that matter, a homemade apparatus can be readily constructed if one keeps in mind the fact that a number of trays are required in

some form of a container through which the warm air will circulate freely. The portable oven which is used to place on top of a gas flame or kerosene burner for baking, is suggestive of a good method of construction, though the dehydration plant will preferably contain six to a dozen trays with plenty of air circulating space. If this is placed on top of an ordinary wood or coal range so that the air is sufficiently warm to dry the food in three hours, but without being hot enough to bake or cook it, ideal results are secured. Thereafter the food may be wrapped up in paper bundles or placed in air-tight containers.

Unfortunately, dried peaches, apricots and prunes and other dried fruits on the market are often evaporated with the help of sulphur fumes, perhaps to make the food keep better. This, however, is entirely unnecessary, and when possible one should buy these fruits evaporated by the sun-drying process or ordinary dehydration, in which case they are more wholesome. As a matter of fact, the sun's rays may be used very effectively in drying many foods.

We have said that dehydration is a present-day method of food preservation. This is not because it is new, but because we are coming back to it at the present day. Dehydration is really an ancient practice and has been in use continuously down to present times, especially in conjunction with corn, fruit, figs, raisins, peaches, apricots, apples, etc. Peas and beans are self-dehydrating. More perfect methods of dehydration will probably go far to solve not only the problems of the world's food supply, but also the vital requirements of human nutrition and health.

THE VALUE OF ACID FRUITS

By CHARLES DELMAN

OF all the foods at man's disposal, fruits, though usually accorded a nominal place in the dietary by most people, are not by any means the least important, and of these none are so effective for health-building purposes as acid fruits. Fruits have been and still are regarded by many people as in the nature of delicacies. As a matter of fact, the nutrients (proteids, fats, carbohydrates and mineral matter), though admittedly in small proportions, enter as elements into all fruits. The carbohydrates (chiefly in the form of sugars) are the main nutritive elements of fruits. Consequently, fruits are energy-yielding, and are certainly not to be despised from the standpoint of nutrition. There are many people to be met who have for a long time lived almost exclusively on fruits. Many fruitarians have become enthusiastic over the fruit diet because it has been an important factor in restoring them to health, and they continue with the diet because they have found that it yields them entirely satisfactory results. For most followers of the new ideas in health, the vegetarian diet, including all the products of the vegetable kingdom, and also eggs, milk, cheese, etc., has proven best.

This discussion is confined to the treatment of the value of acid fruits. Juicy is a somewhat less limiting term than acid, and several fruits, like the water-

melon, for example, which have no more than a modicum of acidity, can be included under the former head. Many people make no distinction of this kind, though it is a wide one. Acid fruits may be divided in three classes: those which are distinctively acid; sweet fruits; and neutral fruits in which neither the acid nor sugar predominate. Pears, grapes and melons are examples of the last class. From time immemorial fruits have been valued for the medicinal properties ascribed to them. They do indeed seem to exert beneficial effects on the alimentary tract. The organic salts contained in fruits, which make them so valuable, are needed by the body, though the exact reasons have not been fully ascertained. The most important of these salts are the malates, found in apples, pears, peaches and apricots; the citrates in the citrus fruits, namely, oranges, lemons, pomelos, and tartrates in grapes.

Although their specific action is not apparent, acid fruits are valuable in the treatment of disease. Nearly all the fruits are useful in constipation. Though the acid itself is not without value for this purpose, their cathartic and laxative effect is largely due to the waste they contain (such as cellulose and seeds), which cannot be digested, but passes from the stomach in its original form and excites the peristaltic action of the intestines, upon which the removal of the feces depends. Raw ripe apples, prunes, and most of the berries are especially valuable in this connection. Though not an acid fruit, the fig may be mentioned as being effective in costiveness. Those who suffer from constipation should therefore include fruit in their diet, and in mild cases the fruit alone may be remedial.

The juice of oranges and lemonade provide both grateful and cooling drinks in fevers.

Most fruits are diuretic in effect; that is, they promote the function of the kidneys. This is mainly because of the large amount of water they contain, but also as in the case of constipation, the organic salts and the acid of the fruit seem to stimulate the action of the kidneys. Acid fruits are also valuable in overcoming acidity of urine. This may seem a strange statement at first sight. The explanation of the action of acid fruits in this respect, given in the following quotation, is typical of that made by writers on the subject: "When these fruit juices are taken into the digestive canal, they are readily absorbed and carried with the absorbed food to the liver, where the acids and acid elements of the organic salts are oxidized, releasing the potassium, sodium, magnesium, etc., which are changed to carbonates at once, and thus increase the alkalinity of the blood; furthermore, the alkalies are soon eliminated by way of the kidneys. This accounts for the diuretic effect of the acid fruits. At first thought the idea of acid fruit juice causing the blood to become more alkaline seems paradoxical, but the fact remains and has been amply demonstrated, and when thus explained it seems reasonable." It is for this reason that fruits are regarded as efficacious in gout, rheumatism, and the like bodily states.

In some diseases, however, more particularly in diabetes, fruits are tabooed on account of the sugar they contain. There is some difference of opinion on this subject, fruits which contain but a small proportion of sugar sometimes being allowed.

It is usually advised that where fruit is used for special purposes, it had best be eaten at the beginning of the meal, and often it is of much advantage to eat it between meals. Fruit should usually be eaten raw, for the greatest benefit can be obtained therefrom when eaten in the natural state. Cooking seems to effect certain changes, though even when cooked it possesses unmistakable value, and its results in the way indicated are not entirely lost thereby. Some persons, suffering from weak digestion, can not eat raw apples without after effects, but can use baked apples without trouble.

It is no doubt superfluous to point out that, except when thoroughly ripe, fruit should not be eaten. The cramps and colicky pains with which boys are said to be most familiar, and which result from the eating of unripe fruit, are due to the large amount of starch and the woody consistency of the immature fruit. As the fruit develops, the starch changes into sugar, and becomes more juicy and acid.

Overripe fruit causes intestinal fermentation, resulting often in diarrhea and sometimes nausea.

The wholesomeness and the need and desirability of incorporating fruit in the diet are equally evident. Many people, however, who become enthusiastic over its value believe, on the assumption, probably, that there cannot be too much of a good thing, that the more fruit eaten the better, or that one cannot eat too much of it. This is a mistaken idea, for while the daily eating of fruit in moderation is a healthful practice, which cannot too often be commended, in excess it is productive of such unpleasant symptoms or disorders as looseness of the bowels and even cramps.

Of most of the fruits ordinarily obtainable there are several varieties, and of some fruits—apples and grapes, for example—there are hundreds. Fruits naturally divide into certain classes, chiefly the pomaceous group, including apples, pears, quinces, etc.; the citrus fruits, oranges, lemons, limes, pomelos (commonly called "grape-fruit"), citrons; the stone fruits, peaches, apricots, plums, cherries, olives and dates; and the berry fruits, consisting of grapes, gooseberries, currants, and so forth. Rhubarb, which is really a vegetable, is rated as a fruit.

To describe and enumerate the vast number of varieties of the apple grown would alone fill a large volume. Nor would it be of much advantage to give even a few of the chief brands that are more or less known to the "consumer," for the fruit is not recognized by means of its brand designation. Most of us are familiar rather with the different classes of apples, as green, red, russet, etc. It is to more practical advantage to learn to pick fruit for its different qualifications. Some apples are mellow, in some the acid predominates, others possess a sort of insipid sweetness, and can not be eaten in their natural state with satisfaction. Again, we cannot always choose apples according to their appearance. There are green apples, for example, which possess just the right acidity and sweetness for eating; other green apples contain but little sugar and much acid and are sour (these are excellent "cooking apples," and baked or made into apple sauce with sugar are very enjoyable). On the other hand, one is often tempted into buying a fine satin-skin, red apple, and on biting into it finds the pulp rather tough, necessitating much

"dental exercise," the tastiness of the apple hardly warranting all the effort required to eat it. Such apples had best be cooked, though usually they are more expensive than less attractive yet far better tasting apples. In such a case it is preferable to purchase the cheaper cooking apples. A certain variety of russet apples, for example, present anything but an inviting appearance, and yet are very "fine" for eating in their raw state.

What has been said of apples applies somewhat to pears. There are "eating" pears and "cooking" pears. It is out of the question to eat the hard pears, which are sometimes called "potato" pears, being of large size. The pulp is woody, and the sweetness is but barely perceptible in the raw fruit. Properly prepared the "cooking pear" can be used to advantage. The Bartlett pear is the fruit with which most of us are familiar. It is usually of good size, sweet, delicate of flavor, rather juicy than acid, and yellowish-reddish in appearance. All of the pears which are most delicious, partake of the qualities of the Bartlett pear, some brands grown being even better tasting, though not so generally met with. Apples are grown in almost every part of the globe, and there is hardly a section of this country which does not boast of its fine apple orchards. Pears are much easier of digestion than apples. Quinces are usually eaten cooked, and do not compare in value with many of the commoner fruits that could be mentioned.

The citrus fruits without doubt are one of the most important of the classes of fruits, and their uses are manifold. They comprise, as has been said, oranges, lemons, pomelos, limes, citrons and kumquats. The last two being marketed in candied form and used as

flavoring in cooking, need not be considered here. The other fruits of this class possess valuable anti-scorbutic properties; that is, are preventives of scurvy. In fact, most of the fresh acid fruits and also, it may be mentioned, fresh green vegetables, are more or less efficacious in this respect, but the citrus fruits especially so. Scurvy was prevalent on shipboard in former years, when salted meat and hard-tack comprised largely the diet of the sailor. Fresh vegetable foods contain certain properties absolutely essential for maintaining the blood and body in a healthy state, and the absence of them from the diet for any length of time is disastrous. Lemons, or lemon or lime juice are now kept in every ship's larder, although the need for it is not now existent, as fast-sailing vessels, with short trips, and the facilities for supplying fresh food have largely obviated this need.

The citrus fruits are universally regarded, and rightly, as tonics for the system. The juice of the orange is delightfully refreshing. It, above all other fruits, seems to supply just the right combination for eating in its natural state, not requiring fixings of any kind. It is best eaten so, though sometimes one meets with oranges that are sour and require the addition of a little sugar. Cutting the Orange in half across the grain will enable one to extract all of the juice. Peeling the orange and separating it into its natural divisions, as usually done, results in the loss of a part of the juice, sometimes quite a proportion of its contents, depending on the skill with which it is done and the difficulty attending the operation, and rough handling of the orange. In this way, too, can be avoided the eating

of the inner integument which adheres to the orange when removing its skin.

The pomelo, or as it is often incorrectly named, the "grape-fruit," is almost as equally desirable a fruit as the orange. Although not nearly as well known as the former, its use is becoming more and more general. There is some prejudice against the fruit because of a bitterish taste imparted to the pulp by the rind. By cutting the pulp free from this, the objection can largely be overcome. The pomelo has attained a sort of popularity as a food for breakfast. To prepare it for breakfast halve the pomelo the night before, sugar as desired, put away in a cool place, covered, of course. In this way the sugar is impregnated with the pulp and juice. Sometimes, however, the fruit can be eaten without sugar, and one must follow his own taste in this respect. The lemon is in daily common use in various ways. It is served with salads in place of vinegar, and is usually regarded as much more healthful than the latter for this purpose. It also replaces vinegar in cookery. As lemonade it forms a most delightfully cool and refreshing drink in summer. It is efficacious also in regulating the bowels. Hot lemonade for inducing perspiration and breaking up a cold is a home remedy of renowned efficacy. In other ways than as an article of diet, lemon juice has uses. It is an excellent bleach for instance, and effective for removing stains. The lime is in appearance much like the lemon, and its uses are similar. In Jamaica the expressing of lime juice has developed into a fair-sized industry, and a considerable quantity is yearly exported.

As with apples, the brands of oranges grown are

too numerous for mention. In this country oranges are grown in Florida and California, the most being produced in the former state. The seedless navel orange is the most well known of the California oranges. Blood oranges, tangerines, and mandarins are grown in both states. It is very difficult to suggest specifically as to how to choose oranges, but in common experience, it has been found that oranges with skin of smooth texture, close-grained and thin-skinned, are superior. Of course, if the peel is thick, there is a greater amount of refuse in proportion to the rest of the orange. Large, coarse-grained, thick-skinned varieties of the pomelo or "grape-fruit" are called shaddocks. These varieties are very bitter, astringent and inferior to the finer textured and smaller pomelo, and the former should be avoided when buying this kind of fruit. It is easily distinguishable from the pomelo proper by reason of the characteristics named.

While excellent apples and pears and many of the other fruits can, as a rule, be obtained in one's own vicinity, in the rural districts, oranges, apples and pomelos are not to be had so readily. An economical way of purchasing oranges, pomelos and lemons is by the box. This will be found to be much cheaper than by buying in small quantities from one's local grocer. If one is living in the smaller towns or in the rural districts, the names of reliable wholesale fruit dealers, grocers or department supply houses located in the nearest large city should be ascertained. By dealing with first-class concerns one can always be assured of fair treatment in case of lost or spoilt shipment. While pears, peaches, berries and other fruits can be kept but

a short time, oranges, lemons and pomelos can be kept, under proper conditions, from one to four or six months. However, to be on the safe side one need not buy such a large quantity as to require the maximum time, arranging only to purchase a one month's supply. These fruits will keep well in a temperature of from forty-five to fifty-five degrees Fahr., the air being kept fresh, so as to prevent the fruits drying out. When a shipment is received the fruits should be examined to insure against there being any spoilt ones. If any have become "spotted" they should be removed together with contiguous fruits, and held out for early use. The fruits should be handled very carefully to prevent bruising, of which there is the greatest danger, and packed again in their tissue wrappers. These will also help in keeping them in good condition.

Of the other fruits referred to but little need be said specially. The general statements which have been made as to the purpose and value of acid fruits will indicate sufficiently the benefit to be derived from using the different fruits as the season brings them to us.

Of the peach, it need only be said that one should avoid the green or hard peaches often sold on the market. They are indigestible and tasteless, and peaches are best done without altogether than such eaten. The fresh apricots ordinarily to be obtained are insipid and not worth using. The dried apricots rightly cooked possess excellent flavor and a pleasing tartness. One should be careful in the use of plums and cherries, as eaten too freely, these fruits particularly have a tendency to excite disorders. The berries are valuable for their acid. It is hardly necessary to point out the value of grapes.

Grapes, oranges, lemons, peaches, strawberries and raspberries are the most digestible of the acid fruits. For reasons that have never been clear strawberries, however, do not agree with some people. Raw apples, pears, apricots, melons and prunes are less digestible. Personal idiosyncrasies also determine largely fruits that are most easily digested. Grapes and oranges seem to be the fruits for invalids; as a rule, even the weakest stomachs are able to digest these fruits.

It is sometimes asked whether the skins and seeds of fruits should be swallowed. If constipation exists it is of advantage to do so. Ordinarily, however, the skins and similar matter may be rejected. It would be best, however, to avoid swallowing the pits and skins of grapes, as these are said to be especially irritating, although the old belief of grape seeds causing appendicitis has long since been exploded.

THE QUESTION OF SWEETS

By CARL EASTON WILLIAMS

TO a considerable part of the population, represented chiefly by children and young women, sugar seems to be the most important, or at least the most interesting, article of diet in the world. The multitudinous confectionery stores and the extravagant consumption of candy, by the feminine and the young is proof of this. Often candy is used in addition to an extravagant consumption of sugar at the table.

Now the question arises, are sweets good for us? If so, how much and what kinds of sweets are best?

Practical experience would seem to indicate that the excessive use of sugar and candy is detrimental. The toothless mouth of the habitual candy-sucking child, as well as the pale face of the typical "chocolate cream" girl, are regarded as convincing and conclusive on this point by everyone possessing what we are pleased to term common sense.

Yet there must be some basis for the universal craving for sweets. Undoubtedly the appetite for sweets is absolutely normal, for the reason that all normal and healthy persons have it, and the person who does not care for sweets at all is invariably abnormal. It is a curious fact that drug habitues, heavy drinkers of alcohol, and even excessive tobacco users have no taste for sweets. But all healthy people have. As a matter of fact, the substitution of candy for whiskey, or even for tobacco, is known to be one of the most valuable treatment helps in the breaking of these habits.

The fact is that sugar is a natural food and can be well utilized in the body if not taken in excess. It is a carbohydrate, and refined sugar especially is an absolutely pure "fuel food." It is so perfect an energy-producer, and in small quantities so rapidly assimilated, that it will relieve fatigue more quickly than any other substance in the world outside of an actual stimulant. Men at work and armies on the march have found that sugar or candy will quickly relieve fatigue.

Sugar, therefore, has a legitimate place in the diet when it is used as a food for purposes of heat and energy. But its weakness as a food lies in the fact that it is too much a pure fuel proposition. It does not supply any of the other bodily requirements. It is burned up in the body without contributing any of the vitamines, salts, building material or biochemic reactions necessary to normal health. After sugar has been burned up, the waste material or end products are acid in nature. In other words, pure sugar is an acid-forming food. If much is eaten, it requires a large amount of base-forming food to balance it.

Also because sugar has a cloying effect upon the appetite, it prevents one from eating the other foods that will supply these requirements. For that reason the candy-eating person is likely to be under-nourished in respect to his general nutritive requirements.

We have said that sugar is a food that is quickly assimilated, but this holds true when it is sufficiently diluted. A large amount of concentrated sugar is likely to provoke trouble and some persons cannot eat more than a very little candy, at least on an empty stomach, without producing a headache.

An excess of sweets involves a tax upon the liver. The body can only use a certain amount of sugar at a time. Any excess of the absorbed sugar, known as dextrose, must be changed by the liver back into a form of animal starch, known as glycogen to be stored up in the cells of the liver for future use. So don't ask it to store up too much. However, sugar is found in a sufficiently diluted form in those foods which naturally contain it, such as fruits, cane sap and maple sap. Honey is really the only concentrated natural sweet; it is concentrated only because the bees have done a lot of good hard work in order to make it so.

But while sugar may be used by the human system, it does not follow that it is really necessary to eat sweets. The fact is that the body is equipped with the machinery for making its own sugar from non-sugar foods, and especially from the starchy substances found in various vegetables. There is also a form of sugar known as milk-sugar, which is found in minute quantities in the milk of most animals, and in a somewhat larger quantity in human milk.

Without doubt, if we were to use sugar just as nature prepares it, and in the proportions in which it is secured in fruit and vegetables, there would be no occasion for discussing the subject. But not only is sugar highly concentrated by the refineries, but it is also so "purified" that the organic alkaline mineral salts and the vitamines are removed, and nothing but the pure crystalline carbohydrate is left. The juices of fruits, sugar cane, maple trees, corn and other sugar-containing products are in their natural state so well balanced in respect to base-forming elements that one could eat an unlimited amount

of such foods without suffering any ill consequences. The negro laborers in the West Indies almost live upon the sugar cane sap for months, and grow strong and fat as the season advances, for the reason that the natural sap contains all of the health-building elements that are removed in the process of refinement. Even when they commence the harvest season in a half-starved condition, they emerge at the end in splendid and vigorous health.

The old-fashioned brown sugar, which was a very popular table article one or two generations ago and is now again coming into use to a certain extent, is a far more satisfactory form of sweet, dietetically considered, than the white granulated sugar, which is practically without taste except for its sweetness. The very flavors that make brown sugar so attractive to the children and to grown-up children represent some of the alkaline salts which make this sugar of real nutritive value. However, the use of brown sugar was discouraged a generation ago by sugar refineries for commercial reasons. If people could be induced to use only the white granulated sugar, it was figured out, they would then of course buy their sugar through the refineries and discontinue using the brown sugar made on the cane plantations. And so, for the sake of dollars for the refineries, the interests of the health and blood of the consumers are sacrificed.

The story of the refinement of table syrups coincides very closely with that of sugar. In the old days the cane sap was boiled down to a syrup consistency and the product was known as "sorghum," which made a delightful and nourishing table sweet. Of course this

was discouraged, along with the use of brown sugar, until at the present day syrups made by the refineries are just about as unsatisfactory as the white granulated sugar. The black molasses, so popularly used for cooking purposes, represents, in the main, the material that is extracted from the cane sap in the refining of sugar. This would be all very well except for the fact that often it also contains other impurities and chemical end products used in the process of refinement.

Glucose is corn sugar, the product of the corn refineries, in which the pure starch of corn is converted into this form of sugar. It is much sold in the form of syrup and is extensively used in the making of the cheaper forms of candy—sometimes in the more expensive brands too. It is not as sweet as the granulated sugar made from cane or beets, but it has about the same fuel value. It will yield almost the same number of calories. Also it has the same disadvantages of being an acid-forming food and failing to supply other balancing elements.

Honey is really the perfect table sweet. Honey, though a concentrated sweet, is not refined in the manner of granulated sugar and appears to be more easily digested and to have a wholesome and beneficial influence under conditions in which ordinary cane sugar and candy disagree. It appears that honey does not conduct itself in the body like ordinary sugar, and probably the reason is the fact that it contains a supply of organic salts and vitamines. It has even been claimed that honey in some instances can be used by a person suffering from diabetes, and as everybody knows, sugar is the last thing that any person suffering from diabetes can

eat without disastrous results. Honey, therefore, is a healthful as well as the most attractive sweet we have.

Maple sugar, next to honey, is a very desirable sweet, for the reason that it is not refined but merely concentrated by the boiling down of the sap of the maple tree. To refine maple syrup would be to eliminate the delightful maple flavoring. In confectionery stores the pure maple sugar can usually be procured, but even when adulterated it is usually with brown sugar rather than with white, so that even then, from a dietetic standpoint, it is not objectionable. For the table, therefore, a pure maple syrup, like honey, is very desirable. Unfortunately the price is high, and therefore the poorer classes, who most need nourishing food, content themselves with corn syrup or perhaps a mixture of corn syrup and refined cane syrup.

In view of the extent to which sweets are used by the American public in combination with white bread, biscuits, denatured cereals, polished rice and other acid-forming foods, it is not surprising that sound and healthy teeth are almost unknown and that disease resistance is at a minimum.

We have said that sugar is a fuel food, used in the body to generate heat and energy. For this reason it is sometimes thought that one can advantageously use more sweet food in winter than in summer, on the theory that these foods are heating. On this point Mr. Alfred W. McCann writes:

"The facts are that foods are neither heating nor cooling. No food has the power of raising the temperature of the body to a point higher than the normal constant, 98.4 degrees Fahrenheit. No foods are cooling in

the sense that they can reduce the temperature of the body to a point lower than this same normal constant.

"Sugars become heat producers only when the body's machinery of heat control breaks down. The result of such break-down is fever. In fever the body literally burns up. Not only are the sugars of the body burned but its very tissues are burned.

"The warmth so necessary to life is produced by a slow form of oxidation supported by the foods we eat.

"In breathing we take large quantities of oxygen from the air through our lungs, provided the hemoglobin, or iron containing substance of the blood, is present in normal amount.

"Hemoglobin carries oxygen to the tissues where it is needed and carries the waste product, carbon dioxide, away. The slow evolution of heat which accompanies this process is described as the body temperature.

"In disease the oxidation or burning process frequently proceeds faster than in health. So delicately adjusted is this burning process that a slight variation of four or five degrees either way is often sufficient to cause death.

"It has been conclusively established that the circulating blood cannot carry for the needs of this burning process any sugar in excess of one-tenth of one per cent of the total volume of blood. To get more than this limited quantity of sugar into the blood circulation vital organs must first break down.

"There is an organ in the body called the pancreas which in health sets up a barrier against the entrance into the blood of larger quantities of sugar than the one-tenth of one per cent which the blood can take care of.

"Cramming ourselves with sugar in quantities never before consumed by any nation in the history of the world, we are literally overloading the pancreas, and the liver, kidneys, lungs, skin and other glands are whipped into action to dispose of the excess fuel.

"How long it takes for these glands, taxed beyond their strength, to completely break down we do not know. But we do know that sugar gluttony is one of the seven deadly sins because it is a slow form of suicide.

"Scientists have proved that in diseased conditions of the pancreas, although they do not know how such diseased conditions are established, all excess or waste sugar is eliminated through the kidneys.

"How long the kidneys can stand up under such overloading is not known. But it is known that in America kidney disease in one form or another is constantly on the increase.

"For the present it is enough to reiterate the fact that we are laying a sugar curse upon the heads of prospective mothers, nursing mothers, infants still unborn, growing children, bread-winners and workers. To lift this curse we must begin at once to exercise control over our refined sugar appetites, cutting down our consumption until the one hundred and fifty pounds per person per year is reduced to thirty pounds or less."

Coming back now to the practical consideration of the question of the use of candy, which is a very important one so far as growing children are concerned, it will be seen that candy can be either used or abused. Also it may be said that there are grades and qualities of candy, not merely so far as tastiness and prices are concerned, but especially so far as their nutritive value

is concerned. For in any real analysis of the subject, candy should be regarded as a food. If it is eaten in any quantity it should be taken into consideration in connection with the rest of the diet. As a matter of fact, if one practically eats a meal of candy, he should be content to let that take the place of a "regular" meal. It often does that automatically, since a loss of appetite follows the free indulgence of confections.

Sugar, as we know, is a fuel food. For this reason it should be eaten at meal time in conjunction with other foods instead of being used as a "palate-tickler" between meals. The ideal method of using candy, therefore, is as a dessert, following the more substantial food eaten at dinner. In other words, candy might well be used as nuts and raisins commonly are used in conjunction with an elaborate course dinner. As we have said, the chief harm brought about when children eat large quantities of candy is the loss of a normal appetite, thus preventing them from eating enough substantial food to be well nourished. In addition to this, of course, there is the tax on the liver incidental to the use of too much sugar, and the general acid-forming tendency of a one-sided diet of this kind.

It is a common habit in America for children, on coming home from school in the late afternoon, to beg pennies and nickels from their parents with which to buy cheap candies, or if these are not available, to eat cake, cookies, crullers or such other sweet food as can be brought to light during a hasty exploration of the pantry or larder. Of course, the period just before dinner is, of all times, the wrong time to eat sweets, ice cream or, for that matter, anything else. It means

that the children will come to the table without an appetite, and after picking and playing with the wholesome foods set before them, will call for a sweet dessert.

If your children must have candy, do not let them have it within two or three hours before a regular meal, though it is fairly safe after they have finished a satisfactory and substantial dinner. It might then even be permissible to allow your child to eat all the candy he desires. Two or three pieces under such circumstances will often be found sufficient. If this plan is followed there is practically no objection to the use of candy, providing, of course, that it is good candy.

Much of the confectionery on the market, especially the cheap varieties sold to school children, is made up largely of glucose or corn sugar. It may not be quite as sweet as the cane sugar candy, but it is equally far from satisfactory, being a pure carbohydrate, acid-forming in its results, and absolutely devoid of nutritive value apart from its heat or energy yielding possibilities. It is used so extensively in the making of candies simply because it is cheaper than the granulated sugar. Of course this is not saying that glucose in small quantities is harmful, or that it is in any case worse than granulated cane sugar. The point is that it is not less objectionable because it is less sweet.

Cheap candies are often unwholesome in other ways, and when highly colored have even been known to contain poisonous ingredients in connection with the coloring matter. Even though these poisons are present only in minute quantities, still one does not want to expose his children to the risk of illness or death from coal tar dyes. Some of these poisons are cumulative in the

human system. That is, the first bit of poison may not produce any noticeable effect, but remains in the system. Another bit added to that may still not cause material trouble. But when more and more is added, there is brought about an accumulation of an amount that may be capable of producing a sometimes fatal illness. Therefore all parents should warn their children against the use of cheap and brightly colored candies. There are pure candies on the market, and it behooves parents to know what their children are buying before giving them pennies or nickels for the purpose. Indeed, some very wise mothers make it a rule to supply their children at reasonable intervals with good chocolate creams or other high class confections, to be eaten only after a meal, so that the youngsters may not be tempted secretly to purchase the cheaper and less wholesome forms of candy. If it is explained to a child that the highly colored candies may possibly be poisonous or unhealthful, and that the better class of candies are more wholesome, he will usually understand and be satisfied with the better kind of candy, especially since it tastes better.

Of course, even the best candies may be objectionable, for some of them have unwholesome artificial flavorings and colorings. As a rule, however, the higher priced candies are safe and infinitely more desirable.

The objection is mainly to the straight sugar candies. Fruit and nut candies have sometimes a very high food value and may serve not only as a dessert, but as a truly important part of a meal. Maple sugar, also, is a very wholesome sweet because it represents the pure maple sap. concentrated. It contains everything in the

original juice, its extraordinarily fine flavor being merely the manifestation of those elements which give it food value. Maple sugar by refining would be made almost tasteless, and in the end would be merely sweet. Therefore maple sugar and maple syrup, when they are not so expensive as to be prohibitive, may be recommended as a real addition to a table that is arranged on a basis of health considerations.

Speaking of table sweets, if honey and maple syrup are not available it is far better to use the old-fashioned brown sugar on one's oatmeal or other cereals than the refined white sugar. As a matter of fact, oatmeal with cream and milk, like other cereals with cream and milk, are so attractive without the addition of any sweetening that anyone who has learned to eat them without sugar will prefer them plain. It is only the depraved taste which depends upon the habit of excessive sugar using that seems to call for the heavy sprinkling of sugar on one's breakfast food. Of course, there are instances in which a very sour acid fruit is improved by the use of sugar to neutralize or diminish the extreme acidity, as in the making of lemonade. It would also be difficult to make use of rhubarb, cranberries and other very sour berries without the help of sugar.

There is, of course, an advantage in the use of home made candies, inasmuch as there is then no question as to their purity. One knows what the ingredients are, especially when milk, eggs, nuts or fruits are used, and one could very readily fit in such home made candy with a regular scheme of diet, even computing the calorie value of the finished product. Of course, straight sugar creams even when home made would have no advantages

over ordinary sugar creams. But in the making of fudge, for instance, brown sugar or honey may be used in place of white sugar. Fruit candies, nut candies and combined nut and fruit candies are to be recommended just in the proportion in which the nuts and fruits are used as compared with the amount of sugar. Some nut confections have only a mere coating or film of candy and consist of ninety per cent of nuts. Glazed fruits can be recommended in the same way. Confections like stuffed dates, in which a pecan or other nut kernel is placed in the fruit instead of the pit, offer a food on which one could really make a satisfactory meal.

So far as children are concerned, the very best solution of the question of sweets will be found in the consumption of figs, raisins, dates and various fresh fruits. If Johnny is given an attractive, juicy apple when he thinks he wants something sweet, and especially if it is midway between meals, he will be as well or perhaps better satisfied than with the candy. And if father, instead of bringing home a box of candy, would bring home a box of dates, a pound of figs, or even a package of raisins, it would not only please the youngsters almost as well—and at an expenditure of less money—but it would be supplying them with foods that rank as high as any in their nutritive value.

The American public is only being educated in recent years to realize the unusual food value of raisins. The result is an increasing use of them in cakes, puddings and even in bread. Raisins have long served to give character to what would otherwise have been a more or less tasteless rice pudding. Also raisins and currants have been used extensively in the making of

cakes, sometimes in conjunction with nuts, citron and other fruits. Cakes of that character, incidentally, not merely taste good, but are good from several standpoints. Sometimes a fruit cake with an excess of suet or shortening may be a little too rich, but there will be no vitamine starvation in the case of one who eats generously thereof. From the chemical and nutritive standpoints a fruit cake needs only additional protein ingredients in the form of ground or pounded dried meat to give it a resemblance to the pemmican upon which Arctic explorers largely depend. However, raisins used in an honest whole-wheat bread are much better than when used in a cake which is excessively rich in fats and which perhaps has white flour as a basis. Raisin bread, indeed, is fortunately coming to be a national article of diet. Especially when white flour is used, raisin bread is to be recommended for the reason that the raisins will supply in large measure that which the white flour lacks.

Raisins are particularly rich in iron and are well supplied with the other alkaline mineral salts, while the large percentage of natural sugar which is developed in the growth of the grape will enable it to satisfy the craving for sweets.

Dates, like figs and raisins, seem to have a food value out of all proportion to their size and cost, if one may put it that way. In the Orient the date is for a large number of people the most important of all foods. We have been told that some of the Arabs and Turks subsist and maintain not only vigorous health but tremendous strength as well on a handful of grain and two or three handfuls of dates per day. We are told that the Hebrews extracted a form of honey from the date

and made bread and cakes from it. Also that when dried and reduced to flour, whole caravans in the desert have lived on it. Dates, in fact, have almost everything that the human system needs, except a liberal supply of protein. Dates are particularly rich in iron, phosphorus, magnesium and the organic salts of the other minerals indispensable to human life.

The problem of the use of sweets, therefore, is very simple if children are supplied liberally with figs, dates, raisins, bananas—though bananas are not always suitable for very young children—apples, oranges, grapes, grapefruit, peaches, pears, berries and fruits in general. There is good reason to believe that a child who is brought up on sweets of this kind and who has never known the taste of concentrated sugar or the modern products of the confectionery shop would enjoy infinitely better health and unquestionably far better teeth. And yet, as we have said, candy may be used as food if regarded as a part of the diet, and probably with little or no detriment if used after meals as a dessert. And, of course, one may argue, if so inclined, that candy eaten during the evening after supper, is only a delayed dessert.

HOW MUCH MEAT DO WE NEED?

By MILO HASTINGS

FOR many years protein was thought to be the source of muscular energy, if for no other reason than that the muscles are so composed of protein. This belief has been known to be erroneous for half a century, yet still it had a hold even upon the scientists who had difficulty in getting away from the idea that a hungry, hard-working man must have meat to keep up his strength.

The food chemists of our colleges before 1908 taught that a diet relatively rich in protein was the diet for strength and endurance. As a result the athletic training tables of those days were heaped high with juicy beefsteaks, ham and eggs and milk, and cheese. About this time Horace Fletcher visited Yale University and asked to be subjected to strength tests in the Yale gymnasium. Mr. Fletcher at that time was in his fifties, yet he broke strength records made by the young and vigorous athletes of the University. His endurance was far greater than that ever before recorded for a man of his age.

Mr. Fletcher, without previous training, was enabled to undergo the most severe ordeals without any resulting muscular soreness that commonly follows such a test.

Mr. Fletcher ascribed his superior condition to his eating habits, the chief distinction of which was that he practiced exceedingly thorough mastication and had developed his sense of taste until his food selection was

very different from that of the conventional American bill-of-fare. An investigation of Mr. Fletcher's diet showed that he not only was eating a great deal less food than was supposed to be essential to health and strength, but that he was also eating a smaller proportion of protein, about forty grams a day, whereas the dietary standard called for 150 grams for an athlete.

Professor Chitteden of Yale became so interested that he conducted a series of researches which gave most remarkable results and seemed to indicate that protein, instead of being of greater value for strength production than other foods, was an actual detriment, and when taken above the necessary minimum is prone to increase fatigue and lessen endurance.

This revolution in the conventional dietetic teachings was seriously and stubbornly questioned by the orthodox scientists. The Danish government took particular pains to investigate the subject and gave Professor Hinhede a laboratory for such research. Hinhede not only confirmed the findings of Fletcher and Chitteden, but went even further in the reduction of proteins and showed that a man could live and thrive for many months upon a protein intake as low as twenty to thirty grams per day, equivalent to that contained in three or four eggs.

These findings in favor of low protein have not been wholly accepted, but practically the entire scientific world has not conceded that the former dietetic standards were entirely wrong, and a much lower rate of protein consumption is desirable than was formerly considered necessary.

The question of the amount of protein, which in

practice is the question of heavy meat eating, is complicated by the fact that meat foods are highly flavored, so that people like them above all others. But because such foods are expensive to produce and taste good, the rich and prosperous people, whether individuals or nations, consume more of these foods than their poorer brethren.

The good things of life are not as harmful as we have been taught to believe, and these animal protein eating people, that is the rich, well-fed of earth, have been the successful, domineering sort. The poor ape their betters and strive to adopt their habits, and the beef eating Englishman who went out and conquered half the earth has never quite got rid of the idea that his beef was partly responsible for his power. Vegetarian arguments about the strength of the rice eating Oriental have been copiously printed, but never more than half-believed, and the prejudice in favor of meat, backed up by its good taste, has kept alive the notion that the protein foods, especially those of animal origin, were of particular value and potency.

Human prosperity and power is a thing of many causes, and we now know that heavy meat eaters eat more because they like it and can get it and are powerful in spite of that fact, not because of it. Some protein food is essential to life, growth and health; the discussion between the old and the new ideas is based not upon their necessity, but upon the amount necessary.

Protein substances are not altogether different from the other foods. In fact, three-fourths of the weight of protein foods are composed of the same basic carbon and hydrogen compounds that form starches and sugars.

When protein is eaten in excess of the body's needs, it is separated into simpler components and the fourth of it which contains the element nitrogen is discarded and excreted in the urine, the remainder being utilized as starch or sugar is utilized.

This process of discarding part of the protein eaten in excess of our actual needs is now thought to be physiologically harmful. Certainly it represents a great economic waste, for not only is the substance wasted, but it is substance that costs five to ten times as much as the substances which it only partly replaces. Both economy and health here argue to the same end—that we should eat only as much protein foods as we need and that to eat more is foolish if not actually harmful. Eating excess of protein is like burning the furniture to warm the house. Coal is better fuel and is decidedly more economical.

This question of how much protein to eat is very important to the man who would cut down the cost of living, as important as would be the question of getting coal if one was heating his house by burning tables and chairs. If you want to save money, patronize the butcher less and the cereal counter and the vegetable man more.

As protein is essential to the formation of tissue, we have been taught the necessity of a high protein diet for children.

The new born infant is growing much more rapidly the first year than at any time thereafter. Some light should, therefore, be thrown on this subject by the composition of milk. The milk from various species of animals varies widely in the amount of protein it con-

tains. The more rapid the growth the higher will be the protein content of the milk. Cow's milk is adapted to calves, which grow at the rate of a pound or more a day; therefore, when cow's milk is fed to human infants it must be modified so as to reduce the protein content and increase the sugar. About nineteen per cent of the nutritive value of the cow's milk is in the form of protein, whereas protein forms only about seven per cent of the milk of the human mother. Thus, the breast fed infant secures a much lighter protein diet than has been commonly thought necessary for the adult, yet by the theory of the greater need of protein for growth we should expect the adult to consume not a larger but a smaller proportion of protein.

In the case of young animals, for instance the young pig, the advantage of the protein diet for growth has been repeatedly proven by experiment. But the human youngster grows so slowly after the first year or two that the amount of protein needed is so small that even a child eating an average diet of cereals, fruits, and vegetables in sufficient quantity to keep up childish activities, must consume more protein than can be utilized for actual growth. A young pig may gain a pound a day and exercise no more than a young human for whom a gain of an ounce a day would be rapid growth.

It takes the human youngster fifteen years to gain a hundred pounds. Eggs are about the same composition as the human body, and in fifteen years a child eating no protein but that contained in one egg a day would have eaten six times the protein equivalent of his own body. We do not dispute the view that the

growth of the body must come from protein, but we see the fallacy of concluding that the growing child's diet must therefore contain large amounts of protein.

The above statements should not be interpreted as an argument against milk as a food for children. Milk is an all round food rich in the particular ingredients needed for growth, not only in protein, but in mineral substances. Moreover, its fats and sugars are in the most digestible and acceptable form. Let the children have all the milk they wish, but do not worry about the absence of meat or other high protein foods from your bill-of-fare on the grounds that there are growing children in your family.

The dietetic teachings now advocated as the "low protein diet" are closely akin to the vegetarianism which has long been advocated by many cults and religious sects. Vegetarianism has been argued pro and con upon the basis of whether it was the natural diet of man or not, and upon the effects of meat diet based on the supposed relation between the meat eating and the brutality of the carnivorous beast. The more scientific view would be that the meat eating animal is a savage brute because it is necessary for him to be so in order to get his living, and not that he is made savage by the effects of his food. If, during the entire history of his species, the lion had had his beef killed for him and laid out on a platter with no one to forbid his partaking of it at his leisure, it is highly probable that the lion would be as peaceable and ineffectual in a fight as a sheep.

This school of sentimental vegetarianism, while involving many unscientific conceptions, has for a long

period been gathering evidence that meat eating was not wholly productive of the excellent results that have been properly attributed to it by meat eating nations. There are examples of vegetarian and therefore supposedly weak and docile nations showing a high degree of superiority. Vegetarians as individuals have likewise shown up remarkably well in athletic competition, especially where the event depended upon endurance. In long distance races, in America and Europe, the percentage of vegetarians who finish in the lead has always been far greater than the percentage of winning meat eaters. About ten years ago, Professor Irving Fisher of Yale put this matter to a difficult trial, by taking the number of simple endurance tests of vegetarians as against meat eaters; the resultant showing for the vegetarians was highly favorable to their claims.

A strange inconsistency on the part of vegetarians is the idea that they should have "meat substitutes." But if meats are a thing of evil and not part of the natural diet of man, why have meat substitutes? It is hardly fair to accuse the leaders of the vegetarian movement of thus deliberately condemning their own doctrines. It is a more likely explanation that this idea of the need of meat substitutes was adopted by the general public who believed there was something good in both theories and that by eating meat substitutes they would gain the benefit supposed to come from meat and sidestep its evil effects. This idea was undoubtedly strengthened by the belief that large quantities of protein was essential to healthful diet. This belief never had a scientific foundation, and modern evidence indicates it to be exactly opposite the truth.

The vegetarian in opposing the excessive use of meat agreed with scientific truth in a rather unscientific way. But in practice it is not wise to omit the animal proteins altogether. In modest quantities they are desirable if not actually necessary, and for giving taste and flavor, they are essential for us who have been so long accustomed to eating them.

Nearly all vegetable foods in their natural forms have small proportions of proteins. Were it not for this fact, life upon the globe would be impossible, as all animals would then have to eat each other, a very difficult state of affairs. But vegetarian animals have a larger digestive apparatus than man. Most vegetarians get around this fact either by advocating large quantities of nuts in the diet, or by meeting the meat eater half way and including milk and eggs and tabooing only flesh foods. Others allow fish, on the theory perhaps that it doesn't hurt a fish so much to die because it isn't red blooded.

But these are sentimental and rather unscientific aspects of the question. Only a small per cent of Americans are vegetarians by conviction, and the complete adoption of vegetarianism usually involves worries and fears about getting enough protein, and especially about getting the right kind of protein. Animal proteins are the right kind, if not eaten in excess, because the tissues of animals are very like our own. Milk and eggs being created in the scheme of things for the express purpose of nourishing young life, are the best of all, and an effort to exclude them from the diet, especially the diet of children, is troublesome, if not a dangerous experiment. Moreover, milk is reasonable in cost and to

exclude it from the diet is both bad cooking and false economy.

The same over-estimation of the value of protein that has long prevailed in human food science, was in evidence some years ago in the scientific bulletins on poultry feeding. The West Virginia Agricultural College planned an experiment to demonstrate to the farmers the practical importance of the high protein theory. One lot of hens were fed corn, potatoes and corn meal. A contrasted lot were given corn, oats, vegetables, bran, oatmeal and fresh cut bone. The second lot produced double the egg yield of the first lot. And so the college proved to the farmers the desirability of a "high protein" diet.

Up in Massachusetts poultry scientists thought it well to make a similar demonstration. But these were men of fairer minds, and their wheat, or high protein, and low protein, or corn diets, both contained a reasonable variety of foods and both contained allowances of fresh vegetable and of animal food. Imagine the surprise of the investigators when the low protein, or corn diet, proved the greater egg producer. Had results agreed with the theory, one season would doubtless have finished the experiment. But as it was, the test was repeated four seasons, always showing in favor of the low protein diet—*when there was ample variety in food —hence sufficient mineral elements.*

A few years later the Rhode Island Station attacked this problem in a new fashion. It had long been held that chickens to thrive must have meat food in some form. Vegetable diets with the same percentage of protein failed repeatedly to equal the results achieved

when "beef scrap" was added to the diet. But some clear headed Rhode Islander raised the question as to whether it was the animal protein or something else in the beef scrap did the trick. So an experiment was planned in which the ash from burnt bone and calcium carbonate (limestone) was added to the diet.

And this is what happened: The chicks fed animal meal gained .864 pounds; those fed dried milk gained .458 pounds; those fed with vegetable protein only gained .195 pounds; the test lot which had bone ash added to the vegetable protein ration gained .502 pounds; while the addition of the bone ash to dried milk increased that gain to .600 pounds.

These are very significant figures and indicate that the gains noted when "animal protein" is added to the poultry yard bill-of-fare are not due to protein at all, but to mineral salts. The gains when these salts were added to a vegetable diet did not quite equal that of the beef scrap diet, but with such a striking distinction from bone ash and lime it is not unreasonable to suppose, were the added mineral constituents in more natural form their addition might have entirely compensated for the lack of animal protein.

Naturally the amount of protein needed by the human system is affected by the nature of the occupation. It is quickly apparent that a man at heavy labor can without apparent harm eat foods which would wreck the digestion of the man at light labor.

If the lumber jack eats from one to two pounds of meat per day, it is his work that makes possible such eating and not the eating of the meat that makes possible his work. The quality of food need not vary with

increased muscular activity. What is good for a man at moderate labor is still good for a man at heavy labor, but there are food elements he can eat without proportionate increase. Theoretically the body requires practically no more meat for heavy labor than for mere existence. Because cereal foods are cheaper, the manual laborer is fortunate in that the demands of his work do not require such an increase of protein as was formerlv thought to be necessary.

Extra muscular activity requires an increase of food for energy only, with the increase of labor; hence the fuel foods, pure starches, sugar and fats are all that need to be added to a diet that already has enough of the other food elements to support normal existence. In practice, in the poor man's home this means the heavier consumption of the cheapest dishes. But it is well to note that the laborer's wife and children will need the same food proportions as other people, and hence the heavy worker should partake with his workman's appetite of the low cost dishes and indulge himself in the daintier dishes only with such appetite as is expected of a man at light labor. This withholding from the head of the household the better food may seem a dangerous business in some instances, yet if we will stop to think it is what is commonly done in every household where bread and potatoes are piled on the table unlimited, and desserts served in limited and equal proportions to all. The foods that are most needed to round out the diet made of the low cost dishes will be fruits, milk, eggs, and vegetables, especially the green salads. In the family hard pressed for cash it may be well if these dishes are served to wife and children at

the noon or afternoon lunch when father is at work. Usually father won't mind it a bit, for he wants something "filling," more "coal."

EDITORIAL NOTE:—Inasmuch as the foregoing presents the conservative opinion of science today on the subject of meat requirements in the diet, it is deemed advisable for the sake of a fuller understanding of the subject to give also the viewpoint of those who champion the theory of vegetarianism. For this reason we are presenting the following statement regarding the vegetarian diet by Mr. Carrington, who has advocated this theory for many years and has written extensively on the subject.

THE VEGETARIAN DIET

By HEREWARD CARRINGTON, Ph. D.

THE question as to the benefits, or the reverse, of a vegetarian diet is one that has been much discussed. Those who are opposed to such a diet contend that, as man has become accustomed to eat meat, he should still partake of a "mixed diet," that is, one composed of meat, vegetables, cereals, salads, fruits, etc. Which of these is correct? The arguments in favor of meat may be found in any book on nutrition—the chief being that, meat being a highly nutritious and stimulating food, it is beneficial, inasmuch as it supplies proteid or muscle-forming elements—and is also easily assimilable. These facts are undoubtedly true, so far as they go; and when the patient has been in the habit of eating an excessive amount of starchy foods, or is overburdened with fatty tissue, a short period of meat diet may be found helpful. In all other cases, however, it can be shown that meat is not only unnecessary, but positively harmful. The arguments in favor of vegetarianism may be briefly stated, and the objections to meat given in a few words.

In the first place, it is absurd to contend—as many do—that man "cannot live" without meat, since a large portion of the human race actually do so, and touch meat only on the rarest occasions. In the Middle Ages meat was a relative luxury; and in our own civilization there are thousands of persons who never eat meat, or any meat product, and who are exceptionally strong

and healthy. Many athletes, undergoing strenuous physical exercise, have become converts to vegetarianism; and a series of tests, made some years ago by Professor Irving Fisher of Yale, proved that the same men undergoing the same series of tests, on a mixed diet and on one devoid of meat, showed far greater endurance and efficiency on the vegetarian than on the mixed diet.

When we come to think of it, practically all the work in the world is done by vegetarian animals. The camel, the horse, the ox and the ass all derive their food exclusively from the vegetable kingdom. If one were to harness a pair of tigers and pit them against a pair of draught horses, it would soon be seen which would outlast the other in endurance. Meat may give sudden, active strength to an animal, but for endurance and efficiency, we must necessarily choose a vegetarian diet. Ethical, moral and religious grounds aside, it can be shown, from purely hygienic grounds, that meat is not a suitable food for man. The following will make this plain:

Every animal organism is constantly creating poisons within itself. This is, of course, also true of the ox, the sheep, the hog and other animals. Some time after these poisons are formed, however, they are eliminated through the various channels or avenues of excretion—their place being taken by new poisons. Thus, at any moment in the animal's life, there is this supply of toxins within its organism. When an animal is killed, these poisons remain in the tissues, and no amount of washing will wash them out. It is owing to these poisons that meat "stimulates," since all poisons are

stimulants to a certain extent. The extent to which a food stimulates it does not nourish; and the extent to which it nourishes it does not stimulate. Hence, the argument that meat is a "strengthening" or "stimulating" food is the very reason why it should *not* be eaten. Normal food never stimulates, since stimulation means invariably an exertion or sudden effort on the part of the system to eliminate poisons which have been introduced into it.

"But," it may be contended, "meat supplies nutritious, muscle-forming elements. It must be good food on that account." Chemistry, however, shows us that the same proteid material is also contained in eggs, cheese, nuts, peas, beans, lentils,—often in higher proportion than they are contained in meat. An examination of the tables of food values, issued by the U. S. Department of Agriculture, will prove this. These vegetable forms of proteid are also free from the injurious poisons which the meat contains.

It may be true that meat is more readily assimilated than certain other kinds of protein, but we have to consider what happens *after* it enters the circulation rather that what happens before. In fact, all the important changes—in so far as nourishment is concerned, may be said to take place after the food has been assimilated.

As a matter of fact, it is, of course, absurd to contend that we cannot derive our nourishment from the vegetable kingdom, because it must all ultimately come from that source. Horses, cows, sheep, etc., live upon grass, roots, vegetables, etc., and when we eat the flesh of those animals, we simply eat the vegetables second-hand—since the flesh of these animals has been built

up exclusively *from* them. Animals do not have the power of adding anything *to* the food substances they consume; there is no "mysterious something" which animals add to the food they eat. When we eat vegetables, fruits, etc., therefore, we derive all the nutriment we need from wholesome, first-hand sources, without the admixture of toxic substances, which meat also supplies.

This is the chief reason why we should avoid meat; not only is it moral, normal and ethical to avoid the unnecessary killing of animals, but humanity is actually far *better* without meat than with it. The enormous increase of heart and circulatory troubles which have been noted of late years have been traced, beyond all question, to the rapid increase of meat eating; while cancer, which also has been on the increase very much of late, is now thought to be largely the result of meat eating, and is being treated and cured by following a strictly vegetarian and abstemious diet.

The argument that man is essentially a vegetarian animal can be supported by arguments drawn from comparative anatomy, physiology, chemistry, hygiene, and experience. Scientists are accustomed to place any animal in a certain class, according to its structure; its food habits are also known, as soon as it is placed in this class. A story is told of the great Cuvier who, one evening, was made the object of a practical joke by his students, one of whom dressed himself up as the devil; and, as Cuvier entered the door, sprang out and cried, "I will eat you!" Cuvier looked the creature over, and casually remarked, "Cloven hoofs—vegetarian—impossible!"

This only goes to show us that as soon as the com-

parative structure of any animal is known, its food habits are also known, and *vice versa.*

Now, if the structure of man be examined, with these facts in mind, what do we find? From every point of view, man is to be classed with the vegetarian —or rather the fruitarian—animals, and not with the carnivora.

The teeth, the skin, the extremities, the length of the alimentary canal,—these and many other factors could be pointed to as proof that man is to be classed with the vegetarian animals, and certainly not with the meat eating.

Many physicians will contend that man's *teeth* prove him to be carnivorous—or at least omnivorous, by nature. They will say: "Look at the canine teeth of man! These show us that man is by nature meat eating!" And they point triumphantly to the two eye-teeth in proof of this. But there is a very simple reply to such persons. There are no canine teeth in man; they exist only in the mouths of carnivorous animals and the imagination of the medical fraternity. The so-called "eye-teeth" in the human mouth can by no stretch of the imagination be called canine; far more pointed teeth—teeth more resembling canine teeth—are to be found in the mouths of the higher apes, whose food consists of fruit and nuts, and who use these large, strong teeth for cracking nuts.

Another fact: All vegetarian animals drink fluids *by suction,* while all carnivorous animals drink by *lapping up* the water. As man drinks by suction, this at once places him in the class of naturally vegetarian animals.

Again, no carnivorous animals *sweat,* while vegetarian animals do. The dog perspires only through its tongue (and for this reason he lolls it out in hot weather); the hog only perspires on its snout; horses, cows, etc., sweat; while dogs, cats, lions, tigers, etc., do not. There is a good reason for this, which cannot be gone into here. Suffice it to say that, inasmuch as man perspires, he is thus placed in the vegetarian class, as distinct from the carnivora.

Such considerations aside, however, it may be said that, from the practical point of view, better health and strength, endurance and efficiency, can be maintained without meat; and this is now becoming so well known that even athletes are beginning to take up this diet, when going into training. In a recent long distance race held in Europe, the first seven to finish were all vegetarians. Thousands of persons are now living and maintaining themselves in the highest degree of strength and energy upon this diet.

As to the vegetarian diet in diseased states: It should be fairly obvious that any diet which maintains a man in health is that which is best suited to restore him to health, when he is ill. As a matter of fact, many physicians now recommend a vegetarian diet, during convalescence, even when prescribing meat while the patient is in good health. If this diet is one which can *maintain* him in health, and is also acknowledged to be one which will *restore* him to health, it must be a fairly normal, healthful and beneficial diet to follow.

THE VIRTUES OF UNCOOKED FOODS

By ROSE SMALL HILL

UNCOOKED foods are commonly spoken of as raw foods. While the word raw signifies merely that the food has not been subjected to the action of heat, to many the term represents an unpalatable, primitive dietary. As a matter of fact, especially in the warmer seasons, a part of the daily fare of nearly all households consists of "raw" foods—and they are not by any means the least enjoyable part of the diet—what with the green salads and fruits.

There is a loss of food material in cooking, the amount depending on the method and the article cooked. There is particularly a considerable loss of the valuable organic salts, through solution in the cooking water or otherwise. So that many foods in their natural state are more wholesome and healthful than after cooking.

It has been the experience of many individuals that as a result of subsisting entirely on an uncooked diet, the desire for alcoholic beverages, tobacco and other stimulants has entirely disappeared, and that habits of overeating and other dietetic errors are overcome. Stomach and other disorders suffered before the diet was tried have been eradicated. But it has likewise been the experience of many individuals that these same results have been accomplished by the cooked vegetarian diet, and also through Fletcherism, unaccompanied by change in the kind of food used. Reasonable care in selecting food so that the diet will be nourishing,

tasteful and free from indigestible articles, the avoidance of overeating and stimulants and proper mastication will enable one to keep free from diseases that arise from dietetic errors. But diet does not solve the problem of health entirely, though it does so largely, for fresh air, exercise, sufficient rest, sleep, recreation, etc., are factors which can be disregarded only at our peril.

Cooked food is not responsible for the ills of mankind, as some protagonists of the raw food dietary would have us think. Bad cooking is responsible—but that is an entirely different matter. With many forms of food, cooking actually develops the natural flavors—notable examples of this fact being the valuable legumes, and many vegetables. Of course, if a raw food diet is followed the problem of right or wrong cooking is completely disposed of.

The raw food diet is particularly suited as a curative factor in disease. It insures the simplicity required in ill health, and is extremely valuable for regulating the bowels. Raw foods alone have been effective in remedying constipation. As a diet in ordinary health, raw vegetarian foods greatly simplify the question. We know that the foods are healthful, and the matter resolves itself down largely to choosing the different foodstuffs to yield the tissue-building and energy-giving elements—proteids, fats and carbohydrates.

The statements that have been made as to the advantages of the natural food dietary, and the advantages and disadvantages of cooked foods, are not in advocacy of one or the other, but to put clearly before the reader certain truths in the matter as the writer

sees them. The last word has not by any means been said on the subject and there is much room for discussion and difference. The value of the uncooked diet has never been recognized in "scientific" circles. Despite the experience of many persons, but little discussion of the diet is to be found except in the literature of the reform health movement.

Whatever consideration has been given by authorities has been of an indifferent sort. The subject is usually dismissed in a few paragraphs and no honest or fair deductions made, rather one-sided and prejudiced conclusions being reached. But as there is a growing following in favor of the raw diet, there will be in time a thorough investigation of the value of the exclusive raw diet.

It will be of advantage in making suggestions to divide them under two heads; for those readers who, while not caring to discontinue cooked foods entirely, desire to use them together with uncooked foods; and for those who wish to follow an exclusive uncooked diet.

The mixed cooked and uncooked diet admits of as wide selection as the ordinary diet largely made up of cooked food. For the nourishing part of the meal among the cooked foods are the dried legumes, cereals and eggs; in those valuable for their organic salts: asparagus, beets, cabbage, cauliflower, carrots, corn, fresh green peas, spinach, summer squash, string beans, turnips. Among the uncooked foods, milk, cheese, butter, nuts, olive oil supply nourishment, and for their healthful qualities there are a great number of berries and other fruits from which to choose, dried fruits, various green vegetables: lettuce, radishes, tomatoes, etc. This

is not to say that the succulent green vegetables and fruits mentioned as valuable for organic salts chiefly contain no nutriment. The division made is merely a relative one, and is suggested to enable the reader to select foods which will form a well-balanced meal.

For instance, the breakfast on this plan of diet might consist of fruit in season, an egg, milk, and bread and butter. This will be a light, yet thoroughly satisfying repast. The second meal should be somewhat more substantial; it may consist of one of the foods giving under the nourishing cooked list, a combination salad of lettuce and tomatoes with olive oil and lemon for the dressing, a fruit for dessert, and bread and butter. The menu can be varied to perfect satisfaction each day, as in the diet consisting chiefly of cooked foods. In the very hot days, meals composed mostly or exclusively of uncooked foods will be a grateful change for the members of the family. It will save the housewife's energies, as the work in the kitchen during the summer is more exhausting than at any other time of the year. The "dog days," especially are a time when it is of advantage to follow a simple diet—in fact, at this more than any other season, it is absolutely necessary that care in diet be exercised. Even to a healthy individual the excessively hot day is a tax on the system, but one who is physically below par, or who through unhygienic habits burdens his system, wilts under the heat like a plant lacking water in the sun.

Those who are entertaining the idea of living on the exclusive uncooked foods may ask, "How shall I determine what foods to use in this diet?" The answer is, those foods that we relish in their natural state; all

fruits and most of the green and succulent vegetables, nuts, milk, cream, butter, cheese, and honey.

Besides the uncooked foods which have been enumerated in connection with the diet of cooked and uncooked foods, the raw dietist uses cereals and eggs in their natural state. In the spring and summer, too, such vegetables as carrots and turnips are young and tender, and can be enjoyed raw. The fresh green peas are also very tender and sweet in their natural state. Many people have a distaste for raw cereals. This is probably due chiefly to prejudice, to being unaccustomed to eating the food in this way, or to the mental attitude which results in developing the distaste for the raw grain. Such persons invariably enjoy a raw food diet restricted to nuts and fruits. In the initial practice of the nut and fruit diet, it is sometimes found that more bulk is desired. If the individual does not like the "breads" prepared from the raw grains, the baked whole-wheat bread with butter will furnish the bulk required to satisfaction. Steamed or slowly cooked whole wheat grains served with butter will also furnish this bulk. It may be felt by ardent nut and fruitarians reading these suggestions that no such need should be felt, and therefore disapprove of these remarks. Habits are such, however, that we can not break away from them at once, and when persons have been accustomed to bulk in food, the nut and fruit diet may seem somewhat slim at first.

It must be remembered that all changes in diet under ordinary conditions should be made slowly, as radical changes are causative of distress. It is better to be flexible in one's attitude toward a given diet and yield

a point occasionally by using foods one has been accustomed to in the past, than to be forced to give up the attempt to change because of an unsatisfactory experience caused by holding too strictly to the letter of the new diet. It is always best to feel one's way. These precautions are suggested for those persons who find that they can not make changes in diet without discomfort, for there are many who have made changes of this kind without much, if any inconvenience, and who in the light of their own experience may consider these cautions as but "alarmist" warnings. And of course, it will be understood that the statements have application only to individuals in health. It is hard to make absolute statements in matters of diet that apply equally to all individuals. A tolerant attitude is necessary and every one must gain his own experience.

To revert to the matter of using cereals in the uncooked diet: it may be well to point out that the prepared cereals ordinarily sold are not altogether suitable for the uncooked diet, as many of these products are more or less cooked when they reach the consumer. The specially prepared uncooked grains should be obtained.

If raw cereals, or any other raw food is found unappetizing or distasteful, despite repeated attempts to accustom oneself to them, one should not force himself to eat them just for the sake of consistency to the raw food ideal. Food that is not palatable is often "choked down," and no benefit is gained and harm results from eating food that is not enjoyed, particularly if there is a decided revulsion against it. The ideal in diet is to eat food which nourishes one the best, and is at the same time most enjoyable—any ideal of which this is not basic

but exists merely for itself, is anything but ideal, and is just a stupid fad.

As a sort of formula for making meals of uncooked foods, the examples that follow may be helpful. Breakfast, for instance, might consist of a cereal, fruit, milk or an egg-nogg. A nourishing and tasteful dinner would be a cake or two of uncooked bread, some cheese, a vegetable salad, a few nuts and some fresh fruit. The menus and recipes given of uncooked foods will suggest ways to vary the meals and combine them so as to form well-balanced meals.

One objection raised sometimes to serving milk over the cereal is that the liquid tends to cause the small flakes to slide down and escape mastication. This is an objection that some raw food dietists have against the use of soups and other liquid foods. The increased palatability given to the cereal by serving milk or cream over it more than overcomes this objection, and by adding the cream just before serving, the crispness of the cereal can be preserved.

One can not but wonder at those enthusiasts who insist that we should not depart one step from what they are pleased to call the "natural way," and in illustration point out the dietetic and other "natural" habits of the ape as worthy of emulation. With a zeal worthy of a better cause they decry preparation of food, the use of clothing, etc. It seems to me their dogmatic belief that they are right in interpreting Nature's way partakes of arrogant assumption. It may have been all right for our simian ancestors to eat their food as they found it, for primitive man to eat such poor herbs and berries as he could pick up—they were driven by stern

necessity, but we are ages distant from that period. In the process of time we have developed refinements. Besides bodily needs, food must satisfy esthetic ones—in appearance, taste, smell, etc., it must appeal to us. Neither the monkey nor primitive man knew of such things—they had not evolved so far. Many foods are perfect in their natural state. Honey, milk, cream, nuts, fruits can not be improved upon. They can be eaten just as they come to us without further preparation. Cereals, on the other hand, are lacking in any pronounced flavor. Therefore, the addition of dates, figs, raisins, nuts, milk, or cream, or olives is actually helpful, since the cereals will be eaten with so much more relish. Fruits can be best eaten in their elementary state, and though they are delicious combined in many ways in the form of fruit salads, this is not really necessary.

There is no good reason why the uncooked diet should be monotonous. The sheer simplicity of the diet can be retained, its palatability increased, and greater variety afforded through suitable preparation.

MILK—PERFECTION IN FOOD

MILK is the most perfect and the most indispensable food in the world. It is the one food that civilized man could least conveniently get along without. It is the ideal food for babies and children. Although there has been some question as to its suitability for adult life, and although there are a few persons here and there who do not like milk and claim that they cannot drink it—eat it would be the better word—yet there is probably no one who does not owe the fact that he is now alive to the use of milk at least during a certain period of his life.

Practically the world over the milk of domesticated animals has been used as supplementary to the human supply available for early babyhood. One of the great drawbacks to human life on the American continent previous to settlement by the white race was the lack of milk-giving animals. The North American Indians were in the same position in this respect as the Eskimo. If the squaw mother did not have an adequate supply of her own milk until the papoose was able to live on other food, then it went very hard with the latter. However, it is the way of nature to respond to vital demands. We are told that many Indian mothers nursed their young for long periods, even up to two or three years of age. Nevertheless, there was a high infant mortality which prevented the rapid growth in numbers of the population.

It may be noted that milk is the only food in the

world produced and intended by nature for a food, unless we accept the rather arrogant theory that the entire universe was made to serve only the purposes of mankind. Other living things and substances may serve as objects of nutrition, but may be considered to have been designed by Nature to live their own lives rather than to serve merely as the prey of other creatures that might feed upon them. For instance, man eats beef. Likewise the shark eats man. But probably the steer was no more intended by nature as food for man than man was intended as food for the shark, or than one man was intended to serve as food for another who is a cannibal. The lion may eat a lamb, or a cat may eat a bird, and yet neither the bird nor the lamb was intended primarily for food any more than man was intended as food for a tiger. Each was probably intended to live its own life and work out its own scheme of existence.

Even eggs, nuts, fruits and seeds, while essentially of a nature intended to provide concentrated nutrition, are not designed primarily as food for animals, but to supply the essentials of growth necessary for the development of new life in each respective species; so that even though eggs may constitute a practically perfect food, it is milk alone in the entire scheme of available nutritive substances that was intended primarily as a food, and that really for the young of the particular species yielding the same.

However, mankind, with a genius for making use of the things found in this world, has developed the milk-bearing capacity of the cow until a tremendous surplus is available for human consumption. It is said

that some thirty gallons per year are consumed by every man, woman and child in the United States. In Asia and parts of Russia mares' milk is extensively used. In the Orient the camel and dromedary contribute in this way to the nutrition of the population; in India, the buffalo; in South America, the llama; and in the Far North the reindeer help out in the diet of the human race. In Switzerland and other mountainous countries, including, to some extent, even parts of the United States, goats' milk is widely used. But for capacity production the good old-fashioned cow so familiarly known to us all presents the greatest and apparently the most economical food-factory in the universe.

Considering its nutritive value, milk, even when at high prices, represents the most economical of all foods, particularly where the diet of children is concerned. Considering not only its content of protein and fat, but also the vitamines and mineral salts with which it is charged, there is no other food that will give so much for so little. Though milk is seven-eighths of water and one-eighth of solid food matter, yet that one-eighth represents the most concentrated and valuable combination of food elements that one can possibly find. In making comparison with other foods, it should be remembered that water forms a high percentage of most of them. Vegetables, for instance, average something like nine-tenths water. Breast of veal, the edible portion at least, contains seventy-three per cent of water; leg of lamb contains sixty-three per cent of water; breast of lamb, fifty-six per cent; fresh ham contains sixty per cent, and even lean smoked ham, partially dried out, contains fifty-three per cent of water, while lean beef con-

tains sixty-seven per cent. You may see, therefore, that even though milk is seven-eighths water, the percentage of protein, price considered, compares more than well with meats in this respect. While meat affords only protein and fat, milk supplies every element needed in the human body.

Milk and eggs are the two richest lime foods. But in addition to lime and all of the other organic mineral salts found in and needed by the human system, milk contains the all-important vitamines, in the fat of the cream the fat-soluble A and in the whey the water-soluble B. The supply of these vitamines seems to be inseparably associated with the processes of growth, especially as regards the fat-soluble A. (See the chapter on vitamines for more detailed consideration.)

Milk, however, while nature's best food, was never intended by nature to be used hours or days after its production. It was intended for consumption on the very instant of its being given forth, and the more closely one approximates that scheme of consumption the greater the merit of the use of milk. Milk should be used, if not absolutely fresh, at least as fresh as possible, speaking in terms of hours. Since this is not generally possible for people who live in cities, milk is kept fresh by keeping it ice cold. Unfortunately, while milk is the best food for babies it is also the best food for bacteria. It is this fact that causes milk to sour quickly, although in this natural souring process there is produced a milk product or rather a form of milk which is for most purposes as valuable and sometimes even more attractive than the original fresh article. Clabbered milk is as widely used the world over as fresh milk.

It is to overcome the tendency of bacterial growth in milk that pasteurization has come into extensive use. It is regarded as a necessity in connection with the use of milk in cities where there is an unavoidable delay, sometimes amounting to a couple of days, before it is delivered to the consumer. Some of the milk used in New York City, for instance, is brought from Maine, or even from Canada, and may be delivered to the consumer some forty-eight hours or more after our good friend Madam Cow has done her part in giving it to the world. Pasteurization is intended primarily to make milk safe through the destruction of bacteria which might otherwise develop into families of many millions, but it also serves the purpose of keeping milk fresh in respect to its normal souring tendency. Pasteurization not only destroys disease bacteria but the milk-souring bacteria which produce lactic acid.

All of these facts are available in many text books dealing with the subject of milk. They are also given out in bulletins issued by most local Boards of Health. There is no question that unpasteurized milk, especially that which has been handled much, as is inevitable in the case of the supply of milk to great cities, is unsafe. Pasteurization is the safest plan since it destroys most of the disease bacteria; and yet pasteurized milk unquestionably lacks some of the virtues of fresh milk. If you can procure clean, fresh milk, it is infinitely superior to the pasteurized. That is why certified raw milk is especially recommended for babies and is extensively prepared and sold for babies. "Certified" milk is simply good, clean, raw milk that has been produced under particularly clean and sanitary conditions at some dairy

in which only healthy cows are used for the purpose. In other words, the conditions under which the milk is produced are certified by public health inspectors to be ideal. This milk also is usually brought from nearby points so that it may be served to consumers with the least possible delay.

It is found that the use of pasteurized milk, as an exclusive diet for young infants, is commonly followed by scurvy and other derangements. In some cases it is conducive to a tendency to constipation. Apparently the use of heat, even to the extent of one hundred and fifty degrees for half an hour, which is the lowest temperature at which satisfactory pasteurization is accomplished tends to destroy the vitamines contained in the milk. Many babies, after having been fed with satisfactory results on fresh raw certified milk will almost immediately show distress signals when the diet is changed to pasteurized milk. This result fortunately can almost invariably be counteracted in large measure by the supply of vitamines from some other source, preferably in orange juice. Oranges yield a very mild and agreeable form of fruit juice that is especially well provided with vitamines. The stomach of a very young baby can tolerate and digest orange juice, particularly if it is a little diluted with water. The orange juice will supply the vitamines lacking in the pasteurized milk, the combination making practically an ideal diet for the city baby.

The same consideration applies in a practical way to the use of pasteurized milk in connection with the exclusive milk diet. There is no question that clean fresh milk is ideal for this purpose, but when this is

not available, one can usually get satisfactory results by using plenty of orange juice in connection with pasteurized milk. Lemon juice, which can usually be taken easily if diluted, is also richly supplied with vitamines and is a splendid scurvy cure or preventive. It is very suitable for use with the milk diet because lemon juice strongly counteracts any tendency to nausea, which one may develop when using large quantities of milk, and it serves especially well to sweeten the mouth. An acid fruit juice always stimulates the flow of the saliva, through this reaction ultimately establishing an alkaline condition of the mouth, since the saliva is strongly alkaline.

The most scrupulous care is always necessary in the handling of milk. Whether kept in glass bottles, milk pans or pitchers, all of these containers should be very thoroughly cleaned. Even after thorough scouring it is well that they should be scalded out with boiling water. No end of trouble with babies has been the result of unsanitary methods of handling rubber nipples and nursing bottles. If there is a baby in the house requiring the use of these they should be sterilized by boiling once each day. This requires very little trouble, but a sick baby involves sometimes a great deal of trouble, anxiety and possibly heartaches.

Pasteurization, while most effectively done in large plants especially equipped for the purpose, may also be done at home by use of a "double boiler" method of heating the milk. In other words, bottles containing the milk to be pasteurized should never be exposed directly to the heat, but should be placed in water that is warmed to the right temperature. For this purpose

a wooden rack or other form of container for the bottles that will permit them to be placed in the water without touching the bottom of the pan, may be arranged. There should be provision for keeping a thermometer in the water, which may then be heated to one hundred and fifty, one hundred and fifty-eight or even one hundred and sixty-five degrees, as determined upon, and kept just at that temperature for from twenty minutes to half an hour. This means that the milk contained in the bottles can get no hotter than this and will be properly pasteurized. After gradually cooling it should be placed on ice and so kept.

The importance of milk in the human diet is shown by the extensive use of butter, cheese and buttermilk. Any one of these alone may be rated as among the most important items in the world's food supply. Cheese is to be regarded as an adequate meat substitute under all circumstances, being a rich and highly concentrated protein food. It may be made the basis of the protein supply not only in a sandwich, but in any meal in which it is served. Innumerable cooking recipes make use of cheese in this manner. Perhaps because it is so concentrated it has the reputation in some circles of being hard to digest. This may be because of a tendency to eat too much of it, or it may be the result of a lack of sufficient mastication. Where cheese is really found hard to digest, naturally, the only sensible rule is to eat something else. The majority of people, however, may include it in their meals without regret and with great appreciation of its palatability and a full realization of its nutritive value. While the somewhat too fragrant cheeses of Europe are undoubtedly easy to digest and

perhaps have lost little of their nutritive value, it appears that the instincts of the human race, in America at least, are tending more and more to the use of cheese that is fresh and wholesome and that derives its flavor from the food material derived from the milk rather than from the products of bacteriological development, as in the case of the well-known delicacy bearing the name of Limburger, and others of the same classification.

Apart from milk itself, butter is the one great food for which we have to thank the cow. There are still families in which the free use of butter is deprecated either on the ground that butter costs too much, or because it is a rich form of fat, and therefore presumably to be used sparingly. Of course there are many abuses concealed under the name of butter. But good, fresh dairy butter is, aside from cream itself, the most nutritious and most palatable form of fat that one can eat. If it is more palatable it is more to be welcomed by the digestive apparatus and more easily assimilated than any other fat. Considering also the fact that it contains the vitamine "fat-soluble A" so indispensable to growth, it will easily be seen that there can be no greater mistake than to stint children on the use of butter with their bread. If little Mary and little Johnny like to spread the butter pretty thick on their bread, one may permit them to do so with the full assurance that it means all the more satisfactory growth and a better resistance to disease. When the neighborhood children are down with diphtheria and whooping cough, you can depend upon it that Mary and Johnny, each of whom consume at least a quart of milk per day with

considerable butter added, will either go untouched through the epidemic, or if they contract any such disease will fight it off so successfully that they will have it only in a light form, for a short time, and with the very least inconvenience.

It is for these reasons that butter substitutes are not always to be recommended as equally as valuable as butter, even when they have a satisfactory palatability, as the best of them undoubtedly do have. If butter substitutes are used, they should be used only in part. Among the best of them undoubtedly are those prepared from nuts.

BUTTERMILK—THE LONG LIFE FOOD

BUTTERMILK is used the world over both as a beverage and as a food. It has long been used to take the place of beer and in that way has had an extensive sale over the bar as well as at the soda fountain. However, it properly should be regarded as a food, inasmuch as it is one of the most nourishing articles of diet in the entire list of nutritive substances.

Buttermilk forms the mainstay of the diet in parts of Asia, mares' milk and camels' milk being the sources of supply there. It is credited with being the chief reason for the much-heralded longevity of the people in the Balkan mountains. Also we are told that in parts of Ireland the maidens develop the very maximum of beauty and vigor, with the most exquisite of rosy cheeks, on a diet which consists of little more than potatoes and buttermilk, the potatoes supplying energy and the buttermilk supplying protein and the organic salts. Incidently, if you are ever forced to the extremity of a very economical diet you will find this combination both palatable and adequate for a considerable period of time.

Buttermilk is highly recommended for two reasons, the first being its very high value as a food and the second being based upon health-giving qualities aside from its nutritive excellence. It has long had the reputation of being good for kidney trouble. It has also the reputation of helping to clear the skin, either when taken internally or when externally applied. It is

widely recommended to relieve inflammatory affections of the urinary passages. It is used as a diuretic and is also sometimes prescribed in the treatment of certain forms of heart disease with edema. The curious thing is that all of these claims seem to be fairly well justified. It may be that the good effect in connection with kidney trouble and inflammation of the bladder is partly the result of the increased use of water, this water, of course, forming such a large part of the composition of the buttermilk. At all events, generally speaking, there is a widespread tradition that "Buttermilk is healthy," meaning healthful; or that "Buttermilk is good for you;" or "Good for your blood."

Buttermilk probably received its biggest boost at the hands of Metchnikoff, the former head of the Pasteur Institute in Paris, who recommended it as a remedy for the condition known as old age, and as a means of prolonging life. Metchnikoff's studies led him to the conclusion that the reported longevity of the Bulgarians was due to their abundant use of sour milk, and he undertook to explain the phenomenon on the theory that the lactic acid bacteria found in buttermilk tend to purify the alimentary canal. Poisons are generated in the intestinal tract and particularly in the colon through the action of various putrefactive bacteria, some of these poisons being very active and violent in character. The condition known as old age, Metchnikoff declared, is largely the result of the poisoning of the body through the absorption of these toxins so generated in the colon. The lactic acid forming bacilli in sour milk, by warring with the poison-producing bacteria in the intestinal tract, tend to counteract this poison.

Unfortunately, Metchnikoff himself died at the age of seventy-one, which was presumably far from what he would have regarded as a ripe old age, though it must be said that his death was probably not related in any way to conditions affected by his theories in reference to buttermilk. At all events, by encouraging the use of buttermilk, which at least is a nutritious and health-giving food, he undoubtedly accomplished a great benefit for the human race. It is possible that the lactic acid bacilli are no longer active by the time they reach the colon, though it is now thought that they do prevent a multiplication of the pathogenic germs in the upper intestines and thus may be of some real service in the direction of Metchnikoff's claims. But by way of combatting the poisons absorbed from the colon and produced there by the putrefactive bacteria, it immediately occurs to the person who is not a scientist but only an ordinary human being that the most effective preventive treatment is the maintenance of regularity of function. If one will completely avoid any tendency to constipation he need have no fear of the ill-effects about which the great scientist was so much concerned, and it is easily avoided by the plentiful use of fruits, vegetables, greens, whole grain, and other natural foods in conjunction with a fair amount of water drinking, exercise and such habits of life as will maintain vigor or functional tone in all of the organs of the body.

The term buttermilk is now rather loosely used to describe two different sour milk products, both of which have a similar flavor and can be recommended. The original buttermilk was and is that fluid residue which remains after the churning of butter out of cream. This

product is very popular down on the farm with the small boys, the hired men and the hogs. And it is good for them all.

Through some laxity of terminology, however, ordinary sour milk has come to be widely sold and used under the name of buttermilk. Apparently it was found that people who like buttermilk could be offered plain clabber or sour milk without knowing the difference and buttermilk is a much prettier name than sour milk.

Any fresh milk left by itself will turn sour. In a warm room it will become clabber in two or three days. In a cool room it will take longer. This change from fresh sweet milk to sour milk is the result of a culture of a colony of bacteria which produce lactic acid. The change is a wholesome one and the product is a wholesome and beneficial food. There may be other bacteria present in the milk but the lactic acid bacilli apparently get to work first, create a culture, and the result is sour milk which may be sold over the counter or by the milk dealer under the name of "buttermilk." It is probably a better product from the dietetic standpoint than the true buttermilk taken from the churn, for the reason that in this cultured milk one has all of the ordinary elements found in the fresh milk. Of course when it is made from skimmed milk there is lacking most of the fat, which was removed in the cream.

There are a great many people who cannot relish fresh milk but who enjoy buttermilk. As to its digestibility, there is much to be said, for the reason that the protein in buttermilk, through the souring process, is split into millions of infinitesimally small fragments

which make it the more easily susceptible to action by the gastric juices. In the fresh milk the protein is first reduced to curds in preparation for digestion. Your young baby will sometimes accommodate you by offering for inspection some of this ready to digest curded milk. In buttermilk, the digestive secretions act upon it at once and without difficulty even in a weak stomach.

To procure good buttermilk, it is usually best to make it one's self, using a culture either of perfectly fresh milk or of clean, wholesome pasteurized milk. If you have fresh, raw milk it will be sufficient to cover it and let it stand in a moderately warm room two or three days. The thick clabber can then be stirred into a light frothy beverage with an egg beater. But this method will not apply in the case of pasteurized milk for the reason that the very process of pasteurizing kills the milk-souring bacteria along with other disease breeding bacteria. Indeed it is doubtful if any wholesome true buttermilk can be produced from pasteurized milk simply by letting it stand. The chances are that instead of souring it will rot. Therefore, in order to make good buttermilk from pasteurized milk one should introduce a culture of the lactic acid forming bacilli. This can be accomplished either by introducing a spoonful or even a drop of a good sour milk, or what is usually more convenient, by using a tablet or even a part of a tablet of a milk-souring culture prepared and sold for the purpose.

For years after Metchnikoff's claims were presented to the world many concerns specialized in producing cultures of the specific bacteria found in the sour milk of the Balkan mountains, offering these to

the general public in dried tablet form. In other words, these tablets are supposed to produce the identical Bulgarian sour milk. Whether this is true or not, they certainly give one a good cultured milk and the tablets are sold at trivial cost. To use pasteurized milk that has been left to sour on its own account leaves one open to the possibility of using a culture which may contain a variety of bacteria, some of them possibly of the putrefactive kind and harmful. However, to the cultivated taste the flavor of the milk may be depended upon as a fairly good guide in this connection. It is well to follow the practice of the animals, who follow their instincts and always refuse to eat or drink anything that does not taste or smell absolutely fresh and sweet and wholesome.

THE DIET OF CHILDREN

CORRECT diet for children is even more important, and faulty diet is even more serious, than in adult life, vital as it is even in the latter case. Children need not only food to maintain their strength and energy, but they need building material with which to grow and build sound, sturdy constitutions that will serve them from four to five score of years.

Many parents err not merely in regard to the kinds of food they give their children, but especially in the manner in which they are fed. While it is true that children vary greatly in respect to appetite and capacity, some of them being extremely fastidious and dainty in their attitude toward food, and others apparently capable of eating ravenously, not only at meal time, but almost continuously between meals, yet the fact remains that regularity and system are most important in the feeding of all children. There should be no piecing between meals, unless perhaps in the matter of fresh fruits, which are usually stomach-cleansing and have no detrimental effect. The use of other foods, however, and especially the use of sweets between meals, will in most cases destroy the appetite so that the child only toys with his food when he finally comes to the table. Thousands of mothers complain of the inability of their children to eat heartily at the table, even while forgetting that these same children have stuffed themselves only an hour or two before.

It is quite a common practice among children to

"piece" upon coming from school. If actually hungry at this time, a cup of milk might be unobjectionable, but fruit, if anything, should be preferred. Many mothers are afraid that their children may actually become hungry, whereas this is exactly the condition that one should strive to have children acquire at about the hour that mealtime arrives.

If your child will not eat, make sure that the meals are far enough apart and that there is no nibbling between meals, and you will find that a cure is automatically brought about. If a child is still too dainty and fastidious at the table, the omission of a meal occasionally will work wonders with the appetite. In the case of a young child who consumes a large amount of milk, it need not be surprising if he does not eat a large amount of other food, and, of course, there is nothing better than milk.

There is an important consideration to keep in mind in connection with the child that seems to have an insatiable appetite, the child that never gets "filled up," but apparently wishes to eat all the time. While it is true that tape-worm is sometimes to be suspected in a case of this kind, yet the suggestion is more often than otherwise intended humorously. The chances are that this constant desire for food is due to the inadequate character of the food used. There is no child in the world, no matter how hearty his appetite, who cannot be properly fed and perfectly nourished on three meals a day with rigid restraint from eating between meals.

One hears much talk about the undernourished condition of the children of the slums in the great cities,

it being assumed that these youngsters do not get enough to eat. The facts are that these children, instead of not getting enough to eat, are usually eating all the time. The trouble is with the kind of food they eat. One will find them on the streets at any hour of the day or in the evening munching doughnuts, cookies, buns or even bread and butter, the butter probably oleomargarine at that. Feeding upon trash like this, both during and between meals, it is no wonder that these children still feel the need for real food and are always hungry. Contrasted with them one may notice that the children of the well-to-do playing in the parks of the city are never seen with food between their meals. They are usually fed with a satisfactory variety at meal time and never need to eat between meals, nor are encouraged by their elders to do so.

As to the facts about the undernourished condition of the children of America, generally, there is no doubt that their poor teeth, the extent of childhood diseases, the high mortality rate and the percentage of those who arrive at young manhood unfit for army service, all demonstrate the need for improvement in the diet of our children.

Among the most vital facts in reference to this subject, are, first, the fact that properly fed children will grow, and second, that properly fed children will not get sick. The metabolism of children is very active if they are supplied with the food elements necessary to maintain their blood and tissues in normal health. They will defy disease of every description and will continue to enjoy steady, unfaltering growth, perhaps not like that of weeds, as their elders often fondly like

to state it, but at least like healthy, vigorous animals. A record of the weight and growth in inches of every child should be carefully kept to make sure that there is no gap in the process of continuous and steady growth. If there is a period in which growth does not proceed, then you may know that there is something wrong, and usually it is the diet. In such a case the question of adenoids and diseased tonsils may be considered, the teeth should be examined, and especially the requirements of open air life and sleep should be considered. But, as a rule, the fault is in an inadequate diet.

We quote from Mr. Alfred W. McCann, the noted pure food crusader of the Now York Globe, writing in the Physical Culture Magazine on the subject of "Foods That Keep Children Well," and pointing out in particular the conditions that make young children seem old.

"We now know that certain kinds of food will produce chemical changes in the human tissues of the same kind that are brought about by fatigue. These changes interfere with the activity of every gland. They destroy the capacity of muscle and nerve to perform the work natural to them. Their chief symptom is depression where there ought to be buoyancy and high spirits. Their chief effect is the destruction of the natural forces that tend to protect the body from disease.

"Nerve fatigue is the same as muscle fatigue and the same causes, over-exertion or undernourishment, bring about both. Age is simply a state of chronic fatigue. Happily young children can be looked upon as merely in a state of temporary age when, through faulty food, they are fatigued.

"The right kind of food will restore the flabby tissues, remove the tissue poisons and bring back the lost resistance.

"There are four men who ought to have monuments erected to them at every place in the world where the parents of children congregate. These four men are Weickhardt, Ranke, Mosso and Lee. They have shown that fatigue poisons are acid in their reaction, a fact which accounts for the acid reaction of fatigued muscles as distinguished from the reaction of healthy muscles in repose, which is always alkaline.

"In the healthy body the acid poisons of fatigue are quickly neutralized by the normal alkalinity of the healthy blood which passes through the fatigued tissues and carries the acid poisons away. The fact that the alkaline salts are removed from most of the foods served on the American dinner table has never been heeded by the medical profession as a body.

"These alkaline salts belong to children. When children are robbed of them they are murdered. The whole gospel of fresh air, hygiene, sanitation, corrective exercises and bathing becomes a farce and remains a farce wherever natural food with its alkaline salts is ignored.

"Changes in temper, irritability, fretfulness, depressing anxiety, loss of physical courage, loss of mental energy, loss of health, strength, stamina and endurance all accompany the loss of these alkaline salts.

"No wonder children are condemned to premature age, when worn-out business men cram themselves with refined foods that no owner of a prize animal would permit in his kennel, stable or stock farm.

"No wonder many a highly developed mind breaks down in the midst of its unfinished labors, solely because with all its intelligence, it still ignores the fundamental physical needs of the body which sustains it.

"If there were anything complicated or mysterious about the nature of tissue sweeteners one could forgive over-taxed humanity for throwing up its hands in despair and crying out: 'This problem is too vast for me to solve.' But no such difficulty stands in the way of providing the child with all the foundation stones on which healthy life is built.

"The tissue sweeteners that correct the acid poisons of fatigue, whether physiological or pathological, are the alkaline salts found in all the ripe fruits, succulent vegetables and greens, milk, egg yolk, beans, peas, whole wheat, whole corn, and whole cereals of all kinds.

"If man were a grass-eating animal he would obtain all the alkaline salts he needs. He doesn't think he is a grass-eating animal so he spurns the food of Genesis. Yet every time he eats asparagus, lettuce, spinach, dandelion, etc., he eats grass.

"Even cabbage and cauliflower are forms of grass and contain chemically and physically about the same substances as are found in grass.

"What kind of bread do these 'old' children, these little prematurely aged and worn-out 'old' men and women eat? What percentage of vegetables is included in their diet?

"Oh, yes! They get enough bologna and liver, enough boiling meat and sausage; the alkaline salts contained in their plentiful supply of potatoes has been poured down the sink in the water in which they were boiled.

"They are crammed with goodies, penny candies, biscuits, wafers, doughnuts, soda crackers, crullers, buns, rolls, white flour products from which all the alkaline salts have disappeared forever, compounded with acid-forming fats, artificial lard, refined oils, hydrogenated oils and acid-forming sugar. Their pennies go for sticks of glucose, dolled up in all the colors of the barber pole. They eat acid-forming table syrups with acid-forming pancakes and acid-forming breakfast foods, out of which all the life that God put into them has been squeezed, sifted, blotted, baked out and banished.

"Even John Galsworthy, a man of letters who isn't supposed to know anything at all about nutrition, cries out: 'The French do cook. We open tins. The French preserve the juices of their home-grown food. We have no juices to preserve. The life of our people is miserably stunted of mineral salts and savours. They throw away skins, refuse husks, make no soups, prefer pickle to genuine flavor.

" 'If we honestly feed ourselves we shall not demand the old, genteel, flavorless white bread, without husk or body in it; we shall eat whole-wheat bread and take to that salutary substance, whole oatmeal, which has made the Scots the tallest and bonniest race in Europe.'

"Galsworthy is right, though he professes to be but a man of letters and not a physician or a dietitian. With an observing eye, his common sense has discerned the prodigious and appalling degeneration in the bones and tissues of his countrymen. He sees instinctively and understands what he sees:—That old and young are older than they should be because they buy fancy labels and eat with their eyes, without regard to bodily needs.

"We have simply got to get the soup pot out and work it. One can't overwork it. Wherever there is a fire in the stove or an oil flame or a gas jet there ought to be a soup kettle and into it ought to go every green thing that comes into the house—beet tops, onion tops, celery tops, all the discarded greens that now go into the garbage can.

"Americans don't know what delicious soups, what fine, savory flavors come out of these rejected tissue sweeteners and they never will know till they put them to work for their children and observe the wonderful change that will come into the dull eyes, pinched cheeks, pallid lips and shrunken shanks of their little ones."

There is no question that milk is the supreme food for childhood. From babyhood on children should continue to use a considerable amount of milk, up to a quart a day or more, but always to the extent of a pint and a half a day as the minimum. This milk should contain the cream, or if skimmed milk is used, a very liberal allowance of butter in the diet should be made. As we have pointed out before, the growth-promoting vitamine known as "fat-soluble A" is found in the natural fat of the milk and cannot be obtained in vegetable butter substitutes.

Good whole-wheat bread is a food that is inexpensive and contains a supply of nourishment that is perfect in respect to all the requirements of human nutrition. Where children are concerned the quality of the bread is a matter even more vital than in the case of adult life. Even under conditions of the most rigid economy, a diet of honest whole-wheat bread with a sufficient amount of milk will provide perfectly for the welfare of any child.

From the age of one to two years children will gradually acquire an appetite for the ordinary wholesome foods of the average table. It is of course taken for granted that stimulants such as tea and coffee are understood to be utterly unfit for the child's stomach or nerves. It is also taken for granted that food of a highly indigestible character such as pastries and pickles and complicated dishes are unsuitable. In many instances, such really good foods as cheese, cucumbers, boiled cabbage and bananas are found difficult to digest. But aside from exceptions such as these children may gradually learn to eat the various foods of the ordinary table, depending upon their individual peculiarities of temperament and the occasional freaks of appetite.

Fruits and fruit juices are always a delight to young children. Orange juice may be digested in early babyhood. Stewed prunes are acceptable from the second year on and are often valuable in checking any tendency to constipation. From the third year on most children can eat fruits of almost any kind, with perhaps the exception of bananas. Of course, all whole grain cereals are to be recommended, though they should be eaten without sugar, that is, for themselves and not for the sake of sugar.

Potatoes are best baked in their jackets, or perhaps steamed in their skins. Green peas, string beans, carrots and other vegetables, either steamed or served in the juices in which they have been cooked are of the greatest value and children should be encouraged to eat them at as early an age as they can find them palatable. In the matter of desserts the greatest simplicity should be observed. A baked apple is always

ideal in this connection, whether served plain or with cream. Fresh berries or stewed fruits are always highly to be recommended.

A magnificent work in the interests of healthy childhood is that now being carried on by the Children's Bureau of the United States Department of Labor at Washington. Special bulletins on the care of children and particularly on the feeding of children may be had free of charge by writing to the Children's Bureau, Washington, D. C. The following reprint of one of these bulletins under the heading, "Feeding the Child," summarizes in a crisp and practical manner many of the considerations expressed above.

FEEDING THE CHILD

General Character of the Diet

Food must contain plenty of the right sort of material to build up and repair the living tissues of the body; enough material to use as fuel to furnish energy for heat and work; an abundance of mineral material and the little known substances which regulate body health and growth.

Children, like all young animals, require more growth or body-building material relative to their size than they do when fully grown.

DO YOU KNOW WHICH FOODS ARE NECESSARY FOR GROWTH?

For the best growth and development, a child's food must contain:

1. *Animal protein*—found especially in milk, eggs, meat, including fish and fowl. The protein of certain vegetables and nuts contains body-building substances and will do to help out the animal protein, but will not suffice alone, for the best growth and development of the average child.
2. *Mineral matter*—needed in the growth and functioning of the parts of the body, such as the skeleton, the blood, the brain, etc. The chief sources of these minerals are milk, eggs, meat, green vegetables, and fruits.
3. *The substances regulating growth*—found especially in the fat of milk, eggs, leaf vegetables, but not found in vegetable oils or pork fat.

Whole milk contains an abundance of animal protein, minerals, and the growth-regulating substances, besides fat and sugar. No other single food stuff is therefore as important in infancy and childhood.

INDISPENSABLE ARTICLES OF FOOD IN CHILDHOOD

1. Whole milk or skim milk with butter.
2. Butter.

3. Green vegetables, especially leaf vegetables.
4. Starchy foods, which are the principal source of energy but are not growth foods.

To these four essentials, it is desirable to add:

5. Some eggs or meat, including fish and fowl.
6. Sugar.
7. Fruits.

Choose easily digested food for the child and see that it is properly cooked.

MEALS FOR THE WELL CHILD

By the end of the first year, a child should have four meals a day. By the end of the second year, three meals a day are sufficient for the average child.

PLENTY AT MEAL TIME AND NOTHING BETWEEN MEALS

A baby at one year may take a quart of milk a day. After this age, as he takes more cereal and bread with egg and vegetables, reduce the milk to three cups a day. A child will take more food if he drinks most of the milk at the end instead of at the beginning of the meal.

Cereals, bread, potato, and rice are the starchy foods —the fuel foods—and should be part of every meal. Cooked cereals are best for children. *Victory bread,* thoroughly dried in the oven, can be used from infancy on. The child needs an abundance of fuel food as well as growth food.

Green vegetables—spinach, chard, beet greens, beets, carrots, onions, string beans, celery, asparagus—should appear in the diet by the end of the first year. These vegetables should be first used in strained soup or broth, then as purees, and by the end of the second year, mashed or finely divided. Peas, beans (other than string beans) and corn should not be given to very young children except as purees. Cauliflower and cabbage may be given to older children.

Children crave sweets, and they should be given these, especially in the noon dessert, as simple puddings, custards, homemade ice cream, fruit, jellies or simple candy.

Sweets between meals mean bad teeth and bad "tummies."

Fruits should appear daily in the diet of the child; fruit juices for the baby, stewed apples, or prune pulp later in infancy. Raw apple (at first scraped), oranges,

ripe peaches, and any cooked fruit may be given to the older child. Bananas are not fit food for a child to eat unless the skin is brown or the banana is cooked.

THE RIGHT SORT OF FOOD AT THE RIGHT TIME

A young child should have the principal meal at noon, including a vegetable and meat soup, or an egg, or meat (including fish and fowl), with a green vegetable, and starchy vegetable or cereal. Cereal and milk with cooked fruit make the best supper and breakfast.

PREACH THE FULL DIINNER-PLATE FOR CHILDREN AND THEN THE CLEAN DINNER-PLATE

Apart from the work of the Children's Bureau, the United States Department of Agriculture has given considerable attention to the subject and a "Farmer's Bulletin 717, Food for Young Children" may be secured free of charge by writing to the United States Department of Agriculture, Washington, D. C.

By way of suggesting a specimen diet for children one could scarcely do better than to quote from another Department of Agriculture Bulletin as follows:

PLAN MEALS LIKE THESE

Here are two sets of the right kind for your youngster. Grown people will like them, too. If sometimes these seem too much work, bread and milk alone will make a good meal.

BREAKFAST

No. 1.	No. 2.
Apple sauce.	Stewed prunes.
Oatmeal with milk.	Cocoa (weak).
Milk to drink.	Toast and butter.

DINNER

No. 1.	No. 2.
Stew, with carrots, potatoes, and a little meat.	Fish, with white sauce.
Whole-wheat bread.	Spinach or any greens.
Creamy rice pudding.	Corn bread.
Milk to drink.	Milk to drink.

Supper

No. 1.	No. 2.
Cream of bean soup.	Baked potato.
Crackers and jam.	Apple betty.
Milk.	Milk.

GOOD DISHES FOR CHILDREN

These dishes are good for children and grown-ups, too. The recipes provide enough for a family of five.

Milk-Vegetable Soups

1 quart milk (skim milk may be used).
2½ tablespoons flour.
2 tablespoons butter or margarine or other fat.
1 teaspoon salt.
2 cups thoroughly cooked vegetable finely chopped, mashed or put through a sieve. Spinach, peas, beans, potatoes, celery, or asparagus make good soups.

Stir flour into melted fat and mix with the cold milk. Add the cooked vegetable and stir over the fire until thickened. If soup is too thick, add a little water or milk.

Rice Pudding

1 quart milk.
⅛ cup rice.
⅛ cup sugar.
½ cup raisins or chopped dates.
½ teaspoon salt.
⅛ teaspoon ground nutmeg or cinnamon.

Wash the rice, mix all together, and bake three hours in a very slow oven, stirring now and then at first. This may be made on top of the stove in a double boiler, or in a fireless cooker. Any coarse cereal may be used in place of rice.

THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART TWO

DIET

SECTION TWO

HYGIENIC EATING AND FOOD PREPARATION

EATING AS AN ART

By BERNARR MACFADDEN

JUDGING from the facts presented as to the nutritive value of various foods, it would appear that eating is something of a science. But eating is also, or should be, something of an art. Irrespective of the kind of food that one selects, the manner of its ingestion has also something to do with the benefit or lack of benefit to be derived from it. Building strength from food is not merely a matter of what one eats, but more particularly a matter of how much one digests and assimilates. Therefore one should learn how to eat. This section will be devoted to various considerations which affect the digestion and assimilation of food.

It has been said that some persons eat to live and that others live to eat. But in the true art of living one would probably avoid both of these extremes. Surely one would not wish to devour his food as does a wolf. Nor, on the other hand, do many of us wish to reduce the pleasures of the table to such a fine art as to occupy a disproportionate share of our attention and interest in life. Most of us desire that our first interests shall center about some higher form of culture or perhaps a more exalted form of art than the art of eating. At the same time, the cultivation of something of the spirit of the epicure, in combination with an understanding of the principles of food science, will enable us to be better nourished, and consequently to be better men and women.

The epicurean theory is of actual utilitarian value because enjoyment of food is a prime necessity in promoting its digestion. It is a very thoroughly established fact that relish of food promotes the secretion of the digestive juices and therefore better assimilation. Palatability therefore is always an important item and efforts to improve the flavor of food are fully justified from the health standpoint. If, for instance, you find butter more palatable than oleomargarine, bacon fat, or olive oil, then you may know that you will more perfectly assimilate the butter. Or if olive oil is more palatable than cottonseed oil, it will be worth more to you from the food standpoint.

On these considerations it will be seen also that no one can definitely prescribe the diet of another without consulting the other's tastes. It may be that a certain food is highly recommended by dietetic experts and is regarded as ideal from a health standpoint. Yet if that food is not relished or does not appeal to your appetite there is little virtue in attempting to eat it. On the other hand it has often been found, particularly among children, that foods which have seemed to be unappetizing become appetizing if one is hungry enough. If little Willie thinks he does not like scalloped potatoes then let him get a taste of the same when he is ravenously hungry, and the chances are that scalloped potatoes will be his favorite dish from that time on.

It is because the enjoyment of food is so necessary for its digestion that appetite is all-important in conjunction with the art of eating. Food for which you have no appetite is not digested and is only a burden upon your system. It is a load, a tax upon your energy.

If upon occasion one faces the proposition of eating a plate or dish of food or having it wasted, then remember that unless you have an appetite for it, it is really better in the garbage pail than in your stomach, however much one of thrifty instincts may be averse to such a use of the garbage can.

There is no greater food crime than eating without hunger. It is sometimes the rule even of physicians in sanitariums to measure the amount of food estimated in calories, that one should eat, it being expected that this food should then be consumed irrespective of a possible lack of appetite. It is often expected that such an amount of food should be eaten even when the very thought of food is nauseating. There is no greater fallacy in the world than "eating to keep up one's strength" when the appetite does not prompt it. If one is not hungry when meal time comes then it is better to wait until the next meal or until an actual appetite has put in an appearance. The subject of appetite and hunger, however, as presented by Horace Fletcher, will follow in another chapter.

Another very prevalent crime against the stomach is that of fast eating. Hurried bolting of one's food interferes with one's digestion inasmuch as the saliva plays a really important part in the process. The teeth were made to chew one's food. The salivary glands were made to supply secretions of the greatest importance in the general scheme of assimilation, and to swallow one's food hurriedly violates the entire scheme of nature in this connection. This is especially true so far as the non-flesh foods are concerned. Animals eat meat without reference to the time it takes to "get

outside of it." It is also claimed that the chewing of meat even by the human race, is not of great importance. And yet it is probable that even thorough chewing of meat is an advantage. All liquid foods such as soup, milk and fruit juices should be sipped slowly and thoroughly mixed with the saliva before swallowing.

Prolonged mastication has been given the name of "Fletcherism" because of the theories of Horace Fletcher in that connection. Fletcher showed that when food is thoroughly masticated, the human appetite is far more keen and unerring in the choice of those foods most needed by the human economy. He showed that through the practice of Fletcherism and the more perfect assimilation thus brought about it is often found possible to decrease the amount of food consumed and at the same time to become more perfectly nourished. In other words, Fletcherism is a splendid protection against, or even a cure for, overeating. But we will come to that a little later.

Actual need for food or true bodily hunger is one of the essentials of good assimilation. If one has done no work he should not expect to eat heavily. But if he has been in the open air doing a large amount of work or taking a great deal of active exercise, thus producing a true need for food, then an appetite will be established. Indeed, a wholesome hearty appetite is one of the characteristics of normal health.

On the other hand it is possible to be too tired to eat. Under such circumstances one should not attempt to go to the table until after having had an opportunity to rest. It takes energy to digest and assimilate food and one may be in such a condition of nervous exhaustion

that this energy is not available, and in that case he should not try to eat until he feels the desire. The hard worker, whether engaged in mental or physical effort, who arrives home in the evening almost exhausted should lie down for half an hour before eating the evening meal. This may seem a very simple or trivial matter, but it is one of the greatest importance in its relation to the digestibility of the meal and the benefit to be derived from it.

Learn to follow your instincts in this connection. Learn that you cannot outrage your instincts, implanted by nature for your protection, without suffering the consequences. If you are lacking in appetite, whether because you are too tired, because of having eaten too much earlier in the day, because you are ill or for any other reason, then if you have any respect for your body refrain from eating until a normal and natural appetite asserts itself.

Your mental attitude is of great importance in this connection. It is the greatest folly to attempt to eat under conditions of nervous excitement, anger or grief. These harmful emotions check the flow of the gastric juices, just as they make the mouth dry through checking the saliva, and should you force food down your throat under such circumstances, you cannot possibly digest it and it can only do you harm. There should be no quarreling at the table. There should be no discussion of unpleasant subjects. There should be no attempt to punish children at meal time. Anything of this nature should be postponed until a more suitable occasion. It often happens that the very act of postponement brings a new light upon the subject and the

quarrel or occasion for anger and sometimes even the seeming necessity for punishment fades away, and a more constructive philosophy of optimism and good will permits the subject to be more satisfactorily and more pleasantly disposed of. If an unpleasant subject cannot be avoided at the table, and if the situation is one productive of nervousness, excitement or anger, then it is better by far to leave the table, or if this cannot be done without discourtesy or bad taste, figuratively speaking this time, then at least refrain from forcing down food that you cannot relish. On the other hand the presence of music, laughter and general good cheer is always favorable to digestion. They have a true strength building value. All of these considerations apply very forcibly to what one may term "the art of eating."

Water is another factor in the digestibility of food. The objection to the drinking of water at meal time is founded on the almost universal use of ice water. The fact is that ice water is not fit to drink at any time but is particularly harmful if used at the table, for it retards digestion. There is, however, no evidence to show that water of a moderate temperature, taken slowly, is a detriment to digestion. In fact, there is much evidence that the drinking of a moderate amount of such water even at meal time is favorable to assimilation. It is a common experience, however, that if one drinks water between meals it will not be desired at meal times. The old-fashioned plan of drinking hot water before breakfast is an example of the use of water with beneficial results.

Soup forms a wholesome part of a dinner, not merely

because of its nutritive character, containing all of the juices of the food served in it, but because of the supply of liquid which it affords. Warm table beverages are commonly in use because of the instinctive recognition of warm drinks as being favorable to the work of the stomach. This subject of water drinking, however, is so thoroughly covered in another section of this course that it need not be referred to here.

We have been told repeatedly that we eat too much. The proof of this statement is seen when people who have hitherto given no thought to the quantity of food eaten decide to observe the matter of food economy as closely as they do their bank account. The outcome is that in four cases out of five the food intake is lowered, and genuine improvement in personal efficiency results. Money is saved and health is gained. The business of living shows double profits, as when a man makes a change in his farm or factory management that at once cuts costs and increases income.

The conclusion that the majority of civilized men eat too much may be reached either by a process of general reasoning, or by the observation of individual experience. The wild men along with the wild animals were endowed with an appetite and food receiving capacity far in excess of what would be needed three times a day. Food in the jungle was available by fits and starts, and the meal hours were irregular. Savages are notoriously gluttonous.

The man with the greater appetite and food capacity had a better chance of surviving unannounced delays in the meal hours than did the man of dainty appetite. Hence our natural instinct as to the proper amount of

food eaten is very wide of the mark for present-day conditions.

So today, at least among all of us save those engaged in heavy muscular labor, the tendency is to overeat. Especially is this true of the man who in earlier life was devoted to athletic sports or engaged in heavy muscular labor, and who upon changing to a more sedentary life prides himself on his former capacity for "three square meals a day."

But the most convincing proof of the universal tendency to overeat is the vast number of those who have conscientiously tried to cut down their food quantity, and gained better health thereby.

Food when taken in excess of that consumed by the activity of the body must be disposed of in two ways. First, and most directly by indigestion. The excessive food simply refuses to digest completely and is passed out through the body.

Once the food is absorbed from the digestive tract, there is no way that it may be eliminated from the body except it be burned up by oxidation through muscular activity. If the food once digested is not burned up, only one other thing can happen. It must be deposited in the body as fat.

The conclusions from the above statements of physiological science are obvious and positive. If we overeat, and do not exercise to use up the surplus, we will get indigestion or get fat. Hence overeating leads to either dyspepsia or obesity, and sometimes to both. Thus we see that the control of body weight becomes a matter of the control of the intake of the food in relation to the amount burned up by muscular activity.

If we would get fat, we should increase the food and cut down the exercise. If we would lose fat, we must decrease the food and increase the exercise. But note this, that few people desire to get fat. Those who wish flesh usually mean that they want to get flesh over a bony form, and that the flesh desired is muscular tissue, not fatty tissue. Hence, in practice, we exercise to gain weight, and we exercise to lose weight, which seeming contradiction is absolutely scientific and proper.

While on the subject of over-eating, there is one important consideration that is often overlooked. That is the relationship of the use of inadequate foods to the gormandizing tendency. While it is true that one may eat plentifully because the food is good and tastes well, yet if the food is entirely satisfactory in every way, one would not be likely to have an appetite for hearty indulgence more than once or twice a day if his food satisfied all nutritive essentials. The facts pointed out earlier in this course in reference to the inadequacy of the conventional diet should serve as an explanation of the tendency to over-eat, at least in many cases. If our food has been much refined and certain elements are lacking then it is only natural that the appetite, in attempting to supply the body with those particular elements, will prompt one to keep on eating until enough food has been ingested to yield those requirements. Of course it is a wasteful system that compels one to eat an excess of starch or protein in order to secure a minimum of iron, lime and phosphorus. And yet that is just what the use of refined and inadequate food entails upon one. If you have been prone to eat excessively, then the use of natural foods, including, if pos-

sible, a supply of such uncooked foods as fruits, nuts, green salads, milk and buttermilk will probably enable you immediately to decrease the amount of food consumed within normal limits.

Many erroneous ideas commonly exist concerning the effect of climate and season on diet. The heat radiated from the body must be furnished by food, and this would indicate an increase in the total food intake. But in practice, cold weather results in our wearing more clothing, staying indoors, and decreasing our exercise. Hence, we really require practically no more food in winter.

People who eat all they can in winter, but worry over their summer diet, have this justification for their pains—the summer diet, because of the greater danger of food contamination and decay, results in more frequent cases of ptomaine poisoning, indigestion and bowel troubles, and the death rate of children who are more subject to such troubles is greater in summer. The man who lightens his summer diet only is usually over-eating in winter, and it may not be without significance that the greatest death rate of adults is toward the end of the winter season, after people have been sitting indoors and eating "heavy foods."

There is some justification for cutting down the meat consumption in summer, as the excessive eating of protein (lean meats) results in a slight increase in body temperature. There is no reason for cutting down on the so-called heating foods—fats, starches and sugars, merely because it is summer. These foods eaten in excess result not in an increase of body temperature, but an increase of body fatness. If one is over fat at

any time of the year he is uncomfortable and inefficient. The fat man is more uncomfortable in the summer and there is more reason for him to reduce, but that is no excuse for him being fat in the winter; it is both cheaper and more comfortable to buy an overcoat than to grow one of blubber like a walrus or seal.

To find a special diet for brain workers has long been one of the goals of science. This search has reached no definite goal. We do know that the brain cannot work efficiently if the general health is in any way depleted. But we have not been able to find any particular food that would make a man think.

A proper understanding of the physiology of thinking should have indicated this to scientists long ago. Muscular work converts matter into energy, but mental work consumes no appreciable quantity of matter. As thinking seems to consume nothing, there is no food that can supply its needs. This brain tissue is removed but slowly and its composition cannot be materially changed by any particular food.

There is no positive thing that can be done dietetically to aid the working of the brain, although there are very many negative things that may be done to injure its functions. Alcohol is a brain poison, the action of which is obvious. Nicotine, caffeine, and the various habit-forming drugs also affect the brain. Any dietetic error that results in auto-intoxication destroys mental efficiency. The mere eating of excessive food produces a condition of the blood which results in dullness and drowsiness. In short, we know no ways of eating to make us think, but we know many ways that will prevent us from thinking, the chief being plain gluttony.

HOW MANY MEALS TO EAT, AND WHY

By MILO HASTINGS

ARE three square meals per day essential to health and happiness or is the three meal plan, like trousers for men and petticoats for women, just part of our inherited customs?

Every once in a while some enthusiastically minded person discovers that he can omit breakfast or luncheon or supper and still survive. The very fact that he still survives is so astonishing that he is likely to be carried away by his discovery and think he has found the open sesame to health and long life. So he publishes his discovery and forsooth we have a new system of eating that promises to cure anything from chilblains to insomnia.

The only thing that can be said against such discoveries is that they are not original inventions—and hence cannot be patented. In fact, every possible plan, arrangement and number of meals, from one meal in seven days to seven meals in one day, were tried out by our prehistoric ancestors long before the flood.

In the palmy days of Rome two meals were in order. One came at about ten A. M. and was of a private, frugal sort. The other was the dinner of the day and was served about four in the afternoon. The more prosperous the Empire became the later came this dinner hour, the longer it lasted and the more it cost.

King Canute, the monarch who had his throne carried down to the beach under the impression that the waves

would have respect for regal authority, is credited with having introduced into England the royal plan of eating four times a day.

The history of Europe generally reveals anything but a uniform system of three meals a day, some of the nations eating five times a day, and throughout rural Europe generally it is the custom to serve men afield with mid-forenoon and mid-afternoon meals. In England the eating customs and terminology have been quite confusing to an American reared on the three regular meals. The great houses of the English gentry formerly had dinner at ten A. M., which dinner lasted till one o'clock. English commercial life has spoiled this three-hour feasting in the middle of the day, and the modern Englishman has his dinner from five to seven in the afternoon. English tea is a four P. M. affair and the English supper was originally scheduled for about nine P. M. Most present-day Englishmen try to get in about four meals a day. As one returned American visitor expressed it, the English eat crackers and jam three times a day and food once.

Urban France eats two and a half times a day—that is, a breakfast consisting mostly of coffee and a regular luncheon and dinner. To Paris also belongs the after-theater supper. The eating habits of the worldly-wise New Yorker are much like those of Paris. City Americans generally eat breakfast, luncheon and dinner, and rural Americans eat breakfast, dinner and supper. The clerical classes of New York all rush to eat when the twelve o'clock whistle blows, but the higher-ups can invariably be found in their offices at noon as they do not go out to lunch before one or one-thirty.

The farmer who has his big dinner at twelve sharp may have been awake and awork for eight hours. The city artist or author who dines at seven may have been awake only an hour longer than the farmer and not as hard at work.

Those who have given thought to the matter rarely advocate more than three meals a day. The most frequent recommendation of change is to a two-meal regimen. Some would leave out breakfast and some would skip the mid-day eating. Occasionally an enthusiast advocates but one meal a day. Where a diet is used consisting largely of fruit or milk partaking of food more often than three times a day is often advocated.

There are always more wrong ways to do a thing than there are right ways. For every one with fixed habits and a uniform amount of muscular exercise there is a best or "optimum" plan of eating. This plan should be found out and followed.

The problem of the number of meals per day cannot be separated from the problem of the total quantity of food per day. Regular meal hours, so insisted upon by the hygienic writers, find no foundation in the habits of animals or of primitive man. Food was then eaten as it was procured, and varied widely in both quantity and quality. The digestive powers were much greater because of the activity. The food problem of the civilized and city-dwelling man is indeed very different from that of his primitive ancestors. The modern man's need for a less total food consumption and for the stoppage of his meal short of the point of repletion is quite an obvious result of the change in the habits which civilization necessitated. But whether the civ-

ilized man who requires the smaller food intake should get it by eating frequently and lightly or by eating less frequently is a question which has not been definitely answered by the experience of races or individuals. The three square meals per day of the prosperous American working man when continued by him after he ceases to work, is the chief hygienic evil of the American people. This can most easily be combated by the individual whose general customs and social relations continue to set him down before the conventional square meals, by the simple step of dropping out one of these meals.

If a "square meal" be partaken of, a man can eat enough to supply him with the necessary nutrition for light labor in one meal. But this filling of the stomach up to its limit once a day results in a heavy load on digestion and frequently makes the hours following such a meal rather useless for anything else than the function of digestion. Therefore, we find little practical reason for adopting the one meal a day plan.

But, if this quantity of food which the stomach can take in one meal is divided into two meals, we have a very practical and efficient amount for the digestive apparatus to handle, and yet we have the feeling that one has eaten a meal and not merely nibbled at food and come away too hungry for comfort.

The general results of careful investigation of the adoption of two meals are: first, a decreased quantity of food eaten; second, a marked improvement in health resulting in both losses and gains in weight when weight has been abnormal. Third, in the elimination of digestive disturbances, and the related ills due to the eating in excess of the bodily needs. The careful

study of the reports leads to the unquestioned conclusion that for office and household workers the system of three meals a day, which has been passed down from our pioneer forefathers, is a mistaken plan.

The evidence, however, is not of such nature as would cause a careful thinker to decide that there is any inherent evil in partaking of food as frequently as three times a day. The benefits received from the change from three meals to two meals are more properly to be ascribed to the fact that it is a practical means of cutting down the total quantity of food consumed.

The testimony of those who reported on the two meal a day experiment is that in thirty-two instances the total amount of food eaten showed a decrease of total food consumed: six reported no change in the amount, and three reported an increase. It is frequently emphasized that the dropping out of the breakfast or other meal has not resulted in increasing food consumption at the two remaining meals. The reports on the amount of decrease of food range from "slight" to "more than one-half."

The average estimate of those who decreased the food intake was twenty-six per cent less food consumed in two meals than was formerly eaten in three meals. It is safe to say that there are forty million adults in America today who are doing light labor, and still eating three meals a day. Fifty cents a day is a fair estimate for the cost of their food. This saving of twenty-six per cent would mean a saving of thirteen cents per day for the forty million which you can figure out. But you should be more interested in the forty-seven dollars yearly saved on the cost of your own food.

The economy of time is worth quite as much as the economy of food cost. This thing of being obliged to be at a certain place three times a day and to "get the family together" if one eats at home, and the interruptions and difficulties involved in this third meal, are all absolute wastes of energy.

By cutting out the extra meal you can get that hour a day that you have been needing to devote to much neglected out-door exercise or a course of reading.

But greatest of all savings of the two meal a day plan is that it gives women an opportunity to escape from one-third of the kitchen's daily grind.

Those who tried two meals a day in this test were almost wholly from the group of lighter workers. Two thirds at least are those whose work could be classified as clerical. Closely related in the nature of physical labor are a number of school teachers, a couple of college students, two traveling salesmen, a preacher, a doctor, a barber, a station agent and a weaver.

The only men whose work would in any sense be considered heavy are an electrician, a physical director, a sailor, a chauffeur and three farmers. Among the women, over half are housekeepers. The rest are teachers or clerks.

A few of those who had tried two meals a day made the comment that when engaged in extra hard physical labor they find it necessary to go back to three meals. With these exceptions there was almost unstinted praise for the two meal plan.

The weight changes of these two meal experimenters were studied by comparing the reported weights with the proper weights for the given sex and stature. It

is found that the change to two meals a day resulted in gains (averaging eight pounds) for the men whose weight would indicate that a gain was desirable. For the men who should lose weight there was an average loss of thirteen pounds. There were a number of men who reported that the change in meal plan did not affect their weight. Those whose weight was not affected were found to be already very near the ideal weight for their height.

The reports of those who have tried two meals a day are almost invariably enthusiastic endorsements of the plan. The following are sample comments: "Much improved. Do not feel so 'stuffed.'" "Tired feeling. Did not feel so ambitious. Since, I feel invigorated, do not fatigue so easily." "In about one month I gained ten pounds and felt like a new man."

Many observers made note of greater sleepiness in the daytime when eating the three square meals. One comments: "The effect of going without breakfast has been to make my mind clearer, wide awake. I found it easier to study in the morning. There was a feeling of mental vigor, whereas with three meals there was a feeling of mental drowsiness, general inefficiency." These comments in fact read very much like testimonials.

The practical conclusion from all this is that two meals a day are the sensible thing for all those not engaged in heavy labor. If for social reasons the light worker cannot adopt the two meal plan, the next best thing is to eat but one full meal a day. For that meal it may be safe to set an abundance of food on the table and eat to a point of reasonable repletion. But the other two meals should consist of definite items set forth in

limited quantities; if one determines to breakfast regularly on half a grapefruit, and two eggs on toast for lunch, the mind and the appetite soon become accustomed to such a restricted food intake and the insistent desire to eat a square meal whenever one sits down to the table is overcome.

Another related question is that bearing on the number of courses to a meal.

The old-fashioned American farm family placed everything on the table at once, and passed it around and around again. Theoretically dinner was served as one course, but in practice was a ten or twenty course meal if one counts helpings as courses.

The more citified form of serving a meal is to set forth part of the food, a single dish or combination of dishes that are to be eaten together; to eat this and clear away the debris and then to serve something else.

Which of these eating habits is followed is a matter of custom and method of service; it is of significance to food economy only in so far as it affects the kind and amount of food eaten or wasted. For purposes of the present discussion we can count a dish and what is supposed to be eaten with it as a course and leave the manner of serving to the established habits of the household.

Considered from the practical standpoints of food cost, labor cost and health efficiency, there is little excuse for any meal having more than three courses: first, soup, second, the meat dish or so-called meat substitute, with its side of vegetables or salad, and third, dessert. This is the approved dinner, simple enough for a farmer and fancy enough for a financier. Likewise a breakfast of

fruit, cereal and a light serving of bread and meat, or of cakes and syrup is sufficiently complicated even for the man who eats but two meals a day.

Such a planning of meals is sensible. It fits in with our habits and is adapted to both rich and poor. Those who have been used to more numerous courses need only to eat large portions, while if one has been used to simpler meals, he may decrease the size of the servings. The three course service permits of ample variety and the inclusion of soups, which are economical, of vitamine foods, preferably in the uncooked state, and if the heavy dishes are largely of cereal origin instead of wholly of meats, it is consistent with thrift and economy. In either case the number of courses should not affect the total quantity of food eaten.

Theoretically we may say that the increase of variety need not affect the quantity of food eaten, yet in practice excessive variety at the same meal tends to both gluttony and waste. Gluttony, because the appetite is stimulated beyond its natural demands; and waste, because there is a slight loss in buying—the grocer sells the paper as meat; in cooking food sticks to the pot; in serving, some of the food prepared is often held back for a second helping and this may not be called for. Lastly there are the left-overs on the plate. The more kinds of food that are to be handled, the greater will be the number of such points of waste and the greater the proportion of the total food wasted.

Variety as a factor in healthfulness of foods is quite a different matter. Such desirable variety is more economically secured by the change of dishes from meal to meal and from day to day, than from more courses.

APPETITE AND HUNGER

By HORACE FLETCHER

AS a man eats so does he feel and think and even act. There is no getting away from the fact that the "dark brown taste" often experienced "the morning after the night before," from indigestion of either food or alcohol, or the dullness due to the stupefaction of excessive nicotine, is a protest on the part of disgusted Nature against such vile and unprofitable sinning.

It is well to consider that Nature does not "kick" at every little departure from the strict "letter of the law" relative to alimentation. There is a large amount of tolerance in the natural scheme of human license—much more than is generally believed—and so much so that it is averred by some physiologists that there are ten times as much tolerance as there is of warning notified by pain. That is: when actual pain comes to call a halt of abuse, there has already been a large amount of abuse passed over without notice, but which is charged up to the debit of endurance at the latter end of life. Take the case of gallstones in the bladder, for example. These calcareous deposits are irritating the delicate inside of the organ afflicted long before there are any pains to call attention to the disease being fixed upon the sufferer.

This is rather a wandering into the field of pathology, where the careful eater rarely has occasion to go, but it is wise to realize some of the possible evil results of only partial carelessness as a check upon forgetfulness. "A

stitch in time saves nine" is one of the wisest of the classic saws, and is never more applicable to anything than to the so-called "stitches in the side" that give warning of trouble within.

There are certain dangers involved in blind, unsatisfied food cravings, and these are closely akin to the cravings of the drunkard after a drinking debauch.

In such cases a vicious cycle of intemperate demand has been set in motion, and the usual end of the cyclone, after much lightning and thunder along the alimentary canal, is not the calm that Nature brings into the atmosphere, but a "spell of sickness"—biliousness, fever, pneumonia and other deadly diseases due to non-resistance.

If we masticate, taste and enjoy our food, when it has been distinctly called for by name, by appetite, and then hear no more of it in its progress through the alimentary canal, the blood stream and all the way through its course of usefulness, we may logically conclude that cramming food into the body in advance of a keen appetite, washing it down with water without tasting or decency, and the resultant discomforts that ensue as the result of such gluttony are the causes of such internal troubles.

Hunger merely means want—lack—need.

The spokesman of hunger is Appetite.

Appetite for water or moisture is expressed distinctly as Thirst.

Appetite for proteid, or repair material, is not as distinct as thirst for water but it is just as effective in that should there be any shortage of repair material in the blood stream for the making good of the break-

ing down of the cell tissue, the appetite will insist on demanding eggs, cheese, lean meat, beans, peas, or other of the foods rich in nitrogen, which is the basis of the cell-restoring structure.

Appetite for the starches and the carbons, which furnish most of the fuel material of the organism, is constant and ever present, for the reason that the body is continually radiating heat and it must be resupplied. In the fat stored on the body, there is always a reserve supply of heat-producing matter, but sooner or later all of the reserve drawn from the bunkers of the body must be replaced.

As to what is true hunger: this is a very important question and it can best be answered by stating some of the common discomforts of the too civilized human body that are *not hunger!*

Any sensation of discomfort felt below the guilotine line of the esophagus, either in the "pit of the stomach" or lower down is *not hunger!*

Indigestion, fermentation, disease or some other pathological symptom is the cause of such disturbance of normal conditions.

True hunger is sensed only in the expression which is described as "watering of the mouth" for some particular kind of food, either suggested by sight, smell or memory.

The moment the attention of the truly hungry epicure is attracted to aliment there will be a choice. It is impossible to think of food in general. The thought centers on something in particular first, even if it rambles about all over the culinary lot afterwards. Even then the inclinations will finally return to the first love.

Appetite changes with the progress of supply and from soup in the beginning of a repast, to the close, the approval of satisfaction may change its verdict.

There is no appetite without true hunger. Abnormal cravings are often mistaken for real hunger but they are false indications.

It is absolutely safe to depend on Appetite *if* careful mastication, insalivation and tasting of the food for enjoyment is practiced. Taste and relish of the food being eaten are prime requisites for the best digestion, for the reason so logically demonstrated by the great surgeon-physiologist Pavlov.

In this great enlightenment it was revealed that taste conveyed a message to the glands of the stomach, declaring not only the nature of the food being tasted, but indicating the sort and quantity of digestive juices or agents best suited to digest the food when it arrived in the stomach.

Thus it happens that if mouth treatment is thorough, the food swallowed drops into a peptic or other bath perfectly prepared for its most efficient uses.

Cutting out complexities: getting down to simples: treating the personal alimentary canal as if we had paid money for its construction and had not received it from Creation as a free gift: conserving repose between working efforts: sleeping soundly as if dead when in somnolent mood: occupying waking moments in bed emulating the great Sanford Bennett in cultivating muscle: or, thinking only pleasant, optimistic and fearthoughtless thoughts until time to get up and renew the hustle of life are some of things man, woman and even youth may do to add to the respectability and delight of living.

As a matter of fact, it is easier than not to do right, and it is cheaper to live industriously and simply than to "burn the candle of endurance at both ends" and wind up a career with inglorious shame.

And, it is "never too late to mend." It is never too late to learn. One is never too late to end even a sadly wasted life in a respectable manner.

Many persons concentrate their attention on the money cost of food as being the only economic consideration: but, as a matter of fact, if bread sold for a dollar a loaf and gave two dollars worth of energy it would be cheap at that price.

Bread or anything that is entrusted to the alimentary canal that is not properly treated as aliment and thereby transformed into nutriment is dear at any price even if costing nothing at all.

Food properly treated as aliment is that which is carefully selected to please the appetite, the taste, and the other senses, daintily served, or, at least, not carelessly and dirtily served, and is treated as if it were incense on the sacred altar of Highest Efficiency.

Too much stress cannot be laid on or insisted on relative to service on the altar of efficiency.

Just think of the *finesse* of *feeding* for *efficiency!*

It is the finest kind of training possible to imagine and really is the first basic necessity of efficient training. Suppose you are a student, looking forward to the examinations that are to decide where you are to stand in your class at graduation from college. Your every faculty is under strain and your future career may be at stake. Your brain should be clear and your memory at 100 per cent condition. All of the attention

is requisitioned for aiming at the subjects of the "exams." If there is any deflection of the energy to the settling of disturbances along the alimentary canal, just that much of force is taken from the matter of primary interest. It is robbery of efficiency to pay the expenses of waste energy.

If the ordinary person of commonplace position in life and medium opportunities of "getting on" in the world, were to pay one-tenth of the attention to training for mental efficiency as do the least of the prize-fighters for physical efficiency, the average of intelligence, learning, success, and the rest, would be raised enormously, and the sum total of the happiness of the environment increased prodigiously.

The question is so often asked: "What are the best foods for highest efficiency?" that it is evident that there is no classic or scientific estimation available in print that is satisfactory to the student of the subject. It is reasonable that we should doubt the cock-sure assurances of the professional food prescribers as to the relative merits of the food materials in which they are especially interested. Theirs may be good but no matter how many brands of the best they may have "there may be others."

In like manner, while I have made a close study of the subject of human nutrition for a score of years or more, with the best talent in the world assisting me helpfully, I have been conversant with only one of the seventeen hundreds of millions of the individual digestive systems of the human system, and in spite of my great variety of experience with the food supplies of many nations, I have dealt with only comparatively few

of the thousands of kinds of aliments that Mother Nature has provided for her children of the world.

Take the question of the possibilities of getting an excess of one or another of the several nutrition elements. Only one of these, the insidious proteid, the nitrogenous element, has appeared to be a real menace. This important factor of nutrition is usually *tasteless* and hence may be ingested in great excess unless the appetite is given extraordinary chance to inspect and discriminate regarding it. This is strange, too, because proteid or nitrogenous food is the only sort that is poisonous if taken in excess. It might be possible to take in excessive amounts of salt and other mineral necessities of the human organism, but these have such decided taste that they are very quickly "cloying" if indulged in too generously, and the appetite goes on a strike, even to the extent of vomiting, if any of these tasteful elements are taken in pronounced excess.

As to starchy foods, I have no personal evidence that they are likely to be taken in damaging excess. "Getting enough" of potatoes, bread and the like fuel foods, and even of the carbonaceous sugar, is distinctly sensed when enough has been taken. Besides, what cannot be utilized immediately of these is tucked away in the fat layers for use later on and is not subject to putrid decomposition for elimination.

When mankind has learned the first great lesson that there is a whole battery of divinely instinctive *senses* placed at the alimentary-canal head of each living organism, tuned and equipped for passing judgment on the immediate nutritive needs of the body and also on the suitability of any food material available at

hand, they will be wise indeed, and the physical culturist will be spared a great deal of useless speculation and all doubt as to what is good or what is bad.

Not only the senses but the IMAGINATION has a modifying influence on the desirability of food. PREJUDICE, too, is an important factor, but that is a department of imagination.

Hence, in the first, last and general analysis, the best food for the moment is that which suits the senses best, and the best test of the real genuineness of hunger or appetite is that the plainest of aliment is good to the senses and satisfies the appetite. Happily, the most common foods of whatever country or clime where they are found, and hence the cheapest, are the most appetizing to anyone with a real hunger. "I've seen the time when I could relish and digest tin cans and labels like a billygoat," is frequently the robust boast of the sunburned geographical explorer when giving reminiscent accounts of his adventures in the wilds.

Then what shall we select as a summary of advice relative to what is good or bad fodder or fare? The most evident hint is: that if food does not look good, taste good, and "melt in the mouth," there is something wrong with the would-be eater or the provender at hand. The best advice is to wait for a robust appetite and then be sufficiently deliberate in giving it a chance to discriminate, for it to do its sacred duty and office efficiently. Then it will be an easy matter to insure the efficient diet for the efficient man.

Now as to whether there really is an ideal diet.

There certainly *is*, but as it changes to suit the activities of the person seeking ideality in nourishment,

and even is modified by the mental processes of the moment, no fixed ideal can be formulated.

The great investigator of dietary economics, Dr. M. Hindhede, of Copenhagen, Denmark, author of "Protein and Nutrition," and other books dealing with his ideals of food materials, insists that only the simplest of foods, which are also the cheapest, be included in a *menu* calculated to sustain the highest efficiency; but in my more varied experience in all parts of the world, I have found that careful eating, thorough tasting, decent deliberation in eating have rendered any foods the appetite approved easily digestible and readily absorbed as nutriment.

I must say, in addition, that even with the rarest and most expensive dishes before me, my appetite has invariably chosen from the simpler and less expensive numbers; potatoes, bread and butter, fruits in season and vegetables generally getting the preference in the selections of appetite.

Hence, Dr. Hindhede and I do not differ in the final analysis, but he favors prohibition of the expensive luxuries while I rely on my guardian Appetite for my protection.

THE HOW AND WHY OF DIGESTION

By MILO HASTINGS, B. Sc.

ON the subject of the digestion of foods, I do not consider a few slices of chemical theory buttered with Latin names to be a very satisfactory meal for the busy man who hungers after practical knowledge of how to live. I have long doubted the worth of much of the theoretical knowledge dumped upon the public for the purpose of arousing the individual reader to the necessity of self-observation and common-sense reasoning about himself. The most important thing that I can say about digestion is not that maltose in the duodenum is changed to dextrose by amylopsin, but that what is one man's food is another man's poison. What is needed is a personal acquaintance with the whims and habits of one's stomach, and this is to be achieved by studying your stomach, not by learning how to pronounce scientific names.

Perhaps I can help you to understand why the usual discussion of theory in these matters is of so little practical help. It is the very complexity of the digestive processes that makes theory so useless. Thus we divide foods into protein, carbohydrates and fat, and the digestive apparatus we set down as the mouth, stomach, small intestine and colon. To know what happens to each group of food in each region requires twelve distinct sorts of knowledge. But it is not so easy as that, for the digestive ferments are more numerous. Here are a few of them: ptyalin, pepsin, rennin, steapsin,

the bile salts (there are several of these), trypsin, erepsin, amylopsin, enterokinose.

Now, these queer named things are definite substances just as are salt and sugar, and they cause definite chemical changes in the foods with which they come in contact. These changes are effected by the varying degrees of alkalinity; and all of these processes are affected by the existence of all the others.

Even if there were but three kinds of food substance to consider, we would have thousands of possibilities to consider in the process of digestion. But there are three kinds of food substances. Starch, sugar and cellulose are all carbohydrates, and yet each presents a different digestive problem. Moreover, food substances are rarely taken straight but in ceaselessly varying combinations and quantities. The quantity of a given food substance affects its digestion because with the same amount of digestive substance present, the relative strength would be changed. Moreover, the combination of various food substances making various demands on the digestive elements would again alter everything.

Nor is this all. The condition of the food, exposing a different surface area to attack is another great variable; likewise the extent of water present in the food, and yet again the chemical alteration caused by cooking. To all these must be added the intangible and unknowable; likewise the extent of water present in the food, ments secreted as affected by the foods taken in and yet again as affected by the physical and mental condition of the patient. I say "patient" advisedly both because a man would have to be patient to understand it all and

would be a likely inmate of the psychopathic ward if he did.

So let the steapsin proceed with the saponification of the stearin without any aid from headquarters, while we proceed to look for a few hand holds where just a plain citizen can get his finger into the problem. First consider the effects, and then we will look again at the causes.

The effect of good digestion is to be unaware that you have any except as noted in the final result of perfect health. The effects of bad digestion are near and far, or in the tongue of Cæsar, proximate and ultimate. The nearby effects or symptoms are pains, distresses, various sorts of intimate and unpleasant inside information.

And the farther effects are bodily weight, that feeling of fitness to perform work, and ultimately health or disease, long life or untimely death.

A classic in the annals of misinformation was the table of digestibility appearing in the school physiology of not so long ago. A Dr. Beaumont was the man responsible. Under his observation came a French Canadian trapper in whom a gunshot wound had created a sort of trap-door into the stomach. So the doctor fed the trapper all sorts of foods and then he would peek in from time to time to see how things were coming on, noting in this way the length of time required for certain foods to leave the stomach. Thus the table of "digestibility" was derived. Boiled rice headed the list with a time of one hour, and roast pork brought up the rear with a four and a half hours. The general effect of cooking was to hasten the stomach digestion of starchy

foods and retard the digestion of proteids. Hard boiled eggs were slow of digestion, soft boiled digested quicker and raw eggs quickest of all.

Highly romantic as were these trap-door observations, the practical significance of them was entirely misleading. In the first place, we have no proof that there is a practical advantage of having foods digest quickly. Second, the usual interpretation of the tables inferred that the stomach was the primary organ of digestion, whereas its chief duty is that of a storage reservoir. Third, the sort of digestion that does occur in the stomach applies chiefly to protein, which fact accounts for most of the variation observed by Beaumont. Fourth, the trapper is only one man with his likes and dislikes and inherited whims called individuality. Moreover, his stomach could hardly be said to be working under normal circumstances, with a meddlesome doctor opening the door every few minutes and letting in the cold air. Lastly, the doctor forgot to take any note of the quantities of food eaten.

Modern science with the aid of the stomach tube has made many studies of stomach digestion. Here are a few of their findings:

"Two eggs (raw, poached, or in the form of an omelet), 7 ounces sweetbreads, 10 moderate-sized oysters, 7 ounces white-fish or 3½ ounces of white bread, cauliflowers, or cherries, each left the stomach in from 2 to 3 hours. Eight and one-fourth ounces of chicken, 9 ounces of lean beef, 6 ounces of boiled ham, 3½ ounces roast veal or beefsteak, 5⅓ ounces of coarse bread, boiled rice, carrots, spinach, radish, or apple, left the stomach in 3 to 4 hours. Nine ounces of smoked

tongue, 3½ ounces smoked beef, 9 ounces roast goose, 5⅓ ounces string beans, or 7 ounces peas porridge, left the stomach in 4 to 5 hours."

Another sort of digestive time study relates to the time required for food to pass the entire length of the alimentary canal. These observations are easily made by swallowing a charcoal tablet or two or a few capsules of lamp black with the test meal. Lamp black is pure powdered carbon and absolutely harmless. This is a sort of observation that can be made by anyone so inclined, and is a valuable aid in solving the problem of the constipating effects of various diets or modes of living. The time required for food to pass through the human digestive tract varies from a few hours to a week or more. Both extremes represent abnormal and presumably harmful conditions. The usual time period is not less than twenty-four hours, or more than forty-eight.

In a book devoted to this and related subjects Dr. J. H. Kellogg of Battle Creek has stated that all the actual digestion is performed within eight or nine hours after the food is eaten and that the ideal time for passage through the digestive tract is twelve hours. Such a condition would seem strange indeed to the average city-dwelling man. Anthropoid apes and forest born savages are more like animals in this respect, normally having three or four movements daily. That civilized man suffers grievously from delayed intestinal action cannot be doubted, but we can reasonably question whether it is possible or even desirable to return to exact habits of our primitive ancestors.

A further type of observation on the digestion of

food is the quantitive study of the completeness of digestion. The usual figures given for animal foods are 92 per cent for protein, 98 per cent for carbohydrates, and 95 per cent for fats; with vegetable foods the figures are, protein 84 per cent, carbohydrates 97 per cent, fats 90 per cent.

These are approximate figures only as there is no way to determine the actual residue of undigested food even in laboratory experiments, because it is impossible to separate the undigested food residues from the residue of the digestive ferments secreted during the process of digestion. But since the food that calls for a greater use of bodily substance in effecting its digestion would yield a small net gain to the body, it seems fair to consider the difference between the intake and the excretion of the digestive tract indicative of the efficiency of the respective types of food.

Here again come complications. If a food of ninety per cent digestibility is a better food than one eighty per cent digestible, why is not the substance that is one hundred per cent digestible the perfect food? It seems plausible reasoning, yet we all know that such perfectly digestible food would get us into trouble right away. The digestive machine was built to work on the foods provided by Nature, and these contained a fair quantity of indigestible residue. When this is decreased, the rate of movement through the intestines slows up. The residue that does remain is likely to putrefy and develop poisonous products. To keep up the proper speed of movement throughout the entire length of the alimentary canal requires a certain bulk that can only be supplied by an indigestible residue. The ideal food must

be partly indigestible, and, as in the case of Beaumont's stomach time tables, we are again obliged to reject the tables of food digestibility as being direct indications of ideal foods.

There is a practical point to be noted here in relation to the nature of the indigestible substances that go to form the intestinal residue. Indigestible proteids are considered an undesirable residue, as this is the group of substances that cause offensive, if not the actually poisonous matter, in the colon. Milk and eggs rank high in diet tests in that they furnish small proteid residues. Animal proteids as a class are more digestible than vegetable proteids. The nuts and legumes (beans, etc.) are not completely digested and the modern view does not rate them so highly as they were held to be a few decades past when the combination of the high proteid and vegetarian theories of diet gave this group of high protein vegetable substances a very honored place.

Among the substances considered as desirable sources of the necessary intestinal residue, cellulose, notably in the form of wheat bran, has been considered ideal. Cellulose does not easily decompose and when it does so, the decomposition products are not objectionable. An additional advantage claimed for the bran particles in cellulose food is that they "scratch" the intestinal walls and so stimulate the peristaltic contractions that keep things moving. Others claim that this very mechanical property of the bran particles is a detriment. The question is still in doubt.

Meanwhile a substance called agar is coming into use as a food-medicine. Agar, like bran, is pure cel-

lulose but it is in a smooth jelly-like form and has wonderful water retaining properties, which adds to the intestinal bulk a volume of water, a highly desirable condition. Agar is obtained from an Oriental seaweed and is truly a remarkable substance, as less than one-half of one per cent boiled with water will form a jelly-like mass as firm as the stiffest apple jelly your mother ever made.

Refined mineral oil is another indigestible substance now widely used as an intestinal residue and lubricant. The virtue of bran, agar and mineral oil is in the fact that they are indigestible yet harmless. Until we know more about the subject all three may be recommended, and the decision left to the individual experiences. Certainly the principle involved in the use of such substances is much more sane than that of purgatives which call forth violent and abnormal efforts in the effort of Nature to free itself from an offending substance.

The quantities of food consumed have a very great deal to do with the quality of digestion. The intolerable unsanitary condition of the digestive tract, which is all too common, is chiefly a matter of surplus of food, a consequent weakness of digestive ferments, with an increase of bacterial decomposition. The cure is less food and particularly less protein. In the writer's belief, the excellent results of Fletcherism are to be largely accounted for by a clean cut and completely finished digestion, which in turn is to be explained both by the better mouth treatment of food and the reduction in the quantity of food eaten. Of course, the thorough mastication and right mental attitude in turn affect the appetite, and that governs the quantity of food.

CRIMINAL COOKERY

By CARL EASTON WILLIAMS

DO you spoil good food through bad cooking? Do you rob it of its vitality through faulty preparation, finally serving only the shell? It is true that many housewives, cooks and servants succeed in getting food upon the table—in some form. But is it "all there"? Does it still possess its full nutritive value?

Every mother owes it to her family and most of all to her children, to see that the food supplied them is the very best. She fails in her first duty if she does not accomplish this. Good blood, strong nerves, sound teeth, vigorous health and absolute freedom from disease, are chiefly matters of perfect nutrition. Every wife and mother, therefore, should know what's what on this subject.

It is not sufficient that a girl should learn cooking from her mother, who in turn has learned it from grandmother. Ignorance, error and incompetence are perpetrated in this way. It is time that all women should learn what are the scientifically correct methods of cooking.

National vigor is influenced in no small measure by the prevailing standards of the culinary art. No one can estimate what women might accomplish in cutting down the death-rate and preventing disease, through learning both how to buy and how to prepare the food of the family. The fact is that the health of the nation

is undermined and devitalized not only in the food factories through various "refining" processes and adulterations, but in the ordinary kitchen through faulty home treatment of even the best and freshest of foods.

Perhaps the most serious of mistakes consists in the almost universal practice of "draining off" the water in which vegetables, rice, spaghetti and other articles of diet have been boiled. There is probably not one cook in a thousand who does not do this. The result is that the most precious nutritive elements are thrown away.

Old-time writers on diet referred to the constituents of food as protein, carbohydrates, fats and what they called "ash." Their attention, however, was directed mainly to the consideration of relative quantities of protein on the one hand and fats and carbohydrates on the other, whereas the *ash* was practically neglected as being of no consequence on account of the very small percentage which it represented in the total bulk of any food. We now know, however, that although the relative proportion of these mineral salts is very small, they are nevertheless of the most vital importance. The organic salts of iron, phosphorus, lime, potassium and other minerals are indispensable in building and maintaining a healthy condition of the blood, the nerve and brain structures, the bones, the glands and their secretions, and the vital organs generally. A disease like scurvy or beri-beri, due to lack of these elements, emphasizes the importance of food adequately supplied with these nutritive principles. For instance, fresh vegetables will cure scurvy like magic.

It is because the normal percentage of mineral salts

in any food is naturally very small that it is important that they should not be wasted or thrown away in cooking. Not only is the nutritive value of food lessened in this way, but the superior, delicate, natural flavor is also lost. It is doubtless for this reason that there has developed the system of artificial "seasoning" almost universally in vogue. One "cooking school" graduate with whom the writer talked upon the subject, declared that she made up for any possible lack of natural flavor by the addition of "plenty of butter," apparently not appreciating the fact that butter is a pure fat and could not possibly take the place of the lost iron, lime and other organic salts. The utter folly of trying to make up for these food losses and the lack of natural flavor through the addition of butter, salt, pepper and other flavoring ingredients, is so apparent as to require no further comment.

Women are not at fault, however. The blame should be placed—where it belongs—upon the cook book and the cookery schools. It is upon them that women depend for instruction, and when their teachings are false and misleading it is not strange that these mistakes are made. It should be the business of those who write these books to understand food values and to provide recipes that accord with the best dietetic principles. But practically without exception the famous, high-priced, "standard" cook books, written by the most prominent women in this field, all join in the conspiracy to denature our foods in this way. In some of these books you will even find instructions to drain off the water twice in preparing some vegetables. They are filled with elaborate and fussy recipes, the apparent object of which

is to make the housewife veritably the slave of the kitchen instead of recommending the simplest and most wholesome methods of food preparation. Women everywhere would do well to write to the publishers of these books and demand up to date works based on scientific principles. There is a field for cook books of this kind and especially for those featuring simplicity. Publishers are keenly alive to the pulse of the public and in practically all instances will not only be very glad to get such letters, but will gratefully acknowledge them.

In the light of what we have said, it will be seen that a good vegetable soup is one of the most satisfactory of all the foods that reach the conventional table. In the same way, the old-fashioned "stew," of meat and vegetables, makes an ideal dinner, inasmuch as no nutritive elements are lost. Clam chowder and other dishes of this kind likewise have a distinct advantage on this account.

A justly popular old-fashioned article of diet is a plain potato soup. Potato soup has a flavor that you do not find in ordinary mashed or boiled potatoes, and it is simply because the "juice" has been retained. It is improved by the addition of an onion, together with milk and a little butter. Again, there is a reason for the popularity of baked potatoes. They are all there. There is really only one way in which mashed potatoes can be made to realize the full richness of their natural flavor, and that is by cooking them in comparatively little water, finally boiling it down until there remains only one to two tablespoonfuls of the juice, and then mashing this up with them along with any milk or butter that may be used.

What are the best methods of cooking? Curiously, some of the very best methods are little used. Steaming, for instance, while not unknown, is far less generally practiced than should be the case, considering the advantages of this method. Almost anything can be steamed, from vegetables up to eggs and custards. Steam cooking is simplicity itself, for an ordinary colander and cover with a saucepan may be used. Special steam cooking utensils may be purchased, however, some of them so arranged that you can cook a number of foods at one time in this way.

From the standpoint of perfect culinary methods, however, the use of the double boiler could not be improved upon. It is now much used as a cereal cooker, but it is equally valuable for any other type of food.

Especially can the double boiler be recommended for the cooking of vegetables, inasmuch as it enables one to cook them in their own juices and without the addition of water or anything else. Most vegetables contain a large percentage of water naturally, and in the double boiler are subjected to a temperature of 212 degrees Fahrenheit, without any danger of burning or scorching. Berries, cranberries and fruits may also be cooked advantageously in this way. Nothing could be more delicious than food so prepared.

Another modern method of food preparation that is still too much neglected is the so-called fireless cooking. It is true that a fireless cooker involves a moderate initial expense if you wish to purchase one that is highly convenient in all respects. A homemade cooker, however, will prove satisfactory. In any case, it is worth more than the cost or trouble involved, and is extremely

economical in the long run. Not only is the fireless cooker a source of convenience, but it involves at the same time a *better* method of cooking in respect to flavors and nutritive values. It is one of the first principles of good cooking that the use of a moderate temperature for a longer time is far better than quick cooking at a high temperature. The destructive effect upon the food is less. In the fireless cooker the process is commenced at the boiling temperature and continues at a degree of heat which gradually becomes very slightly lower.

It is not necessary, however, to resort to steaming, double boilers and fireless cookers for ideal results. Boiling is often more simple and convenient, though one mistake is the use of too much water. It is better to let any type of food "simmer" slowly for a long time than to boil at a gallop, so to speak. Use only enough water to cover your requirements so that in the end there will not be an excess of liquid. If too much water is left, it can be boiled down quickly to the amount of "juice" desired, and this should then be served with the vegetables. Try this plan on your cauliflower, your string beans, peas, turnips, carrots, spinach and beets.

Baking is an ideal form of treatment not only for meats, but for many other foods. The only objection to it is that in some cases it means an unnecessarily high degree of heat, for which reason the above mentioned methods are often preferable. However, such vegetables as eggplant, squash, potatoes, large onions and rutabagas can be advantageously baked.

Frying seems to be the most popular form of American cooking. It is a quick method, and overworked

farmers' wives, especially, depend upon the frying pan. The chief objection to fried food is its indigestibility, especially when only a smear of grease is used in the pan. If food is to be fried, it should be done by completely immersing it in deep fat. In this case the entire surface is quickly coagulated so as to protect the interior, which is then cooked with all juices and elements intact.

Many housewives still make the mistake of attempting to cook oatmeal and other cereals quickly. They cannot be cooked properly in a few minutes. Three or four hours of slow cooking in a double boiler is absolutely necessary.

Eggs are more digestible and more valuable when not cooked too hard. It is not generally realized that egg albumen will cook at a temperature considerably below the boiling point. The best plan is to put the eggs in cold water and to take them off the fire just before reaching the boiling point, or when the formation of many bubbles at the bottom of the pan indicates that the water has reached or approached a temperature of 190 or 200 degrees. Let them stand in this way for ten or fifteen minutes and they will be evenly jellied or lightly cooked throughout. "Coddling," or placing the eggs in boiling water, removing from the fire, and allowing to stand for five minutes, is another fairly good method. The boiling of milk should be avoided as much as possible.

Aside from cooking, it is important to avoid so far as possible the purchasing of denatured food. "Refined" food means devitalized food. So far as possible use whole wheat flour instead of white. Honey is the best

of all concentrated sweeteners. For desserts it is well to use raisins, dates and other sweet fruits for sweetening purposes whenever possible. Buy the natural, brown, *unpolished* rice. Most grocers do not keep it, but they can get it from wholesalers by demanding it.

THE QUESTION OF FOOD COMBINATIONS

By ROSE SMALL HILL

NOT the least important phase of the selection of a proper diet is the combination of foods in the daily fare, and in fact, at each meal, in order that the several constituents needed to nourish the body may be represented in their proper proportions. It is not sufficient merely to say that this or that food is healthful or unhealthful and arrange to include or eliminate it from the diet. It is necessary also that we know how to combine foods to get the best results, both in cooking and in the dietary itself.

Among other things that it may be well to emphasize while on the subject of improper combinations is what I have endeavored to indicate in one course of this article, namely, that no food element should be represented out of its due proportion.

For instance, an excess of fat in combinations makes foods greasy and heavy and hard to digest; the body can not assimilate excess protein, and rejects it at much irritation and expense to itself; the carbohydrates are stored as fat, and persons of good assimilation with a tendency to taking on weight must carefully avoid the presence of too great amount of the starches and sugar in their diet. The scope of this article does not include a discussion of the relative amounts of protein and the other elements needed in the diet, this belonging entirely to the question of standard dietaries.

In fact, this matter is governed by varying condi-

tions, the activity and age of the individual, etc. A hard-working man needs more proteid than a sedentary worker, and the fats and carbohydrates are used in proportion to make up the required number of calories representing the fuel value of the diet. Moreover there is a difference of opinion in different circles, as to the number of calories on which a man can do his best work and remain in the fittest condition. As I have said, appetite and taste are to guide us in the choice of our food.

The most important point is that we must acquaint ourselves with such aspects of diet as here discussed.

In order to combine the different foods comprising our dietary, so as to have well balanced meals, an understanding of food values is essential. Such a knowledge, however, need not be exact. That is to say, it is not necessary to remember that this or that food contains such and such a percentage of proteids, carbohydrates, etc. It is of more practical value to classify foods according to the nutritive elements for which it is valuable, as, this is a proteid food, that a carbohydrate food, and so on.

In the management of the diet, quantity and kind of food are to be considered. The different members of a family eat varying amounts of food, the male adults usually more than women, the young child less than the grown woman. Still, even under the same conditions of work different individuals require varying amounts of food, physical activity naturally determining to a large extent the quantity of food an individual requires. We have appetite to indicate the quantity of food required, and normally it does this. It is claimed

by those who have practiced Fletcherism, that with thorough mastication of food, appetite is a guide that may be relied on absolutely in this respect, and also to indicate the kind of food needed by the body. Habit, unfortunately, is a factor which determines largely for most the amount of food to eat and the kind, quite regardless of the body's real needs and the healthfulness or value of the food use. By wise combination of food, a more nourishing diet will result, and a lessening of the bulk of food eaten thus be effected. I believe that one of the causes of heavy eating is due to the fact that the foods are not sufficiently nourishing, and the individual eats a large quantity in an attempt to satisfy his desires. A small quantity of nourishing food gives more benefit than a large amount lacking in the nutritive elements. If instead of a haphazard arrangement of our meals, with the only view kept in mind to change them for variety, we consciously choose our food for its nourishing and healthful qualities, and combine it properly, we will be better nourished, and yet without any sacrifice of enjoyment of good tasting things.

The pivots on which to turn in combining foods are (1), that the results obtained will provide the nutritive properties in their due proportions: proteid, fat, carbohydrates and mineral salts; (2) that the combination will be tasteful and attractive and thoroughly enjoyable. Combinations that will meet the test of these two are right combinations, perfect combinations; combinations that can meet only one are not very satisfactory. If the combination is nutritious but not enjoyable, not much benefit is derived from its eating. Only food that is thoroughly enjoyed is well digested. If, on the other

hand, it is enjoyable, but not nutritious, though it has the advantage of being thoroughly digested, it will not produce enough energy for the body. Both are absolutely essential. That is not to say that we should discontinue entirely eating things merely for their taste, though they are lacking in nourishment. Occasionally we all want the light non-nutritious things, just to enjoy their good taste; sometimes we just seem to desire to make a meal of such foods, but a continuous desire to eat delicacies and to seem to care for naught else indicates that one's appetite is jaded, and that vigorous exercise in the open air for several days or the skipping of a few meals would be an excellent measure for such a person to follow.

Now a combination to meet the perfect test may be made in two ways; it may be complete in itself. That is, two, and perhaps more foods, as is sometimes the case, combined as one dish will complement each other, or, one course of the meal will complete the other. It is always best to plan tentatively for a few meals ahead, or a few days' meals, and to buy supplies accordingly. This will often save one much trouble and time, and sometimes even money. In planning the menu, a principal dish should be decided upon, and then the rest of the foods chosen to make up the elements not present. Through combination in this respect the most nutritious and yet simplest meals can be prepared.

Many families these days use little or no meat. The staple foods used in such a household are, vegetables, cereals, eggs, milk, flour, fruit, nuts, butter and cheese.

In illustration of the facts presented in the foregoing we find that the high-proteid meats are mixed with

potatoes, rice or turnip, foods in which carbohydrates are the chief nutritive elements. Meats are also rich in fat, so speaking roughly, from the standpoint of nutrition, this is an excellent foundation for a meal, and eaten in sufficient quantities with bread will of itself be a satisfactory meal.

Among the vegetables, the dried legumes, peas, beans and lentils, are the high-proteid foods. These articles of diet, with the exception of peanuts, also have considerable carbohydrates, but lack fat. When lima beans are cooked plain they should be served with butter, which will balance the dish. Other ways of combining fat with beans are in the forms of purees (in purees, the cooked vegetable is pressed through a sieve and to the smooth, thick pulp seasoning and other ingredients added). They may also be baked with tomatoes as a flavoring, and the fats added in the form of olive oil or butter. Bean soups are completed by the addition of milk, cream or white sauces, made of butter, flour and water or milk. The beans or peas porridges (purees), if tastefully made, that is, by boiling another flavoring vegetable with them (onion, leek, tomato or celery), are nutritious enough to make with the addition of a simple salad and dessert, a complete meal.

The egg is an important food in almost every form of dietary. Its nutritive elements are proteid and fat, but it is lacking in the carbohydrates. To supply this, we combine eggs with rice, flour, cornstarch, potatoes, milk and bread-crumbs, which contain the needed starches and sugars. When eggs do not enter as an ingredient into other foods, but are served as a separate course, soft or hard boiled, poached or scrambled, they

are eaten with bread, either plain or toasted. Thus do we supply the missing starch and the bulk.

In the non-meat diet, the animal products, butter, milk, cheese and cream, and olive oil and the nuts provide the fat. Butter is combined with foods in various ways. Foods are flavored with it in cookery and it enters into sauces. Almost every form of vegetable may be served with butter or with a sauce. Since butter is more digestible in the raw state foods should be flavored with it after they are cooked. In the case of vegetables and cereals this is an easy matter. The reason why we can make a satisfying meal on bread and butter and milk or on bread and butter alone, is that in either combination all the nutritive elements are present in sufficient proportions.

Many people consider cheese indigestible. The reason for this is that they often do not realize how highly concentrated a food cheese is. Added to this, we have the statement that cheese is nearly twice as nourishing as meat. Such statements coming from authorities cause people to forget that where a pound of meat includes fat, bone, gristle and other inedible portions which are wasted, a pound of cheese contains practically no waste, and therefore can not be used in anything like the quantities as meat. The writer has heard many people argue that where they could eat a half-pound of meat enjoyably, the same amount of cheese afforded them distress, and therefore concluded that cheese was a most indigestible food. Cheese in its ordinary form goes best with bread, especially because it is so highly concentrated. Incidentally, it may be noted that while bread is lacking in fat, the percentage

of this element in cheese is almost four-tenths. Cheese is also very rich in protein, and combined with bread is one of those foods of which a little bit goes a long way. It is too rich to be eaten alone. In cooking, cheese is combined with rice, macaroni, spaghetti and similar foodstuffs because they are lacking in fat. In soufflés, rarebits, milk is used to dilute the cheese.

Cream and milk are mixed with foods in ways that have been mentioned, and they will be referred to again. The prime element of most of the nuts is fat, though several varieties contain a fair amount of protein, and some of them are quite rich in the carbohydrates. The nut and fruit diet is represented to be an ideal diet, as by this combination, not only are all the elements supplied, but the sugar is supplied in the purest and most digestible form, but the fruit juices are exceedingly healthful. To my mind, too, the fruits are also valuable because the amount of water they contain serves to offset the richness of the nuts. Both fruits and nuts should be included in the ordinary dietaries. Nuts eaten with bread are an excellent combination, and will be found to be actually delicious.

Those important foods, the cereals and the starch vegetables, are the chief sources of supply of the carbohydrates. Cereals contain also proteid, and when served with milk or butter and sugar will provide the basis of a nourishing meal. The cereals because of the amount of starch they contain are balanced by the addition of fats, and as they are rather insipid, the juicy vegetables are sometimes added for flavor. Thus, rice is baked with tomatoes and cheese; combined with milk, butter and eggs in puddings, etc. The same rule of combina-

tion applies to the Italian pastes, spaghetti, macaroni, etc. Rice, barley, farina, oatmeal and other cereal products used in combination with fresh green vegetables make a wholesome dish which would otherwise have very little food value; for instance, fresh green pea soup, with noodles or macaroni; celery soup with barley; tomato soup with rice. Owing to their total lack of fat and protein, potatoes, the chief of the starchy vegetables, should be combined with foods containing these elements. I have cited as an example the use together of potatoes and meat. Their very mild flavor makes them adaptable for combination with various other foodstuffs. This is also the case with rice. It will be evident from what has been said in this paragraph that one of the points to be kept in mind in combination is that of using together foods for the purpose of taste and flavoring. The manner in which this may be done is suggested by the examples given.

There are a large class of vegetables in which the percentage of proteid, fat or carbohydrates is practically nil, but which are valuable because of their salts and acids. Where economy is an important consideration, these vegetables should not be used except when in season. The green vegetables, like lettuce, celery, cabbage and chickory may be combined with eggs and olive oil and lemon juice, or with cream sauces, in the form of salads. In salads we have the pleasing results of the combination of the necessary food elements; protein in the form of the egg, fat in the oil and the mineral salts in the green vegetable. Other non-nutritious vegetables, like carrots, turnips, asparagus, Brussels sprouts, squash and spinach are best simply cooked and seasoned with

butter and salt. They may be served with cream sauces.

Fruits have already been touched upon in an earlier paragraph. They can be formed in pleasing combinations, but they are best served in their natural state.

As to combinations that are to be avoided, it is hard to render any strictures in the matter, much depending on individual idiosyncrasies, power of digestion, etc. There are individuals who cannot combine sugar with their food in any form, and we have all read the opinion of persons who have declared sugar to be even more unhealthful than meat, and that it has no place in the physical culturist's dietary. To set this up as an absolute rule is utter nonsense, for what should be inferred from such experiences is not that sugar is unhealthful for all (except in excess, and that is an argument against excess and not sugar), but only for the individuals who have found that it has affected them ill. On the other hand, many persons are made sick by eating strawberries, others still cannot abide tomatoes or onions in combination with other foods, and even not at all; and so one may go through almost the entire catalogue of foods and find apparently healthy persons who do not like them. This may not be normal, but the fact is to be faced, and when one discovers that certain foods or combinations thereof do not agree with him, no matter how healthful the professors or others may declare them to be, there is only one thing to be done, and that is to avoid them. When a food does not agree with you, no matter what may be said for it as far as others are concerned, it is unhealthful for you. A tendency present in some households is to serve too many sweet combinations, and this tendency should be watched and overcome.

Combinations are often spoiled because under a mistaken notion of economy housewives make substitutions of prescribed ingredients of a combination which renders the food value of the compound almost nil, or at any rate greatly lessens its nutritive value. For instance, a custard should be made of milk and eggs, and this forms a nourishing compound. But if eggs are high, the cook may regard it as economical to substitute gelatine or cornstarch for the eggs. The food value, however, is much reduced, and while the dish is palatable and good for a dessert, it cannot be considered an important part of the meal. A better plan would be to serve such expensive dishes in season, or if substitutions are made (and the dish used because liked) to make up for them elsewhere in the meal. Also, if a recipe calls for cream and one uses milk, the food is deficient in fatty matter unless more butter is used than called for in the recipe to make up for the lack of fat in the milk. On the other hand, after a substantial meal, it is unwise to top the dessert, often complete in itself, with a cream sauce or whipped cream. However, we should not reckon a food as expensive on the basis of its cost. It may actually be cheaper when everything is considered than a food poor in nutritive material for which we pay much less.

Diet is an important factor in treating disease, and much of the effectiveness of food in building health depends on wise selection and combination of food in dealing with the given condition. Many cases of malnutrition are due entirely to wrong feeding; that is, in the sense that through lack of knowledge or indifferent attention to the matter, the foods chosen will not build body and brain and repair wastes. Where the condi-

tion is due to this cause the practical application of the principles of combination suggested in this article should prove a sufficient remedy. Of course, mal-nutrition and associated conditions are often entirely due to the abnormal state of the digestive system, and then treatment must be directed to strengthening the digestive organs. The use of the succulent vegetables and the fruits in combinations of salads are peculiarly valuable in disease because of the splendid effect of the organic salts on the intestinal tract.

To summarize the statements in this article I am presenting a table, grouping the principal foods used in the vegetarian's dietary in such a way as to enable one to tell at a glance the nutritive elements for which the food is especially valuable and suggesting the articles of food that would supplement what they lack. This is merely suggestive and can be expanded by each individual as occasion requires.

The advantage of a knowledge of foodstuffs was shown at a recent exhibition of the work of a domestic science club with classes in the poorer sections of a large city: girls are taught how to buy and prepare wholesome, nourishing meals economically. Specimen meals prepared by the students before and after instruction showed remarkable results. Where a student had without any knowledge whatever usually prepared a breakfast of jelly rolls or sugar buns and a cup of tea, she would after a few weeks' instruction prepare for the same money a cereal with milk; or a dinner which formerly consisted of some fried sausage, pickled cucumbers, and a piece of peach pie, was now, for about the same money, a soup or wholesome stew and a plainly cooked vegetable and fruit.

CHART OF

FOOD COMBINATION

Showing What Foods Should Be Used Together

FOODS	VALUABLE FOR	COMPLEMENT
Eggs, Cheese.	Proteids and Fat.....	Sugar and Starch: Rice, Potatoes, Flour, Bread, Etc.
The Legumes: Peas, Beans, Lentils,	Proteid and Carbohydrates	Fat: In the form of Butter and Oil.
Cream, Butter, Olive Oil, Olives, Nuts: Almonds, Brazil Nuts, Filberts, Hickory, English Walnuts.	Fat	Proteids and Carbohydrates: Legumes, Cereals, Fruits.
Cereals: Barley, Buckwheat, Oats, Rice, Rye, Wheat, Breads, Macaroni, Etc.	Carbohydrates and Proteids	Fats: Butter, Cheese, Cream, Etc.
Potatoes, Sweet Potatoes, Corn, Parsnips, Sugar, Fruits,	Carbohydrates	Proteids and Fat: Eggs, Milk, Cheese, Etc.
Lettuce, Celery, Cabbage, Spinach, Onions, Tomatoes, Cress, Cauliflower, Brussels Sprouts, Etc.	Green Vegetables and Others Valuable for Organic Salts	Made into Salads; Combined with Butter, Eggs and Milk.

THE PREPARATION OF BALANCED MEALS

By ROSE SMALL HILL

TO some extent many people unknowingly use the right combination of foods. Family recipes, cook books or even custom guide them in this rightly. Pork is served with beans, potatoes with meat, rice is made into pudding, and so on. All this is well so long as the "beaten track" is followed, but any side stepping, unless backed by knowledge, leads to blundering.

The more one becomes familiar with the principles of cookery the less need is there to continually refer to recipe books for the preparation of foods. And the best kind of a cook book, by the way, is not the one that is crowded with recipes, but the one that teaches principles, so that one is able to correctly and knowingly devise one's own recipe. Food values, carbohydrates, protein, dietetics, all these look very formidable in print, and the busy housewife is likely to say that she hasn't time to study. But it is not necessary to take a complete course in domestic science in order to be able to cook a well balanced meal. Even an elementary knowledge will help out greatly and with the practice that comes from its daily application good results are bound to follow.

There are in New York City a number of practical housekeeping centers which are attended by little girls in the public schools. These children, after several months' attendance, are often able to influence their

ignorant mothers to do things like the "teacher does," with the result of greater wholesomeness in cookery and better nutrition at the same cost. I know of a twelve-year-old girl who told her mother that it wasn't necessary to serve rice and potatoes at the same meal because they were both alike, starchy; and another girl, a fourteen-year-old, advised her mother not to put too much oil on smoked salmon salad because teacher said that pink-fleshed fish are "fatter" than white. This same girl under the encouragement of "Teacher," became interested in the diet of her three-year-old brother, and at the end of three months following the changes she made in it, there was a noticeable improvement in him. I cite these instances to show what even an elementary knowledge can accomplish.

It is no great task to learn the composition of the foods in general use and in what combinations they are balanced from a nutritive standpoint. This is the day of the application of intelligence and efficiency to all work, great or small, and in the work of buying, preparing and serving food, the housewife should no longer be content with the hit or miss plan of following precedent and custom, but should learn and understand the why that is bottom to the how of cooking.

For the dishes marked with a star in the menus, recipes are provided, the preparation of most of the others being suggested by their names.

Balanced Menus

FIRST DAY

First Meal
Corn Flakes Stewed prunes
Scrambled Egg on Toast
Cereal Coffee

Second Meal Nut and Tomato Soup*
Unsweetened Popcorn
Rice with Celery Sauce*
Banana, Apple and Nut Salad

SECOND DAY

First Meal
Fruit in Season Hominy
Cheese Sandwiches Milk

Second Meal Macaroni au Gratin
Creamed Carrots
Spring Salad* Wheat Crackers

THIRD DAY

First Meal Fresh Fruit
Boiled Rice with Butter and Honey
Toast Hot Milk

Second Meal
Cream of Vegetable Soup
Stewed Lima Beans Beet Greens
Sponge Cake
Rhubarb Stewed with Raisins

FOURTH DAY

First Meal
Stewed Rhubarb with Puffed Wheat
Omelet of Egg and Bread Crumbs
Cereal Coffee

Second Meal Vegetable Irish Stew*
Corn Meal and Nut Cutlets
Salad of Radishes, Cucumbers with
Ripe Olive Dressing Apples

FIFTH DAY

First Meal
Sliced Oranges
Corn Meal Mush with Honey
and Nuts
Toast Milk

Second Meal
Boston Roast
Creamed Potatoes Spinach
Wheat Muffins a la French Pastry*
Canned Pineapple

SIXTH DAY

First Meal
Apples (baked the day before)
Wheatena with Honey
Cheese Toast Hot Drink

Second Meal
Italian Soup*
Green Pea Puree
Boiled Onion Nut Sauce
Fruit Salad Wheat Wafers

Meals of Uncooked Foods

In the summer season, raw food provides the household with the most healthful diet that the bounty of Mother Earth yields. This affords the wise housewife opportunity to provide wholesome foods with less expenditure of time and energy than is possible with any other means of food preparation.

In the large cities many of the various fruits and vegetables suited for use in the raw diet are to be had at all seasons of the year. In the country, the period during which most of such foods are obtainable is restricted to the natural "season" for the foods. However, it is best for even the urban dweller to use foods only when in season, as the unnaturally grown vegetables and fruits are too expensive for use when economy

is a consideration. The important foods of the uncooked dietary are to be had at all times of the year. There are always several kinds of fruits, and in the spring, summer and early autumn fruits of many sorts are procurable. Eggs are to be purchased at low or reasonable prices the greater part of the year; so also nuts. Dairy products, such as milk, butter and cheese are always with us; the autumn and winter bring various dried fruits and the nourishing dates and figs from over the seas. The products specially prepared for the raw diet, like the uncooked cereals and nut butters, are likewise always procurable.

The breads made from uncooked grains if eaten with peanut or other nut butter will be vastly more enjoyable than if served alone. One should avoid eating too much of these nut butters as they are rather concentrated.

Uncooked Menus

FIRST DAY

First Meal

Fresh Fruit in Season
Milk Soaked Wheat with Cream and Honey
Pulled Figs Milk

Second Meal

Cheese Canapes Cold Slaw
Prunes Stuffed with Nuts
Fruit Juice

SECOND DAY

First Meal

Oat Flakes with Egg Sauce
Dates and Cheese
Pecan Nuts Grape Juice

Second Meal

Wheat with Cheese and Olives
Vegetable Salad Sliced Oranges
Fruit and Nut Cakes
Buttermilk

THIRD DAY

First Meal

Cereal with Prune Whip
Fruit and Nut Medley Egg Nogg

Second Meal

Peas Porridge
Rye Bread with Dates
Ripe Olives Tomato Salad
Uncooked Fruit Pie

FOURTH DAY

First Meal

Bananas with Whipped Cream
Fruit Bread Nut Butter Milk

Second Meal

Strawberry Cocktail
Oat Bread with Olives and Onions
Bananas and Lettuce Salad
Walnuts Dates

FIFTH DAY

First Meal

Berries with Cream
Wheat Bread Sweet Butter
Pecans Raisins

Second Meal

Oranges
Shredded Lettuce with Onion Dressing
Wheat Pudding
Brazil Nuts Pulled Figs

SIXTH DAY

First Meal

Strawberries Rye Bread
Lettuce with Cream Dressing
Malaga Raisins Almonds

Second Meal

Rye Medley Figs and Cheese
Bouquet Salad Fruit Egg Nogg

Cooking Recipes

Nut and Tomato Soup

Two and one-half cupfuls of cut up tomatoes, three cupfuls of water, a sprig of parsley, teaspoonful of onion juice. Let boil until tomato is soft enough to be rubbed through a fine sieve. There should be very little to reject, just skin and seeds. Rub two tablespoons of nut butter smooth in a little of the soup, and add to the rest. Bring to boiling point, salt to taste and serve.

Unsweetened popcorn is a palatable and more wholesome accompaniment than the usual fried bread croutons.

Celery Sauce

Simmer half a dozen stalks of celery, cut into pieces in a pint of milk. When tender, strain through a sieve. Add a little cream or butter to the celery milk and thicken with two teaspoonfuls flour, as for a white sauce.

Spring Salad

Slice large red ripe tomatoes crosswise and arrange on crisp lettuce leaves. Garnish with slices or quarters (cut lengthwise) of hard cooked eggs, using half an egg for each portion, and dress with plain French dressing. Serve with salted wheat crackers.

Vegetable Irish Stew

One-half cupful of diced onions, one cupful carrots, half a cupful celery, and two cupfuls potatoes, cut into cubes. Two tablespoonfuls nut butter, seasoning, and enough water to cover the vegetables. Stew the vegetables

until tender, but not soft enough to fall apart or "mash." Rub the nut butter smooth in a little hot water, add to the vegetables, bring to a boil, and serve. Variations of this dish can be made by using any palatable combination of vegetables. Also only half the potatoes may be used, and macaroni or a little barley used instead. Or, when the stew is nearly done, a can of peas may be turned into it. If a dark brown color is desired, a spoonful of sugar may be browned and added to the stew.

WHEAT MUFFINS A LA FRENCH PASTRY

Two eggs, three-quarters cupful of sugar, three ounces of butter, one cupful of whole wheat flour, one cupful white flour, two teaspoonfuls baking powder, and about one cupful of water. Mix the flour with the baking powder. Beat the eggs with the water in which the sugar has been dissolved. Add the butter (melted), any flavoring if it is used and stir the liquid into the flour. The batter should be of a consistency to drop, not pour, from a spoon into the muffin pans. It is sometimes necessary to add a little more water, as flour, the size of eggs, etc., vary. Bake in a quick oven from fifteen to eighteen minutes. This should make a dozen good-sized muffins. These little cakes can be used as the foundation of any number of dainties: they may be frosted and dipped into chopped nuts a la French pastry or with the centers scooped out, the cake filled with luscious berries and topped with whipped cream, delicious little strawberry shortcakes can be made.

ITALIAN SOUP

Slice enough vegetables to make half a cupful each of carrots, turnips, onions and celery. Cook the vegetables in one quart of water. Break up one-quarter pound of macaroni and boil it with a sprig of parsley in a pint of milk. When the vegetables are very tender, rub them through a sieve, mix them with the milk and macaroni, and reheat, thinning with boiling water if necessary. Just before serving add one tablespoonful butter.

Uncooked Recipes

Cheese Canapes

Mash a cream cheese and mix it with a tablespoonful of cream and a tablespoonful of onion juice. When thoroughly blended spread the mixture on as many cakes of the raw rye bread as needed. Place a ripe olive in the center of each one, and put the remaining cheese in the center of the dish, as some people like the cheese spread thicker upon the bread than others.

Cold Slaw

Cut out the inside of a firm, medium-sized cabbage very carefully (not at the stem end), leaving a shell of about three or four leaves' thickness. Wash carefully and set aside in a cool place. Chop fine the cabbage taken from the center and put into cold water for an hour or more. When ready to serve, drain and wring dry in a cloth.

Make a dressing of one part lemon juice and two parts olive oil, add the juice of one small onion and beat till creamy. Pour over the chopped cabbage, mix well and place in the cabbage shell, having first cut off a slice from the stem end to make the cabbage stand. The dish may be garnished with parsley.

Oat Flakes with Egg Sauce

One cup of cream is beaten stiff and to it is added the well beaten whites and yolks of two eggs (beaten separately). This foamy sauce is poured over oat flakes or any other of the raw cereals.

Vegetable Salad

Run through a food chopper a combination of any vegetables obtainable—a carrot, a few cabbage leaves, an onion, a piece of turnip, etc. Mix well with a simple salad dressing, and serve a tablespoonful on a lettuce leaf.

Fruit and Nut Cakes

One-half pound of dates, one-half pound of figs, one-half pound of walnuts, juice of one orange. Wash the figs and dates and grind them. Add the nuts, also ground, and moisten the whole with orange juice. Press into a round tin box (a baking powder can is splendid). Turn out on a dish and cut into slices. If the can is dipped into hot water, the contents will turn out easily.

Useful Hints

In preparing the following dishes, the white of eggs may be used with cream to form sauces, and the yolk is used in salad dressings. The dried fruits (prunes, apricots and peaches, pears and cherries) should be carefully washed and then put to soak in water, well covered. In about twenty-four hours they will be ready for use.

Fruits in summer should be kept cool—not ice cold. If eaten very cold, digestion is retarded, and the flavor deteriorates.

Egg Nogg

Beat the yolk of one egg with a cup of milk and pour into a glass. Whip the white to a stiff froth; sweeten slightly, and heap on top of the glass.

Peas Porridge

Make a rather thick mixture of pea flour and milk and before serving heat (not to boiling point), and add a lump of butter.

Date Paste

Grind one-half pound of carefully washed dates and mix with the juice of one-half lemon. A sprinkling of ground nuts on top after the paste has been spread on bread is relished by many.

Tomato Salad

Wash and dice some ripe tomatoes, peel and thinly slice an onion; mix with the tomatoes, and squeeze over

the whole the juice of a lemon and olive oil to taste. Mix well and stand in cold place. Serve on crisp lettuce leaves.

Strawberry Cocktail

Slice three or four large strawberries into a tall-stemmed glass and pour over the berries the juice of half an orange. The omission of sugar makes them more wholesome as an appetizer. A small spoon is served with each glass.

Banana and Lettuce Salad

Bananas left from the morning meal may be made into an attractive and palatable salad by slicing and mixing with a dressing of olive oil and lemon juice, served in the banana shells on lettuce beds.

Wheat Pudding

Soak some wheat flakes in milk till soft. Sweeten and put into a well buttered, flat bottomed mold. Have ready some seasonable fruit (dried fruits will do out of season), turn pudding out on dish, and heap the fruit on top. Serve with whipped cream if desired.

Rye Medley

Cut into small pieces equal parts of dates and tart apples; add the same amount of chopped nuts, and to each cup of the fruit and nut mixture, add one cup of rye flakes. Mix up well and just before serving add cream in desired quantity.

Bouquet Salad

Bouquet salads are usually served on flat dishes so that the contrasting colors and arrangement of the vegetable used may appear to best advantage. Chicory or romaine with olives and tomatoes cut into quarters make an attractive dish. Any favorite salad dressing may be used.

FRUIT EGG NOGG

Strain the juice of an orange into a thin glass. Beat the white of an egg to a stiff froth, heap up on the orange juice; dust very lightly with powdered sugar and serve.

CHEESE SALAD

Mash some cottage cheese with cream enough to moisten it. Mold into tiny balls. Rub a salad dish with the cut end of an onion and line with crisp lettuce leaves. Heap the cheese balls in the center, sprinkle with chopped parsley, garnish with Greek olives or red radishes.

FRUIT PIE

Moisten enough of a raw cereal with cream to cover a pie plate. Let stand till soft. Then line a well buttered pie plate with the cereal and set aside on oven shelf to harden. Have ready some washed and slightly sweetened fruit—strawberry, huckleberry, peach, cherry, or any favorite fruit (or, if in winter, dried apples, apricots, prunes, etc., may be soaked and then mashed). Fill pie plate with fruit and decorate with stiffly whipped cream, pressed from a pastry bag in decorative manner.

After having gained a general knowledge of the first principles of diet, the practical application of this knowledge consists largely in the preparation of balanced meals. It is not necessary that one should go about continually thinking of food, or constantly estimating the calories or food values of the things he is eating when at the table. It is, in short, better to forget these details after you have established the practice of a fairly satisfactory diet.

In the past the meaning of a "balanced diet" has been taken to cover the arrangement of a fair proportion of proteins, fats and carbohydrates in each meal, so that one would secure a supply of tissue-building food and also energy-yielding or fuel food. On this

basis, therefore, a supply of white bread, polished rice or noodles served with a portion of meat would presumably answer as well as potatoes, spinach, peas, beans or carrots.

But at the present time the term has come to have a new meaning, one which does not have to do with the proportions of protein on the one hand, and fats, starches and sugars on the other. A balanced diet in the best sense is one which provides for the chemical balance of the human body, supplying base forming or alkaline foods to counteract the acid forming tendencies of other foods.

It is not necessary to go into details on this point here, inasmuch as this was taken up in some detail in the chapter on "Chemical and Mineral Food Requirements." You will recall that the foods which carry a good percentage of the organic mineral salts are also in the main those which supply the so-called vitamines. White bread, noodles, spaghetti and polished rice can not take the place of potatoes, carrots, spinach, peas and beans when served with meat, for the reason that they are in themselves, like meat, acid forming in their nature. A diet of such food is one-sided and therefore unbalanced. One needs a plentiful supply of vegetables, green salads and fruits in order to balance the diet.

Fatigue consists in the accumulation of wastes in the system. Muscular effort involves the breaking down of cell tissue and burning up of the "fuel" supplied in our foods (chiefly in starches, sugars, fats). These waste products, which are also commonly called fatigue poisons, are acid in character. They must be neutralized by alkalies or bases. If the diet is deficient in the alkaline

mineral salts, then these bases are abstracted from the tissues of the body itself, thus tending toward a breakdown of the structures of the body, and inevitably in time a breakdown of the general health. But if the food contains these bases the acids may be neutralized or balanced without entailing any such drain upon the blood or other fluids and tissues of the body, and health is therefore maintained.

The present day tendency toward the excessive use of meat especially requires the consideration of this view of the meaning of the balanced diet. The use of too much meat causes the formation of free sulphuric acid and free phosphoric acid because of the decomposition of the albuminoid sulphur and phosphorus containing compounds in the meat. To neutralize these acids one should partake freely of either fresh vegetables or green salads. Some students have especially advocated meals containing a portion of meat eaten with a large amount of green food, but without doubt the cooked vegetables will serve the purpose just about as well.

Among those who are well-to-do and who naturally observe extensive variety in foods, it is quite possible that even without any study of diet a well-balanced menu is attained. In such cases there is always a more or less plentiful use of fruit and green food, as well as of cooked vegetables. Likewise, eggs and milk, which are rich in lime and other mineral salts, are used more or less freely. But where there are restrictions in the matter of variety, and the family pocketbook will not permit indiscriminate indulgence in all of these foods, some of which may at times be out of season, then a clear understanding of the balanced diet is a virtual necessity.

WHAT IS TRUE FOOD ECONOMY?

By CARL EASTON WILLIAMS

IN any consideration of food economy, the true meaning of the term should be well kept in mind. Economy does not necessarily mean excessive stinting in the matter of food, but simply the avoidance of waste both in the matter of food and in the expenditure of money for food. That is all that economy means. The word should not be confused with parsimony or any form of niggardliness. Economy is an expression of the sense of utility. It is a quality, therefore, which is naturally possessed by those who are of a practical nature. Being economical has nothing to do with being stingy. One may be economical and still generous, and we have all known persons who combine these two qualities. The first involves merely a recognition of values.

In the matter of food particularly one cannot afford unwise economy, for such is not economy at all. It is not a matter of buying the cheapest foods, but of securing those which have the greatest value in the supply of the elements needed by the body.

We frequently discover a tendency among families who feel the pinch of the high cost of living, to stint themselves on milk and butter. These are both what may be termed very vital foods because of their life-giving and growth-promoting value, and economizing on milk, especially where there are growing children, is sheer folly. There is no such thing as economy in substituting an inadequate food that is cheap for a food

that costs twice as much but is worth perhaps eight times as much in its life-saving and health-giving character. It is necessary to understand this point very clearly in order to keep in mind the philosophy upon which all food economy should be based. If the diet is one that contains in other respects a high percentage of vitamines, it may be well to substitute oleomargarine for half of the butter supply, but one can easily make mistakes in substitutions of this kind. The family that substitutes oleomargarine for butter, poor coffee for milk, polished rice for potatoes, white flour noodles for green vegetables, vinegar for lemon juice, salted and preserved meats for fresh meat, and tapioca and corn starch puddings for baked apples and fruit desserts, will find itself paying more money for doctor bills than it has ever been able to save by these unwise, supposed economies in food.

The calorie system of computing food values in conjunction with attempted food economy has in this respect a very pernicious influence. On this basis a cheap food may seem worth more than one that costs more. For example, a pound of corn syrup contains as many calories as three quarts of milk at ten times the price. A pound of refined breakfast food contains as many calories as three dozen fresh eggs at twelve times the price. The point is that calories do not express food value. One may list an entire group of cheap foods which are rated very high on the calorie basis, and also a group of expensive foods rated at a very low calorie value, and in so doing get as far away from any true food economy system as the North Pole is from the South Pole. Such "cheap" foods may prevent the normal

and healthy growth of children, or if consumed in a disproportionate quantity by the prospective mother may bring about a condition of impoverished blood such that she will bring forth a weakling or a dead-born child. Likewise the same excess of cheap foods makes it impossible for the mother to nurse her baby. When under such circumstances one considers the consequences in the form of being compelled to buy high priced certified milk for the baby, or perhaps also a sequence of childhood diseases, doctor bills, etc., the false economy of buying these cheap foods, even though they are rated high on the table of calories, becomes apparent. One must use judgment in undertaking any plan of food economy.

But having all of the facts in reference to food values presented in this course clearly in mind, it then becomes possible to arrive at some very practical results in connection with keeping down the food expense. There are foods that have no more value, and sometimes even less value than others, for which the world has to pay an exorbitant price because of variations of flavor. There are other foods which are of doubtful nutritive value under any circumstances. There are foods which one may buy "out of season" and pay unwarranted prices for. The considerations in the following chapter are based upon the assumed understanding of the foregoing.

HOW TO ECONOMIZE ON FOODS

By MILO HASTINGS

YOU cannot gain food economy either through buying alone or through cooking alone. But you must understand both and relate each to the other. By the mastering of buying you will learn how to secure more food nutrients for less money, but unless those foods be economically prepared, served and eaten, your care in buying will prove a boomerang, for the economical buying will become a tyrant and the appetite will rebel.

When the end of the month comes around, figure up your grocery bill, and see to what extent you have drawn upon the economical and the expensive foods. Some items will meet your approval; others will show extravagance. Now look over your list and see what economical foods you have neglected. Buy a moderate stock of these; again repeat your effort to find ways to use them—ways that will please the Lord of Appetite.

As you rebuild your food habits in this fashion, you will soon learn the essential needs of your table so that you can figure out ahead about what you need. Then you can look about for the most economical form and the most economical quantities in which to purchase your supplies.

It is not within our province to recommend any particular firm or even particular system of merchandising, but one can at least advise you to investigate for yourself all places to buy food. There is your local grocery, which all local patriots and community boosters

insist on your patronizing; there is also, if you live in or near a city, the local department stores, which usually carry rather high grade goods and charge accordingly; lastly there are the great mail order houses, which now have stores located to cover practically the entire country. These great systems of merchandising have made wonderful progress and the rise in the cost of living is said to have enormously increased their grocery business.

If you are inexperienced in mail order buying you should be cautioned against selecting the very cheapest grade of goods offered, for that may cause you to become disgusted and repudiate the whole system. Sugar is sugar, but when it comes to syrup or herring the lower grades are inferior in quality and it pays to select your stock from the medium priced grades in the mail order catalog.

Even if you are to purchase most of your foods locally, it will pay you to keep an up-to-date mail order grocery price list in the house. Then you are in position to see to it that the local grocer does not outrageously overcharge you. An instance in point, and not a cross-roads grocery either, was noted in purchasing foods from a large New York department store. For the most part the prices seemed reasonable enough, but a half pound of walnut meats were charged at 49 cents. Later comparison with a Chicago mail order catalog showed walnut meats at 59 cents a pound. Not infrequently does the local department store sell certain staples at a low price and add ridiculous profits on the items that are less frequently purchased. The mail order companies have a more sensible system of trading, as they make no claim of offering goods at "less than

cost," and yet can be depended on to sell all goods at a moderate profit.

Package foods are rarely sold as cheaply as the same foods in bulk. But packages are convenient and with the present law requiring the printing on the package of the net weight of the contents there is no occasion for your being cheated by the package system. But the government cannot prevent you from being cheated if you do not use the information which the law insists on being put there for your protection.

When you buy package foods note the net weights. If you purchase a package of oatmeal for fifteen cents, and the net weight be one pound, ten ounces, figure it out and find that you are paying nine and a half cents a pound. If the bulk price is eight cents per pound and you use ten pounds of oatmeal a month, you can figure your month's saving from bulk purchase at fifteen cents and can judge whether the saving is worth the difference in quality or convenience which the package purchasing will give you.

There is nothing fundamentally wrong with the package system of selling foods. If the packages are not too small and not too expensive, the system may represent the most economical way to sell the food. The sugar trust has recently adopted the package system, and the small cloth sacks which they put up probably represent no more expense, considering the wholesale process of weighing and sacking, then does the real worth of the paper sack, the grocer's time and your time, and perhaps the time of a line of waiting customers. The sugar sacked at the factory is honest weight and is sold at a price that varies but little from

the bulk retail price. The sugar trust did not dare use the package system as a means of boosting the price because the public had so long purchased sugar by bulk that they would not have stood for such price boosting. It is the abuse and not the legitimate use of the package system that has called forth the criticism of the food economists. It is the small package and the fancy package and the much advertised package that are chiefly at fault.

You will find this principle running through all food selling as through trading everywhere, that the greater the quantity purchased at one time the lower the cost per pound. Foods that keep well may then be purchased in fairly large quantities. So far as possible these foods should be bought in the wholesale packages. Sugar, for example, may be purchased by the hundred pound sack, and apples by the bushel instead of by the dozen. Farmers may save in this fashion more easily than city buyers. People in crowded city apartments claim they do not have room to store food, yet a thousand pounds of dry, non-perishable food would only take up a space of twenty cubic feet, a space two by two by five feet, no more than the size of a couple of trunks, and buying foods in large units would work a saving of from ten to fifty per cent and pay enormous dividends on the value of the space required to store them.

By a little thinking and planning, a little shifting about of the furniture, and placing of some boxes or shelves or mouse-proof bins under a table or behind a cupboard, you can find room for storing sufficient non-perishable foods to enable you to purchase them in the larger and more economical sized packages.

Here are a few of the foods that one may purchase in quantities and which will keep for many weeks or months if need be, and these foods should make up from fifty to ninety per cent of an economical dietary.

1. Cereals, if kept sealed.
2. Oils and cooking fats.
3. All nuts.
4. All dried fruits.
5. Sugar, syrup, and honey.
6. Cured meats, like ham or bacon.
7. All canned goods.
8. Dry beans and peas.
9. Smoked, dried, and canned fish.
10. If one has a cellar, potatoes, apples, and many other vegetables.

Speaking from a fairly large experience in handling problems of food economy, the writer advises the calculating of the nutritive value of the diet by totalling the foods as purchased in a week or month, rather than by keeping track of foods as cooked or served. From the standpoint of economy, it is the food we pay for, and not the food we eat that counts. The eliminating of waste between the grocery bill and what cleaves to the ribs is quite a different problem. If one buys carefully and avoids waste, the inaccuracy in figuring one's diet from the grocery bill will be less than the inaccuracy that would occur if one attempted to estimate it by weighing ready-to-eat dishes, and the latter method would involve immeasurably greater labor. Foods, as purchased, vary widely in composition, especially meats, but calculating foods as served is still less accurate for the reason that every cook has a different twist for the recipe and the process of cooking greatly influences the percentage of water.

Do not attempt any elaborate system of bookkeeping, but have a hook on which to hang from day to day your grocery bills or other slips recording food purchases. See to it that you buy everything by the pound and that the number of pounds as well as the price are recorded on these slips. Milk may be recorded by the quart and eggs by the dozen, as these quantities are easily figured in pounds when you make your monthly total.

If you buy other foods by the dozen, the piece or the bushel, find out what the items weigh. A kitchen scale is highly desirable both to check the honesty of your grocer and to weigh up foods that you cannot buy by the pound.

Meat waste should include only bone—no fat should be wasted. Pig skin is a tasty food—you relish it as pigs' feet. The skin on ham or bacon is equally good if cooked until tender. The refuse from bones runs about 20 per cent in chops. The waste in poultry is large, running from 25 per cent in old fowls to 45 per cent in broilers. Fish waste is considerable, varying from 30 to 60 per cent on the whole fish as purchased. The fact that fish as exposed in the shop have a cheaper price tag than meat does not indicate that the real price is lower. The waste of fruits and vegetables runs from nothing for berries up to 50 per cent for cantaloupe. Orange peels are about 30 per cent of the weight as purchased. Bananas have a waste of 35 per cent. In these cases the peels are thick and quite inedible, but in the case of fruits like apples and pears or vegetables like potatoes the peel is very thin, and becomes a source of consequential waste only when we employ the clumsy

system of removing the skin by cutting off part of the substance.

A large amount of good food is thus wasted, including most of the valuable mineral elements. Baking potatoes "in the jackets" also means a loss (if the jackets are not eaten) since much of the meat of the potato sticks to the stiffened skin and is discarded.

Potato skins are not bad eating, and serve the same dietetic purpose of wheat bran, the mineral elements being digested and the cellulose serving to give bulk to the intestinal residue and preventing constipation. If you cannot accept this idea of eating the skins, you may adopt the plan of dropping the washed potatoes into a vessel of rapidly boiling water and allow them to remain ten minutes. Remove, rinse in cold water, and strip around the thin skin as when potatoes are peeled after thorough cooking by boiling. The potatoes will still be practically raw and may be handled like raw peeled potatoes in preparing any dish as scalloped, French fried potatoes, potato chips, etc. Best of all such potatoes may be baked, when they will crust over with a delicious golden brown skin. Such baked potatoes are entirely eaten, avoiding the usual unsightly waste of baked potatoes as usually served.

Buy a fireless cooker and use it. If you prefer to make one for yourself, get a wooden box and a large covered can or tin pail that will fit into the box, leaving four to six inches at top, at bottom and all around. Build a wooden partition that will fit inside this box, and with a keyhole saw cut out a hole that will just fit the top of the pail. Now fit this partition into the box about four inches from the top. The space below

the partition all around and beneath the pail is to be tightly stuffed with crumpled newspapers. Take the papers in single sheets and crumple them—do not put them in folded. Paper crumpled in this fashion is an excellent insulation against loss of heat and is much better and much lighter than sawdust. The space above the partition and the top of the pail is to be filled with a pillow or cushion that must be crammed in pretty tightly. Put a lid on the box.

To use this cooker put the food into a smaller pail and bring to a boil on the stove. While boiling hot place the smaller pail inside the pail in the cooker. Put the lid on the pail, then stuff in your cushion and lastly close down the lid of the box. Foods that are to cook longer than two hours (as in boiling whole corn) may be reheated a second or third time. The fireless cooker saves fuel, it prevents heating up the kitchen and it eliminates the worry from fear of food burning and smelling. The fireless cooker may be used for any food that is to be stewed, steamed or boiled.

If economical foods lack flavor, we have two recourses. We can produce the flavor, or learn to do without it. Cooking is chiefly a process of flavor production and has practically nothing to do with nutritive value. Extravagant cooking has been chiefly defended on the ground of its flavor producing value. The chef who produces the most delectable dish is paid the highest salary, food values having nothing to do with it.

Throughout the earth where plain foods have been used, highly seasoned flavoring substances have been discovered to make them palatable. The Mexican serves his beans with chile, the Hindu his millet with curry,

and the Japanese his rice with soyu. The use of a flavor either developed from cooking the food, or added as sauce, is a thing to be approved when used to make an unflavored food palatable and enjoyable. But high flavors used to spur a jaded appetite to over-indulgence in food of any sort, becomes a dietetic evil.

The relation of appetite to dietetics is delightfully illustrated in Mark Twain's "The Appetite Cure." Mark had a bad case of loss of appetite, and placed himself guilelessly in the hands of an institution which guaranteed to restore it. He found himself locked up in sumptuous quarters and presented regularly with a menu made of various feline and rodent preparations, mingled with extracts from ancient footwear, and incompletely incubated eggs. The appetite cure consisted in offering the patient this bill of fare three times a day until he at last gave his order. Thereupon the doctor rushes in, embraces the patient, and pronounces the cure complete. Moral: Don't eat until you're really hungry and the problems of cookery, flavor, and the finicky discrimination of food quality will largely take care of themselves.

A third reason for the reasonableness of the values of certain foods is that they are produced at low labor cost. Again this reason is related to the others. The fact that foods are cheaply produced makes them common. The fact that they are common makes us so familiar with their flavors that we think them plain.

But the foods that are cheaply produced are not the least nutritious. They will average much higher in nutrition than the expensive foods. Whenever a food famine threatens the nation certain writers rush into

print with the recommendation that we eat dandelions and rabbits, locusts and wild honey, or other naturally abundant foods. But there are no naturally abundant foods. This continent supported about a quarter of a million Indians, and the frequency and regularity with which famines visited them made birth-control clinics quite superfluous.

The products from which low-cost foods are to be secured for the nation or individual are the well known basic agricultural crops, and not the oddities and rarities of wild nature.

The law of supply and demand must be considered here, for an increased demand for a food produced in small quantities will boost the price, whereas an increased demand for a food produced in large quantities but not wholly used for human food will have a smaller influence on price. No matter how excellent an economical food we may find any tree-grown products to be, a sudden increase in the demand, in time of food scarcity, would be very bad economy. The logical products to turn to in such periods are staple crops, chiefly the grains. There is a large surplus of grain foods in America utilized for live stock feeding. These products could be more profitably used directly in human nutrition. The objection that taking stock food for human food will boost the price of meats is rather inconsequential, for the reason that there are rough substitutes from which meats can be produced, and which are not available for human nutrition. Moreover, for every pound of animal product lost from the supply of stock food, there would be five to ten pounds gained by the direct use of such foods in human nutrition.

The egg has been universally called a meat substitute and food writers who have conceived of food economy solely as a problem of finding some way to overthrow the tyranny of butchers' bills have insisted that we eat eggs in place of meat. We are repeatedly told that a dozen eggs equals one and a half pounds of steak, but what of it? A dozen eggs do weigh as much as one and a half pounds of steak but they are more watery and, with shells discarded, the dozen eggs weigh but a few ounces more and do not contain any more nourishment than a pound of lean beef or pork, and very much less nourishment than a pound of meat with a fair portion of fat.

As a matter of economy eggs can only be substituted for meat when the price per dozen falls as low as the price of meat per pound. This may be true of the country district in the summer, but is rarely if ever true for city people, and in the fall or winter is thoroughly ridiculous as food economy.

There is one way by which economy may be gained by serving eggs, and that is when people who by habit have come to eat a half pound or a pound of steak at a sitting find it possible to content themselves with one or two eggs (two to four ounces) in place of the heavier meat order. Eggs may thus prove to be an economical dish, if their use persuades a meat-eating gourmand to content himself with a decent and respectable allowance of food.

As long as eggs are more expensive per dozen than meat is per pound, do not serve them straight except in small quantities as a delicacy. Rather save your eggs for purposes of cookery where they can be of service in making other foods more acceptable.

The uses of eggs in cookery depend upon their power of viscosity and coagulation when heated. The latter property is the essential factor in custards. Custard is not only used alone but as a basis for pudding, and for cocoanut, pumpkin and custard pies. This same property of viscosity in eggs makes them useful in salad dressings, cake frostings and the foamy whips or meringues used to top off many dishes.

These same properties of eggs give them the power of lightening all sorts of baked products. The following experiment will give you a very clear conception of this property of eggs. Mix a little water in a cup and add to it a spoonful of baking powder. It will foam beautifully but the foam will immediately die down as the gas bubbles escape. Now stir a little egg white into the water and add baking powder, and the resulting foam will be more permanent. Eggs do not make the "lightness"; that must be secured by gas bubbles of some sort, either by the use of yeast, baking powder, or soda and sour milk. But the viscous property of the egg causes the bubbles to be retained until the material is hardened by heat and made permanently light. There are no other food substances that may be used for this purpose except the gluten of white flour.

This lightness, due to the presence of bubbles, adds nothing to the food value, but it accords with our notions of good baking. Because eggs are more expensive, many foods, notably corn bread, that we at first think to be economical, prove to be expensive on account of the use of eggs. If you cannot afford eggs, you must learn to accept "heavier" breads and cakes. The value of such lightness has been exaggerated. If baked products

are thoroughly cooked so that they contain no raw or soggy dough, and if they are thoroughly masticated, and if one does not overeat of them, they will not be indigestible.

Richness is a term loosely applied to dishes such as plum pudding and fruit cakes that are heavy in texture and contain large quantities of both sugar and fat. The proverbial indigestibility of such products has little foundation in fact. Eat carefully and eat moderately and you need not worry about rich or heavy foods.

Remember that eggs are not economical substitutes for meat and that there is no substitute for eggs in cookery. Use them if you can afford them, if not go without and do not be taken in by the fake egg "substitutes" which are usually made of artifically colored corn starch, and worth about five per cent of the price they are sold for.

Butter substitutes may be considered from two standpoints, first, as a food that is equivalent to butter in both the nature and the quantity of the nutrition furnished; and second, as a food to be eaten as butter is eaten and which will therefore cut down the amount of butter used.

To use butter for general frying is an obvious extravagance, yet in many homes it has become the custom to fry certain foods in butter, because lard, which is the only other fat used, gives an objectionable flavor. If cottonseed oil be substituted for both lard and butter it would cut expenses in both instances, and the unwelcome flavor which lard gives to certain foods will be no longer an excuse for frying in butter. The only cases in which butter should be used in economical cook-

ing are those in which the other ingredients are very weak in flavor and butter is relied upon to give flavor to the dish.

Because of our universal habit of eating butter spread on our bread, any other spread for bread will reduce the quantity of butter used. In the case where much fat meat is used there is no need for butter to add fat to the diet, but economy may be gained and food be made more palatable if sugar products are used as spreads for bread in place of a large portion of butter frequently used by Americans. An example of such a dish is the orange peel marmalade so commonly used by the English.

The following is a standard recipe for marmalade. Varying the proportions of oranges, lemons and grapefruits will give a variety of similar marmalades.

ORANGE MARMALADE

Wheat pounds 4.61; cost of recipe 46 cents; cost per wheat pound 10 cents.

Oranges 2	Water 5 pints
Lemon 1	Sugar 4 pounds

Slice the oranges and lemon (including the peel) very thin. Let stand overnight with the water. Put on stove next morning, boil one hour, let stand twenty-four hours. Then add the sugar, boil slowly two hours longer, and put in jelly tumblers. This amount should be boiled down until it will fill eight glasses. The marmalade keeps well and it is a good plan when oranges are cheap to make up a supply for the winter.

Marmalade is nothing but sugar flavored oranges, and represents scarcely any cost at all except the sugar. There is a sort of subconscious idea running in the back of our heads which makes us believe sugar to be an expensive food. Even though sugar has doubled in

price since the war, it is still much cheaper than most foods, and in nine cases out of ten its increased use would cheapen the diet.

The good old custom of making apple butter on farms where apples are cheap furnishes an inexpensive spread for bread that will reduce the butter consumption. Sorghum and other varieties of molasses also cut down on the butter bill. Carrot marmalade offers a novel dish of this sort and if made when carrots are plentiful is inexpensive and liked almost as well as orange marmalade.

The following is the recipe:

CARROT MARMALADE

Wheat pounds 5.25; cost of recipe 56 cents; cost per wheat pound 11 cents.

Grated carrots	4 pounds	Vinegar	4 teaspoons
Lemons	4	Sugar	4 pounds

Scrape the carrots and grate fine or run through a food chopper (fine knife). The pulp should be weighed and for each pound one medium sized lemon should be added, thinly sliced. Cover with water and cook in a glazed vessel until the carrots are tender. Now heat one pound of sugar for each pound of pulp. Add to the carrot pulp one teaspoon vinegar for each pound and the hot sugar. Boil down to the consistency of marmalade and fill into jelly glasses, or jars,

Another type of spreads for bread are soft cheeses. Some of these cost more than, butter, but cottage cheese, made from skim milk and enriched with cream and oil makes a spread both nutritious and inexpensive. Cheese can also be made of butter milk.

Heat buttermilk gradually to about 130-140 Fahrenheit. Allow it to cool, pour off most of the whey from the curd settled to the bottom, and strain out the rest. This

cheese has hardly any fat, yet has a consistency suggestive of fat.

Cottage cheese made from either skim or buttermilk may be seasoned with salt only, or mixed with oil or butter or cream and various seasonings. Chopped olives or pimentos combined with cottage cheese enrich the flavor greatly. Cottage cheese can not only be used as a sandwich, but goes equally well as the meaty part of a salad.

But where the diet does not contain much other fat, these sweet spreads will not satisfy; the experience in the war has proven that men crave a certain amount of fat and refuse to feel well fed without it. The following fat-containing butter substitutes may be used as spreads for bread. Some of them you may reject because they are not as tasty as butter, but they are all wholesome and economical, and if economy is imperative there is no reason why you need to continue to suffer poverty elsewhere merely to indulge in an inordinate butter appetite.

The first of these is drippings so commonly used by the poorer classes in England. The drippings from fried or baked meats are very flavory and may be used as a butter substitute both in cooking and as a spread for bread.

Cottonseed oil is too flat in flavor and too thin in body to be a suitable spread for bread. It is not so bad, however, for a hungry man as one might think. With a bit of salt, or still better with a liberal amount of sugar, it is very palatable when eaten with good fresh bread.

Oleomargarine is cottonseed oil and oleo oil (made from beef tallow) churned and flavored with milk or cream. There are many grades of oleomargarine, the

better ones of which are superior in flavor to the poorer grades of butter.

Nut margarine is made from churning cocoanut oil and cream. This sells for about the same price as cottonseed oleo and is excellent while fresh, but does not keep well.

Vegetarian cookery brought forth its own crop of butter substitutes in the form of nut butters. The oil of nuts is fluid at room temperature, but the solid ingredients of the nut give certain firmness or body to the butter. Nut butters are excellent, but, with the exception of peanut butter, are more expensive than the dairy article.

Peanut butter is one of the most economical foods on the market. It keeps well and should be purchased in large sized packages from mail order houses, as the rate charged for it in the small glass containers is exorbitant. The objection to peanut butter is in its mechanical condition. The solid substances of peanut butter form a tenacious mass which does not spread well. Its consistency may be materially improved by working it up with oil and water, or milk, or even plain water. The butter in this form will spread better and go farther and is more comfortable to eat. The manufacturers would undoubtedly take advantage of this were it not for the fact that the butter will spoil when water is added. Mixed up in quantities sufficient for a few days only peanut butter in this form is very excellent and most economical.

Flavor is one thing in food for which people actually pay more than for all other food elements and qualities combined. Strange to say, this factor is never men-

tioned in the treatises written on the cost of living. Such is the difference between theory and practice that we commonly think of the cost of living theory as the matter of the cost of nourishment, and the cost of living practice as a matter of the cost of the pleasures of the palate, or the satisfaction of our vanity.

There is a legitimate element to the cost of flavor. Appetizing foods whose appeal is to a natural taste and not to an artificial one are healthy foods. Palatability, in the truest sense, is well worth catering to and well worth paying for. There are some foods that are refused by the taste, and hence to encourage one to eat them because of economy or any other reason is to cause the appetite to revolt. The sensible compromise is in eating intermediate priced dishes that are made by flavoring cheap basic foods with small quantities of the higher priced and more highly flavored sort. The highest priced foods are usually those of which the quantity is so limited that there is only enough for the tables of the rich. If these foods appeal to a taste and the quantity is limited, those who can afford them will naturally pay the price beyond the reach of the ordinary consumer. Thus the price of caviare runs far beyond the reach of the ordinary man's purse, though the food value is exactly equivalent to that of any other fish roe or practically of any meat. Any number of such foods could be mentioned, even going to the extremities where there is an obvious effort simply to make the diet expensive, as the eating of larks' tongues, and similar fantasies which are credited to the Roman emperors. In none of these excessively expensive foods are there food qualities which, from any standpoint of nutrition,

or even that of flavor, could be considered worth a fraction of the price asked. But there are plenty of flavors like those succulent vegetables and ripe fruits or the delicacy of perfectly fresh eggs that are not to be excelled on the tables of the rich. It pays to make foods appetizing, but this can be done without indulging in any of those rare dishes which the limited supply has boosted to ridiculous figures. There is no reason why one should pay more than twenty-five or at the most fifty per cent more for any sort of meat than is charged for ordinary standard beefsteak; nor is there any reason why any bakery products should ever be used that are more than twice as expensive as plain bread. Vegetables and fruits are less easy to compare to standard articles, as the prices vary widely for the different sorts and from season to season. Any type of juicy vegetable or fruit that costs more than ten cents a pound may be considered extravagant, and anything beyond the price of twenty cents a pound would be sheer extravagance. With nuts the prices may go much higher per pound before they are really extravagant, as the wheat pound value is very high and the quantities eaten are not large. It is more logical to pay sixty to eighty cents per pound for nut meats than it is to pay more than ten cents a pound for green vegetables, or to buy fancy cakes and confections.

Despite the old adage, it does cost something to be clean, because it requires human labor. This applies to the preparation of the food as well as to the body. Pure foods, according to the popular interpretation of The Pure Food Law, mean not only foods that are exactly what they are labeled, but foods that have been

carefully selected and handled, and which are free from inferior and decayed portions, as well as from the mixtures of foreign elements and dirt of all sorts. To discard the wormy apples makes the good ones cost more. To put raisins through an extra cleaning process adds slightly to their cost. To put up genuine raspberry jam instead of apple butter in which the raspberry seeds have been mixed after being extracted for the making of soda fountain syrups, costs more than to put it up the way mother used to do.

There are legitimate additional costs which selected foods have compared with unclean impure foods and we must be willing to pay for purity and cleanliness.

The question of food preservation, whether by canning, drying or cold storage, vitally concerns the problem of the cost of food. The question is a double barreled one, and not all the argument is to be found on one side. The producer claims that cold storage permits the coining of unjust profits by speculators, whereas the warehouse men argue that the storage of foods distributes the product evenly throughout the year and makes it possible for the majority of the people to have foods in the season of scarcity, whereas without storage only the rich could afford eggs in the late fall or fall fruits in the early spring. The preservation of foods undoubtedly increases their cost in the season of plenty and decreases their cost in the season of scarcity. It is a good thing for the producer in that it gives him a market for a greater amount of product by distributing the season of consumption throughout a longer period of time. It is a good thing for the consumer because it gives him a wider variety of diet at all times.

From the standpoint of wholesomeness, this argument in favor of a greater variety of diet is offset to a certain extent by the loss of quality to the foods in storage. Whether it is better to do without eggs in November or eat storage eggs, or to do without apples in April or eat storage apples is a question upon which there will be much honest difference of opinion. The evils of cold storage foods have been exaggerated because of unfavorable developments in bad foods as in ptomaine poisoning from storage fish or poultry. Economically, from the preservation of food, it seems like a blessing which is possible of abuse.

The preservation of foods by canning virtually repeats the argument in case of cold storage. The canned foods are rarely as good as the fresh, but it would be quite difficult to have year-round variety without the canning process. Canned goods are usually expensive and foods should never be used canned that can be had in satisfactory form dried. There are occasional instances in which one can save money by using canned goods. During the food stress of early 1917, fresh spinach was selling in the retail markets of New York for twenty-five cents a pound, while the canned goods could be bought for less than ten cents a pound. Tomatoes are frequently cheaper canned than fresh.

The European War was largely responsible for the development of a new phase of food preservation which is destined to have a large place in this situation, that of drying vegetables. Fruits have long been dried by simple machines, but vegetable drying requires special vacuum process and machinery. Soaking them in cold water restores the contents to a condition that in appear-

ance and flavor is often as satisfactory, though rarely quite like the original state.

Dried vegetables have an economic advantage in the case of households where labor saving is imperative, as the necessary process of merely dumping the contents of the package into water and bringing it to boil is often much less laborious than the necessary picking over, washing and cooking of the fresh product. Dried vegetables may be used economically whenever the price is less than that of fresh goods, which may be determined by comparison of the proportion of water in the fresh vegetables. The following table gives equivalents in fresh fruits and vegetables of one pound of the dried products.

White Potatoes	4	Beets	8
Sweet Potatoes	5	Onions	10
Carrots	11	Pumpkins	6
Parsnips	6	Celery	14

THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART TWO

DIET

SECTION THREE

CURATIVE DIET

HOW TO AVOID INDIGESTION

By Dr. ESTILL D. HOLLAND

A "SOUR stomach," a "gnawing in the stomach," or a "burning in the stomach," usually all mean the same thing—an increased acidity of the stomach contents; in other words, a *hyperacidity*.

In order to understand what a *gastric hyperacidity* means we will first have to consider the *normal* gastric acidity.

All our food is digested by enzymes and ferments which are secreted by certain portions of our digestive canals, and each of these digestive agents requires a certain chemical state of the food before it can become active.

Thus we find that the saliva has no digestive power in an acid state, consequently the saliva is alkaline in reaction so that its digestive ferment can functionate.

In the same way the digestive juice of the stomach cannot act on the food except in an acid state, consequently we find that certain cells of the stomach lining secrete enough acid to change the food, which has been made alkaline in the mouth and throat so that the saliva could act, to acid in the stomach so that the stomach digestive agents can act.

So we see that a certain amount of acid is normal and necessary to a healthy stomach.

Suppose, to make it more simple, we use figures and say that the normal acidity of the stomach digestive juice is thirty, and then, for some reason, the acidity

jumps to sixty; the sixty would mean a great hyperacidity and would be very apt to give all the symptoms that we mentioned in beginning—a gnawing, burning or sourness.

The most important thing to discover about any disease or condition, is its cause, and we naturally ask ourselves what causes gastric hyperacidity.

The lining membrane of the stomach may be compared to the lining membrane of the nose, as what affects the lining of the nose will also affect the lining of the stomach, within certain bounds.

The principal difference is that when the lining of the nose is irritated there will only be a secretion of mucus, as that is all that the nose cells can secrete; while an irritation to the lining of the stomach causes a secretion of all the digestive agents of the stomach including its acid (hydrochloric acid). This is because the cells secreting the digestive agents are all situated in the lining of the stomach, in fact are a part of the mucous membrane composing the lining of the stomach, just like the mucus cells of the nose are a part of the lining of the nose.

We all know that if we snuff pepper up our noses it will cause an irritation which will induce a secretion of mucus, and we know that there are very few things that can be introduced into the nose without causing such a secretion. Right here we have the cause of hyperacidity of the stomach—*irritation,* and it is simply marvelous how much time and attention have been devoted to the refinements of stomach irritation.

Just think of modern cooking, especially the "French style"; think of the dishes that you have eaten the in-

gredients of which you were perfectly ignorant, because the taste conveyed no inkling of what they contained. If you can't read French, drop into some French *café* and tell the waiter to bring you a good dinner; you will recognize the pastry, part of your salad, and your fish, if they leave its fins on, but the remainder of the meal will be nameless.

This is all due to seasoning—to all sorts of condiments and mixtures—and not to cooking. A chicken will remain a chicken no matter how you cook it, but it can be seasoned, minced and mixed until its own mother wouldn't know it.

This seasoning is all done to make the food taste good, to stimulate an appetite; its real object is to coax one into eating a full meal when one has no desire for a full meal; it is an abnormal stimulation of a normal function, *digestion,* and works by irritating the lining of the stomach walls.

When the lining of the stomach is irritated to secrete its digestive juice it is also irritated to secrete its acid, and if the irritation is continued long enough, the lining of the stomach will become so sensitive that any kind of food will irritate it and cause a profuse secretion of digestive juice and acid, and we will have a gastric hyperacidity.

Also think of the temperature at which food is eaten, ice cold and scalding hot; people will actually drink coffee and tea so hot that they could not stand to hold their fingers in it for a minute, and will then eat an ice cold cantaloupe, or ice cream, or a sherbet to "warm it up."

If one will stand under an iced shower bath some

time, and then jump into a tub of water from which the steam is rising, one will realize what a wonderful organ the stomach is, and wonder how it lasts that allotted time subjected as it is to abusive treatment.

Another common form of stomach irritation is irregularity in eating. We are all creatures of habit, we don't all have the same habits, and it isn't necessary that we should have, but we are all, consciously or unconsciously, governed by our habits, and in no way is this more marked than in regard to our stomachs.

We all get into the habit of having our meals at certain times, and we must have them at that time to enjoy them and get the most good out of them. It doesn't make any difference whether one eats lunch at noon or at two in the afternoon, but it does make a great deal of difference if one eats at noon one day and at two the next day.

The stomach gets into the habit of receiving food at certain times and it soon anticipates this time by secreting its digestive juice in preparation for the food, then if the food isn't received at the proper time, there is nothing for this stomach juice to combine with, and it irritates the walls of the stomach.

A great many people will lose their appetites if they are half an hour late to a meal, and most people with stomach trouble feel worse just before they eat.

The above are only a few of the commoner methods of causing gastric hyperacidity—they are not nearly all, for bartenders and cooks are inventing new stomach tortures every day.

When you snuff pepper up your nose it not only causes a secretion of mucus, but also an inflammation

and thickening of the lining membrane of your nose, in the same way that a bad cold causes a secretion from the nose and then an irritation and thickening of the lining membrane, until the nostril may become entirely closed, so that you are unable to breathe through it.

This also happens with the lining of the stomach. The same irritation that causes an increased secretion of gastric juice also causes a thickening of the stomach lining, and we will now see how this may affect our digestion.

The common bile duct—the duct that carries the bile from the liver to the intestines—opens into the intestine a few inches below the stomach, and it is very small, about large enough to receive a good sized straw, and it is surrounded, at its opening, by the lining membrane of the small intestine and is also lined with a membrane of its own.

If we have a hyperacid, irritating, gastric juice being poured out of the lower end of the stomach into the intestine, we are sure to have an irritated intestinal lining, and we have already seen that an irritation of a lining membrane is sure to cause a thickening of this membrane, so we must expect a thickening of the lining membrane of the upper small intestine, and that is exactly what we *do* get in the average case of hyperacidity of long standing.

If the opening into the common bile duct is only large enough to receive a straw when the lining membrane is normal, it is bound to become smaller as the lining membrane becomes thicker, until an opening only a fraction the size of the original opening remains, or perhaps the opening is entirely closed.

If the opening is only partly closed we complain of being *bilious,* say that our *livers* are torpid, we may have vertigo, spots before our eyes, etc., and the chances are that we will take something for our livers. Our livers, however, are doing their best all the time but are being prevented from pouring their secretion (the bile) into our intestines because we have acid stomachs which have caused an inflammation of the lining of the intestines surrounding the opening of the bile duct into the intestine, and of the lining of the duct itself.

If this irritation continues until the lining membrane becomes sufficiently thickened to entirely close the bile duct, we have "yellow jaundice," which formerly was supposed to be a clear case of liver trouble, and which we now know usually has absolutely nothing to do with the liver. When this bile duct becomes closed the bile can no longer be thrown off into the intestine, so it is retained and forced back into the liver to be taken up by the blood and gotten rid of through the skin and kidneys, and that it is well distributed to all the skin is attested by the universal lemon color of the victim.

Fortunately the treatment of *liver troubles* has usually consisted of a diet and medicine proper for an irritation of the stomach, and in this way has helped to remove the cause of the closing of the bile duct, so that the bile could be discharged and the liver relieved; the liver being about the only organ in the body that was not disturbed by the treatment.

Let us now see what else this interference with the free flow of bile may do to our digestion.

The function of the bile is to act as a mild laxative, to help in the digestion of fats, but principally to change

the acid food, passed on from the stomach, into an alkaline mass so that the digestive agents of the pancreas can functionate. The pancreatic juice, like the saliva, requires an alkaline mixture before it can digest.

When we take into consideration that the pancreas is the most important digestive organ that we have, that it is capable of digesting all three kinds of food, and that its digestive juice is emptied into the intestine through the same opening as the bile, we see how absolutely essential it is to our digestion to have a free opening of our bile duct, and how, in order to assure ourselves of a free opening, we must take care of our stomachs.

To be more plain, let us see exactly what an acid stomach with its consequent thickening of the lining of the intestine and its interference with the free flow of bile and pancreatic juice means.

It means a tendency to constipation, a very imperfect digestion of fats, of meats and vegetables. When we remember that there are only three kinds of food, fats, meats and vegetables, we see that we have interfered with the whole of digestion, although we may only be conscious of a slight "heartburn," "sour stomach" or "gnawing stomach."

We now see that one's digestion is a continuous, harmonious sequence of events; the proper functionating of each digestive segment depending on the segment preceding it.

It is usually impossible to pick out any one part of the digestive canal and treat it alone, as the cause of its abnormality is usually far removed from that particular segment, and no treatment that simply overcomes

a symptom, such as pain or jaundice, and does not remove the cause, is of any lasting benefit in treating diseases of digestion.

We have now considered some of the causes of digestive troubles, and if we will examine them closely we will find that they may all be covered by what might be called "artificialities," by customs, habits, environments and abnormalities, such as highly seasoned food, strong drinks, irregular hours for eating, overeating, and lack of exercise.

Did you ever stop to think of how seldom domestic animals suffer from stomach trouble? We all know that some of them are not very choice in what they do eat, but no matter how little we may think of their selection of food, we will admit that all animals try to eat the same kinds of food that their predecessors ate, and if any animal, except man, is allowed to eat what it *naturally* desires, in the manner that it *naturally* eats it, I doubt very much whether it will ever know that it has a stomach except for the satisfaction it derives from getting it full.

If *abnormality* causes stomach and digestive troubles, it would naturally follow that *normality* would be the best way to prevent them; and we find this to be true.

If people will eat good, wholesome food, simply and thoroughly prepared, will eat because they require food and not because it tastes good, will eat at regular times and take plenty of exercise—they will cease to be conscious that they have a digestive tract, and digestive troubles will decrease ninety per cent.

Foods and drinks should never be taken freezing cold or scalding hot, in fact, extremes of all kinds are

the result of the customs and conveniences of the times we live in, and not of natural selection. However embarrassing it may be, the fact remains that our digestive canals still hold pretty closely to the customs of their prehistoric, cave-dwelling ancestors, and refuse to be rushed into these twentieth century environments without a protest; consequently we hear more and more of digestive disorders and so-called liver troubles.

The complaints that are constantly being laid at the doors of our unsuspecting and unoffending livers are enough to make any organ, but a most generous and forgiving one, really get out of order and show what it *could do.*

CONQUERING CONSTIPATION

By WILLIAM EASTMAN

CONSTIPATION is the one most prevalent of all complaints. We must not forget, however, that there are degrees of costiveness. Many otherwise healthy persons, who do not experience any serious inconvenience, nevertheless suffer from a degree of impairment of this function. In other cases the disorder is chronic, stubborn, aggravated, persisting for years and years.

It is not our purpose here to go into details on the effects of constipation, for practically everyone knows that this condition is responsible for more or less poisoning of the body, thereby affecting other organs and the health generally. Everyone knows that constipation in many cases is the cause of headaches, dizziness, irritability, mental torpor and depression, loss of appetite, or a general sense of meanness and discontent.

The late Professor Metchnikoff conducted elaborate investigations in regard to the poisons generated in the colon and their effect upon the body. It was his theory that this poisoning of the system was the cause of premature old age. He believed that he could overcome this condition through the drinking of fermented or cultured milk, and thus destroy the toxin-forming bacteria in the colon. However, to secure and preserve a healthy condition of the colon attention must be directed toward overcoming any tendency toward stagnation in the elimination of the colon contents, and establishing normal regularity of this function.

For our present purpose, therefore, we may take for granted the various ills and disorders that are the result of constipation. What it is important to know is, what can we do about it? Can constipation be cured, even in its most aggravated and chronic forms? The truth is that even where this complaint is of many years' duration, the case must be extraordinary indeed when it cannot be remedied by persistent natural treatment.

Remember that perfect functioning in this respect is the normal condition, not only throughout the entire realm of animal life, but in human life as well. Any departure from normal regularity is necessarily the result of improper habits of life. If one is constipated, there is a good reason for it, or perhaps many reasons for it. By doing away with the causes, and by living a natural life, this complaint can be conquered in practically every instance.

In each and every case of constipation one's first efforts should be devoted to discovering the cause or causes of the complaint. These causes are many. Among the most important are errors in diet. The lack of water in the system is often a contributing cause. Bodily stagnation or lack of exercise is also in many instances a primary cause. In fact, constipation is supposed to be the typical disorder associated with sedentary occupations. In addition to these there are sometimes mechanical causes and, in some instances, more or less paralysis of the parts involved.

The lack of exercise not only means such stagnation of the circulation as to result in sluggish functioning of all organs, but it also means a loss of vigor and tone not only of the muscles but of other organs and

structures as well. In so far as this condition is concerned, the remedy will be found in exercise and massage.

By way of mechanical causes of constipation, it may be said that pregnancy is the most conspicuous example. Naturally under these circumstances there is such pressure upon and crowding of all parts that considerable obstruction is inevitable. Even in this case, however, proper diet, the use of plenty of water, and in extreme cases the colon flushing treatment, will be effective in maintaining regularity. Displacements of the uterus, such as retroversion and retroflexion, through direct pressure upon the colon, naturally produce constipation. In such cases, special exercises or other treatment will be necessary to correct the displacement. A constricted or narrowed rectum, while uncommon, is another mechanical cause of this complaint. This is usually treated by means of special dilators. In such cases one should apply to a physician. A dilated condition of the intestines as the result of relaxation through excessive colon flushing, is another mechanical cause, but this is really a question of weakness.

Still another mechanical factor in constipation, and one not usually given consideration, is the effect of bad posture in causing a downward displacement of all the organs below the diaphragm. In some instances the liver, stomach and kidneys are allowed to assume a position several inches below their normal location. This is probably the case in practically every instance of a pouched or protruding abdomen. It not only means that all these organs are themselves handicapped, but in particular it means such a crowding of the intestines

that the bends of the colon are bent or doubled over sharply, very much as a garden hose is "kinked." This naturally obstructs the movements of the contents, just as the water in a garden hose is shut off by the kink in the latter. It is among women that this form of constipation is most likely to be brought about, especially when corset wearing or tight skirt bands constrict the body, causing both prolapsus of the viscera and unnatural pressure throughout the abdominal region.

When such a condition prevails, it is almost useless to try to overcome constipation either by means of diet, drugs or any other means outside of exercise, massage and improvement in posture. So far as women are concerned, dress reform would be imperative in most instances. Especially when taking exercise there should be complete freedom of the body.

All movements that bring into action the muscles of the abdomen, and especially bending movements and those which flex the thighs against the abdomen will be effective in overcoming constipation. High kicking, for instance, would be a good exercise. Lying on the back and bringing the knees up against the chest, either singly or both together, is suggested. Also lie on the back and then rise to a sitting position, finally bending far forward over the legs. Sitting in a chair, bend far forward until the chest rests upon the knees. Vary this by bending slightly to each side over the right and left knees alternately.

Another type of exercise of value in this connection consists in rolling from side to side, face down, especially with a small footstool, roll of clothing, or a small sofa pillow placed under the stomach.

But in addition to these exercises, movements for improving the posture are especially valuable. If one's poor carriage is due to weakness of the back, gymnastic work, to strengthen the back, should be persisted in. Particularly stretching exercises which raise the chest and retract the abdomen tend to bring all the organs up to their normal position. Stretching of the arms high above the head is the simplest and one of the most effective movements of this kind. Massage movements tending to lift these organs upward will also be valuable in this way.

General exercise will of course be necessary to build bodily vigor, maintain functional tone and keep the circulation active. Prolonged activity of any kind, as in walking, skating, tennis, mountain climbing, horse-back riding, rowing or energetic work of any kind, is very effective. For the average person there is probably nothing better than a good brisk walk of sufficient distance to wake up every organ in the body.

These activities will be especially helpful if deep breathing is practiced at the same time. It is diaphragmatic or abdominal breathing that is important, inasmuch as it produces intermittent pressure upon all the organs below the diaphragm, and thereby massages them. In fact, one of the most helpful influences in connection with constipation will be found in cultivating deep breathing with special stress upon vigorous diaphragmatic action. You can learn to get control of the diaphragm so that you can contract it with an extreme degree of strength, just as you can the biceps, and by alternately pressing downward and drawing upward with this great internal muscle you can practically exer-

cise the entire digestive system. This is worth cultivating.

The time of day for taking exercise for this purpose is naturally in the morning, inasmuch as in most cases this is the normal time of day for the action of the bowels. With the majority of people it is after breakfast. The exercise, however, is always made much more effective if one first drinks a quantity of water. As a rule, two or three glasses of water may be relished in the morning, but in obstinate cases of constipation it would be well to drink much more than this. Also before taking a long walk it is well to drink a couple of glasses of water. If one follows this plan of drinking water, then taking his exercise, followed by breakfast, and is still unsuccessful in bringing about a normal action, then massage may be used after breakfast as an additional help. The more energetic this treatment, the better. As a rule, deep kneading is best, although a large circular movement, either with a baseball or with the fist, rolled or moved in the direction of the hands of a watch; that is, up the right side, across and down the left side, will usually answer all purposes. A more vigorous form of massage is percussion, applied either with the edges of the hands, using a chopping movement, or by light tapping with the fists. If one is strong enough this may be applied quite vigorously, shifting the point of application of this treatment from place to place over the abdomen.

Usually the first attempt in overcoming this complaint consists in the use of some cathartic drug. This is temporarily effective, but the reaction is such as to make the condition more fixed and chronic than before.

The fact is that this treatment, continued for any length of time, is to be regarded as one of the most potent of all causes of the chronic form of the trouble. Cathartics act as an irritant, extracting the water from the intestinal walls and leaving behind a condition which will require continuously increasing doses of the same drug to secure results. In time the drug used ceases to have effect, and some other cathartic is resorted to. In short, the more one tries to cure this trouble by drug treatment, the worse it becomes.

As an emergency measure the most satisfactory treatment is found in colon flushing. This treatment is fortunately coming more and more into general practice in place of drugs. Indeed, the enema may almost be said now to be a national institution. Even this, however, should not become a daily habit, and one should learn not to depend upon it. Regularity should really be established through proper diet and physical activity. At the same time, the enema is, as we have said, a splendid emergency treatment and should always be used rather than to permit the poisoning of the system through neglect of this function. In sudden attacks of disease, especially, where it is important to cleanse the alimentary canal as thoroughly as possible, colon flushing should be about the first form of treatment adopted. In threatened attacks of appendicitis it is particularly important.

As a general thing it is best to use plain warm water at about blood temperature or a little below, for colon flushing. For radical results a soapsuds enema is often advised. There is no question of its effectiveness. At the same time, it is highly irritating and the after effects

are not desirable. Where there is any inflammation or irritation of the colon, as for instance, in diarrhea, it is better to use a saline solution, using one teaspoonful of salt to a quart of water. But for ordinary purposes, as we have said, plain water is best.

The most satisfactory method of taking an enema in order to secure a full injection is to assume the knee-chest position.

The objection to the continued use of the enema is found in the fact that it tends to stretch or dilate the walls of the colon and thus to weaken them in such a way as to make normal self-activity of these parts continuously more difficult. Therefore, whereas the full enema may be used as already suggested for an emergency treatment, for ordinary purposes it is better to depend upon a very small injection if, indeed, the enema is used at all. We should remember that in many cases there is only a degree of constipation, sometimes due to neglect in responding to the calls of nature, and regularity may be restored by "education" of the function, so to speak. In a large percentage of cases all that is necessary is the very smallest amount of warm water. This will usually stimulate the nerves and peristaltic muscles in such a way that a practically normal action is induced. A very good plan in many cases is to use a very small injection of cold water, perhaps only half a cup. Warm water has a relaxing effect, but cold water tends to tone up and invigorate the tissues and is highly stimulating. In many cases, therefore, this modified form of enema may be used effectively as a means of establishing regular habits.

We must remember, however, that in the majority

of cases the most important cause of constipation is to be found in the diet. The eating of unnatural food produces this unnatural condition. The use of natural food, that is to say, food in its natural condition, would make it impossible. It is chiefly the refinement of various foods in the process of manufacture that is responsible for this complaint in most cases. White bread, apart from its chemical deficiencies as a blood and nerve building food, is undoubtedly the one greatest single cause of constipation in this country.

For the sake of normal activity of the bowels it is necessary to use food containing a sufficient amount of fibrous or pulpy material to give bulk to the contents of the alimentary canal, and to stimulate peristaltic action. For this reason, vegetables and fruits should be consumed, so far as possible, in their natural uncooked condition; particularly all palatable green foods, such as lettuce, watercress, cabbage, celery and the like, are advantageous.

But it is in cereals most of all that we find the fibrous matter that is valuable in this connection. The use of the whole of the wheat would supply a considerable amount of this pulpy and indigestible material, and it is for this reason that ordinary bran is so widely recommended as a cure for constipation. The daily use of two or three teaspoonfuls of bran can be guaranteed to relieve this condition in most cases. It can be mixed with other cereal food. It can be baked in gems or muffins. It can be mixed into puddings or pie-crust, or even better—can be used raw by stirring it up in a glass of water. Bran crackers or biscuits are made by many health-food manufacturers and sold in attractive packages.

It will usually be sufficient, however, to follow the plan of using the whole meal cereals, using genuine whole wheat bread and avoiding white flour, not only in bread, but in cookies, cakes, pastries, and the like. Some so-called whole wheat flours are made with a part of the bran removed. On this account it may be best in some instances, to buy a small hand-mill with which to grind your own wheat so that you can make your own whole-wheat bread or biscuits.

The whole wheat just as it comes from the farm may be steamed for several hours and served as a cereal. Oatmeal is also excellent for this purpose. Uncooked crushed wheat or raw rolled oats, however, may be used as a constipation remedy and may be made very attractive by serving in a bowl with a little cream, together with raisins, figs, dates or honey. One dish of this kind each day can be recommended. Barley and rye may be used in the same form, but are less attractive to most tastes.

Practically all exclusively starchy foods are extremely constipating, and for this reason it would be well for those suffering from this complaint to avoid rice, tapioca, sago, spaghetti, macaroni, and all food of this character.

There is no question that milk when used with other foods is somewhat constipating, at least in the case of those with an inclination toward this complaint. The same is usually held to be true in lesser degree of eggs and meat. The reason why these highly nutritious proteid foods are slightly constipating is that they consist almost exclusively of nutritive material with a minimum of waste or fibrous matter such as would give bulk to

the contents of the colon, and they should therefore be used in conjunction with foods containing plenty of pulp. It is not, as a rule, to be advised, however, that those suffering from constipation should avoid eggs and meat and milk, if their dietetic requirements call for these foods, because it is first of all important that one should be adequately nourished, and by the use of a well balanced diet constipation can still be avoided.

So far as milk is concerned, however, in such cases it may be better to use buttermilk or fermented milk. A larger percentage of cream lessens the constipating tendency of milk, just as fat foods of any kind, whether in the form of butter, olive oil, meat fats or gravies, are favorable. If milk is used, the constipating effects are usually lessened if one consumes a sufficient quantity. In the exclusive milk diet constipation is frequently experienced when the total quantity of milk consumed is below normal requirements, but when the amount is increased sufficiently the tendency toward constipation disappears. Cheese is notoriously constipating.

Especially when using milk, eggs or meat to any extent, one should use fruits very freely. Indeed, those suffering from constipation should make a point of eating fruit and eating plenty of it. The money spent on laxatives or cathartic drugs, if invested in a supply of fruit of the same value, would probably solve the problem in many cases. Practically all fruits have a laxative effect, except huckleberries, persimmons and possibly blackberries. Apples and plums are especially recommended. It is also well known that figs, prunes and raisins are very valuable in this connection, and they should be used freely. They are all attractive,

either raw, stewed or used in puddings or cakes. Practically all fruits are pleasing and palatable in combination with milk. The plan of eating fruit before going to bed is excellent. There is no truth in the old saying that "Fruit is golden in the morning, silver at noon, and lead at night," for its value remains the same throughout the day. Fruit juice drinks are also commendable.

If these food suggestions are followed faithfully and rigidly there is no question as to their effectiveness in practically all cases. One obstacle to success lies in the fact that many persons prefer to indulge their cultivated taste for some of the foods on the forbidden list, and cannot be induced to follow a diet such as has been outlined. Nevertheless, the observance of even part of these instructions has often remedied cases of this complaint.

I have already referred to the value of water drinking in connection with exercise, and especially the use of a large quantity of water the first thing in the morning. Likewise, the value of drinking water between meals through the entire day cannot be over-emphasized. The trouble is that interest in one's work and other conditions often prevent one from using as much water as he should throughout the day. It is therefore better to concentrate upon this form of treatment by making it a special point to drink a large amount of water the first thing upon arising.

Mineral oil or paraffine oil is coming to be used considerably as a means of regulating the bowels. It is sold under various trade names by different manufacturers. It is simply a bowel lubricant and passes through

the canal unchanged. It may be recommended as being fairly effective in a large percentage of cases.

If in extreme cases it still seems advisable to use something in the nature of a laxative, there is nothing so harmless and satisfactory as ordinary table salt. One may use this to any extent desired, but one or two teaspoonfuls stirred up in a glass of water will usually answer all requirements. The use of salt in this way is usually followed by considerable thirst and the drinking of much water, which is naturally favorable.

Ordinary sand has been used as a bowel regulator with much success by many persons. Clean sand with rounded granules only should be used, never that with sharp edges. The sand should first be sterilized by boiling and may be kept on the dining table so that one may use it after each meal, or once a day. A teaspoonful is placed on the back of the tongue and washed down with a few swallows of water. This treatment, while very effective, may not appeal to many persons of fastidious taste.

The position at stool is somewhat important. The primitive position of squatting down, with the knees doubled against the chest, is naturally the most advantageous. In acquiring the conveniences of the modern toilet we have sacrificed this advantage, and for this reason it will be well to have available a foot stool, so that the feet may be elevated and the thighs doubled up against the body in such a manner as to practically duplicate the primitive squatting position.

There are exceptional cases in which the cause of constipation seems to be obscure and in which ordinary methods of treatment fail to be effective.

In many instances of this kind there is more or less paralysis of this function, or it may be the result of some form of nervous inhibition. This applies frequently in nervous persons. A condition of nervous tension may prevent normal action, and anything which brings about relaxation and peace of mind is favorable in such cases. As a rule the cold sitz bath is helpful as a means of toning up the nerves and muscular structures involved, but the extremely nervous person might secure better results through the hot sitz bath and its laxative effect. But where there appears to be more or less actual paralysis of this function the service of an osteopath will usually be most helpful.

AUTO-INTOXICATION: HOW CAUSED, HOW CURED

By HEREWARD CARRINGTON, Ph. D.

IT is an old saying that 90% of the ills from which humanity suffers can be traced to auto-intoxication, and the train of evils which follow in consequence. Most of our diseases certainly originate in the digestive tract; and that means that the foods eaten are directly or indirectly responsible for the diseased conditions of that tract. Auto-intoxication means self-poisoning, and is due either to poisons formed directly from decomposing foodstuffs, or to bacterial action, which form the so-called "toxins," and in turn poison the whole system. These bacteria are now well known; they are of several kinds, and flourish upon their appropriate soil. This soil is furnished by the food we eat; if it were not present, there would be no bacteria. The problem of auto-intoxication, therefore, resolves itself into this: What foods should we eat, and in what quantity, to prevent or to cure auto-intoxication?

As the result of many years' work, it has now been definitely established that the majority of all such cases are the result of nitrogenous putrefaction—that is, the decomposition of foods rich in nitrogen, proteid, muscle-forming elements. The food *par excellence* which is rich in this, and of which we eat most, is *meat*. Hence meat is now known to be the chief cause of auto-intoxication. This conclusion has been reached not by "vege-

tarian faddists," but by the most eminent physiological chemists in the world—men who, for the most part, advocate meat eating. And if meat is the great cause of auto-intoxication, the elimination of meat constitutes one of the chief factors of cure. Other foods rich in proteid must also be prohibited in cases of auto-intoxication, such as nuts, eggs, cheese, peas, beans and lentils.

On the contrary, cereals, grains and farinaceous foods of all kinds are now thought to be beneficial in all cases of auto-intoxication. The "lacto-farinaceous diet" is now very largely prescribed by experts in this line. Milk, and particularly sour milk, such as whey, koumiss, buttermilk, etc., are advocated; also pot or cream cheese; sugar, cereals, grains, and all farinaceous foods; macaroni and spaghetti; and fruits of all kinds, particularly acid fruits. These foods are found to lessen the state of auto-intoxication rapidly, and greatly lessen the number of bacteria present in the colon.

This is the régime now adopted by Professor A. Combe, of Lausanne, Switzerland, possibly the greatest living authority upon intestinal auto-intoxication in the world today, and is supported by a number of other eminent authorities both here and in Europe.

To the hygienist, of course, the measures advocated will appear "half-hearted"; for he knows full well that a partial or complete *fast* for several days will do more for the patient than all the "lacto-farinaceous" diets in the world, especially if accompanied by intestinal irrigation. A few days of this régime would radically cure practically any case of acute auto-intoxication. As, however, many people cannot be induced to fast, and as those who do must eat some sort of food after the fast

is broken, it is well to bear in mind this information, as to the kinds of foods which will increase or retard this condition in the future, when a more or less regular diet is resumed.

Another factor must not be lost sight of in this connection. It is this: That *too much* food is a great factor in the causation of intestinal auto-intoxication. The less food we eat, the better, in all such conditions; and the idea that we must eat a lot simply because we leave off meat is an exploded notion. Farinaceous (starchy) foods are binding, and readily ferment, when eaten to excess; and are deprecated almost altogether by some food reformers. However, the above warning may serve as a preventive against undue overeating of such foods, when the nitrogenous foods are discarded. The tables published herewith will indicate the foods prescribed in chronic or light cases of auto-intoxication by the world's most eminent specialists on this subject. In all severe and acute cases, a partial or complete fast should precede this régime.

FOODS FORBIDDEN IN CASES OF AUTO-INTOXICATION

Meats of all kinds:
Beef, mutton, pork, veal, venison, etc.

Animal fats of all kinds:
Lard, bacon.
Strong cheeses.
Beans.
Peas.
Lentils.
Nuts.

Foods Permitted in Cases of Auto-Intoxication

Milk:

Sour or curdled milk, such as buttermilk, whey, koumiss, kephir, etc.
Pot or cream cheese.
Cereals, grains, farinaceous foods.
Macaroni and spaghetti.
"Alimentary pastes."
Rice.
Sugar (not in excess).
Fruits—particularly acid fruits.
Vegetables—other than beans, peas, lentils.

HOT WATER DRINKING AS A HEALTH BUILDER

By WILLIAM EASTMAN

AT the first mention of hot water drinking, one is likely to think of dyspeptic invalids and delicate old ladies.

Apparently many of these have made the discovery that the use of hot water does them good, perhaps even that it keeps them alive. But is not this most simple of all natural therapeutic measures beneficial to others as well, and if so, why? Just what effect does it have upon the body and its functions?

First of all, do we drink enough water generally, irrespective of its temperature? Probably not, in the average case. Great numbers of us undoubtedly experience more or less stagnation of the bodily functions, lack of proper blood fluidity and poor elimination, because of not using sufficient water. It has sometimes been said that we should follow merely the dictates of natural thirst, but under the unnatural conditions of sedentary work there is no such thing. It is true that as a result of active exercise or vigorous manual labor, especially when profuse perspiration is induced, there is no lack of the compelling thirst that forces one to drink copiously. But probably most men and women who live an indoor life habitually ignore the need for water. Without doubt the interest and mental concentration in one's work often interferes with sufficient drinking, even where a natural thirst exists. It is well,

therefore, to cultivate the habit of water drinking, generally, not forcing down large quantities, but at least taking as much as one can relish, and as often as it tastes good.

Water is the great universal cleansing agent. We use it daily for external bodily cleanliness, but what means infinitely more, we need it for its internally cleansing influence. Nor does this mean simply the flushing of the alimentary canal, but the washing, so to speak, of the other organs and tissues of the body, including the blood vessels. It should be known that when one drinks water, only a small part of it directly reaches the intestines, for most of it is absorbed into the circulation, passing from the stomach into the blood. Every organ and structure in the body is thereby affected.

Furthermore, when the body craves water there is nothing else that can adequately take its place, although pure fresh fruit juices are the next best thing, with a certain food value and other virtues of their own.

Milk, again, is not a satisfactory thirst quencher, for it is strictly a food. It is seven-eighths water at that, showing Nature's provision for the liquid requirements of the infant. And yet even the babe should have some water each day in addition to that contained in its milk, in order to maintain the best possible bodily condition.

Apart from the general benefits of ordinary water drinking, the use of hot water has so many special and sometimes extraordinary virtues that it is regarded by some progressive physicians as the most important of all curative measures and the foundation of all treatment of chronic diseases. Many persons testify as to

the real benefits experienced from drinking water at various "hot springs." It is commonly supposed that the curative value of these springs lies in the medicinal qualities of the water, but the truth is that any pure hot water, if imbibed in similar quantities, would probably produce the same good results.

If it be objected that hot water drinking is not natural, it may be said in return that the use of hot drinks seems to be instinctive the world over. Naturally the plain, hot water, for internal cleansing and general therapeutic purposes, has advantages not shared by any food-drink or stimulating beverage.

What, then, are the direct benefits of hot water drinking? In the following summary it will be apparent to the discriminating reader that some of these results, at least in part, also follow the drinking of cold water. As a rule, however, the influence of hot water is more pronounced in these respects. It is of course understood that under certain conditions, such as in fever, cold water only should be used. Chief among the benefits of hot water drinking are, briefly:

(1) Stomach bath—leaving this organ fresh and clean for the coming meal.

(2) Constipation cure, not only through stimulating downward peristalsis, but by supplying the liquid necessary for healthful functioning in this respect.

(3) Improved appetite and assimilation.

(4) Improved or accelerated circulation, with increased fluidity of blood, thus practically flushing or washing the blood vessels.

(5) Bath for other internal organs;washing out and stimulating the kidneys, liver and other organs.

(6) Stimulating the secretions of all glands.

(7) Improved elimination, with the consequent purification of the blood and the prevention of disease through this cleansing effect upon the system.

(8) Bladder washing, especially in diseased conditions.

(9) Relief of colic or spasm, through the relaxing influence of heat internally supplied.

(10) General results in the way of increased weight, improved skin and color, purified blood, and the better health that goes with it.

It is generally supposed that food does not remain in the stomach more than a few hours, ordinarily about five hours. But in many cases, and especially where the stomach is weak and the digestion poor, food may be retained in the stomach for many hours longer, or possibly a couple of days, as is undoubtedly often the case where the stomach is upset. In such an instance the food may be partly or wholly undigested, and in most cases it probably undergoes fermentation. Fermentation may indeed prevail throughout the entire alimentary canal. Hot water drinking, however, is the one effective, simple, natural method for overcoming a condition of this kind. What are known as "stomach headaches" may be thus relieved, through the direct removal of the cause. In fact, in some cases a headache of this type can be relieved almost as quickly through hot water drinking as through the use of "headache powders," which act through the paralyzing effect of some powerful drug contained in them.

To those of delicate health the drinking of cold water is sometimes depressing, inasmuch as considerable

animal heat is required to bring it up to the temperature of the body. But especially those who are troubled with poor digestion or any form of alimentary trouble should find the hot water drinking a boon, not only because of the cleansing of the stomach already mentioned, but because of the direct stimulation of the glands providing the digestive juices. Those who suffer with auto-intoxication or excessive formation of gas should make a feature of this form of treatment. In such cases various changes in diet may, of course, also be necessary. In connection with fasting, hot water drinking is particularly effective by way of cleansing the alimentary canal and promoting better elimination. This hot stomach bath is also suggested for the relief of colic or spasm, acting partly through the relaxing influence of the heat thus applied internally, and partly through the direct effect of the water. In cases of chronic alcoholism, the free use of hot water is valuable as the means of relieving the irritated condition of an abnormal stomach, which, in many instances, undoubtedly produces a craving for stimulants. It has been said that a healthy man does not know that he has a stomach, whereas a dyspeptic does not know that he has anything else. Hot water drinking, by cleansing the stomach and removing any cause of irritation, will help one to reach that state of blissful unconsciousness of the digestive system that goes with perfect health.

One of the most noticeable results of this practice, however, especially if the hot water is used from a half hour to an hour before meals, is a remarkable increase in the appetite and the power of assimilation. This is not mere theory, for almost anyone may experience

this result by trying it out. There will be a greater relish for food, and one may be disposed to eat more of it. At any rate, it will be better assimilated. Those suffering from poor assimilation and loss of weight often find a very radical improvement as the result of hot water drinking alone. It is well known that many people remain thin in spite of continuous overeating. In such cases it would be well to *eat less and drink more.* It is not what you put in your stomach that counts so much as what is digested and assimilated.

Constipation is a condition that especially calls for the more plentiful drinking of water, whether hot or cold, though the use of the former is more effective. It is true that lack of exercise and errors of diet are largely responsible in a majority of cases, and yet the lack of sufficient liquid in the system is usually an important contributory cause. The drinking of sufficient water alone will often overcome this difficulty, even in the most aggravated, stubborn cases.

A common failing of those who try hot water drinking is that they do not drink enough of it. One cup before meals, while beneficial, is not sufficient to accomplish the best results, and particularly will not cover the requirements in aggravated constipation. In cases of this kind it is the use of a considerable quantity of hot water the first thing in the morning that will be found most effective, particularly if this is followed by active exercise. One should use at least one pint of hot water, and in some cases it would be well to use as much as two quarts, consumed one cup at a time over a period of half an hour to an hour. The combination of hot water drinking and exercise described by Bernarr Macfadden

in his recent book, "Vitality Supreme," could not be improved upon for its effectiveness and benefit in respect to this complaint.

One advantage in using hot water instead of cold is that one can drink a larger amount of it, probably because of the degree of relaxation induced by the heat as against the contracted condition of the stomach induced by cold water. It is doubtless by reason of this same relaxation that the hot water seems to be absorbed or assimilated more quickly, so that one can consume a larger amount of it. At all events, it is surprising how much hot water one can drink if he follows the plan of drinking one cup every four or five minutes. By following this plan, muscular exercises can be practiced between drinks, so to speak. The stationary run, sometimes also called the standing run, or still run, is especially effective in connection with water drinking in correcting constipation. Rope skipping could be practiced in the same way.

As we have already seen, the larger part of the water ingested is quickly absorbed in the circulation, not only increasing the fluidity of the blood, but providing thereby all other organs and tissues with a plentiful supply of water, so that the secretions of the various glands may be produced more satisfactorily. With this supply of liquid the organs in the body are flushed and the liver and kidneys washed out, as it were. As a medical writer once put it, hot water drinking "dilutes the ropy secretions of the whole body and renders them less adhesive, sticky and tenacious." As with plant life when deprived of water so with the glands of the body.

The effect of water drinking upon the general circulation is very marked. Because of the more fluid quality of the blood brought about, it is more readily forced through the tiny capillaries, so that all of the tissues of the body to a certain degree are subjected to this cleansing influence. When deprived of sufficient water, the blood becomes thick and viscous and as a consequence cannot circulate so perfectly, especially in the fine capillaries.

Through free water drinking, however, the blood vessels themselves are washed to a certain extent. This action has been referred to by some writers as "flushing the pipes." Inasmuch as the circulation really means the life of the body, it is highly important to keep the arteries, veins and capillaries in the best of condition. Without doubt, hardening of the arteries is partly the result of sluggish or imperfect circulation, as well as of an impaired quality of the blood. There is a theory that the feeling of fatigue is due in part to an accumulation of deposits within the walls of the blood vessels, these deposits being carried off during sleep. If this is true, the flushing of the arteries and capillaries through the increased fluidity of the blood after drinking plenty of water would be of great value in eliminating the "fatigue poisons." Of course, the condition of fatigue, associated in its extrème degrees with lameness and soreness of the muscles, will naturally be relieved by anything which promotes better circulation and thus facilitates the removal of the wastes and fatigue poisons that have accumulated in the tissues.

In truth, the most valuable effect of water drinking —and especially of hot water drinking—next to its

influence upon the digestive system, is found in this improvement in the elimination of wastes and poisons from the system. This is due partly to the improvement in the circulation already mentioned, but partly to the fact that abnormal crystalline substances and other impurities are more readily dissolved, and thus carried off. It is for this reason that water drinking should form a highly important part of the treatment of such disorders as gout, rheumatism, neuritis and other complaints in which the characteristic symptoms seem to indicate the accumulation of poisons and impurities. In such cases it is even well to use distilled water. It is for the same reason that plentiful water drinking is of the greatest possible value in contending with a bad cold, an attack of "grippe," or any other condition in which the system is obviously charged with toxins and impurities, making necessary increased activity in the way of elimination. This, of course, applies in catarrhal disorders of all kinds.

It is only natural that much drinking of water would involve increased activity of the kidneys, and especially so when one is not engaged in such physical activity as to induce free perspiration. It may be said, however, that this really means an effective flushing or washing out of the bladder, which in diseased conditions is of extraordinary benefit. Inflammatory conditions, not only of the bladder but of the prostate gland, especially in advanced years, are commonly due to the irritation of these parts through the strong salts and acids contained in the urine. The effect of water drinking and increased kidney activity is to dilute the urine and render it less irritating. It is really only by such means

that relief can be secured from inflammatory conditions of this kind. Especially men in advanced years suffering from prostate trouble should form the habit of drinking water freely in conjunction with a suitable diet.

The question as to when and how one uses hot water is of minor importance. The old-fashioned plan of using a small amount a short time before each meal is a very good one, but may be improved upon in many cases by using a considerable quantity the first thing in the morning. Some physicians advise the use of water as hot as possible, sipping it slowly. It is a question, however, whether such an extreme of heat might not be injurious to the mucous membranes. Another plan is to use water of a more moderate and comfortable temperature, drinking it rapidly, and thus introducing into the stomach a larger amount of the hot water. This undoubtedly has a better effect in the way of flushing and cleansing this organ. Also, one will use a larger amount of it by following this plan. The natural preference of the individual should in a large measure determine the temperature at which the water should be taken.

It has generally been held that it is not well to drink much water at meals, on the theory that this would dilute the digestive juices, and that it is better to drink water freely between meals. This view is probably justified to a large extent. At the same time, those who neglect to drink water between meals are apt to crave it at mealtime, and when so desired it should be used. The use of such beverages as tea and coffee with meals is an instinctive recognition of this need. So far

as plain water is concerned, however, the great trouble is that, in America at least, the use of ice water has become the general practice. This is highly objectionable, inasmuch as it tends to chill the stomach and interfere with digestion. It is true that there are many persons so vigorous that no harm seems to be accomplished, but in the case of those of weak digestion, the use of ice water at meals is highly detrimental. It sometimes seems to retard digestion.

Certain experiments carried on a few years ago with the drinking of ordinary cool water at meals seemed to demonstrate that not only was this not injurious, but that the assimilation of fats, carbohydrates and proteids was improved. It is to be assumed, therefore, that if this result was accomplished with cool water, the use of hot water would very greatly favor digestion.

In ordinary drinking between meals I would emphasize the advantage of using moderately cool or even tepid water as against ice water, especially after prolonged and vigorous exercise when there is a seemingly unquenchable thirst. The use of water at a moderate temperature has the great advantage of enabling one to drink a very large quantity. Of course, the inadvisability of drinking much ice water when overheated is well known. A great many will object at first that water is tasteless and unpalatable if not ice cold. This, however, is largely a matter of habit. The craving for ice water is a cultivated taste. You can just as easily cultivate a taste for water many degrees warmer. In fact, water at the temperature at which you find it a pleasure to take a cold bath or dip might be said to be ideal for drinking purposes.

There is an undoubted advantage in distilled water, especially when suffering from any form of disease. But any spring water or well water of good quality, especially when "soft," is always satisfactory for ordinary purposes. It may be a good plan to boil "hard" water, inasmuch as this causes a precipitation of considerable of the mineral matter contained in it. Where there is any doubt as to its purity, water should of course be boiled before drinking, even if the taste in this case is made slightly "flat."

In addition to the special results of hot water drinking, summarized above, the general results to be obtained in many cases include a marked increase of weight as a result of improved digestion and assimilation, a purified condition of the blood, with the better all round health that naturally goes with it, and so far as the general appearance is concerned, a very marked improvement in the complexion. I have known of cases in which both the texture and the color of the skin have very materially improved, purely as a result of this particular practice.

THE PURIFYING AND CURATIVE VALUE OF FASTING

By WILLIAM EASTMAN

IF a famine should come upon us, how long would you last? If you were submarined at sea and put out in a small boat without food, though with plenty of fresh water and provision for warmth, for how long a time would you be capable of waiting to be rescued?

In view of the recent extraordinary drains upon the world's food supply, and the by no means remote possibility of famine in various quarters, the question of how long can one fast becomes of serious interest.

Ever since Heaven knows when most of us have lived under conditions of an almost unlimited food supply. We have never known a time when, if we had money, we could not secure more food than we could eat. And most of us have eaten continuously more than we should eat. We have been so accustomed to this unfailing supply of food, and have day after day all our lives stuffed ourselves so thoroughly, that the average man or woman seems to labor under the impression that not to eat for a day or two means to starve. Take a man or woman of conventional habits and suggest a period of three days without food, and vivid pictures of funeral trains immediately cross his imagination.

The fact is that any healthy person can live for weeks without food. The body will feed upon itself, particularly upon its fatty deposits, for a long time before any serious danger of death is approached. Nat-

urally the length of time that you can live without eating will depend upon how much there is of you. If you weigh one hundred and three pounds, you could fast only a fraction of the length of time that would mean no inconvenience to your neighbor who weighs three hundred and one pounds. Fat is stored up nourishment. One who has stored up a great deal of it can subsist upon it for a prolonged period, just as does the hibernating bear or the camel. Large snakes have been known to fast for nearly two years, and a fat man, of the circus type, could well afford to fast for two or three months with advantage.

There are a great many people eating three times a day who are not far from actual starvation because of the poor quality of their food and its imperfect assimilation. When a human derelict is picked up on the city streets, fainting and starving after two days without food, it is because he has been practically starving for weeks, in spite of more or less regular meals of white bread and other practically worthless food. The length of time that one can fast is determined not only by the amount of fat he carries, but by the satisfactory character of his previous diet.

In the first place, one should disabuse his mind of the notion that fasting means starving. When the body contains a sufficiency of stored up nourishment upon which to live in health, one may fast for a considerable period before real starvation commences. In the case of those who are overweight, it is a common experience to gain in strength, energy and capacity for work while fasting. This would certainly not be the case if one were starving. Starving does not commence until the

tissues of the body have been so reduced that any further deprivation of food becomes injurious. The brain and nervous system apparently have the power of subsisting upon the rest of the body. In fasting the fatty tissue is consumed first, and then muscular tissue. After this the tissues of the liver, spleen and other organs, together with the substance of the blood, are consumed in maintaining life, but without any loss whatever of the cell tissue of the brain and nervous system. In the average case when fasting is necessary, the body is choked up with an excess of nourishment. A short fast is therefore often a grateful means of relief from this condition. And as a rule, one can fast without special distress. In a state of disease, one's condition may continually improve and his strength increase while fasting. But when one suddenly becomes much weaker, when there is a marked change in the rate and vigor of the heart beat, and there are other unusual or alarming symptoms, these may be regarded as representing the point of demarcation between merely fasting and the beginning of starvation. The average well-nourished man or woman should be able to fast safely from four to six weeks, while those who are burdened with excess fatty tissue may be able to eat themselves, so to speak, for twice that length of time. This does not mean that fasts of such extreme length are to be commenced indiscriminately. They represent the limits of safety and are desirable only in extraordinary cases.

Fasting is a curative and purifying process that is to be recommended only for those who need it. In other words, it is a remedial treatment for the sick.

Those who are well and strong will find no advan-

tage in fasting. If you understand how to keep your body in good condition, if you know how to eat and how to live, there is no reason why you should ever have occasion to fast. There are few, however, who are able to keep the human machine in faultless working order. In time, if not perfectly cared for, it is likely to become clogged up or choked up with impurities or poisons of one kind or another. It is put out of gear, so to speak, and something in the nature of a thorough housecleaning is necessary. Fasting provides this. It relieves the functional system of the burden of disposing of additional and sometimes unwanted food, so that all of the energies of the body may be devoted to this cleaning out and self-restorative process.

There are times when food of any kind is almost a poison. There are times when food is not palatable. There are times when even the thought of food is nauseating. These conditions commonly prevail during an acute attack of illness. If you follow the natural promptings of your own instincts when you are sick, you will decline to eat. A sick cat or a sick horse will refuse to touch its accustomed food. But the ordinary doctor, who is so much wiser than Mother Nature, will insist upon his patient "taking nourishment" no matter how ill and no matter how much the patient loathes the very thought of food.

The time to fast is when you have no appetite, for this means that the body does not need food and that the stomach is in no condition to receive it. Food that cannot be digested is nothing short of a poison. It is a burden to the digestive organs, and a tax upon the entire system. Do not be afraid of fasting when your

appetite fails. Your appetite will return all the quicker if you take nothing but water under such circumstances. But if you force food upon the stomach when you have no desire for it, you will postpone indefinitely the time when you can enjoy a good, keen appetite and properly relish your food. Ordinarily the return of the appetite is the time to break the fast.

There are two ways in which fasting proves beneficial. The first is the direct and immediate effect. The second is the indirect and after effect.

Fasting is first a purifying process in itself, bringing about the rapid elimination of poisons and accumulated wastes from the system. It enables the body the more quickly to overcome any condition of disease. There are many disorders which fasting will cure in a fraction of the time that will be required to restore normal health by means of any other treatment. And there are some disorders that fasting and nothing but fasting will cure. The results in many cases are nothing short of miracles.

The second good result of fasting comes about through the building up of new cells and new tissues after the fast. One is to a large extent built up anew. The patient, having made a successful recovery, says that he feels like a new man. The truth is that he is literally made over new to a very large extent. Suppose that during a fast you have lost twenty or thirty pounds. After the fast, while on a proper diet, you regain this, or possibly more. But not only does the twenty to thirty pounds of added weight represent new tissue, the building up process means that practically your entire system has been to a large extent made over

new. There are literally millions of new cells in your body. Without doubt this accounts for the feeling of freshness, vigor and exquisite well being that has been experienced in thousands of cases following a fast.

Characteristic of practically all fasting experiences is the unusual clearness of the mind. A great many find it a remarkable mental stimulant. It is for this reason, doubtless, that fasting in the past has been regarded as of special religious significance. Physiologically speaking, this clearness of mind is purely the result of an empty stomach. One who has overeaten is likely to be drowsy and stupid. A large part of the blood supply is required for the work of digestion.

Why do so many writers do their work at night? Why are they able to do it late at night? For one thing, it is probably because they have not done an honest day's work during the day. But the chief reason is that along towards midnight the stomach is empty, and naturally the mind becomes clear. If one sleeps late in the morning, as novelists often do, the brain will naturally become active as soon as the stomach is well emptied. Therefore, your novelist works feverishly for several hours from midnight on. Fasting has the same effect. Its religious and spiritual significance is probably due to this unusual activity of mind, which is likely to make one feel that he is inspired.

In view of the efficacy of fasting as a curative measure, the question arises, "Why is fasting not recognized by the medical profession?" Why do doctors not make use of this extraordinary and extraordinarily simple method of bringing about a quick cure in nearly all forms of illness? Heaven only knows why, unless it may

be the temperamental and constitutional disinclination of the regular school of medicine to recognize anything good until long years after the rest of the world knows all about it.

The general acceptance in the profession of the fasting treatment for diabetes, however, promises to be the entering wedge through which in time will be brought about the general use by all physicians of fasting as a curative measure. The history of the diabetes cure is both interesting and amusing.

The medical profession has always held and declared that diabetes was an incurable disease. Of course, this only meant that it was not curable by any of the methods which they had yet tried. But a couple of years ago the medical journals were suddenly filled with discussions of the new and astonishing Allen treatment for diabetes. Apparently one of the physicians at the Rockefeller Institute had finally learned what advocates of drugless therapy familiar with fasting had known for twenty years and more. He found that a fast of three or four days invariably eliminated all traces of the sugar characteristic of this disease, and that on a subsequent light diet the cure was completed. If sugar reappeared, another short fast would set it right. This cure for diabetes has been so well advertised and exploited in the medical journals that even the most conservative physician now knows that a diagnosis of this disorder is no longer to be regarded as a death sentence.

It is true that there are instances in which fasting is not advisable, but the general advice to stop eating when sickness overtakes one hardly admits of a single exception, particularly if the illness is anything in the

nature of a fever or other acute disorder. When the appetite disappears one may invariably depend upon it that the time to fast is at hand; the only exception, perhaps, will be found in a condition in which fruit strongly appeals to the appetite, in which case what may be called either a "fruit fast" or a "fruit diet" may be of value.

Fasting is beneficial in practically all kinds of stomach and bowel trouble. It gives the digestive organs a rest. In chronic diarrhea it sometimes offers the only possible cure. Kidney and liver disorders of a serious nature are wonderfully benefited by judicious fasting.

An ordinary cold will, it is true, disappear of its own accord if one's constitution is vigorous, and its cure may be hastened by other treatment that stimulates the elimination of poisons. But a severe cold may always be eradicated in a fraction of the usual length of time, if one immediately stops eating on its first appearance, and continues to fast for two or three days, or until the appetite returns.

Similarly, pneumonia, grippe and all feverish conditions, as well as inflammatory disorders, call for the fasting treatment. Eczema, herpes, acne and other skin diseases often yield to fasting as if by magic. Even melancholia, neurasthenia and other disorders of the nerves are often most quickly remedied by this method.

In chronic disorders, however, the advisability of fasting will depend largely upon the vitality and weight of the individual. Those who are far below normal weight naturally take considerable risk in attempting anything but a short fast. I have known cases in which persons who were already under weight have fasted

thirty-five days or more to cure chronic digestive troubles, but one should not attempt anything of the kind without proper supervision.

The consumptive, of all others, should avoid prolonged fasting. Indeed, in tubercular and catarrhal disorders, the value of fasting is doubtful. In such cases, improved nutrition through a fairly full diet is required. The exclusive milk diet (six to eight quarts daily) answers admirably in many such cases. Even there, however, a fast of a day or two as a preliminary to the milk diet is helpful in enabling the system to adjust itself more perfectly to the new regimen.

The duration of a fast theoretically should depend upon the period of absence of hunger and the ultimate return of the appetite. In other words, when the body has readjusted itself and the appetite indicates the readiness and need for food, that should be the time to break the fast.

In practice, however, this rule cannot always be followed. In the event of a high fever this plan works out with complete satisfaction. The appetite returns with convalescence. In fasting for some chronic ailment, however, the sense of hunger may disappear completely and may not return for weeks. Theoretically, we have here a condition that would call for a "fast to a finish," continued until the characteristic coating on the tongue disappears, the breath becomes sweet and an unmistakable appetite asserts itself. Such a fast, however, should only be undertaken under proper supervision, and preferably at a sanatorium where there is every provision for good care and freedom from work or worry. Such a fast, broken only at the promptings of

Nature, may last anywhere from two or three weeks up to five or six weeks. If one has the weight and vitality to go through it, it is the most effective kind of body house-cleaning known. It makes one over, rejuvenates one.

But except in the more serious forms of disease, long fasts are not necessary. A fast of one week or ten days is about as long as one should ordinarily attempt without supervision. In ordinary cases of loss of appetite or minor ailments, a short fast of two to four days will accomplish extraordinary results.

An exceedingly good plan for those suffering from chronic disorder, especially when a prolonged fast would be inconvenient, is found in a series of short fasts. This is sometimes the most comfortable method of getting results. If you are timid about experimenting with this remedy, you might take it up gradually, fasting first one day, dieting for two days, then fasting for two days, and dieting for four days, then fasting for three days and dieting for six days, continuing in this way until you have reached a fast of one week or more in duration. By this time you will have become fairly well acquainted with the symptoms and conditions of fasting.

Doctor Guelpa of Paris, a physician of high standing in France, uses a series of short fasts of about three days each, alternating with periods of equal length in which food is taken as usual. He has found this method extremely effective in diabetes and in many other ailments.

The person who attempts fasting for the first time is likely to become discouraged early in the game, owing to the fact that the first two or three days are often the

most uncomfortable. Take, for instance, a case in which one undergoes a fast for some chronic disorder, possibly skin disease, and does not experience the prior loss of appetite that goes with a fever or acute illness. Under such circumstances, one is likely to have considerable trouble through a persistent sense of hunger for the first two or three days. In nearly all such cases, however, this hunger disappears about the third day, and if the fast is to be a long one, does not reappear until Nature indicates the need for food through the clearing of the tongue and the appearance of an unmistakable appetite.

This coating of the tongue, which becomes in evidence the second or third day on, is characteristic. After three or four days it is commonly accompanied by a characteristic odor of the breath. This coating of the tongue indicates the condition of the entire alimentary canal, showing that it is now used as a channel of elimination and will continue to be so used until the process of body purification has been quite thoroughly accomplished. As already said, when Nature has finished the job, this coating disappears, the breath becomes sweet, and the subject spontaneously begins to look around for nourishment.

A great many people complain that if they omit one or two meals a headache promptly develops. This result sometimes also follows about the first or second day of a fast. Such a condition, however, indicates the serious need for a thorough cleansing of the alimentary canal. A headache of this kind is the result of poisons generated in the alimentary canal through the fermentation or disintegration of surplus food retained.

It is important, therefore, that any tendency to constipation should be overcome and that the contents of the alimentary canal should be passed along as rapidly as possible. Resort to violent cathartics is not desirable, however, and the plentiful drinking of water, particularly of hot water, will often answer all purposes. For the same reason, a full, warm enema is desirable the first day of the fast, and perhaps every day or two thereafter.

Laxative fruits may also be used to advantage on commencing a fast. Indeed, if you have had the experience of developing a headache after omitting one or two meals, it might be a good plan to live on laxative fruits for one or two days after discontinuing the use of all other food and before commencing the strict fast.

The problem of constipation is one of the factors necessary to consider in fasting. It follows naturally in most cases, for the reason that one lacks the customary bulk of material in the alimentary canal. When fasting, the small residue of food tends to produce stagnation, resulting in fermentation. For this reason the enema and the free drinking of water are of extreme importance. Probably the now much used mineral oil, or so-called Russian oil, would be of very great advantage in overcoming this condition.

Remember that fasting means simply abstention from food. It does not mean the denial of water. On the contrary, the more water you can drink while fasting the better. In most cases hot water will be found preferable, for various reasons, among these being that it helps to counteract a tendency toward chilliness sometimes experienced.

It is to be expected that one would experience some loss of energy when fasting, but curiously there is usually not the loss of strength that one might expect. If you attempt a short fast of two or three days or possibly anything under a week, there is no reason why you should not continue with your ordinary work the same as usual, unless you are a piano mover or a longshoreman. You may feel a slight loss of energy, but no real impairment of your strength.

Unless too ill, it is well to combine fasting with a certain amount of exercise. This improves the circulation, keeps all functions active, and helps to maintain a condition of general tone. Also, it favors elimination and the general process of purifying the blood. The amount of exercise will naturally depend upon your strength and inclination.

Breaking the Fast

The end of a fast is not the least important part of it. One may even undo all of the good effects through indiscretion at this time. If you have fasted only two or three days, you will ordinarily find no difficulty in eating a meal of your accustomed food. After a fast of a week or longer, however, care must be used to avoid suddenly overloading the unready stomach. One may feel such a craving for food that he lapses into gluttony, only to regret it later.

At the end of such a long rest for the stomach this organ must be treated gently. It should be allowed gradually to resume its former work. In fact, the very best plan of all is to treat the stomach at the end of a

fast just as the stomach of a newborn baby is treated. You would not think of taking a brand new infant to the table and giving it ordinary food. If you will take this tip and practically supply your stomach after a fast with baby foods, you will do wisely and well.

In other words, the best foods for breaking a fast are those which can be given to a young baby. The best of all are milk and orange juice. A young baby can digest orange juice in small quantities without trouble. One may use other agreeable fruit juices for breaking a fast, but orange juice is milder and more easily assimilated by a delicate stomach. Use it in small quantities, gradually increasing, at intervals of two or three hours. Later in the day you can commence to use a little milk, taking first half a glass or less, and gradually using larger amounts. At the end of a very long fast, if the stomach is in a delicate condition, it might even be well to use diluted or modified milk, just as in the feeding of a very young infant.

DIET THE BASIS OF DISEASE PREVENTION

By CARL EASTON WILLIAMS

IF only this sad old world could be rid of sickness—what a great place it would be! If the human race could get rid of sickness, war, poverty and a few other evils—the millennium would have arrived. Perhaps there are remedies for war and poverty and the other evils as well. At times the outlook seems promising. But as for sickness, that at least can be almost wholly eliminated.

Illness is a mistake. One does not need to be sick. If one lives right he will not be sick. If he does not live right he deserves to be sick. Perhaps that is rather an extreme statement. At least he deserves to be sick if he knows how to live right and then doesn't.

There are many kinds of disease, but in general, there are two great classifications. It seems that we should have different names for these different forms of illness, instead of following the common practice of using the word "disease" or "sickness" to cover both kinds. In the first place, there are the functional derangements in which the weakness or over-worked condition of some organ or part of the body throws the entire system out of gear. Kidney trouble, liver trouble and indigestion are examples.

In the second place, there are the infectious diseases ascribed to germ origin and characterized by fever. It is supposed that a disease of this kind, being an invasion,

may attack anyone. And yet, even the germ diseases depend upon two factors. First, there is the active cause or invasion represented by the infection. Secondly there is the susceptibility of the patient. It is now well known that many such diseases will not take root in the bodies of healthy persons. A man who has vitality or "resistance" is often immune from infection. But what is this quality of resistance? Without doubt it is not only a matter of vitality, but of the chemical make-up of the blood and tissues. The blood must be pure and free from poisons, and it must also be maintained in its normal alkalinity. Proper diet is the chief factor in maintaining this condition, along with active elimination, exercise, skin cleanliness and other factors that promote active elimination and tone up the vital and functional organs generally.

In recent years it has been found that certain types of diseases, which formerly were very mysterious in their nature, are entirely due to an inadequate diet, and they have even come to be termed "deficiency diseases." In other chapters beri-beri and scurvy have been referred to in some detail in their relationship to dietetic deficiency. More recent studies have also revealed the fact that pellagra, a once mysterious disease of our Southern states, also common in parts of southern Europe, is likewise due to an unbalanced diet and has been found to be both preventable and curable by dietetic means alone.

Pellagra, indeed, is one of the foremost causes of death in South Carolina, North Carolina, Alabama, Mississippi, Tennessee, Texas and other of the Southern states. It is a disease characterized by a peculiar erup-

tion, breaking out on the backs of the hands, neck, face, elbows, knees, and perhaps spreading from these to other parts. It is also characterized by loss of strength, lessened activity, nervousness, sleeplessness, dizziness, indigestion, constipation and other symptoms increasing in severity with the seriousness of the attack, and sometimes leading to insanity.

The subject of pellagra in relation to diet has been very thoroughly studied by the experts of the United States Public Health Service, the result being the bulletin called "Pellagra: Its Nature and Prevention" written by Dr. Joseph Goldberger, Surgeon, U. S. Public Health Service (Reprint 461 from the Public Health Reports. This can be secured by writing to the Surgeon-General, U. S. Public Health Service, Washington, D. C.). In this bulletin it is pointed out that it is the poor man who suffers chiefly from this disease, inasmuch as it is the poor who commonly suffer from a lack of a varied and well-balanced diet, especially during periods of rising food prices. It is also pointed out that pellagra is not contagious, as was formerly supposed. On the other hand, when eleven convicts in an experiment were fed on an unbalanced diet of acid-forming tendencies, composed of biscuit, corn bread, grits, rice, gravy and syrup, with no milk, meat or fruit, and only a few vegetables, six of them very soon developed the disease. Again, in an asylum where many of the inmates developed pellagra year after year, it was found that the doctors and nurses never developed the disease, apparently because they had a liberal allowance of fresh meat, milk and other foods. They were better fed than the inmates. When a test was made, giving

the latter more milk, meat, fruit and vegetables, it was found that they stopped having pellagra. Similar results were found in tests carried on at three orphanages.

These facts, therefore, show conclusively that pellagra is caused by a faulty or unbalanced diet and that it is never contracted by those living on a well-selected variety of foods, special emphasis being placed upon the need of milk, eggs, fresh lean meat, green vegetables and fruit.

Quoting from this bulletin:

"*Milk* is the most important single food in balancing a diet and preventing or curing pellagra, and when lean meat, green vegetables, and fruits are for any reason not included in the diet or only infrequently or in very small quantities, it is most important that at least three glassfuls (1½ pints), and preferably more, of milk (sweet or buttermilk) be taken daily. This single addition to the customary daily diet will in practically all instances protect the individual from an attack of pellagra. Milk for the family in these quantities is, however, frequently hard to procure. For this and other reasons it is wiser under such circumstances to use certain other classes of foods as substitutes or, preferably, as additions to the available milk supply.

"*Lean meat* (fowl, fish, pork, beef, etc.) helps in an important degree to give proper balance to a diet, especially the diet of those who take but little milk. Under these circumstances an allowance of half a pound at least three or four times a week should be made. Part of the meat may be replaced by eggs or cheese, but it will be wiser not to make a reduction in the meat allowance, but rather to add eggs and cheese to the diet.

"It is often declared that Americans eat too much meat. No doubt there are many who do. It is important to recognize, however, that there are even more who do not eat enough.

"In seasons when lean meats are difficult to procure or are excessively expensive, the use of the dried soya bean as a substitute for flesh food is to be highly recommended. It is but little known and relatively little used as human food in this country, though an extensively used staple in the Orient. From a nutritive standpoint, it is probably the most valuable of the dried beans and peas. Recent studies have shown it to be decidedly superior to the dried navy bean, lima bean, and the pea. The soya bean may be eaten boiled or baked and, in the form of soy-bean meal, may be included to great advantage in the biscuit or the corn bread to the extent of one-fifth to one-fourth of the flour or the corn meal.

"Generous helpings of green vegetables (cabbage, collards, turnips, greens, spinach, string beans, or snap beans), or fruits (apples, peaches, prunes, apricots), and preferably of both, should be included in the daily diet, especially when milk is not used or used only in small amounts. This is particularly important during the late winter and spring, the season when people have the fewest number and the least variety of things to eat."

Following recommendations in the way of a pellagra preventing bill of fare, including the foods mentioned, it is stated that the same diet serves also in the treatment and cure of the disease, specifying a more liberal allowance of milk and eggs for severe cases. Where only liquids can be taken in the beginning of treatment, milk, fresh meat juice, meat broth, bean, pea or potato

soup and pot liquor (the juice of cooked vegetables) should form the diet until more substantial food can be added.

Quoting again from Dr. Goldberger in this bulletin:

"Indeed, for the cure of pellagra the only medicine we have is the diet. The only use that medicines serve in pellagra is the alleviation of painful symptoms and in the treatment of complicating conditions. The sooner this is realized the sooner will the quacks, both within and without the profession, be put out of business. The money that is now being wasted on useless and quack medicines is well-nigh sufficient to procure for the poor, deluded sufferers the food from the lack of which they are suffering.

"A change of climate is of itself not an essential in the treatment and cure of pellagra. A change from city, village, or "camp" to a farm in the country has not infrequently been found to be beneficial. The benefit derived is to be attributed, however, not to the change of air, as is commonly thought, but rather to the fact that in the country the diet is improved by an abundance of milk, eggs, etc. Practically all the benefits of a "change of climate" may be had at home at the cost of two quarts of milk and half a dozen eggs or half a pound of stew beef a day.

"The patient should be warned that a proper diet is not to be considered as a temporary thing which can be dispensed with after recovery from the attack. To avoid a recurrence of the disease and permanently to maintain health and vigor a properly selected diet is essential and must be maintained at all times. It is worth while emphasizing that if all people ate a well-

balanced diet, pellagra would disappear from the face of the earth. The gain to the country from the consequent reduction of sickness, invalidism and death, and the increased physical vigor and happiness of the people cannot be overestimated."

In other places, and times, various mysterious diseases have shown marked similarity to beri-beri, scurvy and pellagra, wherefore the question arises as to what is the essential difference between these proven food deficiency diseases and those maladies which have been called neuritis, trench edema, jail edema, war nephritis, polyneuritis, or even acidosis. They are invariably the result of a state of constitutional acidity and partial starvation of the body, irrespective of the fact that the victim may eat and even over-eat, day by day, of refined and acid-forming foods. Invariably such cases are cured by the use of base-forming foods, and only in that way.

A classic instance was that of the mysterious illness of the crew of the "Kronprinz Wilhelm," the German converted cruiser which, after 255 days at sea, during which she raided and sank many ships, was finally compelled to put into an American port because the crew were rapidly filling up the ship's hospital. Though the German raider had taken food from many of the vessels which she sank, the cargoes thus secured were practically all in the form of meat, white flour, canned goods and other foods upon which health could not be permanently maintained. The men gradually suffered from swollen limbs and other symptoms until finally suffering from a mysterious form of paralysis. When 110 of the crew of 500 were in the hospital and the others on the verge of prostration, the ship was brought into Newport News,

where distinguished physicians puzzled their heads over the nature of the malady. It was called beri-beri and various other things until Alfred W. McCann, pure food crusader of the New York "Globe," boarded the ship and pointed out to the ship's surgeon the nature of the disorder.

Mr. McCann prescribed a diet of base-forming foods, including the juices drained from cooked vegetables, the liquor drained from boiled wheat bran, egg yolks, whole milk, whole-wheat bread, orange juice, lemon juice, apples, apple sauce and later the solids of vegetable soups as well as the liquor. All acid-forming foods were rigidly eliminated from this diet. In two days improvement was noted, in three days four men were able to go on deck, in four days fourteen men were able to leave the ship's hospital and in ten day's time forty-seven men were reported as cured by the ship's surgeon, the others improving with similar rapidity.

The question arises as to what extent other diseases are due to a similar food deficiency, inasmuch as the diet of the crew of the Kronprinz Wilhelm was not far removed from that of the conventional American table. When a sufficiency of fruit, vegetables, milk and eggs is available, the American family is usually able to avoid illness. With a perfect diet the entire American population would probably avoid disease almost entirely. Even such a disease as cancer is now believed to be dependent upon a devitalized and susceptible condition of the blood and tissues of the victim. There is no agreement in medical circles on the cause of cancer. Apparently cancer is a degenerative process dependent upon a poisoned and unwholesome condition of the blood.

Cancer, curiously, is increasing in a ratio that approximately equals the increased use of refined foods. If there is anything certain about the subject, it is that cancer does not and will not develop in a person possessed of vigorous health, good circulation and pure blood. The conclusion therefore is that one can avoid cancer just as he can avoid any other disease by maintaining a satisfactory diet and good healthy habits.

Some authorities have even held that infantile paralysis, mysterious as it seems, has a direct relationship to diet. Prof. Simon Baruch, a distinguished physician who diagnosed the first recorded case of perforating appendicitis successfully operated upon, made the following statement during the course of an epidemic of infantile paralysis.

"For several months I have watched the scientific development of the malign influence of defective or absent vitamines in certain foods, as published in the weekly reports of the United States Public Health Service, together with articles in the medical journals on beri-beri and pellagra.

"There is a striking similarity in some of the causes predisposing to infantile paralysis and beri-beri. Both occur chiefly in over-crowded localities, in hot weather, and more among males than females. Both are accompanied by fever and paralysis, and both are extremely fatal. Both have prevailed as epidemics, and their fatality has caused terror and despair.

"Beri-beri, once regarded as an infectious disease from undiscoverable sources, is now known to be due chiefly if not solely to absence of vitamines in the diet.

"May not infantile paralysis, which has eluded thus

far the most searching investigations, be likewise traceable to some defect in diet that may be discovered?

"We have a clue to the possibilities in this direction in the report of the United States Public Health Service of April 17, 1916, on bread as food, in which the fact is clearly brought out that the fine roller-milled wheat flour is devoid of vitamines, and that owing to the use of baking powders containing bicarbonate of soda the vitamines in other foods are likely to be destroyed.

"In a study of pellagra in South Carolina, Voeghtlin regards this malady as somewhat related to beri-beri. He found that this disease prevailed in the factory districts, where people eat mostly fat bacon, cereals and soda raised biscuits or corn bread made of highly milled corn, while in the backwoods, where coarsely milled grain is used, pellagra is rare.

"The high cost of vitamine-containing foods, like eggs, milk and meats, makes it impossible for these poor people to protect themselves against the loss of vitamines in purchased cereal foods.

"It may be of interest to ascertain if infantile paralysis has been more prevalent since 1878, when the new milling processes were invented. I omitted to mention as proof of similarity of causes that the experiments made on pigeons have been confirmed in chickens, which fed on whole corn remain healthy, while the same fowls fed on highly milled corn meal are affected with paralysis.

"These briefly stated scientific facts lead me to believe that close scrutiny of the food of the children afflicted may lead to the discovery of a dietetic cause of infantile paralysis."

It has also been suggested that in the case of infants predisposed to infantile paralysis, the diet of the mother previous to its birth may have been responsible for a lack of resistance.

Another interesting consideration in this connection is the fact that the world-wide epidemic of Spanish influenza during the last year of the Great World War was contemporaneous with a world-wide scarcity of food, the prevailing high prices of food resulting presumably in an under-nourished condition of millions of people. It has been suggested that lack of resistance to this disease was due to the food restrictions incident to the war, and even the development of the disease has been attributed to the lack of such resistance. In a well-nourished and healthy human race the disease might never have secured such a foothold. The fact that large numbers of people were immune from Spanish influenza can perhaps be attributed to the fact that they were better nourished than most of the victims.

Alfred W. McCann points out the immunity from the Spanish influenza or "the flu" as it has been popularly termed, in the case of two hundred and fifty boys and girls in an institution known as "The Leake and Watt Orphanage," at Yonkers, New York. The superintendent had taken pains to have the sixteen acres of land belonging to the institution intensively farmed by the children, and the products thereof dehydrated and preserved according to the best modern methods, using the waste heat of the laundry for the purpose. The tomatoes, string beans, rhubarb, cabbage, Swiss chard, spinach, celery, beets, corn, lima beans, onions, apples and peaches raised on the property were sliced

carefully and their moisture driven off at night in the clothes dryer, after which they were bundled up and stored. No sulphur process was used in drying the fruit. As a result of this supply of foods rich in alkaline salts, vitamines and cellulose, the two hundred and fifty children of this institution were so thoroughly fortified against the attacks of the disease that not a single case of Spanish influenza developed in the orphanage.

These facts all tend to show that food is the best medicine in the world. Food will prevent disease and food of the right kind will cure disease, particularly when, as it probably happens in nearly all cases, the illness is primarily or even secondarily the result of nutritive deficiency.

THE MILK DIET AS A CURE

By HARRY B. GALATIAN, M. D.

"CURE alls" have been ridiculed and derided by those who subscribe to that foolish maxim—"What is one man's food is another man's poison," but if we stop to consider we will remember that we are all created in the same image and all have the same physiological functions, and are all subject to the same disease, and that the one method that has come nearest to curing all cases of disease is milk. I believe if I were told that I must select one method of treating disease, and only one, and must discard all other methods, I would ask to be allowed to retain the exclusive milk diet.

This conclusion is not based on the results obtained in a few selected cases, but after many years' experience in prescribing the milk diet, both in private and institutional practice.

The method is not new. It is undoubtedly of ancient origin, as many writers of long ago mention its use, but it is only within comparatively recent years that its true value has been recognized, and an attempt made to use it scientifically. Over two hundred years ago Sydenham employed a total milk diet in the treatment of nervous and gastric complaints. I have a book written in 1733 by Dr. Geo. Cheyne, the "father of modern vegetarianism," in which the use of milk in the treatment of neurasthenia, is described.

More recent practitioners, however, with their greater knowledge of chemistry and physiology, have

given milk a more solid place in therapeutics and established its worth for all time.

One case I will mention because of its immediate interest, is that of a man whose normal weight should be one hundred and forty pounds, but who weighed but ninety-two pounds when he began treatment. His heart and lungs were in good condition but his alimentary tract and nervous system were in a sorry state. For years there was no bowel action without medicine or enemas. There was a chronic gastritis and almost entire atonicity of colon and intestines, and because of the distress incident to eating he had reduced his diet to mere nibbles, which meant that he was practically fasting. His circulation was so sluggish that he suffered severely from cold, and he was bundled up in a thick suit of underwear, two suits of clothes, a sweater and overcoat, and only after several days on the milk diet could he be induced to discard any of the excess clothing, even while indoors. His memory was practically gone and his mind a confusion of ideas. He had tried treatments galore—from medicine to electricity, from spinal manipulations to diet—and was still slowly starving to death. To all intents and purposes, this man was a child, and it seemed to me that he needed most of all the diet of a child—milk. This was prescribed, against his protest, as he had been told or had read that milk was constipating, and as he had suffered severely from this, he could see no indication for milk in his case. Persuasion having won out, he began with one quart, taken in half glass doses every hour, on the first day. On the second day two quarts were taken, and then for several days, three quarts daily—one glass every hour

from seven A. M. to seven P. M. At the present time he is digesting perfectly between five and six quarts of milk per day.

And with what results? He has gained twenty pounds and will continue to gain. There are regular bowel actions without artificial aid of any description. All of the superfluous clothing has been shed. He can walk long distances and take other exercise. His memory has been regained, his mind is clear, and he is in every respect a different person.

Another case came to me weighing one hundred pounds. This man suffered from extreme physical weakness, mental lethargy, and chronic constipation. There was also inflammation of the bile ducts, with retention of bile. Milk was again the prescription, and again against the protest of the patient, as he had been informed that milk was "bad" for his liver trouble and constipation.

This patient gained twenty-five pounds and was entirely relieved of the liver trouble, his skin becoming pink, his strength increasing, and the constipation remedied. He was advised to continue the milk after returning home, and his weight increased to one hundred and forty-five pounds. He has returned to his regular diet and is still well.

So common are the cures of constipation by the milk diet, that the statements of some that milk causes constipation are ridiculous. I believe there is no case of constipation, except those due to organic obstruction, that cannot be cured by the exclusive milk diet. I remember the case of a lady of sixty-eight years, who for sixty years of her life had been a slave to drugs and

enemas, and after two months with the milk diet returned to her ordinary diet—constipation gone.

Another interesting case is that of a young man who had been having one or two epileptic seizures each week. He took the milk diet for several months, and when I again saw him a year afterward, he told me he had only one attack in the year, and that, a few weeks previously, induced by overeating of cake and ice cream at a Sunday school picnic. Milk is undoubtedly the best diet for epileptics.

That the exclusive milk diet is literally a life saver is attested by the case of a young lady who had been told that she would be dead in less than a year, because of anemia. Her hemoglobin was less than fifty per cent and the red cells one-third of normal. Today she is alive and well, red cells and hemoglobin normal, and thirty pounds heavier.

These few cases are mentioned not because they are unusual, as such results are common with the milk diet, when it is taken correctly and for a long enough time, but to stimulate those who have not tried the diet, to do so, and to encourage those who have not secured the desired results by its use to try again. I do not mean that it will build a new body when organs are damaged beyond repair. Getting well in any case depends upon whether there is enough functioning tissue left in the body to carry on the physiological processes necessary for life.

How does milk cure? Milk cures only because it furnishes elements which are badly needed to make new blood. Milk is an easily digested and assimilated food containing ample amounts of all substances required

for growth of tissues and organs, and repair of worn-out cells. When taking milk one does not have to worry about combinations or whether this element or that element is being supplied. They are all there in the milk, in living organic form, and the sick body uses them to the best of its ability.

It is the best food in that most precarious period of our life—babyhood; and it is also the best food in that other critical period, whether of the babe or adult—chronic illness. Some have said, "Milk is food for babes, not for adults." This is true and that is just why we prescribe it to sick people. No sick person is an adult. Let him first restore his emaciated, depleted, enervated, functionless, worn-out old body to normal proportions before he claims maturity. And this is best done by taking the food of babes—milk.

There is no chronic disease in which the exclusive milk diet should not be used. It has long been the standby in wasting diseases, but it should be employed in all chronic ailments of whatever nature. I say chronic disease, because in acute disease fasting is the indicated remedy, but here, too, milk is the best diet following the fast.

One should prepare for the milk diet by a few days of fasting or fruit eating. In many cases, however, the regular diet has been stopped on one day and the milk started on the next, with excellent results.

It must be distinctly understood that with the exceptions mentioned no other food whatsoever is to be taken besides milk while you are on the "diet." I mention this for the reason that many have told me they have taken the milk diet without results, and upon inquiry I

usually find they have taken three regular meals with whatever milk they were able to drink between, and have imagined they were on the milk diet. Such a procedure is not "dieting" but "stuffing."

Holstein milk is undoubtedly the best for the purpose, as there is less fat—an advantage in the exclusive milk diet. The latter statement may surprise those who think of milk only in terms of calories and butter-fat, but experience has shown that the fat is the least important part of the milk. Far more important are the salts. Many have thrived on skimmed milk. If Jersey milk is used the cream should be reduced. From 2.5 to 3.5 per cent of fat is enough.

Unpasteurized milk should be secured if it is possible to secure it fresh and clean. If not, do not give up the idea of taking the milk diet. By taking orange, lemon or grape-fruit juice along with it, pasteurized milk may be used.

The milk usually should be cool. Where there is poor circulation and slow digestion, or during cold weather, the milk may be warmed to body temperature. It should never be boiled and never heated over one hundred and ten degrees.

The amount of milk depends entirely upon the condition of the patient, his digestion, and whether fasting or eating regular meals previously. After a fast it is necessary to begin gradually, depending upon the length of the fast. After a three days' fast, take a glass of milk every hour on the first day, and every half hour thereafter for a period of twelve hours daily. After a seven days' fast, take a glass every two hours on the first day, every hour on the second, and every half hour thereafter.

After a ten to fourteen days' fast, take only half a glass every two hours on the first day, and then increase as before.

The stomach after a fast is contracted and the musculature not having been exercised as usual, are weak; therefore work must be taken up gradually, just as we begin exercise gradually after a rest cure. On the other hand if the milk is taken immediately following a regular diet, a glass should be taken every half hour on the first day. Some prescribe a glass every half hour while the patient is awake, but in a twelve-hour period enough milk is taken and the twelve hours rest is beneficial. Those following this plan are stronger after completing the diet and retain the weight gained.

The ideal amount is between five and six quarts daily. This is as much as any one can successfully digest. Observe that I say successfully digest. It is true that many can push seven, eight and even ten quarts of milk through the alimentary tract, but this milk is not digested, as I have proved many times by chemical examination of the feces.

One of my patients was gaining steadily on six quarts per day, but thought he could hurry the process, and took fifteen quarts per day on four successive days. At the end of the fourth day he weighed less than when he began. I doubt if an ounce of that sixty quarts was digested.

The safe rule is to take as much milk as can be comfortably digested, but the stomach should be kept working to its highest capacity during the milk drinking hours. Pay no attention to hunger and appetite. If no milk is taken during the night there is usually a

morning hunger and the milk is relished. One of my cases took but three quarts per day and gained twenty-five pounds in a month. It is the amount of milk digested and assimilated that is curative and not that passed through the body.

I realize that one taking the milk has little time for other occupation, visiting, picture shows, etc., but if the beneficial results are expected nothing should be allowed to interfere with the regime. Some, however, do well by taking a pint every hour, and some have taken a quart every two or three hours, but the ideal plan is one glass every half hour, and unless this plan is followed, no one can say that the diet has been given a fair trial.

The milk should be sipped slowly. Whether it is held for a time in the mouth before swallowing is unimportant. But whether it enters the stomach in small amounts is important. The smaller the sips, the smaller the curds in the stomach, and the better the digestion. If taken as one drinks water, large, difficultly digested masses are formed.

If the stomach is acid, the more milk taken the better. In such cases the first milk taken is sometimes vomited, or the stomach may have to be emptied, but the milk should be immediately resumed. It is rare that any trouble remains after three or four days. When acid is lacking less milk should be used or some fruit acid added to the milk. Orange, lemon or grape-fruit juice may be used—a sip after each glass. Our grandmothers taught us that acids and milk make a bad combination —that the milk would "curdle in the stomach"—but that is just why we prescribe the acids, because "curdling" of milk is a step in normal digestion. Some

patients have used a dozen lemons a day and have thrived on the milk.

Some are afraid to take milk because of constipation. In a book on diet it is stated that—"milk causes biliousness, fermentation, and constipation." Milk does none of these. Biliousness is a lay term of indefinite meaning, usually referred to the regurgitation of bile into the stomach, and milk has nothing to do with it. Fermentation occurs whenever starch or sugar is not perfectly digested, and it is a well known fact that the constituents of milk are less subject to fermentation and putrefaction than those of any other food. Constipation is not due to eating any particular food, but to enervated and weakened intestines. Therefore, if you are constipated when you drink milk look to the condition of your alimentary tract, because normal intestines are not constipated by milk. Most intestines are stimulated by drugs and rough foods. This is particularly true of those who have arrived at the "milk diet stage" of their "health journey," and whose intestines refuse to do their duty unless given their daily "persuader" in the form of bran bread, sand, enemas, bulky foods, and whatnot. When they take milk, which is un-irritating and non-stimulating, they of course become constipated. We have always maintained that normal intestines need no stimulant to ensure action. Indeed, Prof. Carlson of the University of Chicago has shown that a peristaltic wave proceeds throughout the intestines whether they contain any substance or are empty. It is man's curse that he is always misled by first impressions. When one becomes constipated while taking the milk diet, the first impression is that the milk

is the cause of the condition, when in reality it is the weakness of the bowels themselves. There is no better way to strengthen the muscles of the intestines and cure constipation than a long-continued milk diet.

Some advise that more milk be taken to furnish bulk, and thus force the bowels to action, but personally I do not believe in stimulation of any kind, and never try to correct the constipation incident to the milk diet in this way. I proceed as follows. I insist that there be at least one bowel action daily. If there is not, an enema consisting of from a half pint to a quart of rather cool water is taken in the evening. The smallest amount of water which effects the purpose should be used. A large enema should never be used with the milk diet. The enema may have to be repeated several times. The cool water tends to tone up the rectal muscles. The amount of milk must not be increased or diminished. In a few days and rarely in a few weeks the bowels act normally and the enema is unnecessary.

I believe this plan is better than adding fruit and other substances to the diet. In my experience those taking milk alone have made permanent improvement. Figs, raisins, prunes, currants, apples, bran and other substances may be used, but in my estimation about half of the curative value of the milk is lost. The various paraffine oil preparations so largely advertised are useless in connection with the milk diet. They interfere with digestion and prevent assimilation of the food elements.

In some cases there is diarrhea. This is more difficult to handle than constipation. It is due to malassimilation of water from the intestines, and usually

indicates a catarrhal condition of the mucous membranes. The amount of milk should be reduced for several days. One of my patients had twenty bowel movements a day for fourteen days, after which they became normal and the full amount of milk was taken. Toast, zweiback, oatmeal gruel, cornstarch, lemon juice, honey, or sweet fruit, such as dates, prunes or raisins sometimes check the diarrhea. These tend to retard the progress of the milk through the intestines until the water is assimilated. Often, too, clabbered milk may be used instead of the sweet milk for a few days. In a few cases no milk can be taken without diarrhea and several attempts may be necessary before the milk is taken successfully.

Various other symptoms may arise while one is taking milk, such as headache, backache, pains in the limbs, feeling of weakness and lethargy, sleeplessness, and often the symptoms of some long-forgotten ailment will appear. The rule is to take no notice of these unless fever accompanies them, when fasting is indicated, the milk being resumed when the acute attack subsides. All of the symptoms manifested are indications of the house-cleaning and rejuvenation which the body is undergoing and are no sign that the milk should be discontinued.

Should one exercise while taking the milk diet? In such conditions as arteriosclerosis, high blood pressure, tuberculosis, gastric ulcer, heart lesion, kidney disease, or extreme nervous depletion, rest is indicated, but the general run of cases are best up and around. Of course if one is taking a "rest cure," no exercise should be allowed, but patients are happier, retain the weight gained, and have more permanent results if they take a certain amount of exercise. We would say again

that milk cures, only in that it furnishes the body with food elements needed by the organism for the repair of devitalized tissues, and as exercise is beneficial to a person on any other diet, so it is with this. A cleansing bath should be taken daily. A tepid sponge or a shower are satisfactory, or a warm tub bath may be used, followed by a cold rub. Many deplete their vitality by excessive bathing. It is unnecessary and unnatural.

Keep in the open air or have good ventilation in your room at all times. Greater improvement is made when this factor is observed.

It is rare that one tires of the milk when fairly started, but occasionally there is a desire for other things, in which case the milk should be discontinued for a few hours or for a day, or more fruit juice may be used. Occasionally the milk may be stopped and a meal taken four hours afterward, but the diet should be continued unbroken if possible.

How long should the milk diet be continued? The longer the better. Usually until all symptoms have disappeared. In other cases it may have to be alternated with a fast several times until the purpose is effected. In others a period of meals may alternate with the diet. In such cases it is customary to take milk from four to six weeks followed by two weeks on the solid diet, after which the milk is resumed if necessary. One should remember that the body requires time to overcome the injuries of years of wrong living, and because health does not follow a few weeks of the milk diet, it must not be considered a failure. It must be repeated over and over again until health is attained. The principle of cure is correct and the results are

uniform if the method is correctly followed. One of my patients remained on the diet for eighteen months before he was able to digest solid food. In some cases a few weeks will suffice to restore a person to normal. A Dr. Taylor of Croyden, England, over two hundred years ago, cured himself of epilepsy in two years, with the milk diet, and lived on milk exclusively for seventeen years thereafter.

This answers very effectively those who maintain that man cannot live on milk alone. I believe that man can live in better health and do more real work while living on milk, than on any other diet whatsoever. We must first get the idea out of our heads that the body needs a large amount of nourishment represented by a certain number of calories or heat units. After one has regained his normal weight and health, a smaller amount of milk will maintain the organism, than when one is taking the "cure." I have lived for months at a time on three quarts of milk and a few dates per day, and have worked sixteen hours daily. Milk is so easily digested and assimilated that a much larger amount of real nourishment is obtained from it, than from the large meals of solid food thought necessary for adequate nutrition. It is all very well to figure up the calorie content of a meal, but who knows how much of the food is digested, assimilated, and used by the body.

Some object to the exclusive milk diet because milk contains little iron. Probably more iron is assimilated from milk than from any other food no matter how much more that food contains. I have increased the hemoglobin many times from below fifty per cent to ninety, with no other food than milk. It has been es-

timated that from twelve to fifteen milligrams of iron per day are required in our diet. One hundred grams of fresh milk contain .24 milligrams of iron. Hence if one takes from five to six quarts of milk per day, the required amount will be supplied.

Many fail with the milk diet because they make the change to solid food abruptly. When the time for stopping the diet arrives, take the milk in the regular way until one o'clock in the afternoon, then nothing except water until five or six o'clock, when a meal consisting of vegetables, a soup, whole-wheat bread, and perhaps eggs may be eaten. The foods may be varied according to the desire of the patient. This plan is followed from three days to a week, when the regular two or three meal plan is resumed. From time to time a full day of milk drinking may be observed. Sunday is a good day for this.

Some object to milk in diseases of a catarrhal nature, saying that it increases mucous discharges. It is true that such discharges increase in the beginning of the milk diet, but this is due to the increased circulation of blood to all parts of the body. The system is literally cleansing itself of waste matter, and when this is effected the catarrhal discharges will cease.

When one has been feeding upon foods of an acid-forming nature, such as beef, eggs, wheat products, oatmeal, rice, bacon, etc., and the symptoms of an acid toxemia are present, milk will very quickly relieve the conditions as it has an excess of basic or alkaline forming elements.

It is the ideal food for old age and for the prevention of premature old age.

When there is obesity or a gain in weight is not desirable, less milk should be used, or skimmed milk employed. Buttermilk is also of value. In such cases and also when acid is lacking in the stomach, sumik, a clabbered milk, may be used. This is made as follows: Set away unpasteurized milk in quart bottles, in a warm place, for twenty-four to thirty-six hours, or until clabbered. If the sumik is not to be used immediately, put it on ice until needed. If left in a warm place it will become too sour and the whey will separate. Just before using beat well with an egg beater.

Sumik may be taken as an exclusive diet or a few dates or other sweet fruit may be taken with it. When sweet milk cannot possibly be taken sumik should be given a trial. I remember one young man who abhorred milk from childhood, who could take sumik with relish, from which he derived the same benefits as from fresh milk. He finally, however, developed a liking for fresh milk.

The best time of year for the milk diet is spring and early summer. At this time of year the cows are eating new grass, which seems to give the milk a greater curative value, probably on account of the increase of the organic salts, and the better health of the cattle when outdoors and eating their natural diet.

I may be over enthusiastic about the milk diet, but I believe that the person who knows how to use the fast and milk diet has a regimen at hand that can be used in any form of acute and chronic ailment, and even should necessity in disease never arise, a short fast followed by a few weeks of milk diet every year, will keep any one well, give renewed energy, greater

resistance to disease, a cleaner complexion and a better feeling of bodily comfort than any spring tonic or blood purifier ever compounded.

I will close by quoting the beautifully expressed tribute to the cow, by Gov. Frank O. Lowden, of Illinois, in a pamphlet issued by the Illinois Department of Agriculture: "The cow is a most wonderful laboratory. She takes the grasses of the pasture and the roughage of the field and converts them into the most perfect food for man. In that food there is a mysterious something which scientists have found essential to the highest health of the human race and which can be found nowhere else. Men have sought for centuries the fabled fountain of youth. The nearest approach to that fountain which has yet been discovered is the udder of the cow."

SPECIFIC CURATIVE DIETS

WHILE it is naturally assumed that in case of illness the physician in charge will supervise the diet of his patient, yet a general understanding of dietetic principles as applied to conditions of ill-health will enable the patient to co-operate much more satisfactorily with his physician in the effort to regain health. It is of course understood that any of the suggestions that are presented in the following diets for specific purposes are subject to the approval of the physician. At the same time, it should not be forgotten that many doctors have never specialized to any great extent on the subject of food, and it may be possible that in some instances the suggestions presented here will be of actual help to the physician.

Kidney Trouble

The most important consideration in connection with the diet in Bright's disease or kidney trouble in general, is the reduction in the percentage of protein, and particularly restriction in the use of meat. It is, indeed, a matter of common observation that the majority of those who in middle age acquire Bright's disease are heavy consumers of meat, sometimes eating it two or three times a day. This entails a severe tax upon the kidneys. Faulty protein metabolism causes not only an excess of acids, but the formation of other poisons with which the entire system is burdened.

In kidney trouble, therefore, one should either eliminate meat from the diet or confine its use to perhaps three meals per week. Indeed, any reduction in the quantity used will at once have a favorable effect. It is desirable also that one should not consume too many eggs, since they supply a large amount of protein. Milk and buttermilk can usually be recommended, inasmuch as they supply a sufficiency of protein but not an excess, and it is in a form very readily assimilated. The extensive use of vegetables, green foods and fruits is recommended in kidney trouble, together with whole-wheat bread, oatmeal and whole grain cereals. In a serious case the exclusive milk diet, preferably following a fast of one or two days, has been found to bring about extraordinarily good results.

Liver Trouble

Under conditions of a normal diet liver trouble is unknown. It is produced only by abuses which overtax this organ, either through the necessity of handling excessive amounts of sugar and starch, or of neutralizing poisons generated in the body. Therefore a reduction in the amount of sweets and possibly in the amount of meat and other high protein foods will have a favorable effect. The use of pepper, hot sauces, pickles and various condiments is especially to be avoided. The free drinking of water is always helpful in such cases. Of course the liver and kidneys suffer greatly in all cases of alcoholism, whether chronic or occasional, and it is taken for granted that rigid abstinence will be observed if any improvement is to be expected in any form of liver trouble.

Tuberculosis

The foundation for tuberculosis is invariably laid in either a condition of exhaustion through overwork, or of mulnutrition, or probably, as in most cases, both. These factors produce the lack of resistance to this disease. To understand the causes is to see clearly the remedy. Resistance must be built up through more perfect nutrition and rest, combined, of course, with the fresh air cure. Indoor treatment of tuberculosis is hopeless.

Until a few years ago tuberculosis was regarded as an inevitably fatal disease. To have "consumption" was to be doomed. The diagnosis was virtually a death sentence. Now the disease, unless too far advanced, is cured by outdoor life, rest and a diet which supplies the maximum of nutrition at the minimum cost of effort in digesting and assimilating food. The most nourishing foods and those also that can most easily be assimilated by the human system, are milk and raw eggs. These are invariably represented in all systems of curative diet for this disease. Many consumptives have found their way back to health on a diet chiefly of milk, raw eggs and fruits. Others have travelled the same road and sometimes perhaps more easily on the exclusive milk diet. For those who find raw eggs hard to "stomach," the exclusive milk diet is especially recommended.

Fevers

Without a doubt in most cases the best diet during an acute fever is no diet at all. The stomach is not in a condition to digest food and usually the instincts of

the patient refuse it. The very thought of food is nauseating. Food under such circumstances is a tax upon the system. Not only is it doubtful if any strength is derived from it, but experience will show that one gains strength more rapidly with fasting.

Many physicians, however, insist upon the patient taking nourishment, even during fever. In such a case the diet should be limited either to fruit juices or to a liquid diet. Curiously, fruit juices are usually welcomed by a sick person, even when there is no appetite for any other form of food. Fruit seems to sweeten the mouth and has a cleansing influence on the digestive tract, besides yielding a supply of vitamines and mineral salts which are undoubtedly of value in combatting disease. The instincts of the patient insofar as an appetite for fruit juices is concerned may well be trusted.

As to liquid diet in general, it is doubtful if the much-favored meat broths are to be recommended. The broth may contain flavor and with it the more or less poisonous extractives from the meat, but does not contain the protein itself. Therefore it cannot be strength-giving. A soup containing milk would provide actual nourishment. A soup containing the juices of vegetables would probably be of value, for while containing practically no nourishment in the sense of protein or tissue-building material, yet such juices are richly supplied with mineral salts and vitamines. They might conceivably be very helpful in case of fever. A potato soup prepared with milk would offer a healthful and nutritious combination and may be suggested, if not during the fever, at least during convalescence.

Constipation

Constipation being due to a lack of pulpy or fibrous material in the diet, as well as too often to a lack of exercise and insufficient water-drinking, the remedy is found in a combination of water-drinking, bodily activity and the use of grains and vegetables containing pulp. This means the substitution of whole-wheat bread for white bread and other white flour products, or even the use perhaps of a little clear bran, either baked in biscuits or served with a breakfast food. White flour is undoubtedly the chief cause of the almost universal constipation of the present day. Other starchy and pasty foods such as rice, tapioca and macaroni, together with cakes and pastries, should be avoided. Refined breakfast foods are likewise objectionable. One should use oatmeal, shredded wheat or other cereals containing the entire grain. Such food as lettuce, watercress, Swiss chard, celery, and all cooked vegetables are healthful. Nearly all fruits are beneficial in this respect, some of them being exceedingly valuable, apples, for instance. Likewise figs and prunes should be used in generous quantities. For further details the special chapter on constipation should be very carefully read.

Obesity

Special attention is called to the section in the fourth division dealing with the general subject of normal weight, particularly giving detailed advice on reducing superfluous flesh. Both exercise and quantitative reduction in diet are essential though it may be said here that the plan of eliminating from the diet the fat-forming foods will enable one to eat practically without stint

of those foods which are non-fattening in nature. In other words, if you properly arrange your diet it should be possible for you to eat as freely as desired of those foods which are not prohibited.

The objectionable feature of the diet of most of those who are over-weight is not so much the excessive use of fats and oils, which of course are fattening, but the large amount of carbohydrates consumed. Those who are too stout are invariably heavy consumers of bread, and sometimes also, especially in the case of the fair sex, of sweets. If the sweets can be either eliminated or cut down to a minimum of so many ounces a week, and if the use of bread, pastries and cakes can be discontinued or perhaps cut down to two to four ounces per day, that plan alone will in many cases enable one to reduce weight or to keep within normal limits. In other words, lean meat which is tissue-building but not fattening can be used provided there is not too much fat with it. Potatoes and sweet potatoes are about the only vegetables containing starch in a quantity that will seriously affect the deposit of fat. All other vegetables are chiefly water and should be used as freely as desired, which may also be said of fruits.

Of course if one eats an excessive quantity of meat with gravy it may be necessary to make some restrictions in this direction as well. One must cut down the total quantity of food below that amount which will maintain the weight of the body at the "high water mark." If you eat just a little less than is necessary to keep that fifty pounds of surplus, it will gradually shrink. Watch the scale each day and if you can lose from one to two pounds a week steadily and continuously you can reduce

your weight fifty pounds or more in a year. The gradual reduction is the preferred method. Do not try to take twenty pounds off in a week by a strenuous program.

Do not deprive yourself of water. Fat is made from food, not from water. Drink all you like. Also do not depend upon drugs or patent treatments. Remember that fat is simply stored up food and if you consume that instead of an excess of food in your stomach, while also using up some of your food or your fat through exercise, you will reduce weight. Regulation of body weight can be accomplished and has been accomplished. By following these suggestions you can weigh just exactly what you should weigh. Study your own case.

Emaciation

The diet for those who are too thin is really a question of a diet for building normal health and vigor. Many persons of small bones and slender build think they are underweight when they are actually normal. First be sure that you are really below weight and then undertake to build up your health. Perhaps what you need more than food is exercise. Undeveloped muscles make one thin, as well as making one unhealthy.

Do not think that what you want is merely fat. What you need primarily is more flesh—good, solid flesh and blood. If you build a larger quantity and a better quality of blood and with it better and larger muscular tissues and sound healthy organs, the problem of increasing weight is automatically solved. Therefore any diet which will build vigorous health will, in

combination with outdoor life and exercise, in amounts suited to your strength, serve the purpose. Often those who are too thin are those who eat too much. Be sure that your diet contains the right foods and then keep within limits. Some persons gain weight when changing from three to two meals a day.

Emaciation is often due to chronic disease, dyspepsia, constipation, liver trouble or other conditions. Osteopathic adjustments will sometimes help, but where there is any fundamental organic disorder that should be remedied. For most such cases of malnutrition, therefore, the exclusive milk diet is highly to be recommended. Indeed, in many cases of this kind it is a complete solution of the problem, being the most rapid and most perfect flesh builder in the world.

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of

Physical and Mental Development

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PART THREE

CONTENTS

PHYSICAL FITNESS

The Olympian System of Physical and Mental Development consists of Charts, Instructions, Text Material and Discussional Lectures as follows:

THE CHARTS

General Chart for Daily Normal Exercise.

Charts for Men	*Charts for Women*
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Strengthening the Stomach.	Abdominal and Digestive.
Chest and Shoulders.	Overcoming Weaknesses of Women.
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Three Charts of Instructions for the above.

TEXT MATERIAL IS GROUPED AS FOLLOWS

PART ONE EXERCISE	Section One—Physical Training. Section Two—Constitutional. Section Three—Exercise for Women. Section Four—Recreation and Athletics.
PART TWO DIET	Section One—Essentials of Nutrition. Section Two—Hygienic Eating and Food Preparation. Section Three—Curative Diet.
PART THREE PHYSICAL FITNESS	Section One—Keeping Young. Section Two—Health Guarantees. Section Three—Dodging Disease. Section Four—The Body Anatomical.
PART FOUR EFFICIENCY	Section One—Improving the Human Race. Section Two—The Body. Section Three—Personal Attractiveness. Section Four—Practical Psychology.

DISCUSSIONAL LECTURES

The Olympian System sustains the member's enthusiasm by informal lectures or discussions. These discussions bear directly upon the texts and help the member to clearly understand the fundamentals of right living. Like a lecturer or class leader they are at the member's mental elbow every month during the course, increasing his (or her) desire to be a complete success.

First Month	(a) The Foundations of a Successful Life. (b) Prolonging Our Youth.
Second Month	(a) Necessary Normal Exercise. (b) Correct Diet.
Third Month	(a) Attaining Standards of Perfect Physique. (b) Correct Standards of Beauty.
Fourth Month	(a) The Prevention of Disease. (b) Strengthening Weak Organs.
Fifth Month	(a) Keep Your Ideal Weight. (b) Recreation in Relation to Efficiency.
Sixth Month	(a) Eugenics. (b) Parenthood and Child Training.
Seventh Month	(a) Energy Building and Efficiency. (b) Practical Psychology.
Eighth Month	(a) Character Building. (b) Personality Building.
Ninth Month	(a) Mentality Building. (b) Success Building.

THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART THREE

PHYSICAL FITNESS

SECTION ONE

MIDDLE AGE LIFE SAVING

By HUGO MASTERS

IF you were fifty years of age—perhaps you are—and someone were to tap you on the shoulder and tell you in person that you are twice as likely to die as you would have been had you been a man or woman of fifty years of age forty years ago, you might not believe it.

And yet it is true.

Admitting that you have no reason to doubt the statement, you would immediately ask, "Why is this true?" You would also ask if there were not some means by which this doubled liability to death at your age could be overcome.

It is an absolute fact that men and women of middle age in America are dying just twice as fast as they did at the time of the Civil War. It is also a fact that this doubled mortality is entirely unnecessary. It is due to changed conditions of living, or to be more exact, less healthful methods of living. By more natural and healthful modes of life this death rate among the middle aged can not only be reduced to what it was forty years ago, but even lowered far below that rate.

Men and women of middle age have no right to die. They have just reached the time of life when they can be of the very greatest service to the world. It is the man or woman of fifty years and up who has developed his or her greatest brain power and capacity for useful-

ness. To lose the best brain power of the country just twice as fast or more than twice as fast as necessary is nothing short of a national crime.

If you are fifty years of age you should only have reached something like complete mental maturity. Legally you may be regarded as mature at twenty-one, but even complete physical maturity is not commonly reached until some time between the ages of twenty-five and thirty. One may reach his full height in his 'teens, but that does not mean that complete bodily growth is attained. There is a continued process of growth in the "filling out" of the body, the strengthening of the bones and the attainment of full power in all of the organs, which continues in many cases until nearly thirty years of age.

There are many students of the subject who hold that one is not mentally mature until after forty or fifty. The greatest capacity of the mind is certainly not reached in most cases until after this period of life is reached. This is not only true in the case of business and professional men, but it is true in the case of women. Great numbers of women past fifty, whose children have been brought up to the point at which they no longer require constant maternal care, find themselves splendidly equipped at this period of life to enter into the larger activities for which they are suited and are invaluable to society.

You do not belong to yourself alone. You belong to society. The human race for centuries has worked and contrived to make the world you live in a comfortable, happy and congenial place. Innumerable developments in the way of art, literature, music,

philosophy, science and culture generally have been attained by the human race, so that life means something for you. You can only repay that debt by contributing your small share to the welfare of society in the form of whatever service you may be fitted for. At middle age you are best equipped through your matured mentality to render such service. Therefore you have no right to die of heart failure, kidney trouble, or any other of the preventable diseases which are now working such havoc.

It is stated by Mr. Elmer E. Rittenhouse, a prominent life insurance actuary, that under the conditions existing in America at present we are cheating ourselves of approximately fifteen years of average life.

Up to the present time and even now our scientists have devoted and are devoting themselves almost if not exclusively to guarding life against communicable diseases, the diseases which may be carried. Guarding against the degenerative diseases—the wearing diseases of the heart, kidneys, arteries, the digestive system and so on—has been overlooked, except in so far as general sanitation and measures of that kind make for cleaner and better living and to that extent prolong life.

In Massachusetts and New Jersey, according to Mr. Rittenhouse, the death rate from degenerative diseases has increased about one hundred per cent since 1880. In ten years the death rate from these diseases increased about nineteen per cent per thousand population. And every ten-year period since 1880 shows a like increase.

In England and Wales, on the other hand, the death rate from these causes does not increase, but rather de-

creases. Yet the American mortality records show that we are cheating ourselves of life from degenerative causes more and more with every generation.

The death rate from communicable diseases, according to this authority, has been marvelously decreased. Diphtheria, for instance, has been reduced a full eighty per cent in the last fifteen years, while smallpox has practically disappeared from the earth. There has been a great reduction in diarrheal diseases of children, in tuberculosis and typhoid fever and in pneumonia in the last three or four years.

The average editorial writer, he further states, will point out that the death rate is steadily decreasing. As a general proposition, because of the reasons already noted, this is correct. But, while the *general* death rate has decreased from 21 to 25 per cent in thirty years, the death rate at forty to forty-four and the remainder of life has been and is increasing. We forget that the saving of young lives has been accomplished only in the past thirty or thirty-five years in this country, while the death rate in England and Wales has been decreasing in all age periods.

It should be remembered that deaths above the age of forty are mostly due to degenerative diseases. The deaths from tuberculosis average the highest at the age of twenty-nine, while diphtheria, scarlet and typhoid fevers result in the death mostly of young people. Since 1885 the saving in life has been almost wholly in infancy and up to the age of twenty-five years, and that has been due mostly to the efforts which have been directed against the causes of communicable diseases.

As a matter of fact, states Mr. Rittenhouse, we have

heretofore indifferently accepted degenerative diseases as of natural consequence. When a man dies of heart disease people are wont to say that he must have been a weakling, that not being a communicable disease but a breaking down of a vital organ, that there must have been something about his hereditary tendencies which caused him to give way; whereas it most probably was due to some overstrain, some abuse of the system, to improper habits of life.

It seems very reasonable to conclude, this authority holds, that diseases which indicate an early breaking down of the vital organs must be due to either an increase in life strain or to a decrease in our capacity to resist ordinary life strain. This condition, he adds, probably is due to the fact that during the past forty years there has been an extraordinary change in the habits of life among the American people. This is not confined to the rich nor to the very poor, but applies to every class. Take as an instance our labor-saving devices. In almost any factory today you may see the mechanic standing almost inactive beside some sort of machine. It may be that he is operating a machine which is beating out white-hot steel into some kind of tool, which is accomplished on his part simply by manipulating a small lever or the switch of an electric motor, all so trifling that he in no way exercises his muscles. If he had to beat out this tool with a hammer, as in years ago, he would be exercising every muscle in his body.

Scarcely anywhere is there an occupation which has not in some degree been eased up. The street car motorman used to have to employ muscular effort to operate the brake, and now he operates it by a valve.

Since we have trolleys, men will ride three or four blocks to save a minute because of the grinding rush which has come upon us. Forty years ago we had to walk upstairs; now we have elevators. All this, of course, is not to be deplored; it means that the world has advanced. The trouble is that most of us have not done anything to take the place of our former activity.

Most of our ancestors came from the soil, and they were vigorous, healthy, strong, muscular men and women. But now not one out of every twenty of the descendants of these old people is working with his muscles. The proportion of American people who have gone from the physically active to the physically inactive group within the past forty years is truly enormous, due largely to the increase in labor-saving and time-saving devices.

Furthermore, declares this writer, we must make the people understand the tremendous problem involved in the wear and tear of life upon the vital organs, must interest them not only in guarding against the accidents to health, but also in guarding against the diseases which result from heavy life strain, must encourage them to adjust themselves to the changed conditions which produce organic diseases.

In the course of time, says Mr. Rittenhouse, a locomotive is bound to wear out. But the engineer prolongs its life by watching it continually; looks to its bearings, oils it, keeps the working parts in good condition and the whole free from rust. But its working parts are not susceptible to repair, as new tissue repairs waste in the human body, when properly cared for. The reason for the lack of such proper care is that we either do not

know how or that we ignore the information we already have. We are too much in the habit of doing certain things thus and so because of custom and to ignore new ideas and new scientific knowledge, instead of making for the betterment of our life by accepting them.

Mr. Rittenhouse, in the above summary of the facts, has well stated the case. Men and women of middle age must invariably have been given good, healthy constitutions, or they would never have been able to survive until middle age the unnatural way of living which at this particular period of life finally results in a breakdown of the vital organs. And with such naturally good constitutions, it should be possible in probably every case to live out a full lifetime, whatever that may be—whether seventy or one hundred years of age.

The art of keeping young is identical with the art of maintaining vigorous and perfect health. If the various organs of the body are spared the abuses which undermine them, if the system is given a normal amount of wholesome physical exercise, if the requirements in the way of food are adequately and sensibly supplied, if the need for sleep and recuperation is well provided for, and if in all other ways one keeps himself "up to the mark" physically, so that there is no process of deterioration or degeneration in any part of the body, the danger of death at middle age, except by accident, can be entirely eliminated.

OLD AGE—WHAT IT IS AND HOW TO PREVENT IT

By HEREWARD CARRINGTON, Ph. D.

Yet ah! that Spring should vanish with the Rose!
That Youth's sweet-scented manuscript should close!
The nightingale that in the branches sang,
Ah whence, and whither flown again, who knows!

SO sang Omar Khayyam, and his plea represents the cry of humanity. Youth comes to us but once; and if "the spirit of man is ever young," it is also true that, too often, "the spirit is willing but the flesh is weak." Our bodies no longer respond as they did of yore; some of their comeliness and youthful symmetry may have gone; in short, we feel ourselves "getting old."

But there is no reason *why* we should allow ourselves to grow old in this manner; and there is every reason to believe that, if we but took proper care of ourselves, we would prevent the oncoming of old age very materially—almost to the point of preventing it altogether; and this seems to have been the case in many instances on record where individuals have reached the age of a hundred years or more without losing any of their faculties, or without becoming in any way "decrepit" or losing any of the joy of life.

Theoretically we should all do so! It has been pointed out that practically every mammal lives about five times the length of time it takes to mature. A dog matures at two and lives till ten, etc. A man who matures at about twenty should certainly live until he is a hundred—and *that* while retaining all his organs

and faculties intact, and without becoming weak or devitalized either.

The mere fact that the majority of people *do not* do so merely proves that the human race is living contrary to the laws of Nature, with which it *should be* in full accord. Let us see in what these consist, and how to live one's life in such a way that youth may be maintained, and old age prevented, or youthfulness even regained, to a very large extent, if the signs of "old age" have begun to make their appearance.

The phenomena of "old age," so-called, result from certain chemical and physical and vital changes which take place within the body; and, accompanying these changes, certain mental changes are also noticed, as a rule. These changes are the result of a variety of causes: Mental and emotional states (worry, fear, etc.), fatigue, auto-intoxication, diseases of various kinds, etc.—in addition to the natural or innate property of the living tissue itself, which insures its ultimate resolution into the elements which compose it as we find the case throughout the whole animal and vegetable world.

These "changes" can be either hastened or retarded, however, very considerably. When they are hastened, old age and premature death result; when they are retarded, continued youth, health and strength result, with the consequent postponement of natural death. Further, it has been shown that in those cases in which natural death *does* supervene, and has not resulted from diseased conditions, etc., it is easy, painless and even welcome. It is now the consensus of expert opinion that the fear and dislike of death, which is so universal, results because such deaths *are premature*. When not premature

we lie down to sleep our last sleep content and at peace; welcoming it as we would a night's sleep after a hard day's work. As Bryant so beautifully expressed it—

> ". . . . approach thy grave,
> Like one who wraps the drapery of his couch
> About him, and lies down to pleasant dreams."

And it is possible! If the laws of life are followed, there is no doubt whatever that old age *may* be prevented almost entirely, death greatly deferred, the organs and senses preserved in perfect health and strength, and the life made a happy and joyous one.

Louis Cornaro is a classical example of this. Cornaro was an Italian nobleman who, at the age of forty, found himself completely broken down in health; a physical wreck, his life practically ended, with "one foot in the grave." Yet, by reforming his method of living, he not only lived to be more than a hundred, but when nearly ninety years of age, he commenced writing his famous book, in four parts, which he only completed in his ninety-sixth year! His sight, hearing and general bodily health were perfect up to the time he died. If this was possible in his case, it is possible in yours also! For it is much easier to *keep* a man in good health than it is to *restore* him to that condition when his health has once completely broken down.

How did Cornaro achieve this? He followed what he called "the abstemious life," that is, he ate and drank very moderately (12 to 14 ounces of food a day); he indulged in no "riotous living," and kept his passions and emotions under control. This seems simple, easy to follow, and common sense. Yet these are the simple

rules which he followed, which we can all follow, and which served to maintain him in a state of robust health until well past his hundredth year.

Modern science has shown us why this was so in his case, and why it would be equally efficacious in our own cases also. There is now no doubt that poisons, accumulating within the body, are the chief causes of the premature breaking-down of our various organs; if we continually over-work the lungs and the liver and the kidneys and the bowels, and throw far more work upon them than they should be called upon to perform, they are surely going to break down sooner or later; and man is "only as strong as his weakest link."

These poisons, finding their way into the general blood stream, produce fatigue, irritate the delicate nerve-cells, poison the muscles, find their way into the tissues and joints, and force the various eliminating organs to over-work, in order to dispose of them. At the same time, they predispose us to laziness, inactivity, mental and physical inertia, and tend to break down the healthy tissues throughout the body. The sluggish circulation no longer carries away all the impurities, as it should, and a process of degeneration begins, which progresses more or less rapidly, as the case may be.

The way to offset all this is to prevent the accumulation of these poisons within the system. It has been found by experiment that the way to insure the greatest output of energy from radium is to *cleanse* it, to *purify* it, and when that has been done, the energy-output is materially increased. It is the same with the human body. When healthy and clean, in the sense that it is free from poisons of all kinds, it is capable of exerting

far more energy, of manifesting much more "life" than formerly.

There are two ways in which this accumulation of poisons can be prevented, *viz.*, (1) preventing the introduction into the body, of poisons, in any form; and (2) eliminating those which are already within it.

The first of these two objects can be accomplished by eating *less*, and *simpler food*. *Overeating* is certainly one of the besetting sins of our generation, and is one which tends to break down the health of the people more than anything else. Broadly speaking, there are only two avenues by which poisons can be introduced into the body—through the lungs or through the stomach. That is, the air we breathe, and the food and drink we supply ourselves.

Cornaro's experience shows us the vital importance of cutting down the relative amount of food as we grow older. The body does not need so much food, as we go through life; we have finished growing and the vital activities of the body are less than in youth. That is, we need only enough to keep the body running smoothly, and this is far less than we have been in the habit of thinking. Dr. Henry Thomson, who is perhaps considered the greatest authority upon diet for the aged, insisted over and over again, in his writings that, as the age advances, the amount of food should be *reduced*, and not *increased*. We require *less* and not *more* food. And the older we grow, the less food do we require! It is all a mistake to suppose that old people require large quantities of food to "support" them, to "give them strength," etc. It has now been proved conclusively that such a practice breaks down the vital ma-

chinery rapidly, forces the onset of old age, and induces many of the disorders commonly supposed to be the inevitable consequences of old age, but which we now know to be no more "necessary" than the so-called children's diseases, which were formerly thought to be almost "necessary" to childhood.

The result of eating less food is to take the strain off the internal organs of digestion—the liver, the kidneys, the bowels, etc., and prevent the accumulation of poisons which tend to find their way into the blood stream. In turn, this insures healthy muscles, tissues and nerve-cells, which are no longer poisoned with the excess of toxic material in the blood. The result is clearer thought, higher vision, greater cheer and energy, and a healthier, better and more vigorous body.

Less meat should be eaten, since this is a very "heavy" article of food, and contains within itself a quantity of poisonous material, which requires elimination. Even those who believe in meat-eating now admit that only a very *small* amount is required each day, and that this amount should only be increased if strenuous physical labor is undertaken. This applies to a greater or lesser extent to all proteid (muscle forming) foods—such as nuts, peas, beans, lentils, etc. A large quantity of proteid only does the body more harm than good, if active physical exercise is not taken.

Alcoholic beverages of all kinds should of course be eschewed by one seeking long life. Advertisements of whiskeys, etc., which are said to "build up the strength," "restore youth," and similar remarks, are purely fakes. For one who can live under this régime, thousands find premature graves.

Tea and *coffee* are injurious to those seeking continued youth. In fact, all stimulants, drugs, narcotics of every kind are harmful,—since they merely tend to irritate the internal organs, stimulate them into greater temporary activity, without in any way adding to their real power or strength.

Fruits are very beneficial; and one who makes fruit a considerable part of his daily diet need never worry or fear that he will age prematurely. The fruit juices are cleansing, soothing, antiseptic, mildly relaxing, and contain valuable mineral salts which are not contained in so high a proportion in any other foods whatever. Fruits also prevent acidity within the body; and this is extremely important, since we now know that increased acidity is one of the deadliest perils the human race has to face. Too great acidity in the blood will actually destroy brain and nerve-cells throughout the body, and cause a premature break-down of the entire mechanism. Fruits—and particularly acid fruits of all kinds—will prevent this. It is pure superstition to claim that these fruits "produce acidity." On the contrary, they prevent it.

The *organic salts* contained in fruits are very valuable. We now know that most of the changes which take place in old age are due to the fact that the living, animal matter of the bones and tissues generally is replaced by dead, inorganic matter. It is for this reason that the bones become hard and brittle, the muscles rigid and inelastic, the tendons easily broken, the organs weak and readily overworked, the heart and blood vessels easily ruptured, etc., in old age. Plenty of fruits will prevent all this. If they are eaten each day—not *in ad-*

dition to, but *instead of,* a part of the regular diet, youth will be preserved, and health and vim increased a hundred-fold in consequence.

Plenty of water is very essential. Dr. Trall was of the opinion that death resulted when "the solids of the system become so disproportioned to the fluids of the system that proper functioning can no longer take place." We must keep up the fluidity of the body and the best way to do this is to drink more water! Accustom yourself to drink several glasses of water each day, on arising in the morning, on going to bed at night, and between meals. Water tends to flush out the system, and carry out impurities—through the kidneys, skin, etc.,—as well as stimulate a healthful activity of the bowels.

The *lungs* should be given some exercise every day. Five minutes *deep breathing exercises* night and morning, will keep them in condition,—provided that fresh air be admitted at all hours of the night and day, and the lungs be given free play. This will tend to keep the blood thoroughly oxygenated and purified, and will give a feeling of vitality and strength which nothing else can or will.

The eliminating organs must be kept open and active. Plenty of fruits will serve to keep the bowels open, as a rule,—especially if whole-wheat bread is substituted for white bread. Proper measures must be taken to combat constipation, if this be present in any form,—according to the directions laid down. This is very important! The liver can be kept healthy by proper exercise, acid fruits, and a light diet, containing a small proportion of sugars and starches. The kidneys should

be stimulated by plentiful water drinking, and kept healthy by fruits and abstention from an excess of sweets. If indigestion in any form is present, nothing solid should be eaten until this has disappeared. Nothing is worse than eating when not hungry, or congesting and clogging-up the internal organs with an excess of food which they do not want. If not hungry, go until the next meal, or the next, or the next, or until an appetite does actually develop. A little active fasting once in a while is extremely beneficial, and will keep the body clean, healthy and well.

The *skin* should be kept clean and vigorous by plentiful water, air and sun baths—at least one a day. Air should be allowed access to the skin whenever possible, and the temperature is not too low. Sun baths are especially valuable to the aged; a little active sweating of the skin cleanses it and keeps it active, as well as eliminating poisons in this manner. The temperature of the water should be proportional to the temperature of the skin. Very cold bathing is not advisable, as a rule, for those after middle life. If the skin is feverish, cool water should be applied, but if the skin is chilled, hot water should be the rule. In this way, the circulation is equalized—a very valuable and necessary factor for health.

A certain amount of *exercise* each day is essential. If exercise is not taken, the circulation becomes sluggish, the internal organs fail to function properly, and the whole system is thrown out of order. Walking is a very good exercise,—a certain amount of which should be taken every day. All exercises which call into play the muscles about the waist-line are beneficial,—since these

not only strengthen the muscles, but also strengthen and invigorate the internal organs, which is what we are seeking to accomplish. Outdoor life or exercise in any and every form is good—riding, fishing, gardening, golfing, and every form of moderate physical exercise, in fact, which does not throw too sudden and violent a strain upon the heart, is beneficial for the middle aged, and those past their prime. Younger men and women may take more active and vigorous exercises.

A greater amount of *clothing* will probably be required to keep the body warm, as age advances; but do not make the mistake of piling on quantities of heavy clothing, in the mistaken idea that this is necessary. Keep the surface of the body warm with the minimum of clothing; prevent the skin from becoming anæmic, by exercise, deep breathing and bathing, and the "chilly feeling" so often noted will not be experienced.

The *mind* should be kept busy and occupied. Life is largely a matter of interest, and it is a well-known fact that as soon as we cease to take interest in life, we die,—in the same way that we fall asleep when we are bored or tired at the end of the day. An active interest in life and all that it holds is essential. If you have no business to occupy your mind, by all means cultivate a *hobby.* No matter what the hobby may be, it will be useful. Reading good books is always a source of enjoyment, instruction and amusement; and if one can become interested in any particular line of reading—history, science, biography, whatever it may be—so much the better. It will become more and more fascinating as you proceed.

Worry and kindred *emotional states* should be pre-

vented, so far as possible. Every outburst of anger shortens our own life; every fear inhibits the proper functioning of the body; every form of worry acts as a mental and physical depressant. Optimism, peace and harmony will add many years to life; and Dr. Dewey has said that "cheer is to digestion what the breeze is to a fire." There are many good and helpful books upon this subject upon the market, and it would well repay the reader to peruse some of them. There is no doubt that he will receive help and encouragement from them,—as so many thousands of others have done.

To *sum up* the rules of maintaining youth and preventing old age, therefore:—

1. Be abstemious in your diet. Eat simple foods. Never eat unless hungry.

2. Eat some fruit every day; make fruit a part of your daily diet.

3. Drink plentifully of water.

4. Avoid alcohol, tobacco, tea, coffee, drugs, irritants and stimulants.

5. Take five minutes deep breathing exercises morning and evening.

6. See that there is a plentiful supply of fresh air, night and day.

7. Take some exercise every day—preferably outdoor exercise.

8. Keep the skin active by means of sun, air and water baths.

9. Keep the skin warm, but do not wear too many heavy clothes.

10. Keep the bowels and other eliminating organs open and active.

11. Avoid all excessive and violent emotions. Keep calm; relax; seek harmony.

12. Keep the mind cheerful, occupied and busy. Procure a hobby! Keep up your interest in life. Be an optimist! Keep in the game! Keep interested!

These rules, if followed, will certainly insure youth and prevent old age, and any signs of premature loss or break-down.

To keep these rules more persistently in mind, it would be a good plan for you to make up something in the nature of a chart covering them, to hang upon the wall of your room where you will see it frequently.

Since there are twelve rules, it may be suggested that the chart take the form of the face of a clock, or in other words, draw a circular diagram and let the twelve rules take the place of the marking of the hours. In other words, instead of the numbers one, two, three and so on, simply write in each position a word or two that will suggest to your mind the twelve rules given.

For instance, you may condense the ideas presented in these rules and list them under the titles, "Abstemiousness, Fruit, Water, No drugs, Breathing, Pure Air, Exercise, Skin Activity, Warmth, Elimination, Harmony and Active Mind.

Each day, or perhaps more than once each day, you will take a look at this chart and thus remind yourself of the twelve rules which they represent. In that way you will probably be able to avoid neglecting any one of these important laws of health. Remember that irrespective of your age as measured in years, these rules are essentially the all-important rules for keeping healthy, vigorous and alive in the best sense.

EXERCISES FOR KEEPING YOUNG

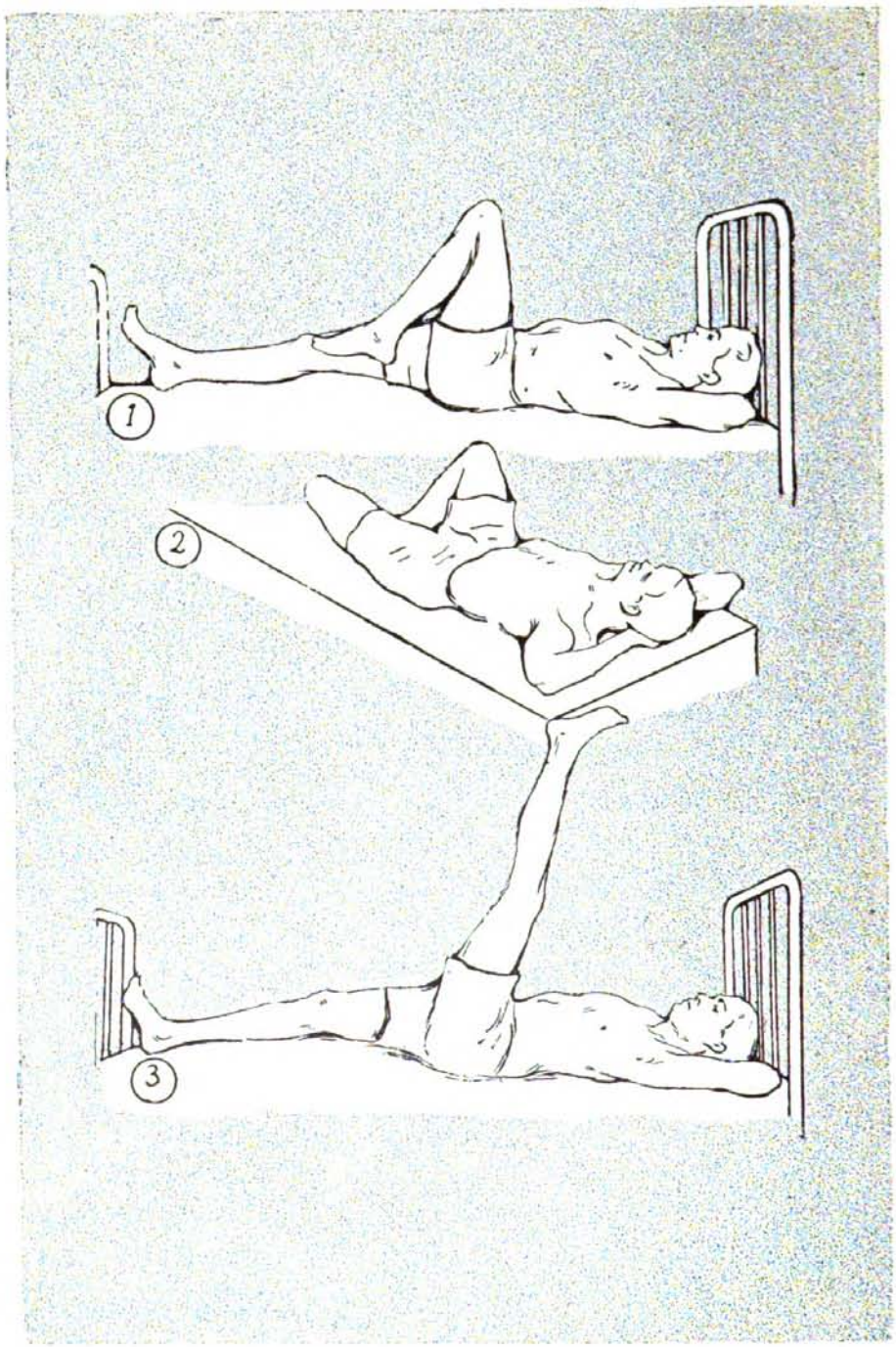
By CARL EASTON WILLIAMS

IF activity is characteristic of youth, and stiffness and inactivity are characteristic of age, then it follows that to continue to be active and to retain bodily elasticity are indispensable for keeping young. This has been proven so many times that no argument is necessary. The question arises as to just what type of exercise is to be found most suitable for those past middle age.

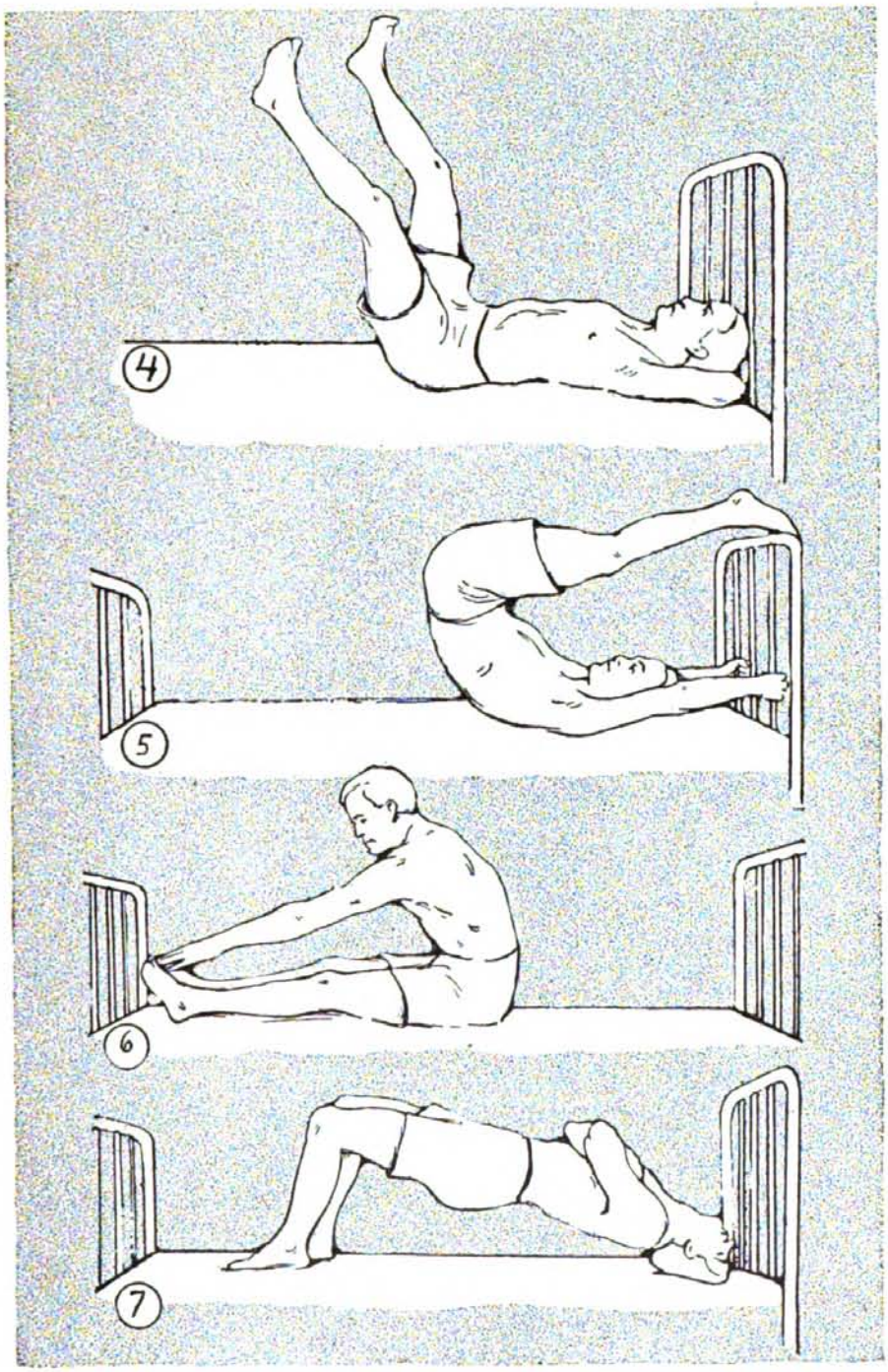
There is a peculiar development of bodily powers in later life in respect to endurance. While the man past sixty or seventy years of age will naturally not find himself capable of such violent effort as in his younger days, nevertheless there is often experienced a distinct advantage in the matter of endurance. This has been proven again and again in the experience of famous pedestrians, who, at the age of sixty or seventy have been able to walk across the continent in less time than it took them forty or fifty years before. Edward Payson Weston is a famous example.

The truth is that walking is an ideal exercise at any time of life, but it is especially valuable to men of middle age and more advanced years. One may safely say that the man who continues to walk anywhere from five to fifteen miles per day will stay young almost indefinitely. Walking such distances not only involves the use of the muscular system but it is a tonic to the internal organs. It strengthens the heart, lungs, digestive sys-

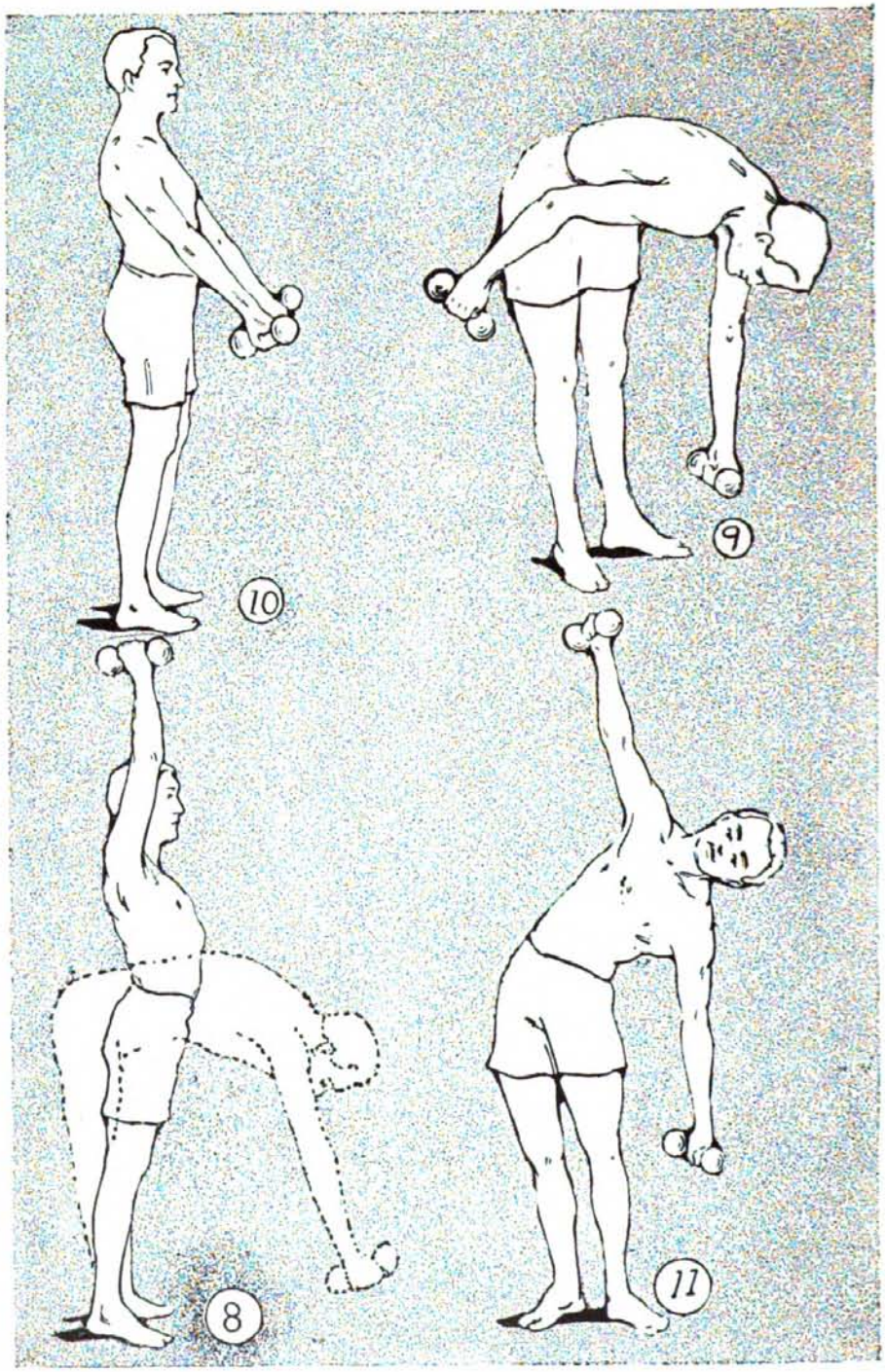
EXERCISES
FOR
KEEPING YOUNG



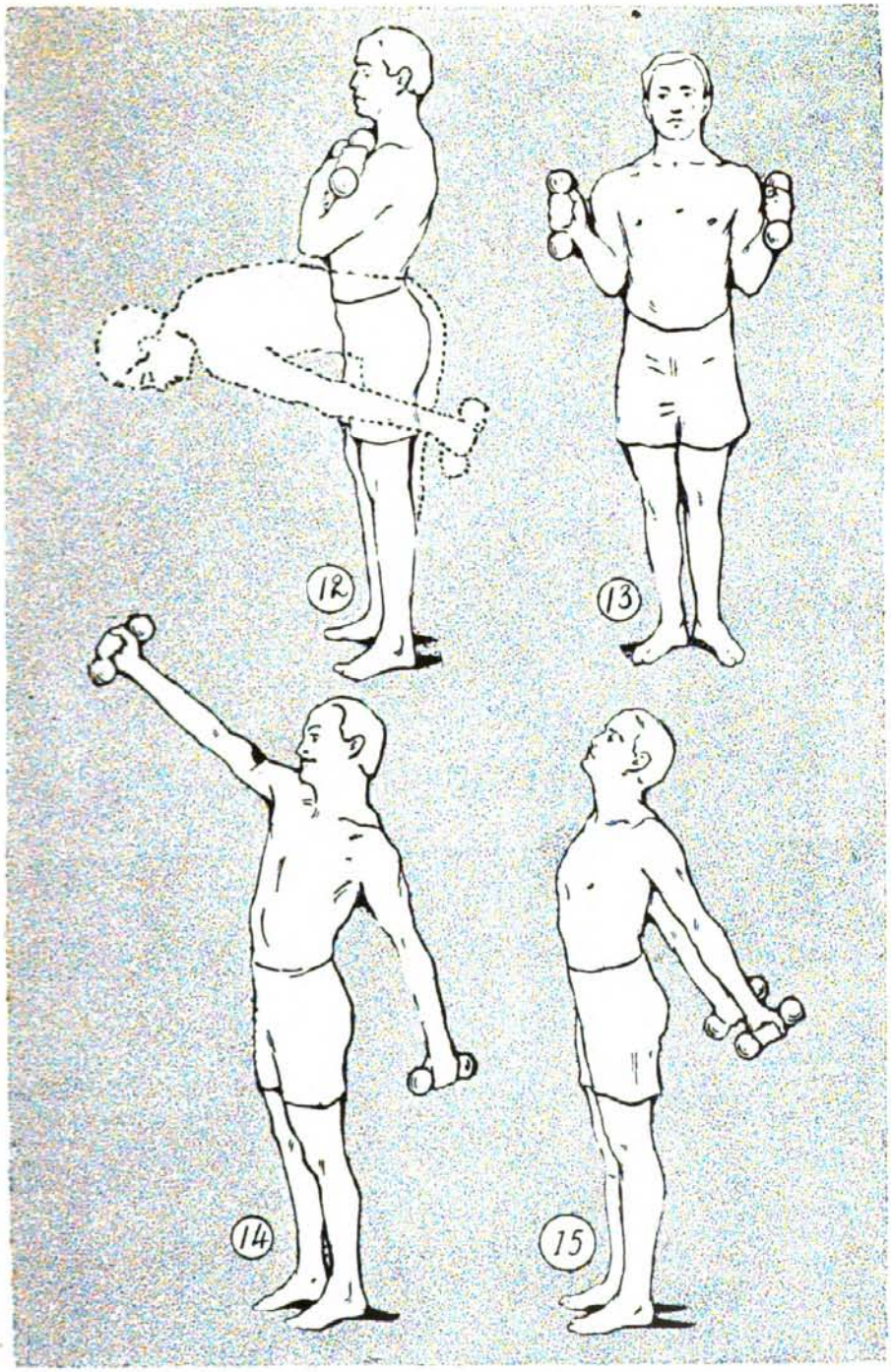
This system of "keep young" flexibility exercises was designed by Senator Tillman. Detailed description in text.



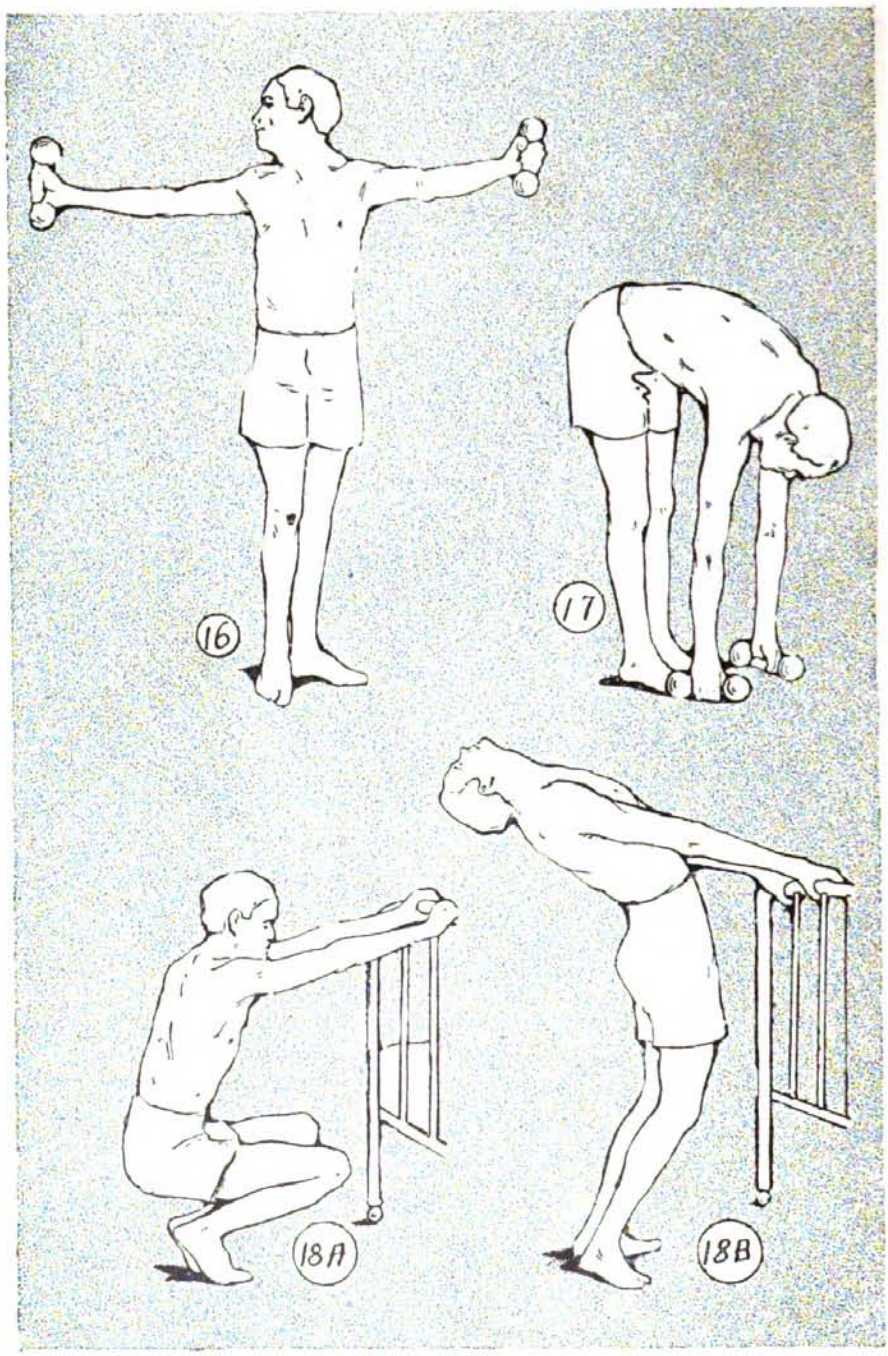
Reclining exercises are in many respects ideal in advanced years because of lessened strain upon the heart. (Description in text.)



Caution should be used in undertaking the more active of these exercises. Unless easily executed, the more difficult of these should not be attempted until after a preparatory period of training.



Light wooden dumb-bells are preferably used in these exercises, though two or three pound iron dumb-bells may be used later for more vigorous effort.



Many repetitions of each movement are not required. One will maintain elasticity and vigor of body just as long as he keeps up this system of exercises.

tem, and all of the functional organs. Long-distance walking is really exercise for the internal man. It will keep one internally vigorous—just where it is most important that one should maintain strength.

Just as soon as a man begins to "sit around," sticking to his cosy place in the corner by the fireside, he will grow stiff and old. Such a program would make an old man of you at the age of forty. But if you have a definite program of walking from five to ten miles every day without fail and irrespective of the weather, you will avoid sickness, and will remain young, active and capable of doing useful and valuable work when you are still in the eighties and nineties. Is it not worth while?

In place of walking, one may enjoy such activities as cycling, gardening, wood-chopping, golf, rowing, canoeing, and other pastimes. Golf is especially valuable because it involves so much walking, and because the amount of walking one does is less fatiguing—through the fact that the stimulation of interest in the game prevents one from realizing that he is taking exercise. Lloyd George, the great Premier of England, said that he could think best when he was walking, and that he could walk best when he was golfing. In addition to this, the exercise of hitting the golf ball involves exercise for the shoulders, but especially a twisting of the spine that is helpful in keeping it flexible and young. William E. Gladstone, once affectionately regarded as the "Grand Old Man of England," maintained youth and strength up into the eighties by the practice of chopping wood, combined with walking.

In addition to such outdoor exercises as walking,

golfing, riding or wood-chopping, a system of systematic physical training should be continued for the sake of maintaining strength and flexibility in all parts of the body. Perhaps flexibility in advancing years is even more important than strength, but both may be maintained by the persistent practice of a good system of exercises. To resort to violent or strenuous movements is not desirable. Fairly light movements or what are often called "free movements" of the body itself, answer all purposes. The most important feature of such exercises consists in the bending, twisting, and stretching of all parts of the body to the utmost comfortable limit, in order to maintain the state of elasticity of all parts to which we have referred.

Any system of calisthenics would answer fairly well for this purpose. It may be suggested, however, that a very desirable system will be found in that used by the late Senator Benjamin R. Tillman of South Carolina, and by means of which Senator Tillman prolonged his life and preserved his health for a number of years. Unfortunately, Senator Tillman had never given the least thought to his health. He had neglected his most precious possession all his life until he was forced to realize its value as a result of a stroke of paralysis which he suffered on the steps of the Capitol in February, 1910. He was not expected to live, but as a result of a careful diet, the drinking of hot water and persistent application to systematic exercise, he continued to live and serve his country for many years.

Nor are these exercises applicable only to old people. This is an excellent system for men and women at any age. They are good for young people. And

they will keep middle aged and old people young. No one should attempt any exercise which involves strain or discomfort. It may be best in some cases to work up to these movements carefully. The following is quoted from Senator Tillman's statement in reference to his system of exercises.

"I have a systematic course of exercise designed mostly by myself which I use twice daily. Sometimes I feel so tired that I am disinclined to go through the exercises, but I do so just the same, and they actually rest me and I sleep better after taking them. The time required is from ten to fifteen minutes. I have no set number of repetitions for all the exercises. Some of the movements are repeated twenty or thirty times, others three or four, simply because close study has taught me the number of times to go through each one. Close watching will likewise teach anyone how many times to repeat each movement, for his case.

"I use two sets of exercises; one taken horizontally, and the other standing. In the latter I use a pair of light dumbbells, about three pounds in weight. These are to give emphasis and momentum, and I have found a great deal of difference between using them and exercising without them.

"The horizontal exercises are taken on an iron bed or a hospital cot made of iron. I will first describe the horizontal movements.

1. Take the head off the pillow and stretch out straight. Draw in a deep breath and begin by kicking the buttock with the heel of one foot fifteen times, holding the breath until the movement is finished; then exhale. Same with the other foot. Then let the air out

and draw in a fresh breath and kick with both feet fifteen times. Draw in a fresh breath to the limit after each movement.

2. Drop the heels on the bed with the knees drawn up. Then throw the knees as far apart as they can be carried and repeat ten times, holding a full breath.

3. Throw first one foot and then the other toward the head-board with vigor, keeping the knee joints as straight as you can. A different set of muscles is brought into play by doing this with the knees drawn up and the knee joints limber. I use both now.

4. Kick out with both feet as wide apart as possible, and kick with emphasis, as though you were kicking off a vicious dog.

5. Place the hands under the small of the back; using these as a lever, elevate both feet at once and the lower part of the body toward the headboard, using the abdominal muscles to pull up the lower extremities. If in an iron bed, this movement can be facilitated by grasping the iron rods above the head with the hands, pulling up the legs and feet. This and the next movement are intended to reduce the paunch by changing the fat on the abdomen to muscle. These movements facilitate the flow of blood to the brain and might be dangerous under certain conditions. My trouble came from too little blood in the brain.

6. Fasten the feet under something and pull the reclining trunk up to a sitting posture. Young, healthy people do not need to fasten the feet, but old, fat ones must do it. One ought to go about it cautiously until the muscles have become accustomed to the strain. Repeat only four or five times.

7. Throw the head back with the feet on the bed and lift the body clear so that the shoulders do not touch, forming an arch. Repeat this only as often as you wish.

The exercises I take standing are as follows:

8. First stand erect with the dumbbells firmly clinched. Throw the arms downward and backward, passing by the thighs, to the rear until the strain is felt on the muscles at the arm pits, and on returning carry the arms above the head; repeat fifteen times. Continuing, bend the body forward as nearly horizontal as you can, and let the hands swing as near the floor as they can go, straightening up between each swing and repeating until you have bent down ten times.

9. Then, keeping the knees stiff, try to punch the big toe of each foot with the fists. Repeat as often as desired, straightening up between punches.

10. Next, using the dumbbells, drop the hands full length of the arms a little to the front, and twist each hand vigorously first to the right and then to the left.

11. Hold arms out at the sides. Then as one goes up, let the other come down, swaying the body from side to side as the movements are made. Elevate the hand that goes up as high above the head as possible, and bring the other as near the floor as you can.

12. Cross the hands on the chest; bend forward, swinging the arms downward, passing the thighs, and then straighten up—taking deep breaths all the while.

13. Clinching the dumbbells firmly, jerk them from the front towards the shoulder, being careful not to let them strike, fifteen times.

14. Throw both arms behind the back hard so as

to bring the back of the hands as near together as possible while holding the dumbbells clinched.

15. Using one hand at a time, swing the dumbbells upward, backward, downward and forward, forming a circle with the armpit as a center. Then reverse and swing the other way; repeat eight times with each arm.

16. Still holding the dumbbells, throw one to the rear and the other to the front, looking first over one shoulder and then over the other, twisting the spine as far as possible and loosening the vertebrae.

17. Standing flat-footed, elevate the hands above the head and bend forward and try to touch the floor while the knees are stiff. Straighten up and repeat. Continue to do this until you succeed in reaching the floor. I usually reach it the third effort. At first I could hardly get lower than my knees.

18. Take hold of the foot of the bed and squat as low as you can. Then straighten up and bend backward as far as you can. Then squat and repeat the entire movement. This will loosen the vertebrae of the spine and relieve the pressure on the nerves inside the trunk. This to me is my most valuable exercise, as it enables me to mount my horse from the ground without assistance.

"General directions: During the movements on the cot I draw in my breath and hold it until the movement is finished. During the movements taken standing I draw in long, deep breaths and hold till I count ten, then exhale as rapidly as is comfortable.

"These exercises stimulate heart action, producing a vigorous circulation of the blood. Deep breathing purifies the blood and the holding of the breath while lying down and exercising insures that the freshly oxygenated

blood will flow into the brain. I discovered early in my illness that the paralysis which I had was caused from too little blood in the brain, rather than too much as I had been told. Apoplexy, which usually follows a stroke of paralysis or precedes it, I have always heard was due to the forming of a blood clot on the brain or the bursting of a blood vessel in the brain. Hence some of these exercises are designed to produce a flow of blood into the brain by gravity. All such exercises must be used with caution. Paralytics whose trouble arises from an excessive blood pressure and too much blood in the brain can not, of course, follow these reclining exercises. In such a case one should substitute some other exercise, like walking.

"My object is to provide active exercise and use for every muscle, every nerve, and every joint in the body, for I believe—and my beliefs are based on experience in watching myself—that the joints, when not bent frequently, become like rusty hinges and begin to creak or give pain. This rheumatic condition of the joints is caused by deposits of calcareous matter—some say uric acid—due to impure blood, poor circulation and lack of assimilation. I have a tendency toward rheumatism and sometimes I have twinges of sciatica and cramps. But I always get relief by kicking as vigorously as I possibly can. But here is where the hot water also comes in. Using a plentiful amount of hot water helps to wash the poisons out of the blood.

"Everyone knows that it is important to keep the bowels open, and I have given special attention to this necessity. I sometimes use a simple vegetable cathartic composed mainly of aloes. However, I endeavor to aid

Nature by diet and kneading the cecal valve. The latter is accomplished by massage of the abdomen, beginning on the right side about three inches above the groin and pressing inward and upward with both hands following the ascending colon, then the transverse colon, then down the left side until you reach the same relative place on the left side where you started on the right. I find this usually effective."

THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART THREE

PHYSICAL FITNESS

SECTION Two

HEALTH GUARANTEES FOLIO

HOW MUCH SLEEP DO YOU NEED?

By CARL EASTON WILLIAMS

DO you sleep too little or too much? Are you slowly, insidiously undermining your health and vitality through a persistent shortage of sleep? Or do you habitually drowse overtime, thus wasting precious hours that might be profitably employed?

How much sleep do you need? And how much do you need sleep? You know in a vague way that sleep is necessary, but how necessary? Let me tell you. If you should wish to go mad—raving, raging mad—then contrive to go without sleep for about five or six days and nights in succession. Or if you have a miserly old uncle with a large bank balance, whom you wish to unbalance mentally, just keep him awake for a few days and nights. Deprive him of sleep for a whole week and he will die in a frenzy of torture, through complete vital exhaustion. I am offering here the suggestion for a diabolical plot, which, however, I am sure you are unlikely to put to use unless perhaps in the writing of fiction.

I know no better way in which to show concretely the value and importance of sleep. Incidentally, the insomniac who tells you without a wink that he has not slept a minute for days or weeks is an unmitigated—well, he is an involuntary prevaricator. No sufferer from insomnia goes for many days and nights without sleep. The truth is that he is simply not conscious of his lapses of consciousness.

The author of the once popular song, "Please go away and let me sleep; I would rather sleep than eat," perhaps wrote from feeling or instinct, but his words were none the less well founded. Sleep is a far more immediate necessity than food. Dogs though starved if allowed to sleep will live a long time, but dogs well fed but deprived of sleep will die in four or five days, as was once proven by certain extremely distasteful experiments.

What is sleep? Is it essential to the satisfactory resting of the body? Or is it purely a matter of rest for the mind, involving the brain and nervous system to the extent that these are concerned in what we call consciousness?

We know that we wish to sleep when we feel tired. But there are two forms of fatigue. In the bodily or muscular sense, fatigue may be said to be of chemical origin, being the result of an accumulation of waste products in the tissues which tend to poison them and deprive them of strength. This type of fatigue is purely local and may be relieved by massage, warm baths and other measures which tend to cleanse the cells and tissues of these waste-poisons.

There have been theories of sleep based upon the hypothesis that it was due to the toxic effect of fatigue products or other poisons in the system, thus benumbing the brain and nerves. There would seem to be some basis for this theory, inasmuch as various poisons are characteristically sleep producing. Alcohol, for instance, is a poison that puts the nerve centers "out of business," paralyzing the mental faculties in varying degrees, and perhaps, if enough is used, inducing a stupor

that resembles sleep. But it is not true sleep. Various drugs, the opiates in particular, have a similar effect, but they paralyze the nerve and brain cells rather than induce anything in the nature of true sleep.

We must remember that sleep is not mere rest in the sense of inaction. Sleep is a very active vital process in the nature of repairing and rebuilding used-up nerve and brain cells. And it involves rest for the conscious mind because it is essential to discontinue all destructive activity in these cells in order that this building-up process may be accomplished.

Now, the second form of fatigue is one which can not be relieved by bodily relaxation or influences which relieve the system of accumulated poisons. This form of fatigue consists of more or less exhaustion of the nerve cells making up the nerve and brain structures. This is fatigue of a more serious character.

Sleep, in short, seems to be either largely or entirely a matter of rest for those parts of the brain and nervous system which are concerned in what we call consciousness or "being awake." You must understand that no matter how you try to relax or rest, the mere fact of being awake uses up nervous energy. Indeed, sleep seems to be made necessary not only by prolonged consciousness and purely mental operations, but also by the use of those parts of the body which are under conscious or voluntary control, or in other words, those parts affected by consciousness. Activity of those parts of the body with which consciousness has nothing to do, such as the digestion, the heart beat and the functioning of various glands and organs, does not seem to have anything to do with the need for sleep, except perhaps indirectly as the

energy of the body as a whole is depleted by lack of sleep. In other words, sleep is concerned with the higher brain centers, the prolonged lack of it having been found to produce degeneration of the cells of these parts of the brain.

The fact is that you can rest your body quite satisfactorily without going to sleep, if you recline on a comfortable bed or chair and relax so far as the muscles are concerned. It is for this reason that the manual worker can find true recreation by reading in the evening. He may secure rest for the body even while indulging in some effort or activity of the mind. Indeed, where there is extreme muscular fatigue, this can be relieved more quickly by massage than by sleep.

But how much sleep must one have? There are some writers who claim we sleep too much, giving as evidence that some men of great mental power need but little sleep. So much has been said about Thomas Edison in this connection that we secured from him a personal statement on this point to cover all doubts on the subject. Mr. Edison said:

"For about forty-five years I averaged about four hours sleep in twenty-four hours, and for the last five years about five and one-half hours. I have had assistants who for years did not get much more sleep that I had myself. I have never heard of any harm arising from this.

"I think that four hours of *deep* sleep are as good as seven or eight hours of dreamy sleep. In my opinion, people sleep too much as a rule; in fact, everything that men do and enjoy, such as eating, sleeping, etc., is apt to be overdone fifty per cent."

There is no question that this plan has suited the needs of this wizard of modern science, but that it would be satisfactory to the average man or woman is still doubtful. Mr. Edison was convinced that everybody sleeps too much. But he touched the keynote of the problem when he referred to "deep" sleep as contrasted with a longer period of dreamy sleep.

When we speak of the amount of sleep necessary, do we mean the quantity as measured in time, or do we mean the quality or intensity? Do we mean duration or depth? Considering that sleep is not a mere matter of external inactivity, but a positive, active recuperating process, the question is in part: How fast do we sleep? There is no question that some people sleep much faster than others. Their sleep is more intense, they build up more rapidly. They get more sleep in less time. Under such conditions, one would naturally need to spend fewer hours in bed. It is partly a question as to whether or not you are really asleep. If you are half awake when you are asleep, naturally the brain will not be rested in the same degree.

This, then, would seem to answer, at least in part, the question as to why some persons need less sleep than others. Their sleep is deeper. The restorative processes are carried on more perfectly, more rapidly, more vigorously. On the other hand, it is probable that some persons require less sleep than others for the reason that they are less fatigued at the end of the day, even when doing the same amount of work. A stronger organism is less affected by fatigue poisons, on the one hand, because of more active and perfect elimination, but especially it is not so easily exhausted because of the vig-

orous and healthy condition of the nervous tissues. The same work, or even more work, may be done with less effort and less fatigue by the stronger man perhaps because of having a more healthy brain or a more perfectly adjusted mental mechanism.

It is probable that both of these considerations apply in the case of such a remarkable man as Mr. Edison. He is a human wonder in a great variety of ways, and we can not assume that everyone could follow him in his sleeping habits, any more than in his achievements in the field of science and invention. In this connection, we may state it as a general principle that those who are strong can get along with much less sleep than those who are weak. This is illustrated by the seeming impunity with which many young people keep late hours. The same men and women, however, reaching the age of forty or fifty, are no longer able to lose sleep without feeling it seriously the following day. If you are suffering from lowered vitality, therefore, you certainly can not afford to emulate Mr. Edison in this respect. The more sleep you can get, the better.

Commenting on this subject, the editor of the *New York Medical Journal* said:

"In a recent number of *The New York Times,* there was published a pathetic open letter written by one who tried to play Edison's game of much work and little sleep and who has lost his health in the process. Doubtless from an early time the foolishly ambitious have tried to get along with less sleep than nature requires, and the curious public (curious subjectively and objectively) is always more interested in the freakish doings of the few than in the sensible conduct of the

average human being. They are little impressed with the miracle of everyday life.

"Mr. Edison, being a scientist, must needs be a good example of correct sleeping habits. But, alas! when it comes to caring for his body a scientist is often more of a fool than his less learned fellow mortal. We do not know how much sleep Mr. Edison requires or takes, but we are informed that he is far from being in the most enviable state of health. We do know that most great men have needed more sleep and have taken more than has been credited to them. In one of our standard works on therapeutics the writer states that Napoleon took but four hours of sleep.

"Had the writer been as careful in his research in this matter as in others he would have found that Napoleon, who was blessed, if ever man was, 'with the constitution of an ox,' took between six and eight hours of sleep, and though he could go for long intervals without rest, always made up for such loss, on one occasion sleeping for thirty-six hours at a stretch.

"Benjamin Franklin, who was as thrifty of his time as he dared to be, and who was very robust, limited himself to six hours of repose, but not less, and if the history of the robust great were looked into carefully it would be found that they had about as much sleep as the average man, and certainly few of them were foolish enough to try to get along with less than they craved. If one desires a commentary on the woes of sleeplessness he has but to read the autobiography of Herbert Spencer.

"It is a greater gift to be able to sleep 'at will' and under any circumstances than to do with little sleep. More time is wasted in getting to sleep than in sleeping.

On the other hand, there is little doubt that too long sleep, too protracted bodily relaxation, is not best for the human organism, and many of our relaxed young people, with no regular employment and more time than they know how to consume to advantage, would be better for spending less time in bed. A prescription for early rising would do them good.

"The physician needs as much sleep as the next person, and when he is robbed of it ought to make it a point to have his nap to make up for it. Only so can he expect to be abundantly awake at his work and to keep going for the allotted span of years of labor."

There are naturally varying degrees of depth of sleep. But how can we measure them? This can be done in a general way by ascertaining the susceptibility to sense impressions. Sleep consists in a lapse of consciousness, or rest of the higher brain centers. Dreamy sleep is not true sleep in the strictest sense, inasmuch as dreams constitute a degree of semi-conscious mental activity. The person who dreams is not deeply asleep. In other cases, certain brain centers may be active while others are at rest, and yet the individual may be unconscious. Mathematicians have sometimes found on waking that a difficult problem of the preceding evening has been practically worked out during sleep, and the solution is easily found. However, one's sensibility to sound and touch are definite indications of the depth of sleep. Sensibility to sight is naturally lost first, as we gradually enter the realm of slumber. As we reach deeper degrees of sleep, we also lose sensibility to sound, although we may still be sensitive to touch. The fact is that we are most awake in our sense of touch, which is

the most primitive of our senses. In other words, the greatest depth of sleep is measured by insensibility to touch. One can often be awakened by shaking, when sounds will no longer arouse him, showing that one is more sensitive to touch impressions. When it is difficult to awaken one by shaking him, he is indeed "fast" asleep. If one can be awakened by calling, he is less "dead to the world."

It has been found that the greatest depth of sleep is reached during the first couple of hours. From that time on, sleep gradually becomes lighter in degree until morning. It is possible because of an instinctive appreciation of this fact that burglaries are most frequently committed fairly early in the night. At four or five o'clock in the morning the occupants of a house are more easily awakened.

It is during the later hours when these lighter degrees of sleep are reached, that we commonly experience what we call dreams. You may possibly be mistaken, therefore, in your occasional notion that you have spent a restless night because you have been dreaming. You may have enjoyed a satisfactory depth of sleep earlier in the night.

But if there are degrees of depth of sleep, there are also various heights of wakefulness or consciousness. One may be far more alert and mentally alive at one time than at another. Without doubt, some persons are habitually more awake than others, which of course means practically that they have more energy and are more mentally active. And it is probable that the degree of wakefulness and mental activity bears some relation to the capacity for depth of sleep. In the first

place, the higher levels of consciousness and of intellectual effort would induce a degree of fatigue demanding profound sleep. In the second place, the individual enjoying such health as to be capable of intense mental concentration would naturally have his brain cells in such a healthy condition that they would be capable of "resting" as vigorously or thoroughly as they work.

It is not our purpose to discuss insomnia in detail in this article, since it will be dealt with in the article following. But in the case of a fairly healthy person, it is probable that good, hard mental work, bringing about brain fatigue, would have a good effect in promoting sound sleep. By this we mean healthy brain work and not emotional strain. We must distinguish between thinking and emotional excitement. What many insomniacs need is more work and less worry.

But on the other hand probably most cases of insomnia indicate a degree of neurasthenia or exhaustion of nerve force. In such cases mental rest and avoidance of any special brain fatigue are probably required, until the brain and nerve cells can regain their normal strength. Healthy brain cells apparently have what may be called a rhythmic habit of alternating activity and rest. Some theorists explain sleep as a mere cell habit of this kind. At any rate, the ability to cease functioning in the direction of mental work and to enter into that other form of equally important vital activity in the direction of repair and recuperation which we call rest—the ability to do this would appear to be a manifestation of healthy strength. In a condition of weakness and exhaustion, however, these brain cells lose the ability to restore themselves or recuperate in this way,

just as they lose their capacity for purely mental effort. And so the nervous man complains that he can neither work nor sleep, that he is half awake when he is asleep, and half asleep when he is awake. Under such conditions, to attempt increased mental work on the theory of promoting the fatigue that induces sleep would only make matters worse. What one needs is relaxation, even during the waking hours. It is for this reason that a vacation in the country, a boat cruise, or a change of scene in which the mind has the opportunity of resting from the strain of its usual work is found valuable as a means of restoring nervous vigor and mental strength. Aside from all physiological considerations, there is a psychic factor that largely determines the amount of time spent in bed. That factor is mental interest. A keen interest in any project, idea or form of activity will keep one awake. Highly intellectual men and women find a great variety of sources of interest. They are susceptible to mental stimuli in a thousand different directions. These naturally lead to great activity of mind, tending toward late hours and a comparatively limited amount of sleep. It is an interesting fact that savages commonly sleep a great deal. Peasants sleep far more than the cultured classes in the city. Their lives are uneventful and devoid of stimulating influences. It is quite probable that savages sleep more than we, not because they require more sleep but simply because their lives are dull and they have little or nothing to keep them awake.

Mental interest is the most stimulating thing in the world. The late evenings of civilization are the result of our variety of interests, even if only in forms of men-

tal recreation. One is able to keep awake on that account. The novelist burning with enthusiasm will work all night. On the other hand, a source of profound interest will also enable one to wake up early in the morning and plunge into activity. It is true that individual temperament has much to do with this. The nervous and mental type of man becomes more quickly interested in a variety of subjects than one of the phlegmatic type. But taking the average case, any unusual source of interest or a variety of interests will tend to keep one awake and the mind active a disproportionate part of the time.

It is on this account that civilization tends to undermine the nervous stability of the race. Nothing is more important than sleep. And yet thousands of us habitually secure too little. If one is compelled to use an alarm clock in order to get up in the morning, he is drawing upon his reserves of nerve force.

There are degrees of fatigue. Ordinarily the desire to sleep asserts itself long before the nerve cells are entirely exhausted. Complete exhaustion of nerve force would mean death. When we use up a certain part of the available nervous energy, the impulse to sleep is felt so that this energy may be restored, although there is still a reserve. It is when we draw upon this reserve energy that we are courting trouble. The sufferer from neurasthenia lacks a sufficiency of this reserve nerve force.

It is wise therefore to secure sleep before one has reached an excessive degree of fatigue. In a case of moderate fatigue, recuperation is easy and quick. If, however, one remains awake too long the increasing

fatigue or exhaustion is out of all proportion to the amount of work accomplished, and recuperation is naturally slow and difficult. It is for this reason that late hours are highly detrimental. The advantage of the so-called "beauty sleep"—that taken before midnight—has been explained on the theory that it prevents this over-exhaustion of the nerve cells.

The "siesta" or after-dinner nap practiced in many Southern countries has a physiological basis as sound as that of the regular sleep at night, because it tends to prevent this excessive fatigue before the end of the day. As a matter of practical experience, any number of persons have found that a "cat-nap" of even one to five minutes in the afternoon has an extraordinarily refreshing effect. It takes the edge off one's fatigue, and seems to revive the nervous forces in a truly remarkable manner. The vigorous individual who is overflowing with energy will naturally scorn the idea. But the person of lowered vitality and limited energy who has hard and exacting work to do will find a short nap of even a few minutes during the afternoon, if obtainable, a remarkable help. Overworked women should cultivate it.

To what extent may relaxation in other forms take the place of sleep? So far as the body is concerned, any form of physical rest will answer to a very large extent. A reclining position is best, because it rests the heart. Also, as we have seen, massage and warm baths are restful because they tend to eliminate fatigue poisons from the body.

How can one insure the depth of sleep to which we have referred? Outdoor sleeping is the most conducive to this result. But a comfortable, fairly hard bed, fresh

air and warmth are always important factors. Heavy coverings are detrimental. Cotton quilts are heavy but not warm, and in winter it is best to use not only woolen blankets but woolen comforters, thus securing "warmth without weight." Warm feet are indispensable, even if one must take a stove to bed with him in the form of a hot water-bag or heated flatiron. Another important help is a fairly empty stomach. A hearty midnight lunch seems to interfere with the restful quality of one's sleep, though a little fruit or warm milk is easily digested and may be helpful.

The best plan is to sleep until one feels thoroughly refreshed. It is very doubtful if one can really sleep too much. The old theory that children should sleep one-half of the time and that adults should sleep one-third of the time seems to be well founded, although many, especially women, can profitably sleep nine or ten hours. It is a good plan to secure an extra couple of hours sleep once or twice a week. The average man or woman probably loses this much occasionally, and should make it up, perhaps on Sunday.

A great many persons complain that they feel more tired on getting up than on going to bed. While it is true that one should wake up feeling refreshed, still it may be that one feels dull and tired simply because he is not yet fully awake. There is one theory to the effect that this tired feeling in the morning is due to an accumulation of carbonic acid in the system as a result of the slower circulation and more shallow breathing during sleep.

Generally speaking, the ability to sleep well is really a question of normal health. It cannot be disassociated

from one's all-around habits of life. In other words, while sleep is essential to maintaining a healthy body and mind, all other factors that are conducive to health of body and mind are likewise important in enabling one to sleep soundly.

SIMPLE REMEDIES FOR SLEEPLESSNESS

By HEREWARD CARRINGTON, PH. D.

ONE of the greatest problems which confronts the student of sleep is the question of insomnia. So many people suffer from it; and its causes are so varied and so complex, that it is most difficult to say, very often, what its chief cause may be, and what measures would be best to effect its removal. Worry and excitement are well-known causes; constipation is a frequent cause (the irritation of retained ingesta frequently causes wakefulness); hearty suppers may cause insomnia—though I believe they generally have the opposite effect; an inactive skin is certainly a contributory factor; close, stuffy air is frequently to blame; congestion of blood in the head with cold feet, is found in hundreds of cases. The treatment must be largely determined by the cause; and if one plan fails, another must be tried. Insomnia can certainly be cured by a persistent course of body-building, and vanishes before the restoration of vitality; but it frequently supervenes only once every so often; and then there is no time to undertake a long course of training. Immediate, palliative measures must be adopted, in order to occasion sleep that very night. Of the various devices and methods which have been resorted to in the past, the following are, perhaps, as good as any, and will probably be found effective in nearly all cases.

(1) A *prolonged warm bath* is a very good method of reducing nervousness—when this is present—and in-

ducing sleep. The patient should be placed, full length, in a bath of water about blood heat, and hot water should be added, every now and then, to keep the water at a constant temperature of 95 to 98 degrees Fahrenheit. The nerve-ends all over the body are in a state of tension, and need to be thoroughly relaxed by some artificial method, before sleep is possible. This the warm water does. Do not be afraid to keep the patient in this bath—soaking, for half an hour or longer, if necessary. It may be found necessary, on occasion, to keep the patient in the water for several hours before relief is obtained. In order to prevent irritation or chapping of the skin, it should be rubbed all over with vaseline or some similar form of oil, before the patient is placed in the water.

(2) Placing the *feet in hot water,* for a few minutes, will induce sleep in many cases—where the head is slightly congested, and the feet are cold.

(3) *Hot water bottles* will have the same effect, very often.

(4) A glass of *warm milk,* just before retiring, will draw the blood down from the head, to the stomach, and induce sleep, in many instances. I do not think this is a very hygienic method of inducing sleep, but I believe that, in a case like this, we often have to choose the lesser of two evils; and the ill effects of the milk are certainly less than a night's sleeplessness.

(5) *Monotonous stimulation* will often have the effect of sending one to sleep. A metronome set going in the room will have this effect; but the "beats" must be comparatively slow. Or the tick of a watch may be listened to. Counting is usually inefficacious.

(6) The practice of *making the mind a blank*—thinking of a high black wall is very useful in many cases. I have used this method successfully on many occasions, and it is useful in inducing sleep very frequently.

(7) *Muscular relaxation* is very helpful; indeed this method is too little known, apparently; for its advantages are certainly very great. The method of procedure is as follows:

Lie flat on your back, on the bed; assume a restful attitude. Now think of the back of your neck. You will probably find that it is tense and rigid; you are unconsciously holding your head on your shoulders, while the pillow should be supporting it. Relax these muscles; let your head sink back into the pillow; let the bed retain the whole weight of your head. Now pass, in thought, to the right arm; relax this in turn. Then the left arm. Then the right leg; then the left leg. Finally, relax the trunk; sink back on the bed; make the body as "heavy" as possible. By the time you have gone all round your body, in this way, you will probably find that your neck is again tense, and this must be again relaxed. Go round your body three or four times in this fashion; always ending up with your neck and head. You will be surprised at the "relief" you obtain; and I do not doubt that, after a few trials, you will be enabled to woo slumber almost at will by this method.

(8) *Deep breathing* is very helpful as a method of inducing sleep. Fresh air in the room is, of course, essential in this method. Yawning is a sign that the lungs are cramped and filled with carbon dioxide; and the stretch and accompanying yawn are but attempts

on the part of Nature to induce greater activity of the lungs and thorax generally. Deep breathing will relieve this condition, and frequently succeed in inducing sleep.

(9) A quick *sponge bath* in tepid water will soothe the nerves, in many cases, and help to bring about the desired state.

(10) A *salt rub* is a good method—which should be taken just before retiring for the night. Sponge off afterwards in cool water.

(11) *Cold wet cloths to the head* and back of the neck will be found very efficacious.

(12) A few muscular *exercises* in a well ventilated room will often cure the most obstinate cases of insomnia. Bending exercises of all kinds are good; but they must be brisk and vigorous. Lack of muscular exercise is a frequent cause of insomnia.

(13) An *air bath* taken just before retiring is one of the best methods possible of inducing sleep. It is said that Ben Jonson, whenever he could not sleep, jumped out of bed, walked about the room in his night clothes for several minutes until he was thoroughly cool and the perspiration, if any, had evaporated. He then got back to bed again and slept like an infant.

These are some of the methods which will doubtless aid in preventing or alleviating insomnia; and one or other of these will probably be found efficacious in altogether curing this dire malady.

The best position in which to sleep is upon the front of the body, with the upper part of the body turned to one side. Next to this, sleep first on one side and then on the other. Never go to sleep on the back, if

it can be avoided. It is not at all hygienic, and often causes nightmare and other disturbances. Many persons who can not go to sleep, when lying on the back, can do so the instant they turn on their side or face.

Do not have the head too high. The pillow should be fairly low, as a rule, and not too soft. Should the arm be placed under the pillow, the combined height, in this position, should not be more than four to six inches.

Do not have the bed too soft. Feather beds are an abomination. The truly hygienic bed is a hard bed; and one can accustom himself to sleep on a hard bed very easily, with a little practice; and will feel much better in consequence.

A small bolster, placed under the neck, will often be found helpful. The Japanese sleep in this fashion, and it is a most comfortable method, when once you have grown accustomed to it.

Stroking the forehead will often induce sleep. The nerves at this point, and particularly over the temples, are much soothed by stroking. "Hypnotic passes" are made in this fashion. Hypnotists declare that all passes should be made in a downward direction; these being "sleep passes"; and all upward passes are "waking passes."

Suggestion is an important factor. Auto-suggestion is very helpful, at times; and suggestions from an outsider will be found most refreshing, on occasion.

Lettuce and onions are said to be "sleep-producers." The former contains small quantities of opium; and the latter act soothingly upon the nervous system. So there may be some truth in this belief.

OUTDOOR SLEEPING

By HARRY G. HEDDEN

OUTDOOR sleeping is nowadays producing most remarkable results as a modern and natural method of treating many classes of physical disorders. Pure blood means healthy tissues, steady nerves, high vitality; and the possession of pure blood unconditionally requires not only wholesome food, the right kind of activity and rest, and clean, intelligent living in general, but also, and with special insistence, an abundant supply of pure air *all the time.*

The rebuilding of the bodily tissues used up or broken down by various kinds of activity calling upon the different physical resources—the replenishing of the precious energy stored in that marvelous mechanism known as the human body—takes place principally during sleep. The better the air breathed at that time, therefore, the greater will be the rest afforded by the sleep, the purer will be the blood carrying nourishment to every organ and tissue of the body, and consequently the more substantial and thorough will be the process of building up the millions of cells and of renewing the really tremendous power that is required to carry on properly all the normal functions of the body.

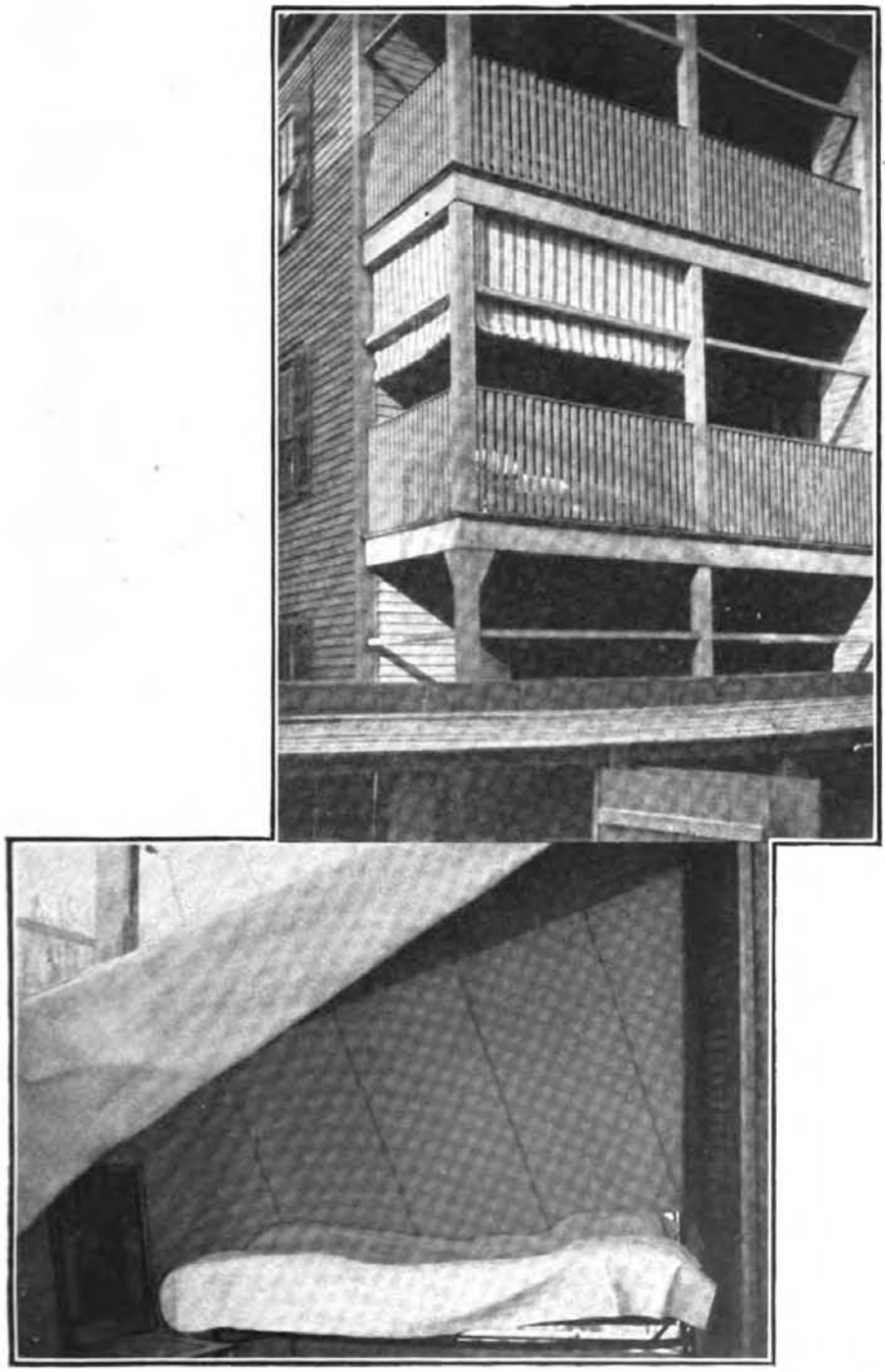
However well ventilated may be any room, it has been convincingly demonstrated by extensive scientific experiments that the air in that room can not have nearly so beneficial an effect upon the human body as fresh, unmodified, unrestricted, *outdoor* air is capable of producing. This vital principle holds true at all

times, during both waking and sleeping hours. Just as pure air lessens the extent of fatigue produced by work or activity of any kind, in like manner does pure air increase the beneficial results of rest and sleep. Foul air always poisons the system, always levies a terrifically heavy tax upon vitality, always causes work to demand more energy and rest to produce less energy.

The success of outdoor sleeping has also clearly shown that the popular fear of "night air" is an absurd fallacy, entirely without sound foundation.

Now let us consider the question of how to secure the best results from sleeping out-of-doors. Like every other good thing, of course, outdoor sleeping must be used intelligently—just as any sleeping must be done under proper conditions. The more natural and correct the conditions, the greater will be the benefits gained.

In the very first place, let it be said that sleeping out-of-doors ought not be allowed to involve any dangerous or even useless exposure of any kind. Enthusiasm should not be permitted to upset sound judgment and to run away with common sense. Different seasons of the year, different weather conditions, and different kinds of climate, all demand special preparations and precautions. Furthermore, it is important that every person give careful consideration to his own physical conditions and his own individual needs. People are not all alike, by a very long way, and every individual has different requirements at different times. What would not be the slightest exposure for a person in good health, for instance, might have a very grievous or even fatal effect upon that same person in ill health—just as an athlete "in the pink of condition" is able, at the



Two excellent arrangements for out-door sleeping. Above, a sleeping porch with curtains that can be raised or lowered for the sake of privacy in the early daylight hours. Below, a canvas enclosure placed outside of one's window, so arranged that the canvas flap may be raised on one or both sides according to the needs of privacy or weather conditions. Entered from the house through the window.

These arrangements for out-door sleeping may be adapted to the requirements of almost any home. A tent may be erected either in one's back yard or on an upper porch, protection from mosquitoes and flies being provided by netting during the hot weather.

Below, a simple arrangement for securing privacy in an improvised upstairs sleeping porch. Canvas curtains are arranged above to be lowered or raised as necessary.

expense of no more than slight fatigue, to go through feats of strength or endurance which might actually shatter his health if performed by him when a long way from being in even fair training condition.

The following directions for outdoor sleeping in *winter* are given by an institution maintained exclusively for the outdoor treatment of tuberculosis:

I.—Arranging the Bed

1. Sew a layer of building paper on the springs and over it a strong piece of unbleached muslin or canvas. This not only prevents the cold from coming up underneath, but also keeps the paper in place.

2. Place an unbleached muslin cover over the mattress and a pad on the top of it; then cover with a white cotton sheet, tucking it in at the head and sides.

3. Cover three-fourths of the bed, lengthwise, with a heavy woolen blanket, with part of it extending over one side; put another one, in like manner, on the other side of the bed. Place pillow at the head.

4. Place a double flannelette sheet, five and one-half or six yards in length, over the bed, with the closed end at the foot. Turn in the sides of this sheet (allowing enough room to sleep between), letting the under part of the sheet extend over and around the pillow at the head of the bed.

5. Fold over the flaps of the two blankets and tuck them in at the sides of the bed.

6. Place one or two double blankets over all, tucking in well at the sides and foot of the bed. Fold back the upper part of the flannelette sheet over the blankets.

7. Place a khaki or canvas cover over the bed.

To get into this bed it is necessary to slide in at the top. The lower part of the blanket sheet can be drawn over the head and shoulders, while the upper part can be tucked under the chin, so that only the mouth and nose, (or the entire face) is exposed.

To Dress for Outdoor Sleeping During Winter

1. Put on a suit of underwear that fits comfortably; this may be either wool or fleece-lined. Over this you may wear an additional larger suit of woolen underwear, if necessary.

2. Wear a heavy pair of wool socks; over these, lamb's wool bed shoes or lumberman's socks. The bed shoes are made of lamb skin with the wool on the inside, and are laced like shoes.

3. A heavy flannelette nightgown or suit of pajamas comes next. Pajamas are better, as they fit more comfortably. This is especially true when the patient must slide into bed feet first.

4. If the blanket sheet of this "Klondike Bed" is not sufficient protection for the head, a flannelette cap that fits over the forehead and under the chin is worn; one with a shoulder cape is desirable.

5. The bed may be warmed with a soap-stone or hot-water can (one that holds a gallon of water will retain its heat all night, even in the coldest weather). A heavy eiderdown robe must be worn to and from the dressing-room.

Now, it should be borne carefully in mind that these instructions are not only for outdoor sleeping in *winter,* but also for following in a section of the country where

the winters are very severe and the cold highly penetrating on account of the low altitude and the general dampness of the climate. Still further, the above directions are intended principally for persons afflicted with tuberculosis and therefore suffering from low vitality and possessing far less than normal power to resist exposure and maintain the natural warmth of the body.

The leading devices in the form of shelters for outdoor sleeping are sleeping porches, sleeping shacks, regular tents, window-tents, and "lean-to's."

The most important points to observe in the construction and equipment of any of these devices are (1), provision for adequate and intelligent protection against storms; (2), affording the least obstruction possible to the natural circulation of the outdoor air while providing sufficient shelter from inclement weather, and (3), making provision to admit the greatest possible amount of sunshine into the sleeping quarters during the day. Air which is never given a chance to receive the purifying effects of sunlight is always unhealthful, not only at night but also all the time. Likewise, the general conditions in a room or any inclosure never reached by the rays of the life-sustaining sun are inimical to health. Especially should bed clothing be given an abundance of "sunning."

Some sleeping porches are equipped with windows which may be closed to prevent the beating in of a hard storm; and others have awnings or pieces of canvas arranged for raising and lowering conveniently. Many sleeping shacks are similarly equipped, but these are usually larger, and consequently the shacks can generally be left more open than the porches. Some of the

best shacks are so constructed that an entire wall on end or side can be thrown open in favorable weather. Different styles of tents are used, and these are arranged to furnish various degrees of openness. A large number of sanatoria consist chiefly of "tent colonies." One kind of window-tent is practically just an awning to shelter the head of the bed, which is allowed to extend outside the window. Another style might be described as a canvas funnel, arranged to keep out storm, but to admit the outdoor air directly to the face of a person sleeping entirely inside the room, but with his head right next to the open window. This device furnishes the fresh air without greatly cooling the sleeping room in general. Using such an arrangement as either of the last two might not accurately be termed outdoor sleeping, of course; but it is a noteworthy approach where better equipment cannot be had.

Where a person does not have sufficient room or money to provide a sleeping porch or shack or tent, it is often possible to build against the side of a house or a high fence a "lean-to," which will afford ample shelter and give excellent service. The shelter may be made of either lumber or canvas.

Outdoor sleeping is now being extensively used in the treatment of the following disorders, in addition to the many forms of tuberculosis. Neurasthenia and nervous disorders of various kinds; intestinal disorders and other diseases of the stomach and digestive system in general anemia, and also other ailments due to improper assimilation or lack of nutrition from any cause; diseases of the ear and nose; practically all cases of insufficient vitality, except in some such malady as typhoid

fever, in which the excessive bathing makes the outdoor treatment less favorable.

Pneumonia, until within recent years imagined to be a disease of such a nature that its cure demanded the patient's being kept in a room not only warm but even close and but little ventilated, is now being combated successfully by outdoor treatment. In hospitals, pneumonia patients are often placed out upon porches or even upon roofs. Indeed a logical method of treatment, since pneumonia is caused primarily by lack of pure air.

Outdoor sleeping is also prescribed frequently to expedite a patient's recovery from different kinds of surgical operations taxing the strength heavily. It is also used, under carefully restricted conditions following pregnancy and childbirth, the vitality of the mother usually being considerably below par at such a time.

Then, still further, sleeping out-of-doors, which has been found such an excellent method of curing various forms of disease and of restoring lessened vitality, is being extensively advocated and practiced as a practical means of *preventing* ill health.

PURE AIR INDOORS

By BERNARR MACFADDEN

THERE is perhaps no other essential of health that is so persistently neglected, and knowingly neglected, as fresh air. Everyone knows that outdoor air is clean and life-giving. Everyone knows that pure air in the rooms one lives or works in can be obtained only by bringing it in from out-of-doors. And yet in spite of this knowledge people everywhere are prone to shut up their windows and doors tightly and breathe in the stuffy air of rooms almost hermetically sealed.

If you were forcibly thrown into the "Black Hole of Calcutta," or if an enemy military force were to throw you into the bottom of a coal mine and keep you there, you would complain bitterly about the air you had to breathe. But, at least if you are like most people, you will go into an ordinary room, shut all doors and windows tightly, and remain there for hours.

Until almost the beginning of the twentieth century it was practically the universal custom for people even to sleep with windows tightly shut—a custom from which unfortunately large numbers of people have not yet broken away.

In the registration area of the United States there are 202,000 deaths a year from affections of the throat and lungs. A large proportion of these deaths may be attributed to bad air. And here follows the proof that bad air is the true cause of these deaths:

The evil of bad air is a winter evil, both because people stay indoors more and because indoor air in winter is much worse than it is in summer. After four months living with closed windows and breathing superheated, devitalized air, the culminative effect on outraged throat and lungs reaches a climax and deaths from bad air diseases are most frequent. Of the deaths occurring from these diseases (tuberculosis of the lungs, pneumonia, bronchitis, broncho-pneumonia, influenza, whooping cough, diphtheria and croup) twelve per cent of the total for the year usually occur in the month of March. In the month of September occur only a trifle over five per cent of the yearly harvest. Thus the death-rate from lung and throat affections toward the end of the winter period is two and a half times as great as it is toward the end of the summer period.

As further evidence that bad air is the actual cause of these deaths, we find that, compared with the total death-rate, the death-rate from these diseases for the year is larger in the cities than in the country, but the *death-rate in the country is larger in the month of March.* This is what one would expect who knows the air conditions in the winter farm house.

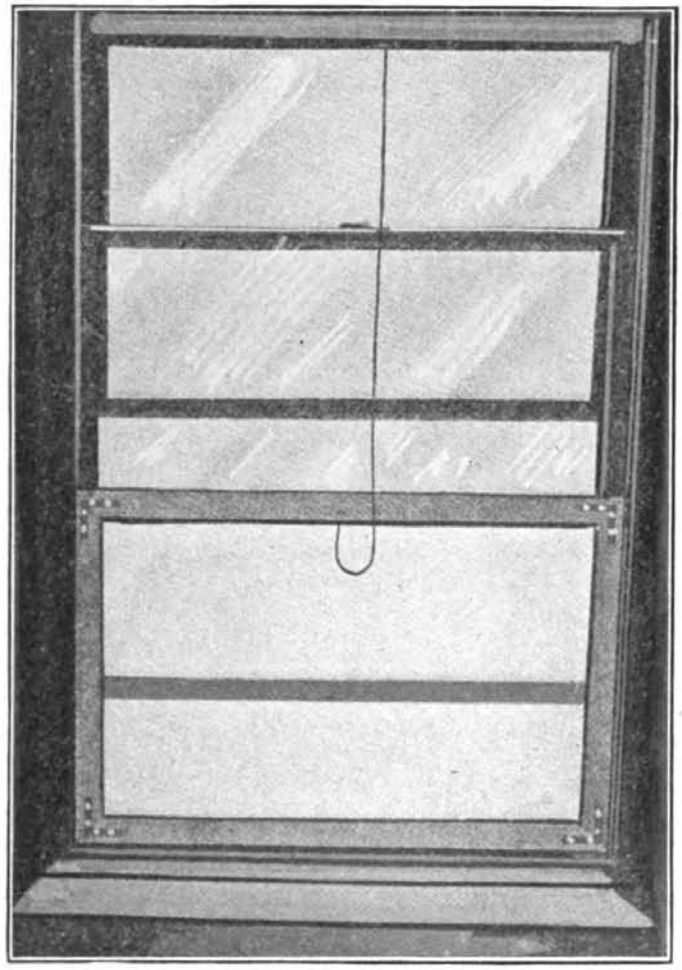
Our whole system of winter living is one unparalleled in the scheme of Nature. The wild children of Nature are fitted to weather colder climes than that of our winter in the temperate zone. And Nature's method of protecting them against the cold is a heavy coating of fur or feathery insulation to keep in the body heat. The Eskimo who has invaded the Arctic has adopted the plan of the wild creature and covered his body with furs. Colds, consumption and the kindred diseases of

the white man are practically unknown among the natives of the Arctic regions.

But all this does not mean that there is any virtue in cold air in itself, but rather that the evil is in the artificially conditioned air of our "civilized" winter living rooms—and in our habit of running in and out without proper change of clothing between such man-made bake-ovens and the outdoor winter.

Considering the question of how to ventilate our rooms, one may say briefly that the best way to enjoy fresh indoor air is to open the windows wide and bring the outdoor air inside. And yet it is not quite as simple as that, for the reason that human nature will never consent to freezing to death in severe winter weather for the sake of having pure air to breathe. The question of warmth as a factor in vitality is equally as important as securing a good quality of air. Indoor life at best is an artificial form of existence. But it might also be claimed that life through the winter seasons of the temperate zone is more or less unnatural to animals of the human variety who have not been covered by nature with a heavy coat of fur. Indoor living conditions in winter therefore require a compromise between or a harmonizing of the necessities for both warmth and pure air.

Recent theories on the subject of ventilation appear to discount some of the old-time teachings upon the subject. For instance, it was held that a decrease of oxygen below a certain point or an increase of carbon dioxide in the air above a certain percentage was inimical to health or even life. Experiments on the part of ventilation engineers and students tend to show that these



The most useful device for winter ventilation is the cloth-covered window sash. In this illustration the cloth sash is made to screw firmly in place just in front of the regular sash. The cloth is backed by a heavy wire screen which keeps it rigid and makes the open window proof against sneak thieves. An adjustable side catch locks the window at any height desired, and it is possible to adjust the window to govern the temperature of the room. Those who wish to sleep in very cold rooms will prefer to open the windows wide. But by means of the cloth screen many who would shun the rigorous winter air may secure practically as fresh an air as they would through the open window, for the gases of the air transfuse readily through the curtain while it checks loss of heat. The cloth screen is especially advantageous in city windows where exposed to the street dust.

limits were by no means well founded. On the other hand, it is declared that the chief difficulty with enclosed air is its lack of circulation, as a result of which men and women easily become over-heated. Bodily comfort, it is said, depends not so much upon the air breathed as upon the regulation of the heat of the body. When confined or so-called "dead air" is circulated, as by an electric fan, the surface of the body is kept properly cooled so that one does not become over-heated, and thereby feels energetic and vigorous.

But while there is a great basis of truth for this statement, nevertheless it does not follow that indoor air as such is just as good as outdoor air. There are unquestionably certain qualities in the air of the open that may possibly be beyond the capacity of the chemist to discover or analyze which make it more healthful. There is no question that air which smells sweet, and which one can enjoy breathing, is better than any stuffy indoor air, no matter how well circulated. Perhaps the presence of trees, grass and plant life generally has much to do with the life-giving quality of the atmosphere. We know that people who live outdoors are far more vigorous, healthy and energetic than indoor workers. Possibly the difference is due somewhat to the effect of sunlight, but even apart from this, it is probable that fresh air itself contains mysterious properties that are essential to life and health.

We know that consumptives who would die in an indoor atmosphere recover by living strictly out of doors, with the help of a suitable diet. If outdoor air will do this for a consumptive, it should be similarly invigorating and valuable for others as well. It has been found

that open-air schools are conducive to far better work on the part of the pupils. Outdoor schools have been operated in a great many cities, usually for the benefit of sickly children. It is found that the children rapidly improve in health and also do far better work in connection with their studies. Their minds are more alert and they can grasp their school work more easily. But if fresh air schools are good for sickly children, would they not be beneficial also to supposedly healthy children?

Of course if one cannot live out-of-doors he or she should at least see to it that a part of each day is spent in the open. If it is only two, three, or four hours a day, it will help tremendously in charging the blood with oxygen and giving one the vitality that somehow can not be developed through continuous confinement indoors. A person who works through the day should practice walking morning and evening, possibly also at noon, and as much time as possible on Saturday afternoons and Sundays.

But how is ventilation best accomplished? Perhaps one of the best ideas so far developed was that evolved in an endeavor to provide comfortable outdoor schools in one of the cities of northern New York State. Direct exposure to the northern winds was found to be too severe in mid-winter. And so a plan was devised by which an ordinary school room could be used, the open window spaces being covered by cloth screens. A fairly durable form of muslin was used to cover the windows so that fresh air could be admitted slowly through these cloth screens. In this way no direct draft was in evidence.

Of course it does not matter in securing a supply of air whether a given number of cubic feet of fresh air is admitted through a small opening of the window at high speed, thus producing what we call a draft, or whether the same volume of air per minute is admitted slowly through a large opening. The cloth screen, covering the entire window, serves to allow the fresh air to enter slowly and without producing a draft. Also it screens out the dirt and dust. The cloth screen gives very little more air passage on a windy day than on a still day. It permits the transfusion of noxious gases and odors even more rapidly than it does the progress of the air, and it makes it possible if desired, to heat the incoming air more conveniently, especially if a radiator is placed directly under the window.

A cloth curtain sash for ventilation purposes may be made like a mosquito netting screen to go under the sash of the ordinary window. The fabric may be as porous or as close as desired. Ordinary heavy woven muslin will answer, or loosely woven white flannel may be used. Cloth screens of this type are now on the market, and may be purchased at many stores.

Of course it must be remembered that in any method of heating and ventilating it is essential to supply a certain amount of moisture to the air. Air that has a proper humidity at a certain temperature becomes relatively drier when heated. Therefore ordinary winter air should have considerable moisture added to it when it is made warm for indoor use. This, however, is a matter which will receive special attention in another place.

The hot air furnace was intended to solve the combined problem of both heating and ventilating, the

theory being that good air could be supplied in one's living rooms by heating air brought in from outside by a large duct and then distributing this air in its heated condition throughout the rooms of the building by a system of ducts, one or more for each room. The theory is very good on paper, but unfortunately the air introduced is not only hot, but dry. Most devices for humidifying air are not sufficient for all requirements. Then again one may possibly experience more or less of a mixture of coal gas, though of course this should not apply to a perfectly constructed furnace of this type.

Naturally, hot water heat and steam heat merely warm the air already present in the room, and do not even attempt to provide a fresh supply, as does the hot air system. Special attention is therefore needed for both ventilation and humidifying. The old-fashioned fireplaces and stoves insure ventilation because of the strong draft of air up the chimney, thus bringing into the room a forced draft through every crack and keyhole.

The most vicious tendency in the matter of heating at present is found in the use of gas stoves and oil stoves. While the burning of gas or oil may not give off smoke, nevertheless it gives off gas in equal quantities. While the smoke of a wood or coal stove is carried off through a chimney, the products of combustion in a gas or oil stove are not carried away by a chimney but are turned loose into the atmosphere of the room for one to breathe. In other words, the gas or oil stove consumes your oxygen in tremendous quantities and replaces it with poisonous gases. By the time your room is warmed in this way the air has become so deadly that it is time to open all

the doors and windows and let in a fresh supply, perhaps of an Arctic temperature, and then commence the process of heating and spoiling the air all over again. Gas stoves and oil heaters are being extensively used by thousands of people everywhere because of their convenience. One may depend upon it, however, that a campaign of education in respect to the unhealthful features of such heaters will never be undertaken by the gas companies, oil companies, or makers of such stoves. Many deaths have been caused by the use of gas heaters.

The electric heater, however, is open to no such objection. There are no products of combustion in the electric heaters, no poisonous gases are given off. They simply heat. In all cases where a small stove is desired an electric heater, though a little bit more expensive in money, is far more economical in the matter of health. However, like any other form of radiator, the electric heater will make the air more dry at the same time that it makes it warmer.

In ordinary circumstances, lacking any special provision for ventilation, the best thing one can do is simply to open the windows. If opened at the top there is usually less draft, although even a draft is nothing to be afraid of, and unless one is chilled by it the presence of a draft is undoubtedly better than the breathing of foul air.

A good place for a radiator, as already suggested, is directly under a window. In this case the window can be opened at the bottom so that the incoming fresh air can be immediately heated. A very good plan when convenient, is to use some form of jacket or air box around one's radiator or stove, open at the top. If a

supply of fresh air can then be introduced from the window and carried by means of some form of duct into the jacket or box, then being heated, one has an ideal method of supplying fresh air with warmth. This of course is, on a smaller scale, the scheme of construction employed in the hot air system. The hot air furnace is really a large stove with a surrounding compartment in which air is heated for distribution in the rooms of the building.

For sleeping, however, there is nothing that can take the place of wide open windows, except sleeping directly out-of-doors. The old plan of opening the windows at top and bottom for the sake of more perfect circulation is excellent. One may in this way attain practically the conditions of outdoor air, though in such cases also special provision must be made in the way of warm coverings. There is no advantage in being chilled at night, even for the sake of good air.

HUMIDIFIED AIR, HEALTH AND COAL ECONOMY

By MILO HASTINGS

"FAITH," said Pat when they asked him to help buy coal to heat the preacher's house, "you can't work me on that game. Oi've been to the preacher's house meself. He don't hate it with coal, he hates it with stame."

Pat spoke more wisely than he knew, for by heating our houses with a little steam in the air we can make a very considerable reduction of coal consumption.

The average American family burns about seven tons of coal each season. Schools, offices and factories where coal is used for heating will easily raise this consumption to ten tons per family or two tons per capita. A conservative estimate would place the cost for heating at eight dollars per ton or sixteen dollars per capita—or sixteen hundred million dollars to keep America warm. Deducting for those who burn wood or shiver we can safely estimate the yearly coal bill at a round billion dollars.

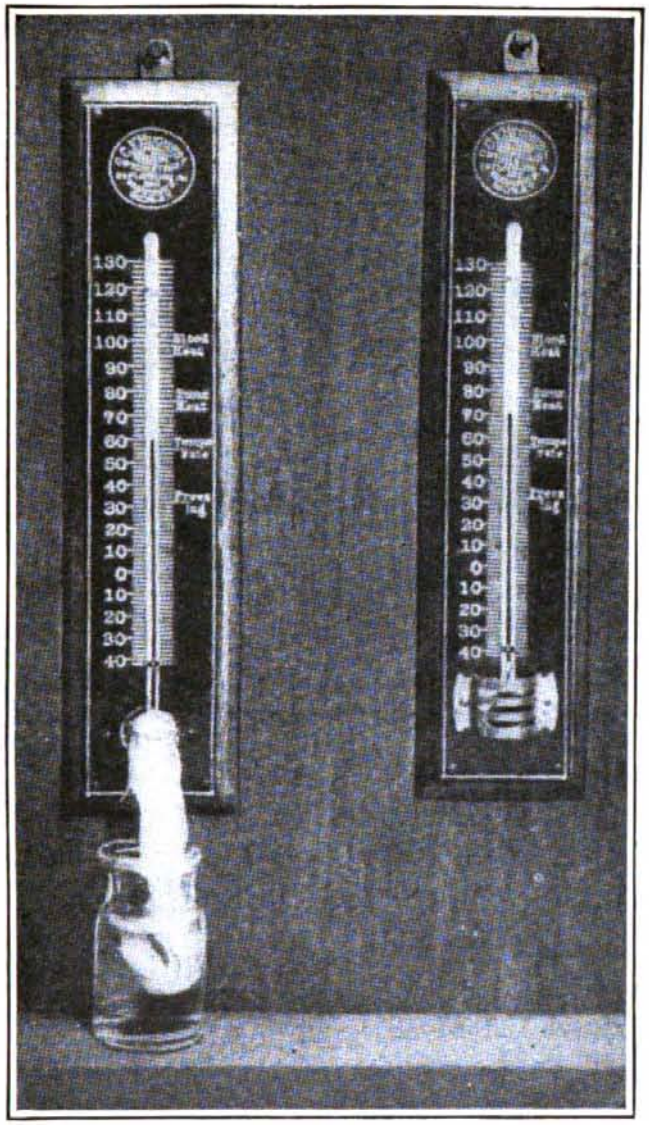
P. T. Barnum tells us that when they bought the stove for the New England church of his boyhood the back pewholders seriously objected on the grounds that the stove drove the cold back in the corners and made it colder than ever. The high school physics students laugh at this line of reasoning on the grounds that cold is merely the absence of heat and has neither material nor spiritual existence. But practically speaking we

burn fuel to keep the cold out of the house and the amount of coal required varies absolutely with the difference in temperatures between the comfy fireside and Howling Winter who rattles at the window pane. But winter howls at zero temperatures only on a few nights in the year. Take it the season through the country over and the average outdoor temperature while we burn coal will probably range about thirty degrees. With our houses heated to seventy degrees we keep out forty degrees of cold with our billion dollars of coal, which means that for every degree of heat in our houses we are required to burn twenty-five million dollars worth of black diamonds.

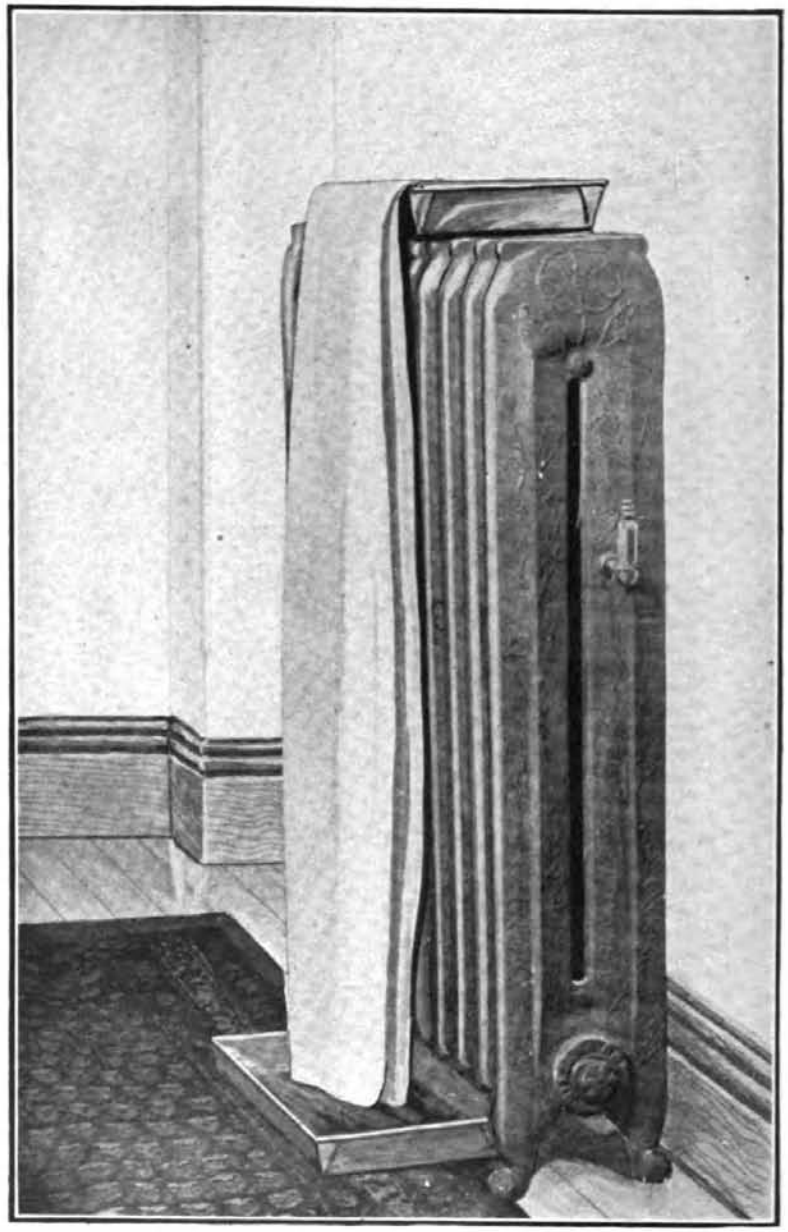
So if we all lived in one big house and the janitor should begin calling down the mercury we would save twenty-five million for each degree of increased shivers. But if the janitor were a canny Irishman and wrapped a wet rag around the bulb of the thermometer, and then heated the house with plenty of loose steam, he would find it possible to reduce the temperature to sixty degrees without increasing the shivers a single shake, and America would be two hundred and fifty millions in pocket and there would be enough coal so that the rich could distribute warm charity to the blanketless without sacrificing plutocratic comfort.

Man is a moist animal. The dry bulb thermometer might record the truth to a horned toad, but to man, who measures his comfort by the temperature of his moist skin, it is a delusion and a snare.

Every human is a sort of a steam boiler consuming fuel in the form of food and producing heat. A large amount of this heat is utilized in evaporating moisture



A home-made wet-and-dry-bulb thermometer. The wet bulb is formed by neatly tying around the bulb of the thermometer a bit of thin muslin, which acts as a wick from the bottle below. Any device that will secure for the bulb a thin covering of cloth kept constantly damp will be satisfactory. The "dry bulb" thermometer is an ordinary thermometer, and is needed to contrast its reading with that of the wet bulb. There is no need for one to trouble himself about "relative humidity" if he remembers that the difference between the two thermometers (in winter) should not be more than ten degrees, and preferably only five to eight degrees.



This is a method of humidifying the air in conjunction with ordinary steam heat. The pan of water does not evaporate fast enough, therefore a more rapid evaporation is secured from a towel or other cloth kept moist by having the ends immersed in water in pans on the radiator and floor, as illustrated.

from the lungs and skin. The rate of evaporation depends upon the humidity of the air. Down on the Florida coast man pants, suffers and suffocates with a summer temperature of eighty degrees. While in the sagebrush country he is perfectly comfortable with the thermometer at one hundred because he is kept cool by increased evaporation. Likewise in the indoor climate of a Northern winter a man is kept warm by reducing evaporation, which is practically achieved by increasing humidity.

The amount of moisture which the air will hold chiefly depends upon its temperature. Outdoor winter air, even when it is foggy overhead and slushy underfoot, becomes very drying the moment the cold air is brought indoors and heated. Dry winter air to give a sense of comfort to one dressed in light clothing must be warmed to about seventy-five degrees. The same air properly humidified will give a similar sense of comfort at sixty-five degrees.

Absolutely humid air is not comfortable at any temperature because it leaves the skin clammy and damp. Such damp skin and damp clothing subjects one to chill the moment he is exposed to a draft of fresh air; hence the atmosphere of the kitchen on washday is as bad on one hand as the other extreme of a dry heater living-room the other six days in the week. The proper condition is to be found in a moderately humid atmosphere in which a thermometer with a moist rag tied around the bulb registers sixty degrees while an ordinary dry bulb thermometer registers sixty-five degrees.

Thermometers only cost fifteen cents apiece and two thermometers fixed as per the accompanying illustration

will give an accurate means of telling when the humidity is right. In the illustration shown ten degrees of difference is recorded. Even this is too great. You should keep the wet bulb registering sixty and increase the humidity, meanwhile cutting down on your coal consumption, until the dry bulb thermometer comes down to sixty-five degrees. Under these conditions you will find a maximum of health and a minimum of coal consumption.

On grandmother's old wood stove there was an urn. She kept it filled with rusty water and explained that it was "healthful," and that it kept folks from getting colds, catarrh, bronchitis, pleurisy, pneumonia and consumption. On this point the doctors seem to disagree as they send sick folks to Arizona and to the seashore with equal promise, and the latest thing in fresh air cures is polar expeditions for consumptives. The evidence against dry air as a disease breeder is not conclusive, but no one has advanced any theories to the effect that the abnormally and artificially kiln dried air of a winter living-room has any advantages whatever in killing microbes. Certainly it is common experience that air so deprived of its natural moisture is irritating to the membranes of the breathing apparatus and less comfortable than the properly washed and humidified atmosphere of the modern scientifically ventilated building.

The amount of water that must be evaporated in a room to properly humidify the air depends largely upon the amount of ventilation. Increased ventilation means that more air is passed through the room to take up moisture and that in turn means that more water must be evaporated. The colder and drier the day outside the

more must this evaporation be increased. There is no fixed rule that can be given. The wet and dry bulb thermometer is the only sure means of determining the proper conditions. In the absence of those the room should be humidified until it is comfortable with an ordinary thermometer at sixty-five degrees.

As to the means of humidifying the air, the following suggestions will prove a practical benefit. The ideal system is the modern forced draft system ventilation in which the air is heated in the basement of the building by steam radiators and washed and humidified by a spray of water. The air is then driven past baffle plates which remove the excess of water and the entrapped dust. This is the ideal system of heating and ventilation and should be installed when new heating systems for large buildings are under consideration.

The above thorough-going plan is not always available however, and we must gain our present fuel economy and healthful atmosphere by more expeditious methods. Those dwelling in houses heated by hot air furnaces can solve the problem by any plan that will introduce water vapor into the air drafts. Pans or pails of water may be placed near the furnace in the warm air chambers. The evaporation will depend upon the surfaces of water exposed and the temperature of water. Where these conditions are not such as to give off sufficient vapor from the surface of the water the evaporating area can be increased by the exposure of damp cloths. If sacking or toweling be dipped in a pail of water the water will tend to rise by capillary attraction and keep the fabric damp. It will not rise rapidly enough against gravity to be very effective. This diffi-

culty can be overcome by using two vessels, one placed considerably higher than the other. If a coarse fabric, as a gunny-sack or Turkish towel, be placed with one end in each vessel the water will flow from the higher to the lower vessel and keep the fabric quite damp. Do not be afraid to provide plenty of water and a large evaporating surface.

In case of apartments heated by steam or hot water radiators the problem may be tackled along the same lines. The evaporating surface must be close to the warm radiator. A shallow pan set on top of the radiator or a deep, narrow pan attached to the side are often used and here again the effect may be greatly increased if some suitable fabric dips into this pan and descends into a similar vessel placed at the base of the radiator.

One should not get the notion that there is any humidifying virtue in steam or hot water heat merely because the heating medium is itself moist. Most steam radiators have small valves with a sort of steam whistle attachment the purpose of which is to permit air to escape from the radiators when steam is turned on. If this valve be left open until the steam escapes it proves a very effective means of humidifying the atmosphere. In practice the trouble with this plan is that it is both noisy and objectionable as it spills water. To remedy this defect devices are now on the market that permit of the use of the radiator steam for humidifying. The plan is very effective as these humidifiers work on the principle of a Maxim silencer and permit the escape of steam without noise and without the spilling of water.

Those whose rooms are heated with stoves can solve the humidity problem by the simple and most effective

method of keeping a good sized vessel of water on the stove so located that the temperature will be near the boiling point.

The owners of pianos and cigars are often wise enough to see that these valuables are preserved by proper conditions of humidity, though they let the more precious human fiber dry and bake in an artificial desert atmosphere, and recklessly waste precious fuel fighting out the winter cold when water can be drafted for one-fourth of this service without money and without price.

SUNSHINE, CLIMATE AND HEALTH

By CARL EASTON WILLIAMS

THE first thing to know about how to take a sun bath is a little about the general effect of light upon the body, so that one may the better realize just how much sunshine he can stand and benefit from. For the most important practical questions connected with the sun-bath have to do with the time of day at which it is taken and how long it should last. It is nearly always the case that any force that has a very great power for good has also an equal power for working harm if it is misdirected. This is as true of sunshine as it is of heat, electricity and many other things.

People are always finding fault with the climate. They don't know when they are well off! Weather is the most talked of subject under the sun, but usually it's too hot or too cold, too wet or too dry, too monotonous or too changeable, and a large number of people make themselves perpetually uncomfortable with the thought that they would be better off in some other place. Sometimes that is true. In other cases it is not. Let us see.

On the whole, there is no doubt that climate has some influence on the physique and health of a people, though so far as strength and physique are concerned it would appear that it is possible to develop a vigorous physique in almost any climate, provided the people living in that climate are adapted in coloring to the degree and amount of sunshine to which they are exposed. In

other words, it is possible for the negro to possess a wonderful and powerful physique in a suitable climate, just as it is possible for a Norwegian to be big and strong in the highlands of Norway. But this does not mean that the Norwegian could expect to be at his best in a lifelong residence on the Congo, or that the negro would thrive for many generations in a climate like that of Alaska.

It is found that as a general thing mountaineers and highlanders are taller, heavier and more powerful than people living along seacoasts or sea-level countries, but the real reason for this is probably to be found in such differences of occupation as naturally go with the two different types of environment. The requirements of mountain life are such as to develop a robust physique.

The bigger and heavier type of man is better able to endure the cold, while the little man can more easily endure an excess of heat. The more general rule is that the farther north one goes from the Equator the taller are the people. This is noted in the comparison of the physiques of the Indians in America, for the Sioux and other Indians of the plains are considerably taller than those in Mexico. At the other extremity of the Americas, likewise, the Patagonians are an exceptionally tall people, in fact were regarded by early discoverers as a race of giants. In Europe the increasing stature of the people as one travels north from the Mediterranean is especially noted. One finds the various branches of the Mediterranean race comparatively short, generally under five and a half feet, while the Central Europeans are a large and powerful race. In Norway and Sweden, again, are some of the biggest men

in the world, while the Scots in the north of Great Britain are likewise among the tallest people on the earth. The powerful Roman army was drawn so far as possible from the north of Italy, but even at that they could not have been very big compared to some of the crack regiments of England and Scotland today, and when Julius Caesar led his men against some of the barbarians in the north they were astonished at what they regarded as the gigantic size of their adversaries. According to some records the minimum height requirement for the Roman army at one time was five feet, three inches, which we would not regard as very impressive for a group of world conquerors.

It is true that there are some apparent exceptions to the rule that the men of the tropics are smaller than those of cold climates. Jack Johnson, of pugilistic fame, is an example of the powerful physique evolved by some of the African tribes. But while there are a few tall races in the tropical or subtropical regions, they are generally tall and slender, never big and "beefy," like many of the Celtic and Teutonic types. The slender body, even with weak muscles, is easier to keep cool, while the heavy or fairly fat body is suited for a cold climate and cannot possibly stand the heat. This has been notably the experience of white men in the tropics. The late Lord Roberts, famous for his campaigns in India, was a little, wiry type of man, and was far better able to stand the strain of the climate down there than other English officers of a heavy and "beefy" physique. The same has been found true in our campaigns in the Philippines, for little men stand the strain much better. In the Spanish-American war the volunteers in the

South who were found best able to stand campaigning, even resisting disease in the swamps, were a small, slender, wiry type that one would almost call frail.

The reason for this is that the small, slender man can more easily keep cool. One great difficulty of tropical life is the continuous over-heating of the body. In our own climate, even in summer, we manage to get along fairly well through the evaporation of the perspiration, and its cooling effect. But in many parts of the tropics there is already so much moisture in the air that this evaporation does not take place. The perspiration gathers on the skin and pours off, but without evaporating. Any one can stand dry heat, but the moist heat, with the air sometimes at the saturation point, is almost intolerable, and the more fleshy the man the more oppressive and destructive to health it becomes.

Skin color, again, has much to do with the ability to endure the tropical heat, and it is partly for that reason that the black races can live where conditions are insufferable to white men. A black surface radiates heat more quickly than a white surface. Hot water in a black kettle will cool more quickly than in a bright, shining vessel. And so the dark man is able to radiate heat while the light man retains it. In the same way the dark man is at a disadvantage in the cold regions of the earth, for it is more difficult for him to keep warm. It is true that a black or dark body will absorb heat more quickly and therefore would be at a disadvantage in the sunshine. But the tropical races generally keep to the shade pretty well, or, when exposed to the sun's rays, like the Bedouins, they wear white or other light

colors. Most tropical animals are dark colored, and to a large extent are nocturnal in habit, thus avoiding the sun. Others have a dark, pigmented skin with a tawny or other light colored fur. The animals of the far north, on the other hand, are generally lighter in color.

History tells that no race has ever moved very far north or south and survived. And so ends the beautiful dream of the "back to Nature" theorist and of others, who would like to move white people into the tropics. We can transplant ourselves to different climates only gradually, and by the waste of the millions of those who are eliminated so that the few variations in the race that happen to suit the new climate may survive and create a new race. In other words, only a part of us would be transplanted, and the rest of us would disappear, as a result of the experiment.

The Egyptian fellah has survived in Egypt unchanged since long before the time of the Pyramids, because he fits, while millions of negroes and lighter skinned peoples both in antiquity and in more recent times have gone into Egypt and in a few generations have disappeared completely.

There is even a question as to whether any European blonds will survive in the United States for more than one or two hundred years, without a fresh supply from Northern Europe.

To begin with, sunlight causes an increase of metabolism (cell activity), as indicated by the markedly increased exhalation of carbonic acid under its influence. There is a good reason why one instinctively chooses to sleep in the dark. Living in dark houses, the Eskimos and Eastern Russians are able to sleep for long periods

in the long dark winters and yet lose very little weight, which clearly indicates slow metabolism. In the light their metabolism would be more active. Light increases the oxygen carrying power of the blood, as well as the excretion of carbonic acid. And, generally speaking, the effect of light upon the body is probably due to a large extent to its influence in causing dilatation of the blood vessels, which naturally affects the circulation.

Some authorities have attributed the beneficial effects of sunlight, first, to its effect upon the circulation; second, to its seeming influence in stimulating the making of new blood cells by the blood-making organs; and, third, the result of these new blood cells and the increased circulation in promoting increased cell growth throughout the bodily tissues generally. It is well known that high altitudes have a decided effect in causing an increase of the red blood cells. It is barely possible that the stronger light due to the lesser obstruction of the rarefied atmosphere contributes to this result. At any rate, it is considered by some that sunlight increases the absorption of iron from one's food, which means an increase of haemoglobin (red blood cells). From all of which one may conclude that sun-baths would be especially valuable to those suffering from anemia. As a matter of fact, it is the pale face that usually characterizes the indoor man or woman, and the healthy color of the red-blooded individual that generally marks the outdoor worker. And, generally speaking, since light stimulates metabolism, sunbaths should be especially potent in the case of those of sluggish metabolism.

It has often been observed, also, that sunshine is a mental stimulant. As a means of cheering one up, it is

proverbial. It is without doubt the greater amount of sunlight in the United States that accounts for the energy and activity of the typical American. Coming from the darker lands of Northern Europe and the British Isles, he finds himself stimulated by the mere fact that he is in America, often, indeed, so stimulated and active that he rushes along into neurasthenia. It is the same in tropical climates, though to an infinitely greater degree. The rule is that when one first goes to a tropical country he thinks the climate is fine, and he finds himself very active mentally, and perhaps stronger physically. He is simply stimulated by the light. But he is overstimulated, and he soon finds himself in the state of exhaustion that always follows active stimulation. At least, this is true if he does not protect himself against the light. First he experiences the results of increased metabolism, followed by derangement, and more or less destruction, of the protoplasm of the body, especially the nerve-protoplasm.

And herein lies the warning for those of fair skin in connection with sun-baths. To be reckless in this matter is like fooling with the buzz-saw. We all know about the extreme cases of sunburn, and about sunstroke, but many ignore the gradual effect of day after day of a moderate excess of sunshine. Even the dark races have to be careful in exposing themselves to the noonday sun in the tropics. And this is especially true of head covering. In India even a few minutes' bareheaded exposure to the tropic rays has been known to be fatal. But what the tropical sun will do to any white man, the bright sunshine of the United States, in summer, will do in a less degree to the blond who is un-

fortunate enough to get too much of it. The lesson of history is that those suited by skin coloring to one latitude should not take up permanent residence very far south of that.

The destructive rays of the sun are the short, actinic rays. It is these that cause sunburn. Pigmented skin tends to exclude these short rays, or, to be more explicit, these rays of short wave-length, including the violet, indigo, blue and ultra-violet rays, the last being invisible to the eye of man. The longer, less actinic rays at the other end of the spectrum, green, yellow, orange, red and infra-red are more or less harmless and penetrate deeply through the skin. The short rays are absorbed by pigment in the skin, and so do not penetrate, and in very dark skins the ultra-violet rays are considered to be almost wholly absorbed, or perhaps obstructed would be a better word. Tanning of the skin in the case of white men is caused by the short rays, and is Nature's method of protecting us against them. Not only do dark skins tend to absorb these rays, but red and yellow colorings of the skin have the result of toning them down into longer rays so that they will be harmless. It is a very notable fact that the amount of skin pigmentation possessed by various races depends upon the amount of light to which they are exposed in their native lands, each being furnished with just enough coloring to answer the requirements of protection against the short rays in that particular latitude. And it is there, where Nature has placed them, that they are better off. Major Charles E. Woodruff estimated that the black races are best off within thirty degrees of the Equator, the brown races between thirty and thirty-five degrees, the

olive types (Semitic or Mediterranean), between 35 and 45 degrees and blonds between 50 and 60 degrees. The Eskimos are exceptions because the glare of the ice and snow is such as to require considerable pigmentation to protect them against it.

The North American Indian in the United States has just the right complexion for this latitude. It will be seen, therefore, why the dark Italian laborers are so much more effective than Irish laborers for work on pavement gangs or in other places in our summer sun. The Irish can not stand the light. They are all right in Ireland, but Ireland lies from 158 to 438 miles north of Dakota, and has so much rain that the natives are not much exposed even to the slanting rays of the sun in that locality. The United States lies much farther south than northern Europe. Florida is on a level with Cairo, Egypt. Madrid, Naples and Constantinople, are north of Philadelphia. Washington City is on a level with French Africa. New York City is on a level with Naples, Boston and Chicago with Rome. Pigmentation of eyes and hair are simply variations of the protective coloring found in the skin. Those with brown eyes can endure much more strong light without weakening the eyes than those with blue eyes. Blue eyes are beautifully adapted to the mild sunshine and the many cloudy days of Scotland. In the same way, hair coloring is protective in purpose. As a matter of fact, the curly and even kinky character of the black hair of some dark-skinned races serves particularly well as a protection from the strong light of the sun in the tropics.

Now, it will be seen from all this that the brunette types, among ourselves, might be expected to endure

far more sunshine than our blonds. And this is precisely the case. And coming back to the question of sun-baths, the blond can not afford to take chances. I have known five minutes of the noon-day sun, in July, in the latitude of New York City, in the case of a brown-haired, but fair-skinned person, to cause violent headache and complete prostration for a couple of days. It is the more or less vertical rays that one should beware of, and in June and July, in the United States, the sun's rays in the middle of the day are almost tropical. It is the slanting rays that one should look for in the sun-bath, for not only are they less powerful, on account of the slant, but by passing much farther through the atmosphere the short rays are more or less absorbed by the atmosphere before they reach us.

The lesson to be drawn from this is that sun-baths in the summer-time should be taken at a fairly early hour in the morning or fairly late in the afternoon, though in the winter-time, because of the natural slant of the rays, one could take a sun-bath at noon. The fairer the skin, the further from noon should be the sun-bath in summer, for the blond. And the fairer the skin, the shorter should be the period of exposure. The brunette, well tanned, may develop a resistance which will enable him to lie for hours in the sunshine, but the blue-eyed, fair-skinned man should not attempt it. Some of our brunettes could probably take a sun-bath at noon, in our latitude, even in midsummer, but the blond should try to take it before nine or ten in the morning, or after three in the afternoon. And when five minutes are enough one should not continue the bath for two hours. The ants that expose their eggs to the

sunlight for its life-giving effect know better than to leave them exposed all day, for that would destroy them.

In short, be a little careful and make haste slowly. If in the open all day, you may really need protection from the sunshine. Opaque garments will give this, but when dark colored they are too hot. White garments reflect the sun, but transmit the light. The Arab wears white under his blazing sun since his own skin is dark enough to protect him. A white man, riding with him over the tropical desert, should have some opaque garment under the white to keep out the light. A combination of black underwear and white outer garments would be much like the covering of some tropical animals with black skin and light colored hair. A hat, to be a perfect protection against the vertical rays of the sun, should be white on top and lined with black or some opaque color, though the black haired man has less to fear than the blond or bald-headed. Yellow or tan is a good color, especially if the garment is fairly opaque.

But don't let all this scare you. It is simply to caution you. You need a certain amount of light just the same. And if it is true that the races nearer the Equator are purposely colored to protect them, it is also true that those the farthest away are purposely deprived of any more pigmentation than necessary, so that in the softer light their skins will let some of it through.

The open-air sun-bath is naturally to be preferred, but for the city dweller it may be necessary, after all, to get his sun-bath indoors, through some convenient window. This is also about the only thing that one can

do through the winter, and so it deserves special consideration. Any window that admits the sunshine squarely at the right time of day will do, and the only difficulty will be found in the possibility of people looking in. The simplest arrangement to prevent this is to have the window shade placed at the bottom, to pull upward, instead of at the top, to pull down, as is usual. It is easy to arrange this by placing a very small pulley at the top of the window frame for the cord to run over. By thus covering the lower part of the window, you can secure the unobstructed rays of the sun through the upper part. Another possibility is the placing of an ordinary window awning upside-down at the bottom of the window, and using a pulley at the top for the little rope with which to open it. This, especially when the sun is fairly high, will enable you to get a larger expanse of sunshine and a larger field of concealment.

Another and perhaps an even better plan in some cases, if you wish a large expanse of sunshine, is to use a coarse net curtain that will let the sunshine in but which it is difficult to see through, for those on the outside. Every one has noted the fact that the person indoors, looking out into the brighter light, can see very well through lace and net curtains, while the man outside, looking inward, is confronted with a screen of light which makes it difficult or impossible to see beyond it. The small net mosquito netting, when a clean white, makes an excellent screen of this type, and might help out in summer, but the curtains would serve all the year round. They will naturally obstruct a little of the light, but not enough to prevent you from getting a satisfactory sun-bath.

This also suggests another possibility in the way of a sun-bath, which will enable you to take a walk at the same time. The idea is to dress in something that is little more than a veil and that will let the light through, leaving you clothed as to looks, but practically unclothed as far as the obstruction of the light is concerned. The tan-colored silk suits are better for this purpose than those of heavier materials, even if not so durable.

CLOTHING AND HEALTH

By CARL EASTON WILLIAMS.

Winter Requirements

A BEAR doesn't need any clothing, even in winter. We do! Next to food, it is our most important necessity. In summer we could perhaps get along nicely without dress of any kind. But when the natural climate that lingers eternally at the northern top of the earth commences to move down and spread itself around us—well, the back-to-Nature state loses its attractions in these parts and we prefer some good warm covering over our cutaneous surface.

Still, clothing should if possible help and not hinder the functions of the skin. One of these functions is the regulation of the warmth of the body. Perspiration is another. Perspiration is, in fact, partly a device for regulating the body temperature. So clothing should be considered not merely for its warmth-retaining properties, but also its capacity for absorbing moisture and conducting it from the skin. And it happens that both these purposes are best accomplished by any fabric that is so loosely woven as to hold considerable air in its meshes. In other words, air-tight clothing, or anything approaching it, would be undesirable, and both underwear and external garments should be of a more or less porous character and permeable to air. In this way, perspiration will not only be absorbed by the clothing, but it will at the same time evaporate through it, keeping it fairly dry and therefore comfortable in respect to

warmth. Dry air is a poor conductor of heat, so that a garment of loose texture, holding considerable dry air, is warm. Damp air and wet clothing are naturally good conductors of heat, and one becomes chilled quickly under such circumstances. It is highly important that perspiration should be provided for by clothing that will "ventilate" the skin, so to speak.

The office worker and the woman at home in winter usually live in a summer temperature and climate by reason of artificial heat. Indoors, therefore, summer clothing or its approximate equivalent should be worn. The idea of putting on heavy flannels in October and wearing them until the fifteenth of April, just because of the winter season, and irrespective of summer conditions in the house, is simply absurd. When the pioneers in America spent their days mostly outdoors, heavy woolen underwear was strictly rational. It is still so in the case of the policeman on his post, the driver, the motorman, the pilot and others continuously exposed to the weather. But for indoor people the only sensible and comfortable plan is to wear summer underwear and clothing of light weight, with the provision of exceedingly warm external wraps for going out. There is good reason for the growing tendency in our cities to wear summer underwear the year round.

Present-day styles in clothing, with the prevalent use of linen collars, thin shirts, silk socks or stockings, shirtwaists for the ladies, and conventional apparel generally, are not badly suited to indoor conditions in winter. But these fashions are very far from satisfactory in the open air for the reason that the mere slipping on of an overcoat or cloak, while protecting the trunk

of the body, does not affect certain other vital parts that are susceptible to the cold. The overcoat may be sufficient for riding in a street-car or train, or a short walk, but to be outdoors for any length of time in bitterly cold weather you will need more complete protection. On the other hand, for a long walk in ordinary winter weather you would perhaps not want even the overcoat.

Men in the Arctic regions give special attention to the protection of three parts, the back of the neck, the wrists and the ankles. We may learn a good lesson from them. The linen collar is irrational for the winter open air, but even when it is worn a good muffler or scarf will usually take care of the neck. The coat collar should also be turned up in the back when it is really cold. A sweater of the right kind will of course take care of the back of the neck. Get one with a neck to it. The kind that pulls on over the head is the warmer, even if less convenient. Have it big enough, with cuffs turned back, but long enough so that they will come well over the hand when extended for warmth in severe weather.

The Mackinaw coat is splendid for walking and general open air activity, but it should be of the best quality. It may be recommended for all occasions on which one does not enjoy being burdened or hampered by a long, heavy overcoat. The combination of sweater and Mackinaw coat is a pretty good arrangement for boys or men who want to play or work in the severest weather with plenty of freedom for bodily movements. When not extremely cold, or when the exercise is pretty vigorous, the Mackinaw coat alone would be either sufficient or too much.

For wet weather, oil-skins and rubber coverings may be necessary under certain conditions. But for the ordinary man rubber raincoats and mackintoshes are no longer desirable, since there are a number of modern methods of water-proofing ordinary fabrics so as to make them shed rain without interfering with their permeability or ventilated character. For universal outdoor service a coat of some such water-proofed material can be commended.

Always, to keep the feet and hands warm in very cold weather, look after the ankles and wrists. The blood vessels are near the surface in these parts. A good, warm wrist covering is as important as a glove on the hand itself. The ordinary coat sleeve simply serves as a door to admit the cold air to the wrist and forearm, the susceptible point. When driving, the air simply blows up, to chill the blood vessels here. When not wearing a sweater to provide for the wrists, it is a good plan to wear heavy, warm, woolen cuffs like our grandmothers used to knit.

If the extremities were properly covered one could probably maintain warmth and comfort by using much less clothing in general than is often thought necessary. Those having much trouble with catarrh, and those with a susceptibility to colds, would do well to note these points: Keep these ends warm. Wear fingered gloves for style, if you like, but not for warmth. Use mittens, in which you can keep the fingers together, to keep each other warm. Naturally, this applies, like many other suggestions I am making, only where there is real exposure to severe cold. On mild winter days one does not even need to "wrap up."

Warm feet are a good test of circulation and bodily welfare. Look out for them. Protecting the ankles with gaiters, leggings or puttees can be recommended for this reason. Spats will help but do not go high enough up. Spiral woolen puttees are comfortable and satisfactory.

Tight shoes are a common cause of cold feet. Free circulation is necessary to their warmth, and this is impossible with tight footgear. Many women err seriously in this respect. For the greatest warmth it is well to have the shoes large enough to permit of two pairs of socks or stockings, one of cotton and outside of that a heavy pair of woolen.

Clothing can be "water-proofed" without affecting its permeability, but leather can not. And of course patent-leather and all air-tight shoes are cold. It is usually worth while to put on rubber overshoes for a short time only for the sake of having dry feet the rest of the day, but don't wear them continually. The rubber heels now much worn are commendable, since they do not affect the shoes as a whole. Wear a "common sense" shoe that gives more than room for the toes but fits around the instep, and that allows your foot inside the shoe to step on level surface much the same as when bare-footed.

A word about the color of your clothing. It is true that black is warm in the sunshine. But it is also cool in the shade, because it radiates as well as absorbs heat more rapidly than light colored material. Black is suited for evening dress in summer when it is very hot, but not in winter. Gray, tan and other light colored fabrics are therefore desirable for ordinary purposes in

winter as well as in summer. They permit the light to penetrate, while black shuts it out. It is desirable to have light reach the skin as well as air. On the whole, there is no sensible reason for the prevalent use of black and dark colored clothing by men. Gray and neutral colors show dust and dirt less than black, and are more serviceable generally.

And now for our most intimate clothing—that to which we are closest. According to the old wisdom, flannels and woolens were the thing for winter. But our underwear should really be determined by conditions, the same as other clothing. Many winter days call for summer underwear even outdoors.

What we have said about the permeability of clothing in general applies especially to underwear. It should "ventilate," promoting and not hindering the functions of the skin. The character of the weave is more important than the material, for in all cases it should be of a porous or open-mesh character. There is no question that woolen garments are the warmer, which of course settles the question in a case of extreme exposure. But an open-mesh cotton is also fairly warm, when it has sufficient body.

If you wear wool get the loosely woven material. Flannel is more compact and less satisfactory; also when shrinking it tends to take on the consistency of felt. Merino underwear is very warm and satisfactory, being a mixture of wool and other materials. There are various mixtures of this kind to be had in underwear, though usually the cheaper garments are less satisfactory. The better materials will not only be more comfortable but they will last enough longer to make them probably more

economical in the end. Silk mixtures are very pleasant if one is able and willing to spend the money for it. Silk rapidly absorbs perspiration, and has warmth in proportion to its weight. The Chinese have a way of wearing silk for this purpose, with a net underneath to prevent the silk from sticking to the skin. For cold weather one should wear long-sleeve shirts to protect the wrists and forearm.

One great objection to wool is its tendency to shrink. But this is almost entirely a matter of improper washing. Don't try to wash it like other clothing. And don't wring it and twist it. Wash it only with white soap, first making a good suds with fairly warm water, and then rinse a couple of times thoroughly in water of the same temperature. Press the water out instead of twisting. Light pressure in using a clothes-wringer would do. In this way you will have no trouble with wool shrinking. Naturally the wool mixture goods wash much better.

Underwear should never be worn day and night. It should be well aired at night. It should be changed every couple of days at least, and daily if one perspires much.

One can be very uncomfortable in wearing underwear of the wrong size, and in buying it is a good plan to get them about two sizes larger than the man wants to sell you after measuring your chest, in order to have freedom in chest and armpits. This will also provide against shrinkage.

Union suits are ideal for women when they fit, since they relieve the much burdened waist of the extra thickness. For men much depends upon fit for comfort.

Summer Requirements

Without a doubt the ideal form of dress for summer, at least from the standpoint of hygienic requirements, would be one's "birthday clothes." There is no question but that we would be more vigorous and enjoy far better health if it were feasible to adopt the plan of wearing no garments whatever except when it is necessary to protect the body from cold. While clothing is necessary for purposes of comfort a considerable part of the year, it is undeniable that it does interfere to some extent with the natural functions of the skin. As we have seen, the more porous the character of one's clothing, and the better the "ventilation" of the skin, the less does clothing interfere with these functions. Nevertheless, the ideal condition is one in which no clothing is worn when the weather is such as to make this possible.

It is for this reason that men and women should dress as lightly as possible during the summer months. The use of clothing of porous texture is a point to consider in the buying of underwear. It might even be suggested that the best plan in summer is to use no underwear at all, but the requirements of cleanliness will seldom permit this unless the outer clothing can be changed and sent to the laundry as frequently as should be the case with underwear. The ideal plan in summer is to make a daily change of underwear and hose, and especially so if one perspires very freely.

For the most part, the dress of women in summer has been far more hygienic and satisfactory than that of men. The heavy, dark cloth used in the making of men's suits is entirely unsuited to summer requirements.

Light, thin, washable or lingerie dresses are far more sensible and satisfactory. The masculine tendency in recent years toward the wearing of linen, silk and other suits of tan or other light colors, is greatly to be commended. These suits are washable, porous and ideal from all standpoints for summer wear.

The matter of color is of more importance than most persons realize. It should be known that black or dark colored fabrics absorb the heat, whereas white and light colored materials reflect it. Place a white piece of cloth and a black piece of cloth in the sunshine for ten minutes and note the difference in temperature. If you wear a black or a dark suit in the sunshine you will find yourself very much hotter than when wearing a tan, light gray, or other light colored garment, even though of the same weight and texture. This of course might be advantageous in winter, but it is highly undesirable in the torrid heat of summer. Furthermore, light colored cloth permits the light to penetrate, and since light on the skin is desirable one can secure something of a light-bath or even a sun-bath by wearing light colored clothing. While it is true that it is possible for those of a blond type to secure an excess of sunshine, still this is not likely in most cases. In any event, the wearing of light colored clothing enables one to enjoy the double advantage of the benefit of light upon the skin and freedom from the excessive heat incident to the wearing of black or dark colored garments. Further reference to the subject of light in connection with the body will be found elsewhere in the discussion of sunshine in relation to health.

The question of bed covering is allied to that of

clothing. On exceptionally hot nights the same observations that we have made in reference to clothing in hot weather will apply equally as well. The best covering on a warm, stuffy night is none at all. It may even be desirable to use no night garments. The danger of taking cold by sleeping nude is negligible. The benefit of the air bath will be very great. You will perhaps find that you can sleep far more perfectly and restfully than under any other conditions.

As in the case of clothing, the general rule applies the year round that the less bed covering one uses consistent with warmth, the better. The skin of the body should, if possible, be "ventilated" even when in bed. Light coverings, and especially porous coverings, are very desirable. If a single blanket is sufficient, then one certainly should not use more. Indeed blankets, because of the porous and open character of their texture, are usually preferable to tightly matted quilts. If a quilt is used, a wool-filled quilt is preferable.

The question of woolen versus cotton blankets applies especially in winter when warmth is essential, but when it is equally desirable to avoid heavy weight in bed coverings. Cotton blankets become very matted and they have relatively much less warmth than woolen or down comforters. Perhaps one or two woolen blankets and one woolen quilt, or perhaps two or three woolen blankets may be enough to supply all the covering one requires. Cotton covers, however, usually burden the sleeper with an excessive weight without providing for warmth. Woolen coverings give warmth without weight, and while naturally more expensive, are far more desirable from the "health economy" standpoint.

THE CARE OF THE SKIN

By BERNARR MACFADDEN

WE are prone to think of the skin merely as the covering of the body, overlooking the fact that apart from this it has definite and important functions of its own. Among these functions the sense of touch and the service of the pores as a channel of elimination are the most important. Also, directly and indirectly, the skin plays the all important part in the matter of regulating the temperature of the body. This capacity for self-regulation in respect to temperature is one of the most remarkable of the powers of the body.

The stability and tone of the entire nervous system is very largely affected by the condition of the skin and the influences brought to bear upon it. The skin is intimately connected with the central nervous system through the million or more tiny nerve endings, or "end-organs" of the nerves resident in the skin and through which the sense of touch is enjoyed. When the body is exposed to cold the skin contracts as a result of reflex nerve impulses, and the blood vessels near the surface of the body are contracted so as to limit the supply of blood and heat at the surface. In this way the radiation of heat from the body is diminished. One is then able to endure a cool or fairly cold atmosphere with comparatively little loss of heat and discomfort. On the other hand, warmth of air or water brings about a relaxation of the skin with an expansion of the blood vessels so that the surface of the body becomes warmer

and the heat of the body is more freely radiated. In the case of excessive warmth free perspiration occurs and through the evaporation of this the body becomes cold. All of these facts, when understood, may be applied to everyday life. For instance, in keeping cool in summer, exercise to induce an increase of perspiration may be used to secure the ultimate result of making the body more cool and comfortable.

Apart from its nervous mechanism, the skin has an important place in the work of purifying the blood through the elimination of waste and poisons in the system. It has been found that if the pores of the skin are completely choked and obstructed, death will follow in a very few hours, as was the case when a little boy at a festival in Europe was covered with gold-leaf for participation in a parade. They thought they would have a very pretty golden boy for the parade, but the unfortunate victim paid a terrible price in order to teach the world the importance of a free and unhampered skin.

When the skin does not do its share in the work of elimination an extra burden is thrown on the kidneys. On the other hand, in the case of kidney trouble the skin may be influenced to assist and partly take the place of the work of the kidneys. A man who suffers from Bright's disease is often kept alive by hot baths, thus stimulating elimination through the skin. In the same way women who during pregnancy experience temporary over-taxing of the kidneys, often dangerous and sometimes fatal, may find relief for this condition in the practice of frequent hot baths.

The varied uses of hot and cold water in bathing are considered in the discussion of the subject of hydro-

therapy. Likewise cold water bathing is given special treatment. But we may say briefly here that cold water baths are chiefly valuable for their tonic effect, their influence upon the circulation and nervous system, whereas warm baths and hot baths are cleansing. For the sake of a clean skin and that activity of the pores which can best be secured by keeping the skin clean, the practice of taking at least a couple of warm baths a week is desirable. Those with a tendency to profuse perspiration would do well to bathe with warm water even more frequently. It may be added that a hot bath is not only skin cleansing but blood purifying as well. It means internal as well as external cleanliness for the reason that it causes the rapid elimination of wastes and poisons through the skin.

A most valuable measure for stimulating skin activity, and indeed for promoting health generally, is a dry friction rub, or what one may call a dry friction bath. This is so effective that it will almost take the place of a bath in warm water as a skin cleansing and skin stimulating treatment. It increases the circulation, accelerates the action of the pores, and has a tonic effect upon the nerves at the same time. It may be applied either with the bare palms of the hands, by rubbing the skin briskly with a rough Turkish towel, or by the use of the soft, light friction brushes sometimes sold in drug stores as "flesh brushes." The friction bath has the advantage that it supplies a certain amount of exercise at the same time, if self-applied. One should rub briskly and thoroughly every part of the body, covering a period of five or ten minutes. You will find that this will give your skin a ruddy glow and give you in gen-

eral a feeling of exhilaration. The friction bath may be used on getting up in the morning and before retiring at night, and especially it may be used following one's exercises before the cold bath or combination warm and cold bath that may be recommended following one's daily exercise.

If one is much troubled with catarrhal affections, or subject to frequent colds, he will find that the daily friction bath, especially if combined with air baths of considerable length, will have a splendid influence in remedying, or at least in lessening, the catarrhal tendency. Often an immediate and gratifying result is found in the improvement of the skin itself. Skins that are sallow, rough and pimply become smooth and velvety in texture. This friction treatment can effectively be applied to the face, using the palms of the hands.

Along with the friction bath, an air bath may be recommended as of great value in promoting activity of the skin, with more rapid elimination, and in toning up the system. There is a certain comfort to be derived from exposure of the skin to the air that is attainable in no other way. It is of course the natural state of existence, and is a grateful relief from the interference with the functions of the skin incident to the use of clothing.

One may say that in the air bath the skin is actually given an opportunity to breathe. Perhaps the skin does not take in oxygen, but it does absorb moisture in a measure, and certainly "exhales" so far as the wastes thrown out through the pores are concerned. Freedom for this skin activity is most important in cases of ill health, such as tuberculosis, kidney disease and other

conditions in which the system is charged with poisons.

As nearly as possible an approach to an air bath should be maintained at all times by the wearing of clothing as porous and light as possible, but in addition to this one should endeavor to spend a certain part of each day absolutely nude. Perhaps you will find a convenient time for this the hour immediately after arising and before dressing in the morning, or the hour before retiring at night. Possibly circumstances will permit of an air bath at other times of the day. Of course due provision is required for bodily warmth. You cannot take a prolonged air bath in a cold room without exercise. If the exercise is enough to keep you warm, the combination is ideal. If writing at your desk, or otherwise engaged with little or no muscular activity, it is well to have the room comfortably warm in order that you may enjoy the air bath without becoming chilled. These comments apply chiefly to the winter season. There will be little or no difficulty of this kind in summer. It should be remembered that the capacity of the body to adapt itself to varying temperatures is very remarkable. You will develop this capacity rapidly if you make a practice of daily air baths. This will, furthermore, help to harden you and make you immune to colds even if exposed to the inclemencies of the weather.

Sun baths are likewise of almost inestimable value by way of natural stimulation and their vitality building influence. Sunshine has a proven influence in the formation of red blood corpuscles, and it may be convenient to combine your air bath with a sun bath. The latter, however, is a matter of such importance that it is the subject of special discussion in another section.

COLD BATHS—HOW, WHEN AND WHY

By CARL EASTON WILLIAMS

"TAKE a cold bath the first thing every morning. It will make you feel like a new man." So says Cousin Henry, who is twenty-one, weighs one hundred and eighty pounds, and plays football. But if we ask Uncle George, who has worked very hard at bookkeeping for twenty-four years and weighs one hundred and sixteen pounds, he says, "B-r-r-r-r!" Of course he knows that a cold bath is a fine thing, because everybody says so, but yet—"B-r-r-r-r!"

A cold bath is one of those ordinary everyday affairs concerning which nearly everybody knows very little. It is a simple matter, and yet its use requires discrimination. Whether or not it is beneficial depends much upon the individual and the conditions under which it is taken. One must know how. And it is sometimes very doubtful whether the first thing in the morning is always the best time for it.

The value of water as a curative agent (hydrotherapy) is being recognized more and more by the medical profession, but it is of equal value, for the average man or woman, as a means of keeping well and vigorous. Cold bathing improves the circulation, tones up the nervous system and invigorates the entire physical organism. Employed with discretion it may be used to strengthen the heart.

It not only quickens the circulation and heart action, but it also quickens the respiration, ventilating the lungs, with the result of better oxygenation of the blood and

more perfect elimination of carbonic acid gas, which, according to some authorities, may at times accumulate to a certain extent.

And cold bathing just makes one feel good generally, which is the best evidence that it is beneficial. It tends to harden the bather and make him less susceptible to changes of temperature. The human body has a natural power of adjusting itself to variations of heat and cold, and regular bathing develops this power, making one more or less immune against catching cold. But like many other effective measures, this may also be effective in the other direction and the possibilities for harm in some cases are even greater than the possibilities for good. It must be done right. The man who is strong may do almost anything with impunity, but he who is only trying to become strong should be careful.

In the case of one with poor circulation and low vitality, injudicious cold bathing may be very weakening. When the victim of promiscuous but well meant advice upon the subject goes with grim courage into his morning cold tub or shower and dreads the shock of contact with the cold water, then he should know that he is placing an undue tax upon his vitality. Taking a cold bath under such circumstances may be an excellent way of cultivating character and moral stamina, but it is not right that one's health should be impaired in the attempt.

Briefly, if you enjoy the morning cold dip, or, in other words, if your instincts approve of it, then it will undoubtedly do you good. But if one is not robust, what then? Should frail and delicate people avoid cold bathing entirely? Assuredly not, but they must know

how to go about it. There are certain simple conditions which should be fulfilled, not merely in order that the bath should be beneficial, but that it should not weaken one of limited vitality.

Perfect reaction or recuperation is the first essential, and this really depends upon several conditions. Nearly everyone knows in a general way the intended physiological effect. The first contact of cold water contracts the skin and the blood vessels, driving the blood away from the surface of the body, this being followed by a reaction in which the blood is brought rushing back to the surface in large quantities. It is this reaction which is important, and it is for its sake, or its expectation, that men and women are willing to brave the rigors of a morning chill. But if the bather can not get this reaction, if his body has not sufficient vitality to respond to the demand made upon it, then he should either let it alone entirely or so modify his method of taking the bath that he can recuperate perfectly.

Even if the body seems at the time to react properly, with a ruddy glow of the skin, you may know that it has been too much of a drain upon your vital energies if you experience a trembling and nervous sensation afterwards. If it should happen that you are chilly after a cold shower, the best thing to do is to get your feet in hot water as soon as possible, or to wrap yourself up warmly or to drink something hot so that you may become quickly warm through from top to toe.

As already said, the important thing is the reaction, arousing a vigorous circulation of the blood, and having accomplished this the bather should not linger in the bath until he becomes chilled. One great secret of suc-

cessful cold bathing is brevity. Simply get into the water and then get out again, whether it is a tub or a shower.

And does this apply to swimming also? It does in a very large measure. The hotter the weather and the warmer the water, the longer one can stay in with impunity. It should be remembered that one goes swimming under more or less natural conditions, conditions sometimes very different from those which attend the tub bath in the raw, early morning. But yet in most cases open air bathers would do much better to spend about one-fourth as much time in the water as they usually do. This applies not so much to robust athletes as to those who are only trying to build up health and gain strength, especially those who are "lean" or thin.

For cold bathing, or for any bathing, the room should be comfortably warm; otherwise it would be better to forego it. Never attempt to take a cold bath in a cold room—it will be more difficult to recuperate.

Next, be sure that you are yourself thoroughly warm. This does not mean that you should be overheated, for under such circumstances you should be more than ever careful not to become chilled, either through reckless bathing or in any other way. But you should be thoroughly warm so that thought of cold water upon the skin will appeal to you and will actually feel good when you take the bath. There is nothing so refreshing and gratifying as a cold tub or shower under the right conditions. That is why it is usually in order immediately after vigorous exercise, for the body is warm and the circulation is active.

Under no circumstances take a cold bath when you

are already chilly, when your hands and feet are cold, or when any part of the body is covered with goose-flesh. It is true that a vigorous and full-blooded individual might take a cold plunge even when chilled, and might thereby arouse such a circulation as to become warm through the reaction, but the average man or woman trying to build up vitality should not attempt it except under right conditions.

Of the two extremes, it is probably better to take a cold plunge when too hot than when too cold if the bath is brief, for the surplus heat of the body will enable one to react instantly. But to take a cold shower when one is already chilly is to make recuperation difficult and is like striking a heavy blow at the vital organism. It is like adding to burdens already too heavy. If, on the other hand, you are perspiring freely, it does not matter. But don't linger in the bath; it should be of only momentary duration.

The important thing naturally is to be absolutely warm and comfortable immediately after the bath, and the preceding bodily warmth and comfortable room are required only for the sake of enabling you to do so. If your teeth chatter afterward there is something wrong. The entire body should be in a glow and your spirits high so that you can sympathize with your bath-robed and exultant friend who greets you with the declaration that he "feels like a fighting cock," however unwarlike his actual disposition. My own experience is that after a successful cold bath one feels very different from and very much better than a fighting cock. Perhaps more like a crowing cock.

The shock that is experienced upon entering cold

water may, when too severe, serve as a warning. It is then truly a shock to the nervous system and is likely more or less to upset the normal action of the vital organs. It is true that even for one who is strong and capable of enjoying the cold water, there will always be something akin to a mild shock upon sudden immersion, but this is not unpleasant or detrimental. It brings about the reaction and the benefit. The test lies in the question as to whether the shock is pleasant or otherwise, whether it is a source of delight or of dread. What do our instincts say about it?

The temperature of the water is another important factor. Naturally the colder the water the more powerful the reaction and the more effective the result, but each one must consider the limits of his own powers of easy recuperation. The temperature of the water should depend upon the individual, but it is not usually best to have it too low. A regular cold bath of 45 degrees Fahrenheit is too strenuous a proposition for many people. A temperature from 60 to 70 degrees will be very pleasing to some, but others will require water considerably warmer.

It is a matter of personal preference whether one takes a plunge or shower, sometimes a matter of convenience. But if these two forms of bathing seem too rigorous in your case, then a quick sponge or splashing with cool water will be better. A dry salt rub may also be effectively substituted for a cold shower.

If your condition is so delicate that even a sponge bath seems to chill you, then you will probably get successful results by placing the feet in warm water for a minute before the bath or even by standing with feet

and ankles in hot water while you quickly sponge the body with cold water, first the legs, then the arms, then the abdomen, then the back, and finally the chest.

If your vitality is so low and your circulation so poor that you can not find pleasure and comfort even in this method, then you would better not try cold bathing until you have gained in health and strength through outdoor life and moderate exercise. After a warm bath you will probably find enjoyment and benefit in a quick cool spray while standing in the warm water. If so, then such a spray or shower should always follow a hot bath.

One cold bath each day should be enough. Track athletes have sometimes found that too much cold bathing affects their speed and power, although a quick shower after exercise would not do this. If one is engaged in athletics or takes any other active exercise in the afternoon or evening that should be the time for the cold bath instead of in the morning.

The first thing in the morning has commonly been suggested for the cold bath, probably because it is so often the most convenient time. This does not mean that it is always the best time for one trying to gain strength. It is true that it wakes one up, arousing all the vital and functional organs, and that this is desirable in many cases, but for one of limited vitality it may not always be best that his energies should be so suddenly and violently aroused. In such cases it may often be better if the activities of the body are awakened more naturally and gradually.

A cold bath is something of a stimulant. This naturally does not apply to the shower taken after a cross-

country run, but it is true of the morning cold tub, taken just after getting out of bed. It is furthermore a natural stimulant and does not have the ultimately detrimental effect of a drug stimulant except where one fails to react.

Nevertheless it arouses the activities of the body to an unusual extent, perhaps to an extent that will call for a depression later. The time worn expressions, "whipping up a tired horse" and "borrowing energy from nature in advance" used of stimulants in general will also apply to the morning cold bath in some instances, since it may result in a slump in one's working energies some time during the day. And this is particularly true when the morning dip is regarded as a duty rather than as a pleasure.

Of course these remarks do not affect Cousin Henry, the fresh young brute, who has so much vitality to spare that he would not know it if he lost a good deal. One person may be so rugged that he can do almost anything, but this does not mean that the same tests of vigor should be applied to others who find it necessary to make a continuous fight for health and energy.

I knew one young man who went in for cold baths. In the morning he would come flying out of the house filled with vim and energy, highly stimulated, but along toward noon came an inevitable slump. "That tired feeling" struck him when the day was only half gone. He had just about energy enough for his daily work if he saved it and used it right, but he had no extra vitality to waste through that morning stimulation.

It is true that he might have done even worse and that he used water too cold. A dip in water of more

moderate temperature with a less violent reaction might have done him good. And it is also true that thousands do probably even more harm through their morning stimulation with strong coffee. However, vitality is such a precious commodity that one can not afford to squander it in any way. I have emphasized these points not to discourage cold bathing but to show how important it is not to make any mistakes. The other extreme of physical stagnation is even worse.

A similar caution may apply to the morning exercise if a man takes his exercise at this time of day. It is better to take only enough for warming up and getting the blood in circulation whether through bedroom movements or a morning walk. The walk is the better of the two. However, some enthusiasts endeavor to take the entire allowance of exercise intended for the whole day the first thing on getting up, and this is likely to detract from the energy that one can put into his daily work. The late afternoon would be a far better time or the evening. As for snow baths and swimming in ice water, don't experiment.

HYDROTHERAPY: ITS THEORY AND APPLICATION

By HEREWARD CARRINGTON, Ph. D.

WATER has been employed as a remedial agent, internally and externally, from the earliest ages. It may be used to warm, soothe, or cool the whole system, or any part,—if it is torpid, irritated or inflamed; it will reduce the morbid heat of fever, promote the excretions, act as a solvent, and is capable of permeating every organ, tissue and fiber; it dilutes and transports from the body matters and impurities of all kinds. Internally, water may be taken as a drink or in the form of enemas; externally, in the various hot, cold and tepid applications.

As to *drinking* water, there is one primary rule that is always safe to follow, viz., *the purer the better!* Water should be carefully filtered from all impurities, if these are in the water, and boiled if there is any danger of taint.

The *temperature* of the water should be gauged according to the condition of the individual; usually, this should be cool-to-cold; but there are times when hot water is very beneficial—especially the first thing in the morning. This tends to wash out the impurities from the stomach, stimulate the sluggish internal organs, and generally stimulate and flush the system. It is very useful, often, in cases of constipation. A squeeze of lemon-juice in the water will take away the unpleasant taste that is often present. At other times, cool water is best.

Not much water should be drunk *at* meals; but between meals, from one to three quarts a day is advised, according to the condition of the individual and the temperature of the surrounding air. In summer, of course, we need more water than in winter. Most people do not drink enough water, however, and the habit of profuse water drinking is one that should be encouraged.

In all feverish conditions, cool water is very beneficial. If water enters the body at the temperature, say, 50° F., and leaves it at blood heat—98.6° F.—it is obvious that the body has heated this mass of water some 48.6° F.; that is, the body has been cooled to this extent. Profuse water-drinking is therefore advised in all feverish conditions—and this includes practically every form of illness—since we now know that they are nearly all coupled with some form of congestion of the internal organs. When the body is chilled or cold, however, or in cases of anemia, hot water is advised.

As to *enemas,* that is a separate subject; but, generally speaking, the temperature of the water should be fairly warm, followed by a small cold injection, to tone up the internal parts. From one to four quarts can often be taken in this manner. It is a good practice to take the first enema lying on the *left* side, and after this has been allowed to pass from the body, to take a second, larger one, while lying on the *right* side. This serves the purpose of cleaning out, first the left or descending colon, and afterwards the right or ascending colon,—the water being allowed to flow across, by the force of gravity, during the second enema.

Dr. Trall taught that, in practically all diseased con-

ditions, the circulation was unbalanced—usually too much blood being determined to the congested internal organs, and too little to the skin. His object, therefore, was to bring a greater volume of blood to the skin, and thus relieve the internal organs. And in order to do this, he would apply water of varying temperatures to the skin, in the form of packs, applications, etc.

The *rule* to follow, in such cases, is simply this: If the skin is hot and flushed, apply cool to cold water; while if the skin is chilly and anemic, apply hot.

This tends to draw the blood to the surface, or to cool it, as the case may be. The invariable application of *cold* water—as taught by Kneipp and others—is heartily deprecated. The above rule is a very simple and a very practical one to follow.

The *extremities* will often be found cold, even when the rest of the body is warm or even feverish; and it is a good rule to feel the hands and feet, and apply hot bottles, bricks, or cloths when this is the case. Dr. Trall used to place the feet of his patients in warm water, even when treating the rest of the surface of the body with cold water. It is always a fairly safe rule to warm the extremities of all sick patients; and in cases of shock, insensibility, etc., this is essential.

The Wet Sheet Pack. It is important that the feet should be kept warm when the patient is placed in the pack. The "pack" consists merely in wrapping the patient in a wet sheet, wrapping it all round, and afterwards in two thick woolen blankets, and lastly in one or more comfortables. The result is that, after the reaction, the patient breaks out into a profuse perspiration. The sheet may be wrung out in hot, warm, or

cold water—this being governed by the temperature of the patient, as before explained. The head should be left out, placed on a pillow, and covered with cool cloths—if it perspires too freely, or becomes overheated. The feet should be kept warm. Drinking water may be allowed, as craved.

A very *common error* is made in packing the patient too tightly about the chest, thus interfering with free respiration, and rendering the patient uneasy, nervous and irritable. In order to obtain the full benefit from this bath, all parts of the surface should be in contact with the wet cloth; but as the sheet, unless unusually large, will not conveniently fold so as to cover the armpits, it is better to place a wet towel on the inside of each arm, and another between the thighs.

The *time* for remaining in the pack varies in different cases. From half an hour to an hour is the average. There are cases, however, which could be limited to fifteen or twenty minutes. In all cases, the time should be determined by the condition of the patient. The wet sheet should always be followed by the application of tepid, cool or cold water in some form,—as the spray, sponge, douche, plunge, shower, dripping-sheet or half-bath.

Too much sweating is not desired; if the skin is kept too long congested and engorged, harmful results are sure to follow. Sweating should never be continued after a thorough, wholesome action of the skin has been produced, or until dizziness, faintness, etc., result. This will only do more harm than good.

The full wet sheet pack is one of the most useful of all water-cure processes. It tends to equilibriate the

temperature, and hence the circulation; determine the blood to the surface, open the pores, and generally flush out the system. In addition to this, however, there are many other processes which are extremely useful for other purposes or for local action. Chief among these, perhaps, we might mention the—

SITZ BATH. In this, the patient sits in a shallow tub or bath, in which five or six inches of water have been placed. The upper part of the body and the feet thus remain out of the water; if the sitz bath is cold, the feet may be immersed in warm or hot water. The object, as a rule, is to relieve the local congestion in and about the pelvis, where the blood is more or less congested, and will serve a useful purpose when there is congestion of the head, headache, etc., as well as being very beneficial in cases of constipation, hemorrhoids and various sex weaknesses. The patient may remain in the bath from one to ten minutes; and the temperature of the water should usually be tepid to cold.

COMPRESSES are merely local water applications, hot or cold, as the case may be, applied locally to the part. Cool compresses to the head are often very beneficial in cases of headache; abdominal compresses in cases of congestion or constipation.

A hot spinal pack is very useful in cases of nervous strain, fatigue or irritability, insomnia, anemia, etc. The towel should be folded, lengthwise, three times, and then folded-up until it is the proper length to cover the whole length of the patient's spine. This is then dipped in very hot water, wrung out, and placed over the spine, with two dry towels over it, to keep the bed-clothes from getting wet. It is best for the patient to lie on his stom-

ach, when this is being applied, in the same way that he should lie upon his back when abdominal compresses are being set in place.

Cold applications are used to allay inflammation and fever. In extreme cases a cold compress may even take the form of an ice-pack. This consists of a cloth bag containing chopped ice, but it should never be applied directly to the skin. A Turkish towel or other protection should be placed under it. An ice pack is used in appendicitis and often applied to the head in the case of apoplexy or sun-stroke, although treatment of this kind should not be self-prescribed, but used only under the direction of a physician.

Hot compresses, cloths wrung out of hot water, are valuable in relieving pain, as in the case of neuralgia, a sprain or an abscess. Alternate hot and cold applications represent the most energetic means of increasing the circulation in a particular part. The alternate hot and cold spray will act in the same manner as hot and cold compresses, and may be more convenient.

Sprays, showers, douches, plunge baths, swimming, etc., are all useful—a strong spray of water directed against a given part being a strong stimulant. *Mud baths* are often applied, the patient being covered with warm mud or cold earth for some time. In addition to the general skin tonic, it is possible that the body receives in this way valuable magnetic properties from the earth. The recent discovery that many earths are radio-active affords additional argument in favor of this belief.

Eye and *ear baths* are useful at times, if not overdone. The *nasal douche* is also valuable, for cleaning

out the nasal passages, but care must be exercised, that the water should be allowed to run in and out freely, rather than drawn up into the nose by great force of suction. In many cases, water has lodged in the small cavities in the nose and even the sinus, in this manner, and caused subsequent harm. A nasal douche of salt and water may be useful at times, but it must not be overdone.

Swimming is one of the finest water-cure processes, since it not only supplies the needed stimulating properties of other baths, but also exercises the whole muscular system, insures deep breathing, and at the same time insures an air and sun bath, which are most useful adjuncts. It has now been established that sun and air baths increase the number of red blood-corpuscles very materially, while the exercise affords an additional wholesome tonic. Care should always be taken, however, not to swim (or in fact take any bath of any character) within *at least two hours* after a meal, since the blood is then drawn to the stomach, and the determination of the blood and vital energies to the skin will serve to interfere, if not inhibit altogether, the processes of digestion for the time being. Many cases of "cramp" are due to this cause; and it is probable that cramp would rarely result if this rule were followed, and the muscles were in moderate condition at the time.

It has been well said that "heat facilitates, but cold stimulates, function." That is very true. The one renders it easy; the other drives greater vital energy to the part, insuring action. Sometimes one, and sometimes the other, method is desirable. As there seems to be much confusion, in the public mind, as to just what con-

stitutes warm, hot, tepid, etc., baths, the following table may be found useful:

Cold	33°	to	60° F.
Cool	60°	to	70° F.
Temperate	70°	to	85° F.
Tepid	85°	to	92° F.
Warm	92°	to	98° F.
Hot	98°	to	112° F.

The advocates of drugs often point to the wonderful results which have been obtained by their use, in the sense that some of them are emetics, some cathartics, some tonics, etc. Every one of these effects can be obtained in a more hygienic and practical manner by the use of water! Thus: Continued application of ice and cold water will produce *refrigeration.* By the use of cool or cold water, the pulse may often be reduced twenty to forty beats in a few minutes—*sedative* effect. As a tonic, a hot bath is a most efficient *stimulant,* in the true sense of that word. It will so excite the circulation as to increase the pulse from seventy to one hundred and twenty and more in fifteen minutes. As an *anodyne,* hot compresses and fomentations will give relief, as a rule, as rapidly as any other form of medication. As an *antispasmodic,* no remedy is so certainly successful in hysterical convulsions as water. In infantile convulsions, the hot bath is unrivalled. As an *astringent,* the value of cold water in arresting hemorrhage is well known to all physicians. As a *laxative,* water in various ways is most efficient in promoting a healthful activity of the bowels—and without the harmful reactions, so common with drugs. As an *emetic,* water is the best that can be used. As a *diuretic* (affecting the kidneys) and

as a *diaphoretic* (affecting the skin) we all know water to be unrivalled. As an *alternative, derivative,* and *counter-irritant* water stands unsurpassed. Thus all the various reactions produced by drugs can also be produced in a simpler and less harmful manner by the use of water in one of its many forms—and this treatment at the same time tones up and invigorates the body, cleanses it, instead of poisoning it and enfeebling it, as is the case with drugs.

We repeat, therefore, all the results obtained by drugs can also be obtained, usually in a much more efficient and lasting manner, by the use of water; while at the same time the body is actually benefited instead of devitalized and injured! There is no excuse whatever for administering drugs in any of these instances, provided the doctor knows how to administer the proper water-compresses, and uses discrimination as to temperature, duration of bath, etc., at the time. There need never be a harmful reaction if the physician knows his business and is not an "extremist."

All parts of the body should be kept thoroughly washed-off and sweet and clean by the use of water. Many authorities hold that women should take a douche every day of their lives, with salt and water (a tablespoonful of salt to a bag of water); and if this be done, no unpleasant odor will ever be noticed about the body. There is no need to fear this, as it is a rational, simple process, and can not possibly do harm and in this way the body can be kept sweet and clean.

Above all, cultivate the habit of drinking more water! The body is composed of more than eighty *per cent* fluid, and this fluidity must be maintained. It can only

be maintained by the water we drink—which also stimulates the liver, the kidneys, the bowels, and the activity of the skin. Six glasses a day is a good ration for the average person.

THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART THREE

PHYSICAL FITNESS

SECTION THREE

DODGING DISEASE

HOW AND WHY NATURAL CURES CURE

By HEREWARD CARRINGTON, Ph. D.

THERE is a story told by one of the surviving students of the famous Dr. Trall, to the following effect: Every day, as he entered his lecture room, where his medical students had gathered, as he was taking off his coat, he would ask the same question, and every day he would receive the same answer. This was the invariable rule. The question was: "When you are called to the bedside of a sick patient, what is the first thing to do?"

And his pupils, knowing the answer, would cry out in unison: "Balance the circulation!"

And why balance the circulation?

We are here at one of the fundamentals of the natural methods of cure. The answer to this question would enable us to perceive the correct answer to many a knotty problem, and enable us to find the solution of many a case of disease. For we are here dealing with the blood of the body and its circulation. As soon as we begin to deal with this, we are very near the heart of our problem: The rational cure of disease.

First of all, then, a few fundamental principles.

When a bone is broken, the only thing the surgeon can do is to set the bone, and let Nature heal the broken ends of the fracture. When any part of the body is sprained, we can only assist Nature in restoring a normal condition. Nature does the rest.

There is, therefore, resident in man *a natural heal-*

ing force, which heals broken bones, burns, sprains, cuts, etc.

This same healing force, rightly directed and helped, will cure disease, and is the only thing that will. It is the curative agent. Nature alone cures. We can only assist or retard her efforts.

Again, we are apt to mistake the actual nature of disease. We look upon disease as an entity—as a thing, like a cat or a dog,—which has somehow found its way into the body, and which must be expelled, driven out, driven away by drugs and other means.

But all this is wrong! It is the outcome of the older belief that disease was caused by "evil spirits"—by demons and devils which somehow managed to get into the body of the patient, and which were expelled only by exorcism and other means. They must be expelled or driven out, it was thought.

But we now know that most diseases are not entities or things, but *conditions.* What we know as a disease is merely the outward, manifest signs of what is going on within. They are the outward and visible signs which we see,—the *symptoms.* The real disease is *that which causes these symptoms,* not the symptoms themselves. If we remove the cause the symptoms will disappear. On the other hand, if we merely suppress the symptoms, without first removing the cause, we leave this "cause" in the system, which is then free to run on, accumulate and work greater harm later on.

Our object in all rational healing, then, should be to discover the *cause* of any disease, and remove it. That once done, the symptoms disappear of themselves. The so-called "disease" is cured.

What is this cause: In what does it consist?

Any cause of disease is naturally a poison, an impurity. A substance which the body can use is a foodstuff; and as such is appropriated and used by the body. It does no harm; but, on the contrary, good. Only substances which the body can not use are poisons.

How do these substances—these poisons—get into the body?

Normally, there are only two ways—through the lungs, in breathing, and through the stomach, by food and drink. In these ways only are poisonous substances introduced into the body.

The lungs take in bad and poisonous air, and smells and gases which are directly and indirectly harmful. Air lacking in oxygen also fails to oxidize the food properly. On the whole, however, it may be said that—in spite of the enormous quantity of air which the lungs inspire—they actually add very little material to the body which can be called poisonous. The material must come through the other channel.

Those who drink quantities of alcohol, tea, coffee, etc., of course add poisons to their bodies all the time; yet it must be admitted that many persons become ill who never drink these beverages. Hence the poison must come through the other source—the food.

Our food supply is, then, the chief cause of the diseases we find in the world. It is the food alone which introduces into the body most of the poisons which it endeavors to expel. And yet we have always been taught to believe that food was the most important thing in life, and without it, as we know, we should soon die! How account for this apparent paradox?

The paradox is only seeming. It is possible to have too much of a good thing; and it is just this which happens when we eat too much. The body becomes choked and blocked with the excess and then poisons begin to accumulate. This is how it comes about.

If you shovel *just enough* coal in a steam-engine to burn properly, it will yield a steady heat, and the machine will run on, steadily and well. If you put in too little coal, the fire will die down. If, on the other hand, you put in too much coal, it will begin to choke up the furnace; ashes will accumulate, and we must turn on a forced draught to burn up the excess of coal and other combustible material.

In precisely the same way, the body may suffer from either too little or too much fuel (food). If too little, we have starvation. If too much, we have other complications and diseases.

Now, it is highly improbable that under normal condition any large number of persons living in ordinary civilized conditions get too little food. They may in India and some other countries; but, in civilized communities, it is almost certain that the trouble is all the other way; and that people suffer, not from too little, but from too much food. Even the very poor, and especially the babies of the poor, suffer from this. The rich and the poor both eat more than their bodies need—that is, too much; and they are both ill. The rich eat too much good food; and the poor too much poor food, and they are both sick in consequence.

If this be true, it shows us that an excess of food is the cause of most of the ills from which humanity suffers; it is this excess of food which generates the

poisons (the so-called "toxins") in the human body, just as ashes accumulate in the furnace; *and these are the cause of most of our diseases!* It is an easy matter to show just how this comes about.

The body needs just so much food to keep it in perfect health. Above this amount is harmful. We have only recently learned that this amount is so much *less* than was formerly supposed that we have all been eating far more than was necessary—under the mistaken idea that we *had to.* We have all been ingesting too much food, all the time!

What does this excess of food do?

The proteins create toxins—uric acid, xanthins, etc. —which poison the muscles and nerve-cells throughout the body, causing fatigue and ultimately disease.

The excess of fats and carbohydrates create an excess of fat, over-work the liver and clog up the pores of the skin.

Excess of sweetstuffs causes constipation and overtaxes the kidneys. Further, bad food combinations create poisons and gases which are absorbed by the general blood-stream, and are carried to every cell and tissue of the body. Poisons thus being formed, we must overwork the eliminating organs for a time (turn on a forced draught) in order to get rid of them. Otherwise we shall become ill.

Now, what must we do to insure this?

Under the ordinary conditions of life, the *skin* is inactive. Poisons which should be eliminated through that organ are retained in the body, forcing the other organs to take up the work which the skin should do.

Nature has so arranged matters that the work of

the eliminating organs is largely interchangeable. That is, the liver may perform work which the skin should, the lungs instead of the bowels, etc. In this way, if one organ is "put out of commission," the others can take up its work.

So, with the skin inactive, the other eliminating organs must work all the harder to get rid of the load of impurities thrown upon them.

But, of these, the *bowels,* are already over-worked, and have probably become constipated, by reason of too much food, eaten at too short intervals, and because of the fact that the food was binding instead of laxative. Further, because of the sedentary habits of the individual, they are never stimulated into wholesome activity, and hence stagnate. They become constipated, and they too refuse to act as they should. The work is thrown upon the other organs.

But of these, the *liver* is already vastly over-worked, by reason of the quantity of fat, greasy dishes which most people eat, and the abnormal amount of sweet and fatty food which they have taken. So it throws some of this work upon the *kidneys.* But these, to work properly, must be supplied with a certain quantity of liquid water; they must be "washed out," as it were, and if the blood becomes too thick with sediment, they too become choked and blocked up and over-worked. The result is that the lungs are called upon to eliminate the poisons formed; but because of our shallow breathing, these can not eliminate the poisons generated either. As a result, they try to eliminate, not only gaseous and fluid matter,—as they should by rights,—but also solid matter, which the other organs should have eliminated;

and thus we have "a cough"—an attempt on the part of nature to expel *via* the lungs solid matter poured into their delicate tissues, which should never have been allowed to get there. Thus it is that the various eliminating organs of the body soon become overworked; and how it is that the lungs become congested, and suffer in consequence—forming ripe "soil" for the germs of tuberculosis, etc.

What will Nature do, under the circumstances? As she is unable to get rid of these poisons in the normal manner, she must perforce get rid of them in some abnormal method—by disease! So we have a "cold in the head," or break out in spots, eruptions, boils, smallpox, etc.; or we have diarrhœa, or fever, or some other disease—which is only Nature's way of getting rid of the accumulated poison. Disease is always *a process of cure*. It is the process of elimination.

We are now in a position to see clearly enough the value of the relative methods of cure; and how and why they operate. There are two ways of treating disease when it arises—by drugs and by natural methods. Drugs act, very largely, by *suppressing symptoms* when they arise, and as the patient imagines that he is "cured" when the symptoms disappear, he feels that he *is* cured! But, as a matter of fact, he is not. The causes which underlie these symptoms run along in the body, and will later on cause either the same disease, or some other—worse and more dangerous, because more deep-seated. Disease, to be truly cured, must not be treated in this manner; but rather by the more fundamental method of removing the causes—the poisons which are in the body, as yet uneliminated.

The only way to do this is to (1) stop putting more poison into the body; and (2) get rid of what is already there. As, in disease, the body can not properly utilize food, and it remains mal-assimilated, this acts like a poison; and therefore must not be eaten.

In other words, the patient must *fast*.

It must be remembered that fasting itself is not a cleansing process. *It does not eliminate anything.* It only allows the body to "catch up," as it were, by giving the eliminating organs a chance to get rid of the over load of impurities which it contains. Fasting does not cleanse. It only allows the body to cleanse itself. But this is just what is wanted.

The body, when unhampered by the constant arrival of new food, calling for elimination, is free to devote itself to the elimination of the accumulated poisons. This it does through the various depurating organs, as always.

How, then, should we proceed? We should stimulate the activity of the *skin* by hot and cold baths, by packs, compresses, by sun, air, and mud baths, by salt rubs, by Turkish baths, and by every other means in our power. Dry friction, with a hard brush, is a very valuable asset. The value of all external hydrotherapeutic measures is thus manifest.

The *kidneys* should be assisted in their functioning by plentiful water drinking—thereby thinning the blood, flushing these depurating organs, and assisting Nature to eliminate the solid matter, in the form of salts, etc., which they are called upon to expel.

The *liver* should be helped along, likewise, by acid fruit-juices (which serve to stimulate its activity) by

massage, by abstaining from all fatty and sweet foods, etc.

The *bowels* should be flushed out by several full enemas, which will rid them of the solid, decomposing material they contain, free the body from toxins, and from the bacteria which accompany such internal conditions. Purgatives are sometimes taken; but pure water will have just the same effect, and will cleanse the bowel in a more sane and thorough manner. The bowels should be constantly cleaned while fasting.

The *lungs* can only be stimulated by deep breathing, pure air being supplied, as cold as possible. This will soon clear out the clogged cells, and oxidize and carry away the impurities which are lodged therein.

In addition to this, the *blood* (really an organ) should be stimulated in every manner possible into greater activity, and at the same time cleansed. Exercises of all kinds have the effect of forcing the blood through the arteries and veins of the body with greater speed; clogging and stagnant material is thus carried along to the eliminating organs, where they are disposed of or forced out of the system. These "deposits," which accumulate when the muscular system is inactive, are the cause of most of the trouble, and active and passive exercise of all kinds will serve to get rid of these. Hence the value of exercise as a curative measure in disease.

A final word will take us back to our first paragraph, and show us the wisdom of Dr. Trall's remark about "balancing the circulation." Physicians of the last generation used to bleed their patients. Why? Because they found *congestion*—too much blood. Bleeding got rid of this. To that extent, their method was perfectly

sound. Later, they employed leeches for the same purpose. But now we know that the body as a whole does not contain too much blood; the trouble rises from the fact that there is too much blood *in one place* (congestion, etc.), and too little in another (cold hands and feet, anemic skin, etc.). The thing to do is to adjust and balance it. So we should apply cold to the congested portions; and heat to the cold parts—hot water bottles, etc. Hydrotherapeutic measures are especially valuable here. As congestion—especially of the internal organs—is often highly dangerous, the first thing to do is to relieve this. Hence the value of Dr. Trall's advice.

The value and the simplicity of the natural methods of cure is thus manifest and can be seen to be so by anyone possessing even the most rudimentary knowledge of physiology and hygiene. All we need in order to cure almost any disease is, *not* a profound knowledge of *materia medica,* but a knowledge of the workings of the human body, and the application of the principles of sound common sense.

WHAT YOU SHOULD KNOW ABOUT FIRST AID

By EDWIN F. BOWERS, M. D.

THE great war taught us many new lessons. For one thing, it emphasized our plentiful lack of knowledge respecting that most important of all earthly subjects, ourselves.

Girls who would dauntlessly look old Differential Calculus himself in the eye, or beard the Transitive Verb in its murky den with all the ardor of the chap that carried the "Excelsior" banner, are palled with terror at a little spurt of blood, and they drool stupidly at a case of shock.

Men who have built great industrial enterprises, or won recognition for efficiency in business or professional life, haven't the remotest idea that there is any difference between sunstroke and heat exhaustion.

All of which is a by-product of a stupid educational system which places more value upon physics and philosophy than it does upon physiology, and esteems an ephemeral smattering of a dead language more than it does a living human being.

So the importance of a general knowledge of common remedial measures and first-aid treatment can not be overestimated by anyone who values human life. For what we do first to a person suffering from injury or from some emergency condition may mean all the difference between an ornate Gates Ajar and a large evening at the movies for that person. This is especially

true with respect to the treatment first accorded "open wounds," which means anything from a pin scratch to a major accident.

Remember, it isn't the size of the breach that matters, so much as it is the number of germs that flock in through the broken defense in the skin. The tiniest scratch is sometimes more effective for potential evil, if neglected, than would be a grave injury, with copious bleeding to cleanse the injured parts.

That's why prompt and intelligent treatment of wounds of any kind is so important. For one thing, it explains why the death rate from wounds on the battlefield is 75 per cent less fatal now than it was thirty years ago. Also why there are now almost 95 per cent of recoveries among wounded soldiers who can be gotten to the dressing stations and to the hospital within a reasonable time.

There are a number of good antiseptics, some of which should be in every household. Of these, perhaps the grain alcohol (95 per cent "pure") is one of the most widely used. It "bites" and smarts quite a little on an open wound, but it is a splendid and dependable germ killer, just as it is a splendid and dependable man-killer when taken internally. Ordinarily, it may be diluted with one to three parts of water, but for a "first dressing" the pure juice is best.

Great care should be taken not to use wood alcohol (methylated spirits) instead of the ethyl or grain alcohol. For, in certain susceptible individuals, its use on an open wound, and consequent absorption, even in minute dosage, into the system, might produce serious disorders of the nerves of the eye, possibly even blindness itself.

Bichloride of mercury is also rather extensively used. It is very much over-rated, however, as when it is poured into or over a wound it loses 80 per cent of its germ-destroying powers because of the insoluble compounds it forms in conjunction with the blood and other body fluids. Bichloride is tremendously dangerous on account of its "flat taste" and generally harmless appearance. It has possibly been the cause of more fatal poisoning accidents within the last ten years than all other poisons combined. The best place to leave bichloride is in the drug store, or else in the hands of a physician who understands its use.

Ordinary "saleratus," the common or kitchen variety of baking soda, is much better, and infinitely more safe to have around the house than bichloride, carbolic acid, or any active poison. While soda has no germ-killing powers outside the body, yet it is one of those remedies that exert a most discouraging influence upon ambitious germs when brought into contact with living tissues. Bicarbonate of soda, through its alkalinity, probably prevents the formation of the local acid condition, lacking which the germs are unable to flourish.

Iodine is another dependable antiseptic, and found a prominent place in most of the first-aid packets issued to all our soldiers in the battle lines. Its use undoubtedly prevented thousands of cases of tetanus (lock-jaw) from wounds sustained and necessarily dressed in incredibly filthy surroundings during the war.

Hydrogen dioxide is another reliable household antiseptic, and this has also the advantage of being harmless if taken internally. It is one of the safest and most dependable antiseptics for home use.

But perhaps the best of all antiseptics, and the safest, inasmuch as it is not an active poison, is the solution of sodium-hypochlorite evolved by Dr. H. D. Dakin, an American chemist. Dr. Dakin, working in France in conjunction with Dr. Carrell, of the Rockefeller Institute, gave the world a new antiseptic in the treatment of infected wounds, regarded as a distinct achievement in science, and an important contribution from America toward the winning of the war.

Dead tissue, even large sloughs, treated with Dakin's solution, as it is called, are quickly "digested" away, the surfaces becoming smooth, clean and bright red in color.

This solution is now put up in tablets, known as "chlorazene" and can probably be obtained from most druggists.

Every wound, no matter how trivial, should be immediately washed and treated with some reliable antiseptic. It should then be covered with a layer of absorbent cotton and bound snugly with lint, gauze, or some other sterile bandage. The main idea in treating any wound is to clean it, be sure that it is uncontaminated, and then let it alone. Nature will do the rest.

Every wound, however, made by any animal's claw or tooth, or punctured by a rusty nail, should be referred to a physician for cauterization, or for such other treatment as will insure its being sterile. Take no chances with anything that might subsequently develop into "lock-jaw."

Burns should be treated the same as any other wounds, only more so, because there usually is a much larger surface from which the natural protection of the skin has been removed. A most thorough cleansing,

followed by a good liberal dusting with baking soda and a snug bandaging is all they usually require. Perhaps the best treatment for a severe burn, however, is to cleanse thoroughly the parts with an antiseptic solution, and then coat them over with the wax-like preparation discovered by Dr. Barthede Sandfort, of France, put up by pharmaceutical chemists under the name "parresine." In the army hospitals this is usually sprayed over the burned surface, although painting it on with a broad, soft brush does quite as well.

This affords immediate relief from the excruciating pain and completely protects the denuded surface. If much serum accumulates under the dressings, which will be manifested by the oozing through the lint, the application should be repeated every day or two. Even the most extensive burns treated in this manner heal generally without leaving the slightest trace of a scar. This marvelous treatment for burns is another valuable boon to humanity developed during the war.

For local inflammations of the eye, and for a cleansing soothing wash for the nose or throat, particularly if there is any catarrhal trouble, a bland alkaline wash is desirable. One of the best of these is "alkolol," diluted with from one to three parts of water. Alkolol is absolutely harmless, even to the most delicate structures, and much more effective than the more commonly used boric acid solution.

Bruises and strains, among the most common of all accidents that befall active humans, should be treated by plunging the parts into water as hot as can be borne, keeping them there for twenty minutes, or until the skin begins to shrivel up, and then giving them a long rest.

There are many doctors who profess to get their best results in sprains by having the patient continue to use the strained member. But this seems to be one of those beautiful medical theories that work out better on paper than they do in practice, as most patients who have had sprains treated by the "ambulatory"—which means moving around—method, will cheerfully testify.

If the injury has been severe, and if there is any suspicion that the ligaments may have been torn, or the bone splintered, it is good judgment to have an X-ray taken, so the actual injury may be seen.

The best obtainable surgical skill is none too good for a fracture, however. So much depends upon its being "put up" in the best position that it is unqualifiedly no job for an amateur or a bungler. If an honest-to-goodness doctor can be gotten within twelve hours, and he usually can, unless the accident should take place on some camping trip, or remote from human habitation, there will be but little need for first-aid treatment. The main requirement is that the patient be kept at rest, with the injured arm supported by a "sling," or the leg supported by pillows.

There is no danger of any union taking place in the broken ends of the bones within twenty-four hours, or even forty-eight hours, and there is comparatively little pain in a "clean break," not until the surgeon comes to fix it, anyhow. And then, if he's humane, he'll probably give a general anaesthetic.

If the accident should occur at some distance from the nearest doctor, however, it might be well to gently pull the limb as nearly straight as it can be made, and bind some light pieces of board on it, well padded with

cloth. Or frequently a couple of rather firm pillows, bound on each side of the limb, do even better. For they allow for the natural swelling of inflammation, which, under the long continued pressure of unyielding splints, might cause gangrene.

Every human being more than eight years of age ought to know something about a hemorrhage and *how* to check it. Instead of teaching them that the United States is bounded on the east by the Atlantic Ocean, or that Cromwell had a round head, teach them the location of their heart, and give them some simplified account of its action. Explain that if blood *spurts* in little jets from a cut or a wound it means than an artery is severed, and that some means should be used to bring pressure on that vessel *between* the wound and the heart. But that if it *flows steadily,* most probably a vein is severed, in which case pressure should be made *below the wound* and *on the side furthest from the heart.*

The best thing is to lose not a moment's time in applying a tourniquet. A piece of rubber tubing such as is used to connect the automobile gas tank to the headlight makes the best kind of a tourniquet, as it needs no lever to tighten it. But if this isn't available, a woman's stocking, or any piece of strong thick cloth may be wound around the limb loosely, and then twisted by putting a stick part way through it. If a deep lying blood vessel should be involved, it would be best to put a large, round pebble directly under the bandage and over the course of the blood vessel, being careful always to remember whether it is a vein or an artery which is bleeding.

Tighten the tourniquet until the blood stops flowing,

being careful not to pinch the skin with the "twist." Fasten the stick by binding it against the limb further up or down with another piece of cloth.

If you can not get a doctor to attend to this injury for some time, release the pressure on the tourniquet at least once an hour, even though the wound bleeds pretty freely, so as to prevent tissue gangrene from setting in.

Slight hemorrhages can usually be checked by putting a pad of sterile gauze over the wound and fastening it snugly with a bandage. Needless to say, that no household should ever be without gauze, a package of cotton, a roll of bandage, and such other emergency appliances for which experience shows the need.

Nosebleed is best arrested by removing any constricting influence from around the neck, elevating the head and arms, and "ironing" the back of the neck, the forehead, or the bridge of the nose with a lump of ice; or else applying compresses wrung out of cold water. Pressure against the base of the nose is useful, and snuffing salt or alum water, or, better still, peroxide of hydrogen, up the nostrils.

Loss of blood is one of the things that may produce "shock," although shock is also caused by too much bad news, or by anything that depletes the reserve of vital force.

Don't confuse shock with apoplexy. In shock the skin is cold and clammy, the breathing shallow, the pulse feeble and irregular, with little beads of perspiration standing out on the forehead. A patient in shock is not usually unconscious, but appears stupid and apathetic. The thing to do with this person is to get him flat on his back somewhere, in bed by preference, and

warm him, no matter how hot it might happen to be, nor how unnecessary a warming might seem. Then give him a half teaspoonful of aromatic spirits of ammonia, or a cup of strong black coffee, and keep him as quiet as possible. Rubbing the limbs, stroking always in the direction of the heart, is a useful procedure. But care must be taken not to uncover the patient in order to do this.

All this is also good routine treatment for fainting, although sometimes with fainting spells it is desirable to use rather drastic stimulant measures, like dashing cold water over the face or body, or slapping the hands or face smartly with a wet towel.

But neither of these conditions must be confused with apoplexy, in which the face is reddened and congested, the pupils usually dilated, the breathing slow, labored, and "snoring" in character, the cheeks being puffed out during each expiration. Here the first thing to do is to elevate the head, and arrest the further escape of blood within the skull. Then cracked ice or cold compresses should be employed, and no time lost in seeking expert aid, for these conditions are most serious.

Remember, also, that "heat prostration" and "sunstroke," while they originate from the same cause, are two totally different conditions,—quite as different as are apoplexy and shock.

Heat prostration is a general functional depression, characterized by a cool, moist skin, and a general collapse. Removal to a cool place where the patient can be kept quiet in a darkened room, loose clothing, and appropriate stimulants usually bring about relief within a few hours. Remember always that alcohol is a stimu-

lant that always has a sting in its tail, and should never be used when ammonia, coffee, or any other safe stimulant is available.

"Heat stroke" usually warns of its approach by the irritability and depression it creates. The head aches, eyes are congested, face is flushed, skin dry, the stomach upset. The temperature sometimes rises to 108 or even 110 degrees (98.6 is normal), in which case there are usually convulsions, delirium and unconsciousness.

Sunstrokes are serious conditions, particularly as they leave their victim highly susceptible to recurrent attacks of this malady. Of course the ideal way to treat such a patient would be to follow the hospital practice of immersing him in a tub of ice water. But cracked ice about the head or spine, or through drenching with cold water, repeating at frequent intervals,—in fact, any intelligent method of applying cold and neutralizing the intense body heat,—may work quite as successfully. Only don't lose any valuable time debating how, and where, and why you're going to do whatever it is that you're going to do. For the patient might not wait for you to incubate a decision.

Proper first aid in a case of poisoning has more to do than anything else in saving life. If poison has been swallowed, the first thing to do, if possible, is to un-swallow it. Repeated emetics of lukewarm salt water or mustard water are best for this purpose. Use a teaspoonful of salt or mustard in a glass of water. If nothing but water is at hand, drink a great deal of that, inducing vomiting by tickling the throat with the finger. Then drink more water; do this again and again to thoroughly cleanse the stomach. There are many poisons

and many specific antidotes for them. Generally speaking, however, milk or whites of raw eggs will answer for practically all poisons. The egg may be used in the milk, or beaten up in water. To save time you may use the entire egg, or several of them. Continue to drink in large quantities either the milk or egg water, or both, also using two or three enemas of the same albuminous liquid. If poison has been absorbed into the circulation, hot baths (105 degrees Fahrenheit) or hot blanket packs will help to eliminate it through the skin.

If you are going into the woods, or anywhere where you are likely to meet a snake, don't feel that you have to burden yourself with a demijohn of whisky; not for snake-bite, anyhow, for booze is absolutely discountenanced as a snake-bite antidote. Whatever good effects whisky seemed to have are pure moonshine. The *real* treatment is to ligate the limb above the wound. Make a good deep incision into the bite and suck the wound freely, or have some good companion perform this office. If the mucous membranes are intact, there isn't the slightest danger in this, as snake poison is only dangerous when taken directly into the blood.

Then rub crystals of permanganate of potash into the wound, loosening the tourniquet to prevent gangrene. If this treatment is used early enough, there is little fear from the bite of most snakes found in this country.

What first to do for a person apparently drowned is one of the most important matters that anybody ever could decide for that person. And there are probably more loose ideas about this procedure than about any other first-aid emergency measure.

First and foremost, it is only a waste of time to stand a victim on his head, or roll him on a barrel, or shake him head downwards, in order to get the water out of his lungs, for the simple reason that there is little or no water in the lungs of a drowned person.

The chief cause of death by drowning, according to the findings of the Commission appointed by the English Government, appears to be a profuse pouring out of mucus from the throat, windpipe and lining of the bronchial tubes. This, by violent efforts at respiration, is churned into a viscid froth, which plugs up the tubes and air cells and prevents air from entering the deeper lung cells.

This explains why many individuals, gotten out of the water after even the shortest immersion, die in spite of every effort made to resuscitate them. They actually choke to death on their own mucus. They are drowned in their own secretions. For even the small amounts of water taken into the lungs are either coughed out as soon as the passages are cleared, or they are absorbed into the blood vessels.

Therefore it is obvious that any method of resuscitation that keeps a victim on his back is inadequate and dangerous; for the reason that such water and mucus as may be present in the throat will accumulate there and prevent the entrance of air.

So never attempt to restore an apparently drowned person by rolling him from side to side (the Marshall Hall method), or pulling his arms up over the head and then pressing down firmly on his chest (the Sylvester method), or compressing the walls of the chest and then waiting for them to expand (the Howard method).

Instead, without the loss of a moment's time spent in loosening clothing, chafing, drying, warming, or attempting to shake or force water out of the lungs, place the victim face downward, the face being turned to one side so that the mouth and nose are free. Then kneel directly alongside, or else astride the patient's hips, facing his head. Place both outstretched hands over the small of his back just over the "short ribs," and pitch the whole weight of your body forward, so as to bring the fullest squeezing pressure upon his lungs. This downward pressure should occupy about three seconds. Then swing upward, lifting the hands away quickly. The natural elasticity of the ribs, and the pressure of the abdominal organs will cause the chest of the subject to expand.

Repeat the procedure in three seconds, making about a dozen of these movements a minute. The tongue will fall naturally forward by gravity, allowing any mucus or water to escape readily through the mouth.

By this simple method almost as much air is forced into the lungs of the victim as he might breathe voluntarily. This is the "Shaefer method," being generally adopted all over the world. Promptness in beginning the pumping operation is the essential thing; also patience and perseverance in keeping it up. Don't give up for at least a half or three-quarters of an hour. (Further details, with illustrations, will be found in Part One.)

Now all these are simple little things, not difficult to remember. They may not be quite so academically orthodox as the Punic Wars, or "Veni, Vidi, Vici,"—but they are much more important, and interesting.

And, what's more, they should be taught in every boys' and girls' school in the world; the higher, the more definitely and completely.

This would be a real advance in the great movement which is making physical culture and physical nurture among the most important of all physical sciences.

WHY YOU NEED AN ANNUAL PHYSICAL EXAMINATION

By Dr. EDWIN F. BOWERS

WHEN your friend asks "How are you?" do you know?

You probably tell him that if you felt any better you'd have to send for a doctor. Then he laughs, and tells you "It serves you right; all your own fault." And both of you are immensely pleased.

Yet you have something or other the matter with you—especially if you are more than forty.

The chief reason for this depressing state of affairs is that you don't know nearly so much about yourself as you do about your automobile. Nor do you have yourself looked over as often as you do your automobile. This is where you lose many valuable years of life and much physical efficiency.

For, while it is true that the average of longevity is increasing, it is also true that men and women are dying off faster than they did a generation or a half a century ago. Many good folk are confused on this simple point. They are prone to tuck their thumbs into the armholes of their vests and inflate, in consequence of their plentiful lack of knowledge on this subject.

Now get this clear. The principal cause of the low average of life in former years lies in the enormous infant mortality.

If you take a million infants, for example, who died before they were a year old, and add them to the men and women who died at the age of thirty, forty, fifty,

sixty or seventy, the average length of life would be greatly decreased.

Our slightly increased intelligence enables us to cut this million deaths of infants to a half million—or even a quarter million, in exceptionally favorable seasons and surroundings. Naturally, this increases the average length of life.

But this doesn't mean that men and women live longer than they used to—despite all the wonderful advances science has made in helping them preserve their lives. On the contrary, the opposite is true.

The "life expectation" at forty is less than it was twenty-five or fifty years ago. Disease of degeneration, particularly diseases of the heart, kidneys and blood vessels, are increasing to an alarming degree—especially among mental workers, and those in sedentary occupations.

Kidney diseases alone claim approximately one hundred thousand victims a year in the United States. The death-rate from these diseases is increasing at an abnormal rate—seventy-two per cent in twenty years to twenty-three per cent in the past ten years.

If we continue our mad rush and scramble, if we persist in ignoring the common rules of health—of hygiene, exercise, diet, rest, recreation—the withering leaves of our lives will fall faster and faster, while the outlook for doctors and undertakers is most promising and alluring.

At present the average death-rate in the United States is about fourteen a year to each thousand of population; of which proportion alcohol and syphilis can be credited with a goodly two per cent.

However, it is the insidious character of the degenerative diseases—heart-disease, arterio-sclerosis, Bright's disease—that makes them so dangerous. This, and the fact that our treatment of them must be more or less empirical—directed toward the removal of causes.

To illustrate, consider the results of the routine examination of the employees of the Department of Health of the city of New York. These results are especially significant since the average age of these employees, namely 33½ years for the men and 32 years for the women, represents the period when preventive measures might most profitably be begun.

Of the 700 employees 20, or 2.8 per cent, were overweight to such a degree as to menace their health. For forget not that a big load of that perilous stuff that doth weigh upon the heart—and all the other vital organs as well—is a serious handicap in life's hurdles, and has a definite, measurable effect in shortening life—so recognized by insurance examiners. For no one can rock his abdomen to sleep in his lap and last as long at the job as an individual of merely human proportions.

The emaciated, under-nourished individual, however, is equally handicapped, for he hasn't anything that disease can feed upon before it feeds on him. He has just thirty per cent less chances of recovery from typhoid or any wasting disease than one who is comfortably plump.

An abnormally high blood pressure, with some albumen in the urine, was found in 25, or 3.5 per cent of these employees.

While there is some difference in opinion, even among the most able men, as to the significance of an

excessive blood tension, it is quite generally accepted that persistent high blood pressure represents a condition that is bound to put extra work on the heart and circulatory apparatus, and that ultimately the kidneys and other eliminative organs are bound to suffer because of this excessive work thrown upon their frail shoulders. When albumen appears in the urine as a constant factor, the portent is ominous. And when finally casts, especially fatty casts and epithelial cells appear, the condition is grave. For these mean degenerative changes in the kidney structure.

Also, some derangement of the heart, more or less dangerous in character, was found in 92 of these city employees, or 13.2 per cent.

Hardly one of these men and women had any suspicion that there was anything the matter with them. Altogether the number of persons who needed medical advice or treatment, or both, was 327.

This means that 44 average men and women—out of every 100—presumably in the prime of life, had, without knowing it, some physical defect which might have and probably will, even in spite of treatment, shorten their lives.

After allowing for the factors of syphilis, over-indulgence in alcohol and tobacco, for gout, rheumatism, muscular overwork and occupational diseases, there is big increase in degenerative diseases which seems to be accounted for by assuming an over-indulgence in food.

But our ancestors were also valiant trenchermen. They ate anything and everything. And they ate all they could hold—and a little more on top of that, for good measure. And they drank anything and every-

thing that was not too hot and hearty to swallow. Still they thrived and labored by the sweat of their brows—and got tough and tougher, and old and older—until finally a tree fell on them, or they were struck by lightning, or some other accident befell them that cut them off in the prime of their youthful old age.

But they didn't worry much, and they *did* exercise a whole lot. To my way of thinking this explains their longevity—in spite of all the horde of life-shortening things, the cure for which was not discovered until far too late to do them any good.

They ploughed the stubborn glebe, and homeward they wended their weary way. But they had completely oxidized every molecule of protein, to say nothing of the hydro-carbons and carbo-hydrates they had loaded aboard during the previous meal.

The main thing they worried about was what "mother" had for dinner and supper, although they knew without being told that whatever it was there'd be enough of it.

But we, their effete descendants, became too prosperous. The average American over forty, for instance, has more money to spend than the average European. What does he do with it?

First or foremost, he eats it, lots of it, especially translated into meat. This might not be so bad if he were to limit the amount of starch and sugar he takes with his meat.

The individual has only so much oxygen in his tissues. He can only oxidize and convert a certain amount of food product.

Starch and particularly potato starch, being so much

more readily oxidized than protein, takes advantage of this oxygen, leaving none for the albumen molecule. This, lacking the necessary oxygen to complete its oxidation and convert its end products into harmless substances for elimination, emulates the example of the hunchback Richard—"since I can not be a hero I am determined to become a villain." And it does.

It forms indoxyl, xanthin, hypoxanthin, and a lot of other formidable and fierce sounding compounds, which have a powerfully depressive effect upon the nervous system, and also upon the organs and vessels subject to degenerative changes.

Authorities show conclusively how the alkalinity of the blood and body fluids is decreased by our pernicious over-indulgence in sugar, and how this directly causes actual degenerative changes in various vital organs.

Then, too, we ride around—in automobiles, if we can afford them. If not on top of the bus, in electric cars, in subway trains, or in anything and everything that runs on wheels.

Perhaps there is no one reason so potent for early decay and dissolution as our tendency toward a sedentary and luxurious existence. This is true not alone of the wealthy, but of those of even moderate incomes.

The farmer, the artisan, the clerk, are more prosperous in America than anywhere else in the world, and more disinclined to exertion. Hence they die younger and more enthusiastically than their benighted confrères in the Old World.

The answer? Never ride when you can walk. Never save yourself work that will help you to an honest sweat. Study the Olympian System—and *live* it.

Next take Old Man Worry down to the wharf, tie a stone around his neck and kick him overboard.

For worry never helped anybody into anything—except an early grave. Worry is the effect, as well as the cause, of many physical delinquencies. So to completely eliminate worry it is frequently necessary to find its pathological as well as its mental cause, and remove them both.

There is another reason for early old age and physical degeneration—another important reason for a periodic physical stock taking. That is tooth decay.

There is the very intimate connection between decayed teeth and a large number of diseases that apparently have nothing to do with teeth. Ulcers and cancers of the stomach have been traced to decayed teeth; so have rheumatism and diseases of the kidneys. Tuberculosis can be traced directly to the malnutrition resulting from improper mastication of food, or from direct infection of foul mouths.

Many cases of mouth breathing and adenoids arise because of the lack of a proper combination of brush, tooth paste, and elbow grease, judiciously and persistently applied. Decayed teeth may cause disease in the ears and eyes, and various other unpleasant or dangerous conditions, more or less remote from the seat of war. Ulcerated tonsils and swelling of the glands of the neck, and those very serious diseases of the cavities of the facial bones (sinus abscesses) develop quite frequently from the infection of dental decay.

Almost every germ of a general infectious nature can be found in the cracks and crannies of hollow teeth—waiting and watching for a favorable opportunity to

jump out and pounce upon the insufficiently protected or fatigue weakened organism. Measles and German measles, chickenpox, whooping cough, mumps, scarlet fever, diphtheria, influenza, and smallpox have bred in the fertile soil of decayed and neglected teeth, and have manifested their presence by starting the particular kind of trouble for which evolution has designed them.

This suggests the importance of thorough mastication. Perhaps there is no one thing wherein the patient may minister to himself more assiduously or effectively than in the proper mastication of his food. Fletcher had a death grip on a very big idea in his doctrine of the "Long Chew."

For there isn't a particle of doubt but that seven out of every ten persons bolt their food, fondly imagining that the stomach is amply provided with teeth.

That food bolting is one of the chief causes of indigestion no one will deny. This would be bad enough if indigestion stopped where it was—with a mass of rotting food (for that's exactly what it is) in the stomach or the upper intestines.

But it doesn't. It produces a breath reminiscent of the Cloaca Maxima of Rome. It fills its victims chuck full of poison gas, which interferes with the proper action of the heart and lungs, and hinders intestinal digestion. It loads the system with a lot of toxins that poison the nerves, causing irritability, insomnia, neurasthenia, functional heart troubles, and all manner of distressing symptoms, not the least of which is the intensification of the original trouble—digestive failure through atony—or lack of tone and digesting power in the alimentary tube.

Fletcher had the right idea. But he had it by the throat and choked it to death. There's a difference between mastication and masceration. Food must be thoroughly chewed. But the injunction to pulverize it into impalpable pap is impractical, unnatural, and wholly unnecessary.

Having done all we can for ourselves there is yet another thing we can have done for us. We can have an expert overhaul our physical machine and provide it against a breakdown.

An analysis of the urine once, or better still twice, a year, will disclose the presence of Bright's disease or of diabetes in a stage in which these diseases are curable or in which their progress may be arrested for years.

For in most cases breakdown of the kidneys, or of the processes of metabolism responsible for the failure properly to convert and oxidize starches and sugar, comes about slowly and painlessly, without any objective warning signals. The result is that when the discovery of nephritis or diabetes is made the disease may have gained a tremendous and discouraging lead—it may be eternally too late to do it any good.

But a semi-annual urinalysis will uncover the condition, even in its most incipient stages, long before there is any other evidence, patent to the victim, that he should be "getting busy."

No doubt thousands of lives could be saved each year by a careful urinalysis and an auscultation of the lungs by a competent skillful physician.

Also any abnormal increase or decrease in the blood pressure should immediately attract attention, the one because it indicates a lowered state of vitality and a lack

of resistance, and the other because it shows the presence of tension, either from nerve stress or from the insidious irritation of some poison or toxin. In either case—but especially in the high pressure conditions—there is a likelihood of developing degenerative changes in heart, kidneys or blood vessels, unless the cause of the pressure is corrected.

In addition to a yearly or semi-annual precautionary visit to a physician, every man and woman should have a thorough examination made of their spine—by an osteopath, or a competent chiropractor.

Don't trust the average doctor on such an important matter. For there isn't one in a thousand who knows anything about spinal lesions—unless it were a scoliosis bent like a bow, or some gross anatomical deviation.

Yet grave disorders may have their origin in some hardly palpable spinal mal-alignment. I recall a case of "heart disease," in a medical friend who had a very badly functioning heart, irregular in rhythm, irritable, and with a most disquieting "skip" every third or fourth beat.

He was on the point of giving up his practice and "taking it easy till he got well," when I persuaded him to try the effect of osteopathy on a very prominent "hump" on the fourth and fifth dorsal vertebrae.

The osteopath put the vertebrae back in proper place, and corrected also a rib lesion in that same neighborhood.

Within a few hours my friend's heart was absolutely normal, and after a few weeks' treatment it remained that way permanently.

I have seen albumen and hyaline casts clear out of

the urine of more than one man who had some mal-alignment in the region of the tenth dorsal vertebra, while it is a rather common occurrence for osteopaths to correct incipient diabetes by straightening out spinal mal-position between the sixth and ninth dorsal vertebrae.

These things seem almost preposterous—especially to a medical man saturated with the usual prejudices of medical men, and a few of his own for good measure. Yet there is the heart—listen to it. There are the urines—test them. There's more in heaven and earth than some people are willing to admit.

So, if you have any love for yourself, or any desire to adorn and gladden the environment in which you happen to be, find out what's the matter with you—assuming that you are not the perfect missing link connecting mankind with the gods. Then cure it, or put a muzzle on it and tie it up where you can watch it. For one of the very best means ever discovered for attaining a ripe and benevolent old age is to contract some incurable disease and then take good care of it all its life.

COLDS AND COUGHS

By WILLIAM EASTMAN

BREAK up that cold. Get rid of it.

That's what everybody tells you when your head is all stuffed up, your nose and eyes red, your throat raw, sore and sandpapery, your chest tight and congested, and your whole being feverish and hot with a "cold." Just as if you wanted to keep the plagued thing!

Never neglect a cold, they will tell you, because it may run into pneumonia, kidney disease, hifinutinonthechest, con something or other, and so on. Don't neglect it. And then you learn that a cold must run its course and wear itself out, and that there is nothing you can do for it.

What is a cold? Ask the doctor. Why—er—hem and haw. A cold is a "coryza," which makes everything perfectly clear. A coryza is a "catarrh of the mucous membranes of the nasal passages and adjacent sinuses, popularly called 'cold in the head.'" In short, it is an inflammation and congestion of the mucous membranes of the respiratory passages. You know almost as much as you did before.

Of course you knew all the time what a cold is from experience, and yet common and familiar as it is, the thing is still a medical mystery. A great deal is said about colds, but little is known. What are their causes? How do we take them? Do we catch them or do they catch us? Apparently they often catch us napping.

There are various theories. According to the old-

fashioned view, colds are the result of exposure to cold air or to draughts, or perhaps of a chilling of the extremities, as in a case of wet feet. More recent theories hold that colds are the result of a stuffed up or poisoned condition of the body. And of course the conservative medical mind contends that a cold, like everything else, is a product of some germ infection. What is the truth?

Very possibly either or all of these factors may help to cause a cold in various cases. It would appear, however, that low temperatures do not necessarily cause this complaint, for the reason that Arctic explorers practically never experience colds, though they may suffer severely from cold. On the contrary, heat is just as likely to produce this complaint.

It is a curious thing that one seldom catches cold in the open air. Even when subjected to severe winds, one does not catch cold. But draughts in a house have been blamed for this disorder ever since nobody knows when. It is possible that trouble may arise in susceptible persons through a localized difference in temperature of various parts of the body, interfering with the normal distribution of the circulation. This would also apply in the case of wet feet, when the latter become chilled. Certainly no one could suffer any evil effect from wet feet if they could be kept warm at the same time.

The chilling of a part of the body, as when exposed to a draught, causes a contraction of the skin and blood vessels in that region of the body, and this naturally means a congestion of blood in some other part, frequently of the mucous membrane of the respiratory tract, which has sometimes been spoken of as an "inside skin." This congestion is often made apparent when it

causes one to sneeze. It is probable that if the equilibrium of the circulation could be maintained under all conditions, one would not readily catch cold.

A burst of sneezing indicates only a temporary congestion of the nasal passages. It does not usually lead to a regular cold. The congestion passes away as soon as a good general circulation is restored. This and the failure to catch cold in many instances from wet feet or from exposure to draughts and chilling shows that there are other factors in producing this disorder which must be considered. There is apparently a susceptibility or a condition favorable to the development of the cold which must be regarded as its real cause.

Over-eating, lack of exercise, indoor life and other conditions conducive to imperfect elimination of impurities in the system, are unquestionably conducive to this susceptibility. In short, a stuffed-up condition of the body predisposes one to this acute catarrhal condition of the mucous membranes. It has been held that a cold is simply an effort upon the part of Nature to throw off impurities. In its very nature it obviously appears to be an eliminating process.

What may be called the uric acid theory of colds is interesting. An excess of uric acid has been said to be the cause of rheumatism, gout, and many other affections. Dr. Alexander Haig, of London, is the champion of the uric acid theory, and contends that a person free from an excess of uric acid would never "take cold." This condition he believes may be attained by a "uric acid free" diet, that is a diet free from purin or purin forming material. His diet accordingly would proscribe meat, peas, beans, tea, coffee and beer, leaving one free

to use milk, cheese, fruits, cereals and most vegetables, with eggs and nuts to some extent. Those who are predisposed to frequent and violent colds might find it well worth while to try out Dr. Haig's suggestions. Irrespective of the stated uric acid forming tendency of certain foods, however, it is entirely probable that a low protein diet would often be advantageous in the case of an inactive person. An excess of protein may be productive of serious poisoning of the system.

There is no question that lowered vitality due to any cause makes one susceptible to catching cold. Dissipation, for instance, lowers one's resistance. Carousals cause coryzas. Not only does the "night out" debilitate one and pave the way for colds and worse, but the moderate or so-called "temperate" use of alcohol and tobacco creates a susceptibility by weakening the natural resistance of the tissues. The tendency towards pneumonia of the chronic drinker is well known, as is also the extreme danger of death from this disease if he contracts it. The probability is that what might be only a cold in a vigorous individual may often assume the seriousness of pneumonia in the drinking man.

Excessive and continued fatigue, due to overwork of either a mental or physical nature, or lack of sleep, will put one in a condition to catch cold easily. Fatigue means a choking of the tissues of the body with waste poisons. Constipation through the resulting poisoning of the system is also a factor in many cases. Diseased tonsils, bad teeth and defects of the nasal passages, are often blamed as being the source of infection resulting in cold. But in any case, they are inactive until the system is run down.

An important cause of colds that is commonly overlooked is that sheltered indoor existence by means of which many people think they will be able to escape from this complaint. Living in overheated rooms means not only the breathing of bad air, but the breathing of exceptionally dry air as well. It is the lack of a proper amount of moisture in the air that sometimes makes one feel chilly even in a warm room, with the result that more heat is used. With the air still hotter it becomes still drier. This not only makes one tender so far as resistance to cold is concerned, but especially it dries up the mucous surfaces of the respiratory passages and in that way makes them susceptible to colds. If you must live indoors, see that the rooms are not too hot, but especially see that you have sufficient humidity. Throw a wet bath towel over your steam radiator, and by the time it is dry wet it again. You will save coal by so doing and feel warmer.

If your bodily condition is truly satisfactory, your blood pure and your circulation vigorous, you need have no fear of catching cold, either through draughts or germs. Indeed even conservative medical opinion now recognizes the benefits of a draught, because it signifies fresh air. The danger of catching cold as a result of draughts is really very slight unless one is extremely sensitive or is stuffed up with impurities as already suggested. It is not the draught so much as the bad air and other unhealthful conditions that one should fear.

While the "regular" school of physicians insists that a cold is the result of a germ, the statement is now generally qualified by the explanation that it can only secure a foothold when the soil is favorable, that is when there

is lowered resistance. It is admitted that the germs supposed to cause colds are found continuously upon the mucous membranes of healthy persons, but without doing harm, because of the natural resistance of the tissues. This, it is explained, is the reason why some persons catch cold while others do not, and why the same individual is proof against it one week and susceptible the week after. It is said that the chilling of the body through exposure has the effect of reducing the resistance, so that the little bug is then able to bite and multiply and make trouble generally.

There is no question that colds often act very much like other infectious diseases, and it may be that bacterial action is sometimes involved, as in influenza or pneumonia. At times it is hard to tell whether one is suffering from an extremely bad cold or a mild attack of influenza, for it is hard to draw the line between them. Some colds are quickly broken up while others hang on very stubbornly. Possibly in the former case there is only a congestion of the mucous membranes, whereas in the second case, which may be associated with headache, backache, muscular stiffness and general misery, there may be a germ involved. One may well hesitate to be dogmatic upon these points.

In any case, however, there is no question that a person experiencing a bad cold is suffering from an overcharging of the body with impurities or poisons. Whether these take the form of uric acid, the toxins produced by bacteria or any other foreign matter, the central fact is that the body is stuffed up.

What then should one do with a cold? Can the cure be hastened, or must the cold run its course?

A cold is truly a simple matter, if one handles it correctly. The best way to get rid of it is simply to cast it out. Eliminate it literally. The great need is to purify the blood. In other words the one quick and effective remedy is elimination.

The one most available and valuable channel for rapid elimination is the skin. It may be stimulated by special treatment to unusual activity. Perspiration indeed is one of our most valuable blood purifying processes.

That is why a "good sweat" has been recognized from time immemorial as an effective method of breaking a cold or a fever and setting the body to rights. It is simply a matter of getting rid of the poisons through the pores of the skin.

Even physicians recognize this. After telling you all about germs as the cause of a cold, the medical writer will turn about in the very next paragraph and tell you to take a hot foot bath, a hot drink and a cathartic. In other words instead of logically killing the germs, the important treatment is the simple process of elimination, just the same as if there were no microbe connected with it.

Any treatment inducing profuse perspiration will be effective in treating a cold. A great many men have learned the value of a Turkish bath for this purpose. It cleans one out. Any other good "sweat" will do just as well. If one is vigorous, a cross-country run fully dressed and with a good sweater will answer the purpose splendidly, though one must not become chilled afterward. Indeed such exercise will sometimes break up a stubborn cold. The writer at one time, when ex-

tremely busy and careless in the treatment of a cold which had hung on for three weeks or more, had occasion to take an unexpected three mile run. It "broke" the cold. The average man or woman might not be capable of such vigorous exercise, but a long and energetic walk, warmly dressed, resulting in copious perspiration, can be recommended.

For the ordinary case, however, a hot bath is probably the one most effective form of treatment for this purpose. A good substitute is a hot foot bath in a warm room, while wrapped up well in a blanket, and supplemented by a hot drink, preferably hot lemonade. By the way do not consider a whiskey sling, a toddy or any hot alcoholic beverage in this connection. Alcohol does not fight the cold, but it weakens your resistance and your ability to fight it. Above all things avoid quack remedies, pills and drugs for curing colds. Most of these are coal tar products and more or less poisonous and harmful. Natural methods are better.

A steam cabinet bath or a dry hot air bath will answer the same purpose as the ordinary hot water bath, but the latter in most homes is more convenient and probably more comfortable. It is somewhat a matter of preference. Water at a temperature of 105 to 110 degrees may be used if one is vigorous. Use a bath thermometer. It is best to get into the bath at about 102 degrees, then turn on more water stirring it meanwhile, till you have a temperature of perhaps 108 degrees, or as hot as you may find comfortable. You may stay in this bath anywhere from ten to twenty-five minutes, or until you find it oppressive or uncomfortable. Do not stay in until you feel weak. Be careful if you have a weak

heart. You may drink cold water while in the bath with good results. It is important not to become chilled after leaving the bath, and a cool sponge or a quick cold shower, depending upon your strength, will be advantageous. Following this bath it is best quickly to get into a warm bed, covering up so that you will stay warm and continue to perspire until morning, granting that the bath is taken in the evening. This treatment alone will usually break up a cold, but if it is persistent the hot bath might be repeated every other night.

We are told we must not sneeze for fear of spreading colds, just as if one can always avoid it. The old plan of pressing the upper lip with the finger will sometimes work, but getting one's feet and hands warm and the circulation active is a much more certain preventive. A run around the block, a clog dance, a handstand or other exercise to accelerate and more perfectly distribute the circulation will usually enable one to avoid sneezing, as well as the congestion of the mucous membranes leading up to it. Indeed, active exercise, particularly prolonged exercise, will make congestion in any part of the body almost impossible except where there is acute infection of some kind. Again, if you feel a "cold coming on" and find yourself sneezing violently and repeatedly, you may find as I have found that a hot bath will stop sneezing and prevent any further tendency toward it for the next day or so.

Anything else that increases the activity of the skin is helpful. Dry friction rubbing is splendid for this purpose, also for increasing circulation. Air baths and the wearing of loose and porous clothing are especially advantageous. It is important, however, that one should

avoid becoming chilled when suffering from a cold, and the best test of normal bodily warmth is a condition of warm feet and hands. If the extremities are comfortable and warm, you may know that your condition is satisfactory.

Cold baths, taken in the morning, are helpful in preventing colds and also in curing them, if one can react with warmth. If they leave the body in a glow, they are very beneficial. If they leave one chilled and unable to recuperate, they are detrimental. Cold baths and air baths are especially recommended as an every-day practice, to improve the adaptability of the skin, in order that one may avoid the extreme sensitiveness to cold.

If there is any tendency to constipation, this should be looked after. An enema is a good emergency treatment, to be taken immediately on the first signs of the cold, but free water drinking and the use of fruit will usually be effective. If you are inclined to the use of cathartics, it would be better to use Russian oil or mineral oil instead.

The free drinking of water is especially commendable to promote more active elimination. Hot water is especially helpful. So far as the throat may be affected, it cleanses and to some extent sterilizes this part.

In dealing with a severe cold, it is best either to fast for two or three days or to adopt an exclusively fruit diet. A fast is always helpful in eliminating a cold, and it is imperative when one's appetite is lost. Eating without appetite when suffering from a cold is to add fuel to the fire.

It is not to be assumed, however, that a fast is always necessary. In some instances there is a strong craving

for acid fruits, and in such cases oranges, grapes, apples, grape fruit and the like may be used as freely as desired. The fruit diet is sometimes to be preferred to a complete fast.

In still other cases where there is no loss of appetite, neither fasting nor the limitations of a fruit diet may be necessary, providing one follows a fairly light low protein diet. In other words, the mere reduction of the amount of meat, eggs, and other high protein foods is often a sufficient change in the diet, especially if one makes it a point to use plenty of fruit when the latter agrees with him. Again where increased vitality is the chief requirement, the exclusive milk diet may be found best.

Other health requirements should be looked after when fighting a cold, particularly sleep and fresh air. If the trouble is partly the result of excessive fatigue you will most of all need plenty of sleep, and if this can be secured in the open air, so much the better. To shut yourself up in the house when suffering from a cold is a serious mistake. If you could live an exclusively out-of-door life you would get rid of it very much quicker.

The treatment of a cough is practically the same as the treatment of a cold, inasmuch as the one is usually the outcome of the other. Honey or honey and water may be used as a means of temporarily relieving a cough. There is no better cough syrup. Patent cough medicines all contain opiates or other injurious drugs.

Getting rid of a cough requires improved circulation and more active elimination. Remember that an ordinary cough is a natural action designed to throw out phlegm and mucous discharges. A bronchial cough, how-

ever, is sometimes very stubborn and may take the form of an irritation or a mere nervous habit. In such a case the inclination to cough should be resisted, but through the building up of the general health, the practice of daily exercises, outdoor life, a suitable diet, and care in maintaining a good circulation and bodily warmth, as indicated by warm feet and hands, one may eradicate a bronchial cough in a short time just as one may overcome catarrhal conditions by the same methods.

It is often said that a neglected cold may develop into something more serious. The truth is that it is the weakened bodily condition that may develop into a serious disease. One can not avoid germs, but one can keep himself or herself in such a state of health that the germs will have no effect. What starts out like pneumonia may not become any more serious than a cold, if one starts treatment immediately. A well nourished, healthy person need have no fear of pneumonia. Sometimes an athlete dies of pneumonia, but even a former athlete may be poorly nourished or lacking in resistance. And it is then that pneumonia may attack him. Chronic alcoholics are particularly susceptible to pneumonia, having very little resistance to this disease.

Tuberculosis following a prolonged cold is probably not so much the result of the cold as of the run-down state of health and lowered vitality indicated by the persistance of the so-called cold. If a cold hangs on top long, it indicates need for a strenuous change of habits. Even tuberculosis in its early stages can be cured by living completely out of doors and on a full, nourishing diet. The exclusive milk diet is the best possible for this purpose.

HEALTH AND THE LIVER

By Dr. C. S. CARR

YOU are bilious, are you? Your tongue is furred. Your breath is bad. You have an oppressive feeling on the right side just under the ribs, a heavy, dragging sensation, almost amounting to pain. You are constipated. The bowels are very irregular, sometimes too loose, sometimes constipated. You loathe food one day, and the next day you can not eat enough. You are taking powders and bitters and tonics and digestants, and all that.

Well it is lucky for you that somebody invented the word bilious, since there is no opprobrium attached to the word, and you are privileged by common opinion to imagine that biliousness means some sort of a disease which you have innocently acquired, either having got it from your neighbor, or inherited it from your forefathers, or that it is in the air, or water, or the food you have eaten. Bilious! Yes that is a fine word. There is no hint in it of the real facts.

If some Billy Sunday sort of a doctor should come along, an outspoken teller of the truth, he would plainly inform you that you are a glutton, a gormandizer. You have simply been in the habit of stuffing your stomach with all of the food you could possibly get into it. You have been in the habit of eating for the pleasure you get out of it. You have selected your food because it tastes good, and you have continued to eat just so long as it continued to taste good.

You have no idea what becomes of the food after you

swallow it. If you find yourself eating a little less than usual, that means you will have to take some tonic or some alcoholic drink with your meals. Logical treatment, isn't it? A cocktail before meals to excite your appetite; then some expensive liqueur after eating, to help digestion. Attractive program.

Yet if you knew what was going on down there in your liver while you are indulging in all this sort of thing, you might hesitate to carry on this program any longer. I wish I could make you see how it is that everything you swallow into the stomach, absolutely everything except the oils, is dissolved, digested, made into a semi-fluid, and must pass through the liver—all that champagne you drank, the whiskey, or beer—all that nice, juicy steak—and puddings and pies and pastries. For all that conglomerated, heterogeneous mass of palate tickling stuff you indulged yourself in, has got to go through the liver, and be taken up by a great vein whose rootlets originate in the alimentary canal—taken up, the whole of it, and carried through the liver.

And the liver has got to contrive somehow to get along with the mass, two or three times as much as the liver has any need of. But that makes no difference to you. You never knew anything about it. If you did you didn't care.

And now you are bilious, are you? Umph! Isn't it a shame? Nature should have given you a cast-iron liver, with compartments for compressed air and tubes with rubber valves to force things along—a liver that could stand any tom-foolery that you had in mind to impose upon it.

But inconsiderate Nature did not furnish you such

an organ. It supplied a regular, old-fashioned, flesh-and-blood liver,—a good one too. If rightly used it would be a source of great comfort and satisfaction. But owing to the way you are treating your liver you are bound to hear from it. Yes trouble begins almost at once.

Oh that nasty taste in your mouth! Well, what else could you expect? If you make a garbage can of your stomach, what do you suppose your mouth ought to taste like? If your liver has got to act from day to day as a refuse disposal plant did you suppose you could still have a nice clean pink tongue, a sweet breath, a clear complexion?

The liver has tried very hard to save your complexion. It has resorted to every function within its power to keep the foul odors from your breath. It has tried to conceal the evidences of your disgusting habits. But you have poked the food into your stomach too fast —too many kinds, too much of it. The liver has become overwhelmed—and now you are beginning to find out that you are bilious!

You ought to be sent to the workhouse and put upon a bread and water diet for twenty days, spending ten hours each day breaking stone for the road, with a heavy stone hammer. That is what ought to be done to you.

Of course this is not what will happen. You will step into some doctor's office and tell him in a half-truthful way how you feel, what you have been doing, and the chances are that he will in a very polite way call your disease something that reflects no discredit upon you, and then give you something to take for it, and you will go out of his office feeling quite virtuous. You

have certainly done your duty now. You have gone to a doctor. You have paid your fee. You are playing in bad luck anyhow. You can not see any reason why you should be sick. It seems to you as if Fate was against you. And so you will go right back to your eating. Now won't you?

Have you ever heard of those people who fast?—those people who live frugally on a rational diet?—who exercise themselves freely?—who have no other means of keeping well or getting well except to live close to natural laws? Have you ever heard of such people? Yes, I thought you had. What a queer set of cranks they are, to be sure!

You would not be like them for anything in the world, would you? No, of course not. Why, if you lived as they do, what about the banquets, the club dinners, the after-theater suppers, and the like? Where would these come in? Why they would have to be simply cut out, that is all.

You don't know what life is. You don't know what it is to live without a dope of some kind—beer or tobacco, coffee or cigarettes, tea or cocoa, something or other that stimulates, that stupefies. You don't know what it is to stand out under the open sky with nothing inside of you but water and plain food, joyful that you are alive, to look up into the starry heavens and feel that you are a part of God's creation, so glad of life that you throw yourself on the ground and kiss the earth in exuberance of feeling.

You don't know what it is to live that sort of a life. Yours is quite different. Eye openers in the morning. Eye closers at night. Powders and pills through the

day. Something to keep you awake. Something to make you sleep. Something to give you strength. Something for this and something for that. Everything except plain food and water.

You are bilious, aren't you? I have a garbage can out back of my house. I keep it down in a cement pit, made on purpose for it, with a tight cover over it. A filthy garbage can. Into it every bit of stale food, all the leftovers are dumped.

That garbage can of mine is always bilious, just like you are, and for the same reason. It contains a lot of fermenting, soured material.

From the bottom of my garbage pit, where I keep the garbage can, a pipe leads to the sewer. Quite frequently I turn the hose on the filthy garbage can and rinse it out, can and pit and all. I run several barrels of pure water in a powerful stream through the whole thing and thoroughly cleanse it out, and then for a day or two my garbage can is not bilious.

I wish I could treat you in exactly the same way. I wish, first of all, that I could turn a hose on your liver, your stomach, and your alimentary canal, and clean you out, just as I clean out my garbage pit. Then you would not be bilious for a while. That is the sort of treatment you need.

Then after refraining for several days from taking any food at all into your stomach, you would develop a natural appetite. You would like ordinary things to eat. You wouldn't have to have a tonic before meals or a digestant after meals. You would be glad to get a little plain food. You would eat with a relish that you never knew of before. Yes, you would.

The people who used to turn their heads every time you came close enough to breathe in their faces, would not do so any more. They would like to talk with you, face to face. They would be charmed with your clear complexion, your sparkling eye, your clean teeth, your sweet breath. Wouldn't that be great? How much would you give to be converted from your present state into that sort of a man or woman, clean inside and out?

Yes, of course I know there are people beside gluttons and gormandizers who get bilious. These are people who live sedentary lives, who sit in a chair all day, and do some literary or clerical work.

The health of the liver depends largely upon active exercise. It is a great, big, heavy organ. Unlike the stomach and bowels, it has no muscular tissue. It depends entirely upon movements of the body for exercise, being wholly incapable of exercising for itself. And yet the circulation of the blood, the portal circulation, the venous circulation, the arterial circulation, the lymphatic circulation, all these circulations in the liver depend upon mechanical movements of the organ.

If a man or woman sits all day in a certain posture, the liver must necessarily suffer for the want of exercise. Such a person may eat correctly, may be abstemious in his diet. Yet because he gets little or no exercise for his liver he becomes bilious.

Yes, the amount and quality of blood that reaches the liver is all right. But because of the quiescent, passive condition of the liver, the manufactured bile lies sluggish in the bile ducts, and portions of it are absorbed into the blood, producing jaundice, and the bile gets thicker and thicker until in the end it actually clogs up

the bile ducts. It is just this sort of thickened bile that makes gallstones, produces "brick dust" sediment in the urine, creates bilious colic, and all that.

What such livers need is exercise. You know where the liver lies in the body. Put your hand over it. Put both hands over it. Shake it up and down. Lie on your back, with your hips the highest. You have a good chance now to give the liver a good deal of exercise with both hands. Walk to and from the office, even though it be three or four miles away.

Gallstones; it is the passage of these through the ducts that causes what is known as bilious colic,—a terribly painful ordeal. If you have ever seen any one have a regular bilious colic you never will forget it.

I was called to a case once, many years ago. Before I reached the case they had given the patient what they supposed to be castor oil, though it afterward proved to be sweet oil. Spoonful after spoonful of the oil had been given, until nearly a pint had been administered. The patient had rolled about in bed, and had pressed over the liver with both hands. The attendants to help him in his terrible ordeal, had pounded and kneaded and exerted considerable manual force over the region of the liver, while he was swallowing the sweet oil.

When I arrived he was in the height of his trouble. But suddenly before I was able to do anything for him, the pain was relieved. At first I suspected that the bile duct had ruptured, and that I should have a fatal case of peritonitis to deal with. But nothing of the kind happened. The relief was sudden and permanent. I was somewhat puzzled to know what had happened. The passages from the bowels were carefully watched,

and a large gallstone was discovered the next day.

Thinking the matter over, I made up my mind that they had accidentally followed the correct treatment for bilious colic. The constant movement and other exercises over the liver had actually forced some of the sweet oil, which had passed through the stomach into the duodenum, onward into the common bile duct, lubricating the passage, and assisting the escape of the gallstone that was doing the mischief.

Since that I have always treated these cases with sweet oil and massage, though since paraffin oil has come into common use we have some reason to believe that it is better than the sweet oil, being absolutely without any evil effect, and even more bland than the sweet oil. Half a pint or a pint of the paraffin oil or sweet oil can be taken without any harm whatever, and if the patient is properly exercised and massaged, the chances are that the gallstone will be brought away.

But gallstones and biliousness and jaundice and a large quantity of sediment in the urine, which may be pink or white or brick-dust color, all these indicate an overworked liver as to food, and an underworked liver as to exercise. Water, exercise outdoors, plain, coarse food that has a considerable residue for the bowels to act upon are the remedies.

Now I am going to tell you something about the liver. I don't care whether you read it or not. If you will do what I have already told you, you need not read any further. What I shall say from this on will appeal to any one, whether they are ever bilious or not, and will prevent many people from becoming bilious.

The liver is the largest and the heaviest gland of

the human body. It weighs five pounds shortly after a full meal, especially if much drink is indulged in.

The architect who devised the liver must have had some special preference for the number five. For the liver weighs five pounds, has five lobes, is permeated by five fissures, is fastened and suspended by five ligaments, and is intimately attached to five other organs. It contains five different sets of circulating vessels, and requires five kinds of bile ducts to transfer the bile from the liver cells to the duodenum.

The liver is a large workshop, producing in a healthy person anywhere from twenty to fifty ounces of bile every day.

The bile is manufactured from material brought to the liver by the veins and by the arteries. Every organ in the body, including the liver, is nourished by arterial blood, brought to it by the arteries, and the waste products are taken away by venous blood, carried by veins.

This is all the blood circulation that the other organs of the body require. But the liver is supplied with a special set of blood vessels, bringing to it vast quantities of blood loaded with nutritive material. The most important of these blood vessels is known as the portal vein.

This vein has its origin in the mucous membrane lining the stomach and small and large intestines. Millions of small blood vessels, which are the beginning of the portal veins, are distributed within the inner lining of twenty-four feet of the alimentary canal, and coalesce into larger and larger vessels, finally reaching the liver through the great portal vein, which in the

substance of the liver divides and sub-divides until each one of the millions of liver cells receives its due proportion of the rich blood laden with materials brought directly from the digested food in the alimentary canal.

All of the starches, sugars and other carbohydrates, except oil, are brought directly to the liver. Some of this digested material reaches the liver in the form of glucose. Such a large quantity of glucose, if not accepted by the liver and converted into an insoluble form of sugar, glycogen, would immediately surcharge the blood with sugar, producing temporary diabetes. But the liver acts as a sort of a cold storage plant, in which the superfluous sugars are stored and dealt out to the blood as they are needed by the system.

The disease known as sugar diabetes is occasioned by an inability on the part of the liver to store up the glucose brought to it by the portal vein. This allows the glucose to pass immediately through the liver into the hepatic vein, and is carried out into the general circulation in such quantities as to produce diabetes.

Alcoholic drinks have an immediate effect upon the liver, because they are seized upon by the portal vein, and the alcohol reaches the liver without any change.

The liver acts not only as a storage plant, but as a manufacturing plant, taking the materials brought to it and converting them into biliary salts and acids, which are conveyed to the intestines by the bile ducts.

Bile has a great many uses in the alimentary canal, although this subject is not wholly understood. For instance, the presence of bile in the alimentary canal prevents putrefaction and decomposition, and increases the peristaltic action of the bowels, tending to prevent con-

stipation. It also helps to emulsify the foods and prepare them for absorption by the lacteals. It is suspected of doing many other things, which need not be enumerated. It is sufficient to say that the bile is very necessary to health.

The liver also acts as a garbage disposal plant. That is to say, it takes charge of the worn-out material of the body and converts it into harmless and soluble salts, which find their escape from the body through the kidneys, skin, breath or alimentary canal. One of the principal salts manufactured from the poisonous debris is urea, which is afterwards chiefly eliminated by the kidneys.

Owing to the tremendous amount of fluids circulating in the liver, venous blood, arterial blood, bile and lymph, the liver is a very fluid organ, much subject to congestion. Indeed physiological congestion occurs in the liver after each meal. Over-eating will produce unnecessary congestion of the liver. If alcoholic drinks are taken with the meal the natural congestion of the liver is much extended beyond its usual time. The result is that with gluttony and alcoholic stimulation, the liver is in a state of perpetual congestion, which finally produces chronic congestion.

It is not my purpose to enumerate all the diseases to which the liver is subject. I am proposing to confine my remarks chiefly to congestion of the liver and to derangements of the bile which result in disturbance.

Congestion of the liver is of two kinds, passive congestion and active congestion.

Passive congestion of the liver is occasioned by an obstruction of the hepatic vein, which is generally due

to some pressure upon it from without, or to an obstruction of the circulation further on. For instance, heart disease will produce a condition of the liver known as cardiac liver.

Active congestions of the liver are more frequent. They are generally the result of improper eating, especially over-eating. There is an active congestion of the liver quite prevalent in tropical countries, called cold liver, which is supposed to be due to change in temperature. Such a congestion is not common in this country. It would be quite safe to affirm that in every case of active congestion of the liver in America, gross habits are the direct cause.

Congestion of the liver will produce the symptoms that are ordinarily knows as biliousness. The liver is absolutely unable to cope with the excessive amount of nutrition brought to it, and the result is a general disturbance.

The usual remedy for such a condition is some cathartic. The effect of a cathartic is immediately beneficial, the poisonous action of the cathartic upon the circulation of the liver causing a temporary discharge of serum from the liver and portal circulation into the alimentary canal. Such a procedure of course is absolutely uncalled for and greatly harmful. Instead of taking the cathartic the patient should have dieted, temporarily confining himself principally to fluids and acid fruits. This will correct any case of congestion of the liver in a more rational way than drugs of any sort.

The old time physician could think of nothing else but calomel or blue mass whenever he confronted a derangement of the liver. He had no idea whatever of

correcting the difficulty by regulating the diet, indeed he would have considered it beneath his notice. And to a great extent this custom prevails among the medical men of today. Something out of a bottle, some pill or tablet, seems the most effective recourse to correct such difficulties.

If I were in the habit of purchasing for my house a certain amount of furniture every month, and I discovered at last that this was becoming a nuisance, that my house was cluttered up with an excessive amount of otherwise good furniture, I could of course correct the matter by taking out a portion of it every month and burning it up. This would prevent the household congestion. But how much more sensible it would be simply to quit bringing in furniture, to quit buying furniture for awhile and allow the surplus furniture gradually to disappear.

Giving physic is the same as taking out some of the furniture and burning it. The patient goes right on stuffing himself with unnecessary food, and in a short time he has to repeat the remedy. Much that is called constipation today, pill taking and physic taking, is simply the result of over eating, over loading the liver with unnecessary material, which is temporarily relieved by the action of cathartics.

A cathartic operates on the liver only because it causes the serum of the blood to escape from all of the blood vessels. It operates on every other organ the same as it does upon the liver, depleting the body temporarily of blood serum, which of course is immediately made up by the surplus nutrition which the over-eating has occasioned.

Fasting would cure every one of these cases. That is why a sea voyage, if it is accompanied with sea-sickness, is so good for biliousness. The nausea simply compels the patient to fast, and even though he returns to his gluttonous habits, the benefit will continue many months after the fast.

THE KIDNEYS

By Dr. C. S. CARR

NO intelligent idea can be had of kidney diseases without at least a smattering of knowledge concerning the function of the kidney. While I can not hope to give in this article a complete account of the physiology of the kidney, yet I shall be compelled to summarize this subject in order to make myself at all intelligible in speaking of diseases of the kidney.

The kidney is a very complex gland, in fact, the most complex gland of the human body. It is mainly an excretory organ. That is to say, its function is to take from the blood stream passing through it waste products, and discharge them through the ureters into the bladder, to be expelled from the body.

The function of the kidneys is mainly excretory. It is generally thought to be wholly excretory. But there is a suspicion arising among those who make special study of the kidney that it is also a secretory organ; that is to say, that it not only takes materials from the blood, passing them out as waste products, but it also takes raw materials from the blood and manufactures them into vital substances which, turned loose in the blood, perform very important functions in the body. This, however, is at present not well proven, although there is some very strong evidence in favor of the theory that the kidneys make an internal secretion which, passed over to the blood, operates as an antidote to the poisonous material which is constantly accumulating in the

blood as the result of broken-down cells all over the body.

The picture of the human body which the physiologist holds before his mind constantly is that it is a congregation, a multitude of living cells, each cell a separate being, imbibing from the blood current its nutrition, throwing off from itself into the blood material already used. This is going on everywhere. Consequently the blood stream not only contains the sewage of the body, but also the nutrition from which the body is nourished.

The same blood stream that conveys to the cells of the body nutrition is the same stream that must carry away the excrementitious material. It is as if the water pipes in our homes must be used also as sewage pipes. Sewage and drinking water all mixed together, from which the cell must extract the water and the nutritive material upon which it subsists, without imbibing any of the poisonous materials which are constantly accumulating in the blood.

Each one of the millions of cells which constitute the human body is pushing out its own excrement into the blood current. If it were not for the fact that there is a purification plant within the human system, constantly taking out of the blood stream the poisonous materials, the blood would very quickly become so contaminated that death would be the result.

It is upon the kidney that the task of purifying the blood current rests principally. To be sure, the skin does some of this work, and under extraordinary circumstances may be made to do considerable of it. The mucous membranes lining the bowels undoubtedly excrete a great deal of poisonous material of the blood,

and when the kidneys partially fail the bowels may carry on this work quite successfully for a limited time. The breath even carries away a little of the sewage of the body, but after all this has been said we must come back to the kidneys as the principal organ by which the blood currents are protected from the accumulating poisons.

How do the kidneys do this work? We must have some vague understanding of how this work is accomplished in order to understand the diseases of the kidneys. I do not ask this question merely for the fun of answering it. My question and answer is for the purpose of making it possible to carry the reader with me a little way into the secret laboratory of Nature's workings.

In the first place, the kidneys are supplied with very large arteries. Much larger than any other organ of the human body, in proportion to their size. These arteries, known as the renal arteries, are given off directly from the aorta, which is the large artery nearest to the heart.

The consequence is that the blood pressure in the kidneys is naturally greater than in any other portion of the human body, except the heart and aorta. The blood rushes to the kidneys with tremendous force. As soon as the large artery reaches the kidney it divides and subdivides, and subdivides until it reaches the size of a capillary vessel, about one twenty-five-one-hundredth of an inch in diameter.

These capillary vessels in the kidney, like capillaries in any other portion of the body, are merely passive tubes, having no contractile power of their own, which

allow the blood to flow freely through, which can stretch on occasion of blood pressure or shrink if there is less blood pressure. They are absolutely passive to the blood current.

If much stretched these capillaries will allow the watery portions of the blood to pass through their walls. This is going on everywhere in the body to some extent, but especially in the kidneys, because of the tremendous blood pressure, and the great abundance of capillary vessels.

The capillary vessels of the kidney are arranged into numerous small tufts, looping round and round, making a little globe or capillary bulb or tuft. This capillary tuft is enclosed in a fibrous sac. Inside of the sac opens the end of a tubule, which expands like a flask. Down into the flask dips the tuft of capillaries.

Therefore, the water which is forced through the capillary walls by the blood pressure is caught by this flask-like end of the tubule and slowly it dribbles down through the tube, out of the capillary tuft, and is caught by the flask of the tubule, which conveys it from the capillary tuft into the kidney tube. There are thousands and thousands of these microscopic tubes in the substance of the kidneys, for they are very small, and these thousands and thousands of little tubes are gathering the drops of water as they accumulate.

These tubules do not go straight, but they wind round and round in the substance of the kidney. They are convoluted, so that if the tube was straightened out it would be many inches long, whereas it occupies a very small space.

This little tube which is conveying the water squeezed

out through the capillary tuft, was evidently contrived so that the water could pass through it only very slowly.

The water that enters the tube in the capillary tuft is practically pure water. It contains little or none of the salts in the blood. But as is passes along down through the tubule, the water gradually absorbs from the surrounding blood currents the poisonous salts of the blood. Each tubule is surrounded by a net of capillary blood vessels from end to end and by a physiological process known as osmosis, the blood salts continually pass through the capillary walls, and through the walls of the tube, mingling with the tiny stream of water flowing through the tube.

On and on the stream of water goes through the tube, becoming more and more impregnated with the poisonous salts within the blood, until it at last reaches the pelvis of the kidney, which is a curiously shaped cavity into which all of the tubules empty.

If the walls of the pelvis of the kidney were perfectly smooth there would not be room enough for the numerous tubules to empty their contents into the pelvis. In order to meet this necessity, all around the walls and on the floor of the cavity of the pelvis are conical-shaped eminences, called pyramids. This increases the wall and floor area to such an extent that there is room for each tubule to have a separate opening.

Now, if you have followed me in this description we now find ourselves in the pelvis of the kidney, quite a large cavity. When in a normal condition it may contain three or four tablespoonfuls of fluid. This fluid is oozing out on all sides, on the top and sides and bottom of the pyramids, oozing out, filling up the cavity.

Leading out from this cavity is a small tube no larger than an ordinary drinking straw, which conveys the urine directly to the bladder, there being a separate tube for each kidney, of course, both emptying into the fundus of the bladder in a peculiar way, so as to prevent the possibility of any return of the water from the bladder to the kidney.

I have purposely avoided in this description technical words which are used by the physiologist and pathologist, and shall continue to do so throughout this article.

If I have been successful in giving to my reader the picture as it stands before my own mind, it would take little or no imagination for anyone to understand somewhat clearly the different accidents that might happen to this very complicated apparatus, which would constitute the different diseases ascribed to the kidney.

In the first place, the water forced through the capillary tuft (glomerule) would be greater or less according to the amount of blood pressure. It is well known that the blood pressure varies. Great fright or sudden emotion may cause the blood pressure to at once increase to the extent that there is forced through the capillary tufts an unusual amount of water. This may be so prodigious as to cause a copious discharge of urine, as clear and limpid as ordinary water. This unusual amount of urine is explained by increased blood pressure. The unusual amount of water forced out into the tubule causes it to pass more quickly through the whole length of the tubule, absorbing less than usual of the salts as it passes along.

Alcoholic stimulants may increase the blood pressure, causing a free flow of the watery constituents of

the blood, containing little or none of the poisonous salts. Drugs known as diuretics have the same effect. Even the drinking of a large quantity of water may so increase the volume of blood as to increase the blood pressure, producing an appreciable effect upon the amount of urine excreted. This is especially true if the water is drunk hot. There is no better diuretic in the world than a cup of hot water. And when for any cause the kidney needs flushing out, neither pharmacist nor doctor could supply a more potent remedy than large draughts of hot water.

There is a disease of the kidney known as diabetes insipidus. In this disease there is simply an increased flow of limpid urine. The volume of urine is increased so much that the proportion of salts contained in it is very small. The consequence is the urine seems like ordinary water.

This disease appears to be not primarily a kidney disease, but is a disease of the nervous system, which produces an inordinate thirst, thus supplying the blood with unusual quantities of water, which in turn increases the blood pressure in the kidney, and the unusual amount of urine is the result. This false diabetes is more correctly called polyuria, which simply means much urine.

In true diabetes, or sugar diabetes, there is also much urine, but it is heavily loaded with glucose, for which, of course, the kidneys are not at all to blame.

The most common functional disturbance of the kidney might be named a nervous kidney. With the nervous kidney the blood pressure varies from day to day. One day there is a great deal of pale, limpid urine

excreted, and perhaps the very next day the urine is scant and high colored. Such people have to get up to void the urine several times perhaps during the night.

An examination of the urine does not reveal any morbid condition of the kidney at all. It is difficult to make such patients understand that they have no real disease of the kidney. The derangement is back of the kidney. It relates to the arterial pressure, which today may be very great and tomorrow much below the normal.

The nervous kidney is dependent upon irregular habits, mental agitation, improper eating, the use of narcotics, including tea and coffee; indulgence of any sort that unbalances the nervous system.

During the child bearing period, women are frequently victims of this condition. The doctor may assure them over and over again that there is nothing wrong with their kidneys, and while under his wise guidance they may be partly contented with his opinion. But let some charlatan appear who goes through with some pretended analysis of the urine and tells her that she has a grave kidney disease, and the faithful doctor's assurances are all forgotten and she becomes hysterical over her condition. This tragedy is happening every day, everywhere.

If she had simply made the best of her condition, calmed her fears, avoided needless exertion, taken as much rest as possible, until she had passed through her strenuous period and rounded safely the change of life, she might have lived many years, a blessing to herself and family. But under the false guidance of some alarmist who neither understands her case nor has any

serious desire to understand it, through constant agony of apprehension and worry, she at last acquires a real kidney disease and a fatal result follows. Thousands of women have escaped this untimely end by simply adopting some form of drugless healing through which their fears have been assuaged and their faith revived.

I can not refrain from dropping a remark here that may be of use to many readers. I wish to say that those who pretend to make an analysis of urine are largely pretenders. No adequate diagnosis can be made by simply analyzing a single specimen of urine. It may supply negative evidence, and sometimes hint at positive evidence, but mostly it throws little or no light on the real condition of the patient, even though the analysis is faithfully and scientifically made. But in many instances no real analysis of the urine is made. The pretense of doing so is done for effect. This is not only done by the advertising physician, but many times by the regular practitioner.

Remembering what we have already said, it is easy for the reader to see that a specimen of urine furnished today may be entirely unlike the specimen of urine that the same patient would have furnished tomorrow. For in the one case it is abundant and limpid, and in the other case scanty, highly colored and heavily loaded. Neither one of the specimens, or both taken together, would be able to reveal exactly the real condition of the patient. This is so true that the best diagnosticians today require more evidence than can possibly be furnished by a specimen of urine as to the real condition of the patient.

There is another class of patients who have a great

deal of needless worry about kidney disease. They are the ones who have frequent backache, pain over the small of the back, frequent attacks of lumbago and increasing weakness of the muscles of the back, bearing down pains, which may be accompanied by frequent occasion to urinate.

Now, as a matter of fact, real disease of the kidney is no more apt to produce pain in the back than disease of any other organ. To be sure, the kidneys happen to be located in the back, but disease of this organ will not directly cause any pain in the back. Anything that weakens the muscular strength is liable to produce pain and weakness in the back. Advanced kidney disease may do this, of course, the same as any other weakening disease.

Another thing that many people worry themselves about is sediment in the urine. As a rule sediments that can be seen without the microscope have no real significance as to the kidney disease. Urine after it cools thoroughly is apt to throw down a sediment which may be reddish, grayish, or even pink. There may be large quantities of this sediment, which indicate, of course, that the habits of life are not what they should be, but it does not indicate any disease of the kidneys. This is more apt to occur in the winter season than in the summer season, when more water is drunk and freer perspiration is the rule.

When a heavy sediment persists in the urine it is not always wise for the patient to consult a physician. All he needs is to be told he is eating too much concentrated food, drinking too little water, and taking too little outdoor exercise. As a rule, correction of these habits

will cause the deposit to disappear. But whatever he does about it, the mere fact of the sediment, whatever the amount or color may happen to be, does not necessarily indicate any grave disease. It much more likely indicates faulty digestion, bad habits, or possibly a derangement of the liver.

The kidneys are compelled to do their best to excrete whatever they find in the blood current. If there is in the blood current a great superfluity of nutritive materials, these materials will appear in the urine. If there has been going on in the system anywhere rapid destruction of tissue, the débris of this destruction will appear in the urine. All of the urinary salts, whether they are normal or abnormal, are taken by the kidneys from the blood stream and passed over to the bladder without any special change.

I have so far only described what might be called spurious kidney diseases. They are generally referred to the kidneys, but inaccurately. Perhaps it would be a good thing for me to stop right here. For, as a matter of fact, real kidney disease begins very insidiously. There are no symptoms that the patient himself will notice until after the disease has become quite far advanced. If I should go on to describe these real kidney diseases, I would simply alarm my reader without being able to say anything for his comfort. And yet even the gravest symptoms which the urine can reveal do not always indicate a fatal termination.

For instance, finding albumen in the urine is not always a very grave symptom. As I have already said, it is the function of the kidneys to excrete useless material from the blood. At the same time it excretes use-

less material, a normal kidney will prevent the escape of nutritive material from the blood. Organic disease of the kidney, generally called Bright's disease, is a change in the tubules, by which not only the poisonous salts in the blood escape into the tubules, but the nutritive materials of the blood also find their way into the tubules and appear in the urine. This condition is known as albuminuria, and is generally thought to indicate a very grave condition.

But as a matter of fact, some albumen may escape into the urine from other causes than real disease of the kidney. A great many times a diagnosis of albuminuria has been made simply because mingled with the urine in the bladder are those albuminous products such as mucus, pus, semen, and in cases of women vaginal discharges, any of which may appear in the urinary analysis as albumen. The doctor may make a hasty conclusion that he has a case of Bright's disease. But in real albuminuria or Bright's disease there is a constant escape of albumen from the blood, which can only be ascertained by repeated analysis of the urine, together with a microscopical examination of the sediments which appear at the same time.

But I am not going to annoy my readers with a detailed description of this disease. It is comparatively rare, although it is increasing somewhat in this country. It is the result of continued abuse of the body. The kidneys can stand a great deal, but if there is constantly poured into the blood currents unnecessary and harmful ingredients, the kidneys after a while will break down under the strain. Eating too much, eating under conditions when perfect digestion is impossible, eating a

conglomeration and variety of foods at one meal—such habits surcharge the blood with useless material, raising very grave problems for the kidneys to solve.

But the most fruitful source of kidney disease is the use of narcotics. The effect of narcotics upon the system is a change in the blood pressure. One narcotic will decrease the blood pressure, another one will increase it. And so it is that many people fly from tobacco to alcohol in some form.

This constant seesawing of high blood pressure and low blood pressure, brought about by the use of narcotics, will finally derange the kidneys. The delicate tuft of capillaries through which the water of the blood was being forced becomes thickened. Sometimes they burst, forming a little clot. Following this is the destruction of the tubules. Then the other tufts and tubules must take up the additional work imposed upon them, and so one by one the tubules and tufts are destroyed, simply because of the needless work put upon them by the reckless indulgence in narcotics and concentrated foods.

So long as the capillary tufts in the kidneys are soft and pliable, so long the ordinary heart beats are sufficient to force the water out of the blood. But when these capillaries become thickened by bad living, the heart must beat harder in order to keep up sufficient blood pressure in the kidneys to keep the secretion going. The extra work imposed upon the heart soon causes it to enlarge and then we have organic disease of the heart, added to the kidney disturbance.

If some words of mine would operate as a warning to the vast multitude of splendid young men and women

who are ruthlessly destroying their bodies by fast living, it would be well worth my while to write these words. But in writing them I am constantly harassed by the suspicion that my words will not reach the very people that ought to read them, but on the contrary will reach only those nervous people who are morbidly afraid of disease, and thus do harm instead of good.

I wish I could assure that multitude of nervous people who have brought upon themselves an unbalanced condition of the nervous system by which the kidneys are embarrassed, that they are in no danger whatever, that they only have to go calmly on, making the best of life, that they require no doctor, no medicine, all that is needed in their cases is hope in the place of despair, courage in the place of fear. This can only be brought about by a radical change of mind toward life in general.

Is is a curious fact, in kidney diseases especially, that the gravest diseases excite the least alarm. Those people who are always saying that their kidneys are weak or affected, that they are in danger of this or that derangement of the kidneys, are generally the people who are in no danger whatever. The kidneys, like the other organs of the body, are disturbed by the senseless agitation and worthless activities of a poor, nervous, misguided, misinformed man or woman. If such people would begin to develop their bodies by athletic and hygienic living, quit introspecting themselves, get a larger view of life, develop their latent physical powers, they would soon forget their fears and fancies and begin to live.

HEART DISEASE AND ITS HOME TREATMENT

By Dr. H. B. GALATIAN

MANY persons if told by their physician that they had "heart trouble" would almost consider that sentence of death had been pronounced on them, and probably from that moment would so worry about their condition as shortly to become hopeless invalids.

The writer has in mind a young man, a woodsman, capable of doing a hard day's work in the lumber fields, who considered himself in the best of health, so far as outward symptoms went, who, upon being examined for life insurance, was rejected by the examiner because of a heart lesion. He was told that he must give up active work or he would die.

The young man immediately gave up his healthful outdoor occupation and took up sedentary employment. The suggestion of illness brought the element of fear into his mind. In a few months he was reduced from robust manhood into a worried, despondent, sick individual. If he had not later come under the care of a physician who showed him the folly of worry and who taught him how to take care of himself, he undoubtedly would have died.

Another young man, a wreck at twenty because of a similar condition, made up his mind that if he was to die he might as well have the fun of trying to get well rather than go through the despair of a hopeless existence. By following out a sensible régime based on

physical culture methods, became well, an athlete in fact, and is today a strong, healthy specimen of manhood.

These two cases show that one having organic heart disease need not give up in despair, but that on the contrary he should learn all that is possible about his condition and then set out to remedy the trouble.

In this article we will try to furnish a working basis for the understanding of the character of heart disease and show how one who has the condition can help himself or herself get well and so conduct his or her life as to take an active part in the world's business and avoid the illness and disability incident to the disease. The extent to which one may recover depends upon the amount of impairment of the heart, the intactness of other organs, and the degree of compensation that is maintained.

We will not burden the reader with the names and a technical description of the many conditions affecting the heart, for they are practically all due to the same causes and the principles of treatment are the same. Would advise the reader to look up the anatomy and physiology of the circulatory system in any standard book on the subject. Just what happens when the function of the heart is disturbed or the circulatory equilibrium overthrown will then be more readily understood.

Heart diseases may be classified as functional and organic. Functional disturbances are mostly symptoms, due to causes outside of the heart, and not due to structural changes in the tissues of the heart. These we will not at this time consider.

Organic diseases of the heart are those conditions which are due to, or in which there is a change in the tissues or structure of the heart. These may again be classified as acute and chronic. As inflammation is a chief phenomenon, they are also called inflammations of the heart. Thus if the pericardium or covering of the heart is affected, we have acute or chronic pericarditis; if it is the muscular wall, it is called acute or chronic myocarditis; if it is the lining of the heart it is acute or chronic endocarditis, the last named being the most common condition.

Any factor that tends to produce an accumulation of poisons in the body is a potential cause of heart disease. It is a well-known fact that organic heart disease is increasing in frequency. As epidemics of acute infectious diseases decrease, heart disease increases. That there is a connection between the two facts is the belief of many hygienists and sanitarians. At least the matter is under suspicion. It is thought by some that the suppression of acute diseases by means of drugs and serums is responsible for the retention of poisons in the system, and this is followed by disease of the heart and other vital organs. At any rate, heart disease follows such diseases as rheumatism, diphtheria, scarlet fever, tonsilities, and venereal disease very frequently, and indeed the patient in most cases will date the beginning of the trouble from an acute ailment. If this is so, the best way to avoid heart disease is to avoid acute sickness.

Among other causes are bad teeth, abscesses, ulcerations and other sources of pus and toxins in the body; overeating and the eating of improper food, alcohol, tobacco, and the habitual use of drugs; sexual excesses;

exposure to extreme cold and muscular fatigue; the hurry and worry incident to an active business life.

It is the well fed, active, pleasure loving, hard working business man, perhaps taking part in politics and public affairs, smoking and drinking moderately, in fact the all-round successful man, that is too often attacked. The so-called strenuous life may bring wealth and social position, but it is destructive as far as the heart is concerned. Where is the sense in amassing a fortune, and then dropping dead with heart failure at middle life before you can enjoy the fruits of your toil?

Another potent cause of heart disease is excessively hard work in youth. Growing boys and girls often have to follow occupations which entail work that is too heavy for their undeveloped bodies, and the heart breaks down under the strain. Perhaps at some time in the future when social conditions are conducted on a scientific plan, the young will be assigned a form of work suited to their physical and mental condition, or will receive training that will make them equal to their task. As it is many a youth enters upon his career physically untrained, and a bad heart in middle life is the result.

We might also mention the fact that heart trouble is not uncommon in retired athletes, and this is due to the fact that they have developed a large fibrous heart during their athletic training, and upon settling down to a life of ease the heart muscle atrophies and is replaced with fat. Then some day, thinking they still have their old-time strength, they engage in a baseball game or other strenuous exercise, develop dilatation of the heart and die. No one should engage in athletics or train for athletics unless he first goes through a course

of eliminative treatment and frees himself from disease, nor should a person retire from athletics suddenly without adopting and continuing some other form of exercise to keep the muscles of the body in condition. In short, to avoid heart trouble, one must live a clean, careful, active life.

The valves of the heart are subject to much wear and tear in the circulation of the blood. As these are covered by the same membrane—the endocardium that lines the cavities of the heart, they are especially subject because of their position and function, to any inflammation affecting this membrane. It is somewhat similar to a pump valve which always wears out before other parts of the pump and has to be replaced. In the case of man, however, there can be no replacement of the worn-out valve.

When an infective poison carried along in the blood stream reaches the heart, and the membrane becomes diseased, the tissues are softened and disintegrated, and particles of the valve break off or are absorbed, or the valve adheres to the wall of the cavity, or excrescences form on the margins of the valve, or the heart cavity dilates, any of which prevents the closing of the valve at the proper time and allows blood to pass backward when it should be going forward, or prevents its onward flow.

A certain amount of blood must pass through the heart and be sent to the tissues of the body at every beat, but if one of the valves, most commonly that on the left side of the heart, allows some of the blood to pass backward or prevents its going forward, there is a disturbance of circulation, and until the equilibrium

is re-established the patient will suffer from the group of symptoms common to heart disease.

In other words, an organic change has taken place in the heart, and we have the condition known as organic heart disease, valvular disease of the heart, valvular regurgitation, insufficiency, incompetency, stenosis, valvular leakage, etc. And since the physician can hear the "swish" of the blood as it regurgitates, it is said that the patient has a "murmur" in his heart.

The valve can never be restored to normal, but what does happen is that the muscular walls of the heart become stronger and thicker, so that the same amount of blood is pumped as before. As long as this condition lasts, we say that there is *compensation,* and if this is maintained by the patient taking care of himself and with proper treatment, he will get along as well as before. But if the heart muscle weakens or the cavities dilate, compensation is lost and the symptoms return, or the patient dies.

This brief and academic description of the pathology found in heart disease will help in understanding the symptoms and treatment of the condition.

Many persons think they have heart trouble when they are only suffering from a dilated stomach or flatulency due to fermentation or constipation. If the heart defect is perfectly compensated, there are no symptoms at all except perhaps a slight shortness of breath upon exertion. In such cases only a physical examination will disclose the trouble, and many physicians to save the patient needless worry will not inform their patients of the fact, if they happen to be following a suitable occupation or are inclined to worry.

If there is threatened a lost compensation many symptoms are presented, most of which are not considered by the patient as being in any way connected with his heart. For instance, he may develop a slight cough and there may be slight streaks of blood in the sputum, causing him to seek treatment for lung or bronchial trouble. The cough is due to congestion in the vessels of the lungs and bronchi because the blood is backing up.

The patient may seek treatment for indigestion or other stomach trouble, this again being due to congestion. In fact, every organ in the body may present symptoms which are all due to the heart condition. There will be shortness of breath upon climbing stairs, or when walking rapidly or running; at first the pulse is strong and rapid, but later it becomes rapid, weak and irregular, the patient feeling the "thump" of the heart against the chest wall; the lips and cheeks are blue-red in color or may be pale; the hands and feet are cold; headache is common; ringing in the ears, vertigo and insomnia; sharp, shooting pains or an aching sensation in the region of the heart or extending to the shoulder and down the arm; at times there is palpitation and strange fears as of impending death; weight may be lost and great weakness comes on; during the later stages as the compensation fails still more there will be swelling of the limbs and abdomen, or dropsy. As said before, there may be symptoms referable to any organ in the body. The reader must not be alarmed if he has any of the above symptoms and rush off to the doctor thinking he has heart trouble, for any of them may be present with no fault in the heart. The one definite point in

diagnosis is the discovery of the lesion by physical examination, and even in this many a doctor has made a wrong diagnosis.

Of course the different lesions of the heart show symptoms peculiar to the valve affected, but those mentioned are common to heart diseases in general and are the ones most often observed by the patient himself. There are many objective symptoms only discovered by the physician making an examination. There should be no time lost in having an examination made if there is any trouble suspected.

Having discovered that you have heart disease, what must you do to get well? It all depends upon how far the disease has advanced, and whether your heart is compensated or not. If you present no particular symptoms except enough to let you know that the trouble is there, and you are still up and about and able to work, all that is necessary is to give up your bad habits and regulate your life in such manner that all unnecessary strain will be taken off the heart. You must not worry; you must avoid constipation; you must eat food that agrees with you, that is easy of digestion and that introduces a minimum of toxic substances into your system; you must not drink alcoholic liquors or use tobacco or drugs; you must not overwork or engage in enterprises or occupations too strenuous for you; you must get a maximum amount of rest and sleep; you must adopt some system of exercise that will use every muscle in your body every day and which at the same time will not put strain on the heart; you must in short take good care of yourself.

But suppose that you have serious symptoms or your

heart has lost its compensation, or such loss is threatened? Then you must adopt a more definite course of treatment.

1. Do not worry one minute about your condition. The best thing that you can do is to try to get well. Place yourself in as cheerful surroundings as possible. Avoid grouchy, sour-faced relatives and friends who take delight in retailing accounts of people who have died of heart trouble, and who advise you to take this and that treatment. Select a pleasant, sunny room, and have a capable nurse or a sensible friend or relative to wait upon you, and then having decided that you wish to live, let nothing interfere with your struggle for health.

2. Of course you have stopped all of your bad habits. You must also have removed all possible causes of your illness. All sources of infection must have been taken care of—bad teeth removed or treated, abscesses drained and ulcerations cleaned and healed, and acute complaints remedied. You must set out to make your body as clean inside and out as it is possible to make it. This means thorough elimination through skin, bowels, kidneys and lungs.

3. The heart must have chance to rest and "catch up," as it were, with its work, and this applies especially if there is dropsy. Therefore you must rest in bed, flat on your back, for a period depending upon your condition. If there is dropsy you must stay in bed until the swelling is gone, and even if there is none, you must precede your treatment with a period of rest in bed. During this rest period you must do nothing for yourself, and while the dropsy lasts not even raise your head from the pillow.

4. The quickest and safest way to reduce the fluid in the system, if you have dropsy, and also to take the load off the heart,is by fasting. We should never be afraid to fast the heart patient. We do not mean a long fast, but a short preliminary fast, or a succession of short fasts. You must fast for a few days, say two or three, and then eat a little, and then fast some more, and in this way you will gain confidence in yourself, and can fast until the dropsy is gone. Very little liquid, or none at all for a time, should be taken while the dropsy lasts. If there is thirst a very little water or orange juice may be sipped. Even after the dropsy is gone, fluids must be restricted somewhat, as they raise the volume of the blood and hence increase the work of the heart. Fasting is always the emergency treatment whenever dropsy appears.

5. The bowels must be moved by the use of a daily enema. One is often tempted to use saline cathartics with the idea of also removing the water from the system, but this is a dangerous procedure, as we must not forget that dropsy is a conservative condition and the best the system can do under the circumstances to relieve the heart of work. The sudden withdrawal of the water before the vessels can accustom themselves to the change in pressure may cause sudden heart failure. The best plan is to wait until the water is reabsorbed into the capillaries and eliminated in a natural manner, even though a longer time is required. The writer has never observed any permanent gain made by thus trying to hurry Nature in her work.

6. The room must be well ventilated. This does not mean that it must be kept cold and uncomfortable.

You must breathe as freely and deeply as is comfortably possible, but avoid forced breathing.

7. A daily sponge bath must be given, with water at the temperature of the body or a little warmer, during the time you are in bed. But as you get up and about, the temperature should be gradually lowered to 75 or 80 degrees F. Chilling must be avoided. There must always be reaction after the bath, otherwise don't take it. The use of the bath is for cleanliness and skin elimination only and must never be used as a stimulant. Cold showers, douches and plunges must be avoided.

8. Clothing that will *keep you warm* should be used at all times. Cold contracts the surface capillaries and thus increases the work of the heart. The clothing must be light in weight, but effective in heat retaining qualities. Use woolen fabrics.

9. "What may I eat?" will be your next question. This is important and must be carefully attended to, as in connection with this one factor great harm is often done. In this we find the reason why so many fail to recover. It is largely a matter of quantity. With the mistaken idea that a certain number of "calories" must be supplied to support the patient, more food is given than can be digested or assimilated and circulated, and so the heart fails. The heart will support itself if some of the load is taken off, and fasting or restriction of food will take off the greater part of the load.

As said before, liquids must be restricted. Nothing besides water, fruit juices, thin soups, or milk should be allowed for the liquid part of the diet, and this should be taken three times per day, eight hours apart, and always between meals. Taken in this way there is less

tendency for the fluid to remain in the system. Not over one or two glasses should be taken at a time. If milk is taken, less solid food should be eaten.

The solid or semi-solid food should be taken in three or four small meals, and should consist of food that is relished, well masticated and easily digested, and should be tastefully prepared. The amount must be limited. It is better to be hungry than to get too much food. "What you don't eat won't hurt you."

The following articles are suitable: Unpolished rice, boiled or baked; baked potato or squash; custard and fruit gelatin; stewed carrots, beets and cauliflower; spinach, beet greens, kale and chard; soups made from chopped and strained vegetables; salads of lettuce, celery and tomato; toast or zwieback; prepared cereals, farina, cream of wheat; baked or raw ripe apples, dried or raw peaches, apricots and prunes; and a small amount of fish occasionally. Red meats, fowl and game stimulate too much and had best be left alone, or reserved until the patient is up and around.

One need not worry about combinations. The idea is to eat small amounts, using only one or two articles at a meal, and making the variety from meal to meal, rather than taking many things at each meal and thus causing fermentation in the stomach and intestines. When the patient gets up the amount of food can be gradually increased, but at the first sign of a return of symptoms, the thing to do is to fast or reduce the food intake.

In some instances it is best to adhere to the exclusive milk diet, but care must be observed not to take too much, as the large amount of fluid necessarily taken in

the milk diet will raise the volume of blood very quickly. In fact, that is the reason milk is of such benefit in many diseases.

If not more than two quarts are taken daily, one glass every two hours, during a period of sixteen hours, the exclusive milk diet will be found superior to any other diet in a case of heart trouble. But absolutely no other food should be eaten while taking this.

In cases where fasting seems inadvisable, a half glass of milk every two hours may be used. Or if a still more limited diet is indicated, the milk may be diluted with water. Skimmed milk, buttermilk, sumik or fruit juices may all be used as an exclusive diet in the same manner when more palatable.

10. Formerly the heart patient was warned not to exercise, and the enforced inactivity usually resulted in fatty degeneration and subsequent death.

Now it is realized that exercise according to a definite plan is the best thing for a heart patient. It is the best means of re-establishing and maintaining compensation. In every case, however, whether there is or is not compensation, a period of absolute rest should precede the exercise period of the treatment.

The rest period should last until any dropsy present is gone and in other cases for at least two to six weeks. During this time the patient must be waited on in every way. When the right time arrives, a system of passive exercises must then be instituted. This consists in moving the joints in every possible direction, without any active effort on the part of the patient, for a few minutes daily. The exercises must cease upon the least sign of breathlessness or discomfort, or increased pulse. Each

day the number of movements is increased, and after a while the patient should offer slight resistance to the movements of the operator, or the operator resist the active movements of the patient.

At this time a mild massage may be given, but this should not be used before the dropsy is gone. Some teach that massage and passive movements will help in the absorption of the fluid back into the vessels, but the writer does not believe that anything is gained and harm may be done, for the reason that dropsy is due to circulatory failure and to force the water back into the vessels will undo what Nature is trying to do, viz., relieve some of the work of the heart. It is best to lie at rest and wait.

Mild exercises in a reclining position may next be allowed with caution.

When it is shown that you can take considerable exercise in bed without discomfort in breathing, rapid pulse, or the return of the dropsy, you may be allowed to sit up in bed for a few minutes, daily increasing the time to hours. If there is still no discomfort, you may be allowed out of bed for a short while each day, taking no active exercise while up, but continuing the bed exercises.

Active exercise out of bed may next be attempted, but all movements must be very slow, one limb or group of muscles only being moved at a time and only one movement made. For instance, one arm is slowly raised to the level of the shoulder and then lowered once. Then the other arm, and so on. The principle may be applied to any set of exercises, provided no apparatus is used, and only free arm movements made.

If the respirations are increased or the pulse rate increases too much, or there is any discomfort less exercise is taken. As days go on the number of movements is increased and slight resistance or the use of light dumbbells employed.

Walking and hill-climbing on a basis of graduated effort may be undertaken. If the patient lives in the city, he can walk a certain distance the first day, and if no discomfort is noticed, the distance may be increased by a certain number of houses on the next day, and so on. The whole idea of exercise is to adopt some system, the amount of which can be measured, and increased or reduced as need be, each day. If the heart becomes rapid, or if breathlessness or dropsy appears, exercise must be stopped and rest be resumed.

11. As usually is the case, the heart is doing as well as it can under the circumstances. The best we can do is to take off as much of its load as possible, reduce the toxic condition of the body and wait until it is able to take care of the circulation. Digitalis has long been used as a heart stimulant. But much more can be done by lessening the load the heart has to carry than by whipping it up. This is done physiologically by reducing the food intake, fasting and facilitating elimination. If any stimulation is needed, the ice bag applied over the region of the heart will suffice. This should be left on for an hour, then taken off for an hour, and so on, if necessary. The effect is increased by applying heat for ten minutes before applying the cold. Hot applications are of value also in case of pain.

Heat may be applied to the extremities. This dilates the peripheral (surface) capillaries and lowers the blood

pressure. The warm blanket pack is of value provided it does not increase the pulse rate greatly. On warm days the sun bath will be beneficial, but must be of short duration.

Of course there are many complications that may arise, calling for special treatment, but if one will only get into his head the idea of assisting Nature by taking away the hindrances to her work, and not try to hurry matters, these will take care of themselves—in fact, most of the complications in any disease are due to meddlesome methods of treatment and forced feeding.

In this article no mention is made of the many other mechanical and manipulative treatments often employed in the treatment of heart disease, as they are usually unnecessary, simply wear out the patient and accomplish nothing. The less treatment the better for the patient. What is needed most is careful nursing.

Once on the high road to recovery, you must "play safe" in everything that you do if you desire to keep what you have gained. One thing is certain—the same causes will again produce the same results. We can not tamper with the laws of Nature and escape the penalty.

NERVES AND NERVOUSNESS

By Dr. C. S. CARR

NERVOUSNESS may be divided into three kinds. Nervousness of the brain, nervousness of the spine, and nervousness of the internal organs.

The brain becomes nervous by overuse—close application to mental vocations, Worry, Fear, Anxiety—all these make the brain nervous. That is to say, the function of the brain is erratic. As a piece of machinery it does not operate regularly and freely.

Nervousness of the spinal cord is produced by overactivity—always doing something. The moment such a person is awake he begins his unnecessary and ceaseless activities. He cannot even sit down and keep still—drumming with his hands—tattooing with his feet—pitching around—cannot hold himself still—does not try to.

Then there is an internal nervousness—nervousness of the nerve centers that control the action of the heart, the function of the stomach, the rhythmic movements of the lungs, the internal nerve centers that control the heat of the body, regulating it so as to keep the body warm in spite of surrounding coldness, or keep the body cool in spite of surrounding heat—all these internal, automatic functions of life, so important, so vital. They may all become nervous.

By nervous I mean irregular in action—activities that are as useless as they are harmful.

The nervous brain is an overworked brain—a tired

brain. The same is true of the spinal cord—overworked—tired out—acting fitfully—doing things by spurts and spasms—more or less loss of self-control. Internal nervousness, which perhaps is the hardest to bear of all the forms of nervousness, indicates the internal machinery has been misused, disused, overused, depleted, enfeebled.

This form of nervousness includes sexual nervousness, nervous dyspepsia, palpitation of the heart, fainting spells, fear of heat and crowded assemblies, hot and cold. At times the victim can hardly tell whether he is too hot and desires to throw off clothing, or too cold and wants more clothing—cold, clammy perspiration.

The nervous system may be likened to a great machine shop. First we have the business office, where all of the work is planned, where each man's function in the big shop is designated, where everything is ordered or predetermined. This is analogous to the brain of the human body—the thinking part of a great machine shop. If the business management of such a shop is overworked, or if it is wrongly organized, or composed of men that do not do their work properly, to be sure the other parts of the body suffer from such a derangement, yet the cause of the trouble could be fairly located at the business office.

The brain is the business office of the great machine shop of the human body. If the brain plans too much work, or has no plan of work, allowing things to happen irregularly, fitfully, the brain will soon be reduced to a nervous state.

Besides the business office of a great machine shop, there is the central power system; the boilers, engines

and revolving shafts, to which the various machines are attached. This may be likened to the spinal cord. The spinal cord carries away motor impulses, and fetches back to the brain the various sensations which the body has received.

The part of the machine shop directly under the personal control of the business office are those machines that are attached to the main shaft. Besides these, machines are scattered about the machine shop in various places, independent machines, operated by a separate dynamo. For many reasons these detached machines are very necessary, and are becoming more numerous in the great machine shops of today.

These independent or separate piece of machinery, which play a very important part in the perfection of the whole machine shop, are analogous to the sympathetic nervous system, sometimes called ganglionic nervous system, which controls mainly the internal organs. If these machines do not do their work properly the whole shop becomes deranged. The derangements, however, are more difficult to locate. They are not so obvious as derangements of the main shop or of the business office—here and there a little machine that is not properly supplied with power, a machine, however, that is performing an important function in the human body. Brain nervousness, brain fag, inability to remember, confusion of the senses—such derangements are obvious. It is easy to see that such a person needs a change, that his intellectual faculties have been overused. His life is becoming a burden. Foolish fears spring up in such a mind. His brain does not operate normally.

When the nervous system is perfectly balanced, each portion of the nervous system performing its function properly, life is a pleasure. Every little action gives its quota of satisfaction. But so soon as the nervous system gets deranged all functions become more or less painful. The nervous brain shrinks before the slightest intellectual task. It dreads the very things that it used to enjoy.

The rested brain, the brain full of vital energy, the brain that has not been overworked, enjoys the use of the intellectual faculties. Just as soon as life in any of its activities becomes burdensome or painful, we may know that nervousness has begun. A well-ordered brain, calm, deliberate, free from pride and jealousy, or envy, a brain untouched by regrets or sordid ambitions, such a brain is a blessing to the whole body. Other things being equal, the spinal cord can perform its function a great deal better.

The beginnings of most cases of nervousness are mental deviations. First, bad mental habits are formed. These mental habits may be induced by business pressure, financial responsibilities, the eager pursuit of knowledge, the use of narcotics. Any one of these may induce a bad mental habit. Or a person may be free from all these and yet fall into irregular ways of thinking. Religious fanaticism frequently destroys the nervous system completely, by fantastic fictions to which the brain undertakes to adjust itself. Such a disordered or nervous brain sends out through the body all sorts of needless orders. Muscles are used without any purpose. All sorts of internal disturbances are set up as the direct consequence of mental agitation.

Spinal nervousness is also a very obvious derangement. A person stands at a machine all day, making over and over again the same motions, or performing any other monotonous function, until he finds that during sleep he is still at work. This is spinal nervousness. The spinal cord has been subjected to such a continuous strain and discharge of vital energy that it does not cease, even during sleep. Such a person may have a well-ordered mind and strive against the inevitable by the very best of mental efforts. Yet a constant overwork of the voluntary muscles will produce a very distressing form of nervousness, spinal nervousness.

The nervousness of the sympathetic system, the various nerve centers, the internal brains, as they have been called, this is the most distressing form of nervousness—vague internal tremblings, foreboding, the dread of swallowing food, for fear it will injure the stomach, sleeplessness, fluttering heart—everything that ought to give pleasure gives pain. A gust of cooling wind on a hot day, that is gratefully received by every normal person, sends a shudder, a thrill of horror, through the person who is internally nervous. Life is a perpetual panic. The person may look well, may be strong, have good muscle. His mental habits may be commendable and without fault, and yet his internal nervousness reduces life to a continuous horror.

Generally these cases of nervousness are more obscure than brain nervousness or spinal nervousness. To be sure, all three kinds of nervousness are generally more or less mixed in any case, yet the beginning, or the principal derangement, will be found by careful analysis to be either one of the three.

An irritable prostate in the male, or a laceration of the cervix in the female, may give rise to an unceasing internal irritation which will finally derange all of the ganglionic nerve centers. The cause may be entirely overlooked. The victim may be unconscious of any organic trouble. But the little point of irritation is sufficient to keep a physiological electric bell ringing constantly, which will surely sooner or later deplete the batteries that must supply the energy of all the automatic functions of the body.

A person with a well-balanced nervous system always has a margin of vital powers. Adverse things may happen, but they can ride right over them without noticing them. They have nerve energy to spare. A slight indigestion will pass by unnoticed.

But the ones who are afflicted with internal nervousness have no margin of vital force. The slightest thing that happens to them throws them into a furore of suffering. Indigestion becomes a fearful ordeal—the same indigestion exactly that would hardly produce a passing disturbance with a healthy person. Sexual contact produces a shock that requires days of recuperation before the damage done is repaired. With a healthy person the same sexual contact would give strength, would simply provoke more energy and recuperate the body.

Brain nervousness, called by the medical profession neurasthenia, spinal nervousness, frequently referred to as nervous prostration, sometimes spinal irritation, nervousness of the internal organs, that horrible condition which is partly described by the word "melancholia" —three kinds of nervousness—nervousness of the

cerebral tissue, nervousness of the spinal cord, nervousness of the sympathetic system—these three. But the worst of these three is nervousness of the sympathetic nervous system.

Of course a doctor hardly ever finds a case of nervousness that is strictly one or the other. Two or more blend, and yet just a little faithful inquiry and consideration reveals to the sagacious doctor which of the three has caused the other two and should be treated accordingly.

Sleep medicines and sedatives, which are often used for any form of nervousness, are very damaging to brain nervousness, and also to nervousness of the sympathetic system. Such medicines may apply with some degree of certainty, but only to spinal nervousness. Indeed, in many cases of spinal nervousness, some sort of a sedative seems almost necessary.

A tea made of poppy leaves, or a tea made of celery seed, either of which can be obtained at the drug store, makes a very excellent sedative for spinal nervousness. But for brain nervousness a sedative does not work at all. The various coal tar sleep remedies are frequently used for insomnia or brain nervousness, which can have no other effect than to send the victim to the insane asylum.

For brain nervousness a stimulating, aromatic vegetable often works miracles. Raw onions, when they are tolerated by the stomach, make an excellent sleep medicine.

I used to be acquainted with Thomas K. Beecher, a man of large brain, and one who led an active intellectual life—pastor of an institutional church—a leader

in every local philanthropic enterprise in the bustling city of Elmira, N. Y. Sleeplessness was one of his handicaps. A very eloquent speaker, and yet he could never find words to wholly and fitly express his appreciation of raw onion as a remedy for his thorn in the flesh. Other distinguished men I have known have had the same experience.

The onions will do no good for a case of spinal nervousness, nor sympathetic nervousness, although when they agree with the stomach they are advisable for other reasons. But for a case of pure brain fag the onions are great.

When the raw onions can not be tolerated, the boiled ones will do fairly well. Onion tea can be taken by even the most delicate stomach. A number of peeled, small onions are put in cold water. The whole is gradually brought to a boil. This is allowed to simmer a while. The water is poured off. A half teacupful of the tea may be taken at a dose. Cinnamon is sometimes added to the tea to make it more palatable.

Asafetida is a vegetable remedy, allied to the parsnip. It is an oriental vegetable, frequently used for food by the Persians. In this country it is known only as a medicine. The juice of the plant is gathered, much as opium is gathered from the poppy. It is sent to this country in the form of gum, and is used either in pill form or in tincture. It is best for each one to get the gum asafetida for himself and use it in small pellets. A splendid vegetable remedy for brain fag.

For spinal nervousness, lay the patient on his face. Wet a strip of cloth two inches wide. Long enough to reach the whole length of the spine. Lay it on the spine

wet. Take a hot flatrion (not too hot), covered carefully with flannel. Lay it on the wet cloth, on the patient's back, moving it along slowly, from top to bottom. Then from top to bottom again. The patient will frequently go to sleep while the treatment is given. The osteopaths are sometimes able to cure a case of spinal nervousness in a very few treatments. It is always worth trying. Do not take drugs.

Victims of spinal nervousness frequently look well —are strong, may be vigorous, sometimes athletes— but as to their nervous system they are all shot to pieces. Whiskey or any other form of stimulant, especially coffee, does such people a great deal of harm. Spinal nervousness is frequently caused by excessive coffee drinking. In most cases it is only necessary for the patient to stop every form of stimulants—tobacco, alcoholic drinks, tea and coffee.

But who shall describe that third and worst of all forms of nervousness, internal nervousness. Women are the most frequent subjects. These are the ones who get the reputation of having hysteria. May be feeling perfectly well, and in less than an hour feel sure they are going to die. Fear. A panic constantly attends their footsteps. No other suffering can equal what these patients endure. Every species of agony is their lot, and yet they rarely have a real ache or pain.

Smelling salts is a great comfort to such people. Get the druggist to break up half an ounce of carbonate of ammonia. Put it in a wide-mouthed bottle. Carry it in your pocket. And when any one of the indescribable feelings attacks you a few sniffs of the ammonia may be sufficient to avert the spell.

A good wholesome companion, who will comfort without preaching, who will help without scolding, is better than a doctor, unless, perhaps, the doctor knows by experience the horrible purgatory through which these people are passing. It is from this class of nervous wrecks that suicides are derived.

Now, then, here you are. All of you! Nervous. Brain nervousness. Spinal nervousness. Internal nervousness. If you can do so, you ought to get away. Change your habitation, your recreation.

Get rid of the idea that remedies consist of things that you may swallow. Your salvation lies chiefly with yourself. First, you must do something with your hands every day—something useful. It may be an athletic exercise. It may be the use of an instrument devised on purpose for your case. It may be some manual work. Whatever it is, do something with your hands, to turn loose in your system volitions that are normal, to give expression to the nervous system through the muscles. This must be done. A simple life, consisting of the bare necessities. Frugal diet.

As for the use of electricity and vibratory treatments, they have their place, but in order to know exactly what their place is, a systematic study of the whole subject should be taken up, as above recommended.

You are nervous simply because you have lived wrong. You have departed from the ways of normal living. Go back carefully to the time when you were not nervous. Try to recall the days when you first deviated from good feeling to ill feeling. Remember the habits you took upon you at that time, the change in vocation or living. Try to find out what it was that

first sent you astray. Life now has become a burden to you where once it was a joy.

Remember, my son, my daughter, whoever you are, that it is a problem that you must mainly solve for yourself. Do not think the doctor has either the time or the ability to solve your problem. You have gone astray already. The question is only coming back where you belong. Many things will help you to get back. A real understanding of yourself, of the nature of your disease, is necessary to help you to get back.

THE HIDDEN DISEASE MENACE

By CARL EASTON WILLIAMS

IN view of the alarm and panic with which we view a trifling epidemic of smallpox, a disease, by the way, which few of us have ever encountered, even in others, and in view of the prominence and publicity given to such diseases as tuberculosis and cancer, which fortunately anyone can avoid by right living and maintaining blood cleanliness and vitality, is it not curious that civilization should tolerate in silence and secrecy certain types of disease which are even more prevalent than those mentioned, and also, if not immediately more disastrous, at least more far-reaching in their consequences? Yet civilization has permitted to exist practically unmentioned and without precautions to guard the innocent against them, a trinity of evils in the form of disease which not only frequently destroys life but beyond that actually threatens the life of the race itself.

Admiral Cary T. Grayson, M. D., White House physician to Presidents Roosevelt, Taft and Wilson, summarizes this threat to our national life in the following terms:

"Because of the sterility caused among both men and women as a result of the effects produced by venereal diseases, the human race eventually would die out and the earth become as uninhabited of mankind as the moon if we should allow to continue unchecked the unprecedented increase in these diseases which has been noted during the past few years."

Without a doubt the reason why these diseases have been so prevalent is because they have been kept under cover, through a false sense of delicacy, whereas the public is protected against diphtheria and other contagious diseases by public notice and quarantine. It has been regarded as impossible even to mention these diseases, as though it were better to have them than to speak of them. If only they could be dragged out into the light of day so that one might be warned against them and be protected from them, they might be as thoroughly avoided as is yellow fever at the present day.

With the loose terminology characteristic of the usual evasive attitude toward the subject, these maladies have been called social diseases, vice diseases, sex diseases, private diseases, unmentionable diseases, and a few other things. Their real names are syphilis, gonorrhea and chancroid. Of the three, gonorrhea and syphilis are the two most widespread. The third is an infectious ulcer sometimes equally as serious but less frequently encountered.

Of the two serious venereal diseases, one is constitutional in character, affecting the blood, skin, mucous membrane and the various fluids and organs of the body, even to the bones. The other is usually local in character, affecting the mucous membrane, though sometimes penetrating to the kidneys, or by reaching the circulation, attacking the heart and other parts and producing a most violent form of rheumatism.

But as if these diseases were not sufficiently terrible in themselves, they too often give rise to a train of sequels, such as blindness in innocent babes, sterility, paralysis, insanity and the necessity for deplorable un-

sexing operations on women. Three-fourths or more of the operations on women for the removal of pelvic organs are due to gonorrheal infection, often accompanied by unbearable pain. Such is the wedding gift presented to thousands of innocent brides by young men who have sowed their "wild oats" and who not alone reap the harvest, but compel others to reap it with them. It is infection by this same disease that causes most of the blindness among babies for which the world pays so high a price in the way of institutional care, and a still higher price in the form of suffering and heartaches. It is the same brand of infection that is in so many cases responsible for complete sterility. This sterility may take place in either man or woman through the closing up of the germ ducts as the result of inflammation. And there are sometimes other sequels, including heart trouble, rheumatism, kidney and bladder disease due to this same infection.

As to the other disease, syphilis, which if uncured goes on to a variety of horrors, this has sometimes been called the "child-murderer," for not only does it produce sterility in some instances, but it makes the normal termination of pregnancy difficult or impossible. Syphilis bears the proud distinction of being the only inheritable disease, the only one that can be directly transmitted from parent to offspring, bearing out the old Biblical tradition about the sins of the fathers being visited even upon the third and fourth generations. The child who is born alive of the syphilitic parent is weakened, often crippled, and perhaps mentally abnormal. It is only in the milder stages of the disease, however, that babies are born alive. In the more active stages

they are either born dead or the pregnancy is prematurely terminated. Syphilis is the world's supreme abortionist.

There are said to be, in round numbers, a million innocently infected wives suffering from gonorrhea in the United States. As to the number of women otherwise infected, no estimate can be made. The best evidence as to the prevalence of these diseases among men was that brought to light through the examination of those called for service in the great draft army during the World War. The figures showed that men in the army and navy were not, as had once been supposed, the most seriously diseased, but that the men drawn from the civilian communities were far more extensively affected. In some groups accepted for service during given periods there were found to be in round numbers as many as four hundred admitted to sick list on account of these diseases out of every thousand men, that is, forty per cent or four men out of every ten recruits. The report of the Provost-Marshal General on the first draft disclosed the fact that there were 445,000 syphilitics and 2,225,000 men infected with gonorrhea among registered men who were not then called. It was thus estimated that in the United States probably eight per cent of the total population is affected by syphilis. Some authorities have placed the estimate at more than double this number.

These being the facts, what can be done with the problem? The question may be put in a two-fold manner. What can we do with the problem individually? And what can we do with it nationally?

There is no question that not merely ignorance, but

rather prudery is responsible largely for the prevalence of these diseases, inasmuch as it is prudery which is responsible for the lack of that knowledge which might otherwise protect one against them. What would you think of parents who sent their children out into a forest that was filled with quicksands and pitfalls, having first taken pains to blindfold the children so that they would not see the dangers, on the ground that the swamps and holes in the ground might not be pretty to look at. What would you think of such parents? And yet that has been just the attitude of parents, teachers, doctors and ministers in regard to the dangers besetting the sex life of our young people. And many of these dangers are not dangers at all when one knows of them, just as the edge of a cliff is not dangerous if one is walking along the top and can see it in broad daylight. But it is in the dark or when one is blindfolded that they become perilous.

As far as the individual is concerned, therefore, protective sex education is the supreme requirement. One should know and understand not only the fundamental facts of life, but the dangers incident to looseness of behavior and even to association in any form with those prone to such laxity of conduct. If a young woman, for instance, knows that she may be infected with syphilis, even through a kiss, she will not permit such familiarities at the hands of one whose condition of health she does not know. And even though she has full confidence in the character and integrity of some young man, she can not always know absolutely that he is free from taint without the assurance of a competent medical examination.

This brings us to the importance of a clean bill of health as a condition precedent to marriage. The laws of some states require such a health certificate before granting a marriage license. Furthermore, the young man who is on the level will naturally desire that the woman whom he loves should have full assurance on this point, and so he will voluntarily undergo the examination so that he may present her with this certificate of clean blood and health. It should ordinarily be a father's duty to demand such a thing. But if the father is too negligent or stupid, then either the brother, mother, sister or perhaps the girl herself should look into the matter. Preferably the examination should be conducted and the certificate given, not by the young man's personal physician, but by the prospective bride's own doctor.

In dealing with this problem from the national viewpoint, or perhaps, one may say, from the standpoint of the general public, a varied program is necessary. Fortunately the United States Public Health Service now has a Division of Venereal Disease at Washington, D. C., devoted to research and educational propaganda. You can procure free literature from this branch of the government by simply writing a letter and asking for it. There are pamphlets

A. For Young Men.
B. For the General Public.
C. For Boys.
D. For Parents.
E. For Girls and Young Women.
F. For Educators.

The war on these diseases from the public standpoint includes first of all moral education. It is generally agreed that sex knowledge in itself, while fundamental, is not always sufficient, and moral education should accompany it, best supplied by intelligent parents. Young people everywhere must have instilled into their minds the necessity for a clean and continent life as the only basis of absolutely maintaining health, self-respect and a viewpoint of life that is entirely wholesome.

Next, rigid suppression of the social evil is imperative. The objection that repressive measures do not absolutely eliminate prostitution cannot alter the fact that certainly they do minimize it, whereas such make-shift follies as segregation, regulation, licensing and the like are really a tacit encouragement to immorality. Suppression of prostitution is a practical and to a large extent effective weapon.

In the past doubtless the greatest ally of venereal disease has been King Alcohol. In fact, alcohol and prostitution have always gone hand in hand. To a very large extent in the past the problem of "why girls go wrong" has been identified with the saloon. And when we say "saloon" we do not mean merely the rum shop on the corner with the familiar bar and brass foot-rail, but the many other saloons disguised as dance pavilions, tea rooms, restaurants, cabaret parlors, inns and whatnot.

The effect of alcohol is to paralyze the higher brain centers and thus remove those inhibitions which ordinarily prompt restraint of conduct. With the relaxation of these restraints under the influence of alcohol, a young woman may be persuaded to do things which in her right mind she would never think of doing. The

same is true of young men. It is incontestable that in probably ninety-nine per cent of all cases young men have started the sowing of their "wild oats" only after they were induced to drink. In this connection, however, the future is promising. Perhaps for an indefinite time the cause of human decency will still have to contend with the secret and illegal use of alcohol, either stored or manufactured clandestinely. Moreover, the close relation of alcohol to sexual laxity is so well known, by none better than by the professional seducer, that probably to a large extent the practice of drinking will continue to be associated with immorality. For this reason the sex education of all young men and young women should include this very knowledge, inasmuch as no young woman who possesses an atom of self-respect will then permit herself to indulge in alcohol, and no young man who has the instincts of a gentleman will ever ask a girl to drink.

There is another important factor in the eradication of venereal disease, and that is based upon the general scheme of modern sanitation. The experience of the American and British armies is especially illuminating in regard to the possibilities of stamping out venereal disease through what is now generally termed prophylactic treatment. Of course prophylaxis is a general term signifying disease prevention. The word has been used so extensively in conjunction with the avoidance of venereal disease that it is now coming to be understood chiefly as referring to the specific protection against these infections by means of antiseptic treatment.

Apart from all moral considerations, the fact remains that syphilis and gonorrhea are essentially

diseases produced by infection. Prophylactic treatment applied directly after exposure to infection, or even within an hour, sometimes longer, will kill the germ of either syphilis or gonorrhea. For this reason all army posts at the present day maintain what is known as a prophylactic station at which those who are exposed to infection of this kind are required by strict orders to report as quickly as possible for treatment. Mercurial salve, often spoken of as calomel ointment or "blue ointment," is found to kill the germ, the spirocheta pallida, which is the acting infectious agent in syphilis, whereas a three per cent nitrate of silver solution or a two per cent protargol solution used as an injection or douche will prevent the germs of gonorrhea from taking root, so to speak, in the mucous membranes. If one should learn, for instance, that the person by whom he or she has just been kissed is syphilitic, the rubbing of the calomel ointment into the lips, cheek or part exposed would in all probability prevent the development of the disease. In the United States army what is known as a prophylactic packet has sometimes been used, consisting of a collapsible tube with mercurial ointment in the one end and a two per cent protargol solution in the other end.

The objection to prophylactic measures of this kind is based upon the fact that they are not infallible. One may use them carelessly or may perhaps wait too long after exposure, and it is argued, therefore, that a false sense of security may encourage one in lapses from good conduct. On the other hand, it is now generally held that conduct is primarily a matter of character and moral purpose, it being also pointed out that the

experience of the world has never shown that fear of disease or of other punishment would deter certain types of men from taking the risks. In the army, at least, it was found that while immorality could not entirely be prevented among men on leave, at least infection by these diseases could be avoided. The reports of the experience of one station in the British army showed that in a body of 20,000 men only 7 contracted venereal disease, and that in each of these 7 cases there was some special circumstance, such as drunkenness or failure to use the protective treatment early.

The question naturally arises as to whether or not the problem is based purely upon the moral issue or whether it may properly be regarded as a problem in sanitation. But, of course, the truth is found in an appreciation of the fact that it is both. One of the results of the World War has been such a widespread dissemination of information on prophylaxis, as well as such a demonstration of its value, that it will undoubtedly be regarded as a practical measure in the future. In other words, if mankind in a mass can not be controlled in matters of sex behavior, at least the blotting out of these terrible diseases through the prevention of infection and the quarantine of those infected is a matter of gigantic importance. When one considers that it is not only the guilty but the innocent that suffer, and when one appreciates the total of human misery through blindness, insanity; sterility, abortion, dead-born infants, deformity, feeble-mindedness and mutilating operations on women, then may it not seem that any practical measure that will tend to check the far-reaching ravages of these plagues is well justified?

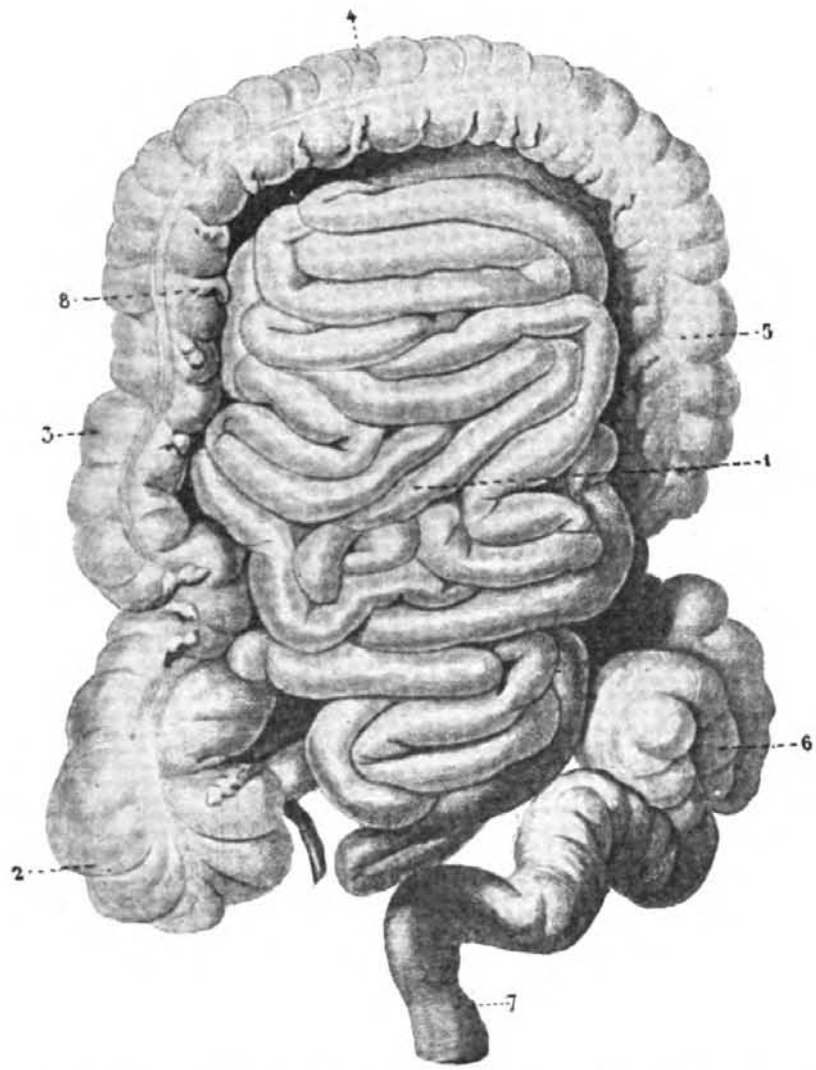
THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART THREE

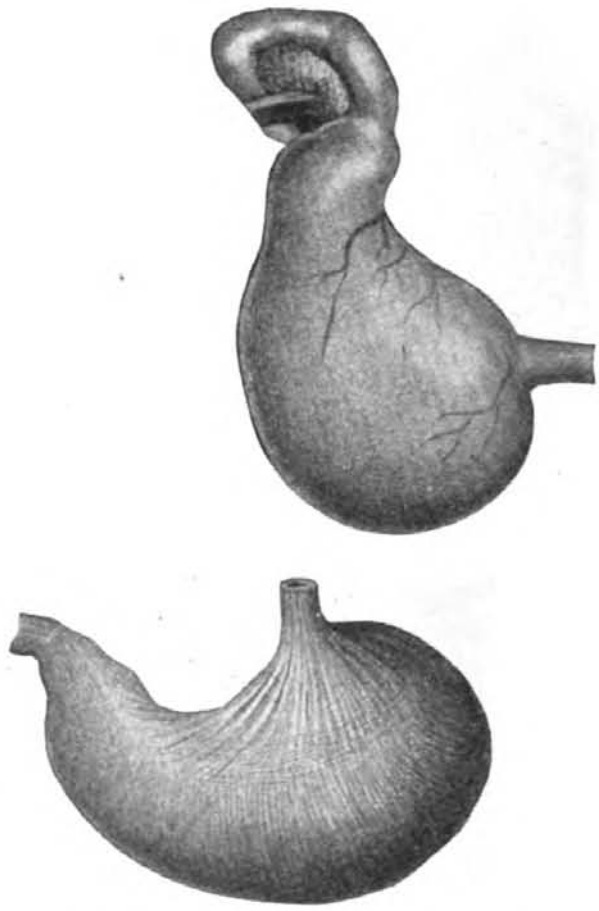
PHYSICAL FITNESS

SECTION FOUR

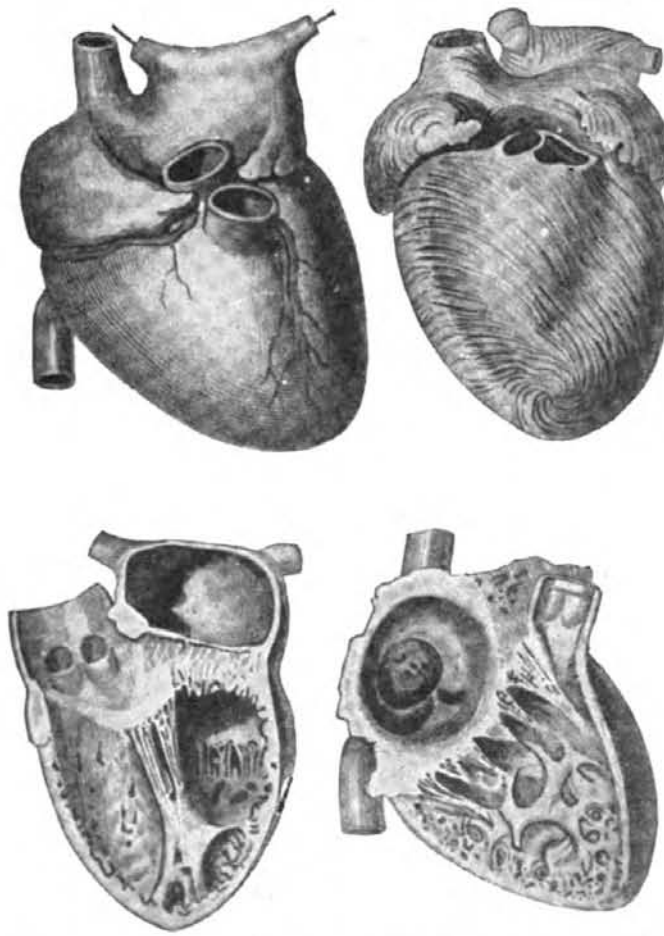


The intestinal tract, showing in the center the small intestines and surrounding, the large intestine or colon. The vermiform appendix is shown at the lower left hand corner, at the juncture of the small intestine and the colon.

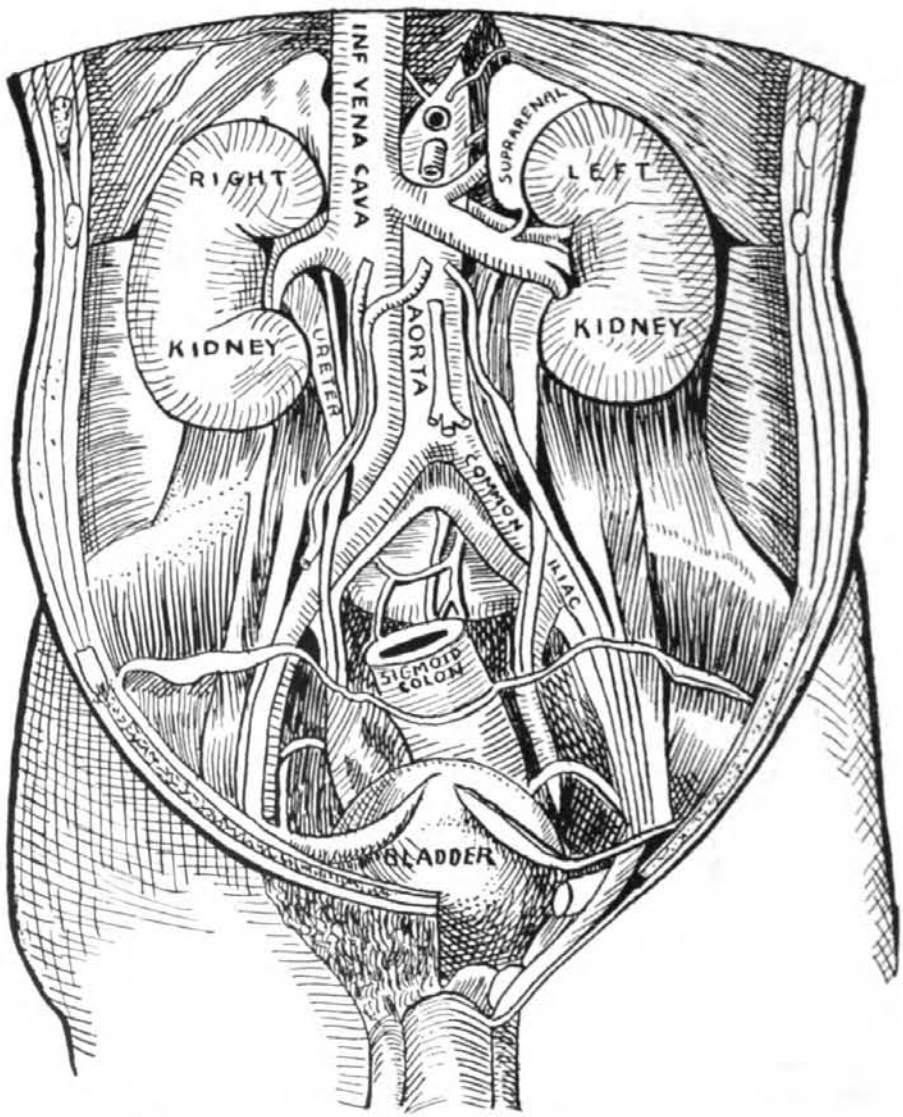
1. Small intestine
2. Cecum
3. Ascending colon
4. Transverse colon
5. Descending colon
6. Sigmoid Flexure
7. Rectum
8. Large intestine



Two views of the stomach, showing above, the external coat, and below, the muscular coating of the stomach. At the right, cardiac orifice or entrance, and at the left the pylorus or exit, so to speak.



The human heart, showing above, at left, its external coating, at right, muscular structure. Below, the arrangement of heart chambers and valves, showing cross sections. The lower left hand figure shows at the top, the right and left auricles and the larger chambers below, the right and left ventricles.



Showing the relative position of the large blood vessels and distribution of the circulation.

THE VITAL MACHINERY OF THE BODY

By HEREWARD CARRINGTON, Ph. D.

THE search for food is doubtless the most fundamental and instinctive of all our instincts. It may be said that the lowest forms of life do little else; but as they rise in the scale of evolution, less and less time is actually devoted to nutrition. Nevertheless, hunger is still the great law of our being; and the digestive system is that part of us which digests, assimilates, changes and disposes of the food we eat.

Food—cooked or uncooked—when introduced into the mouth is ground up into small pieces by the *teeth* so as to separate it into small particles; and at the same time is acted upon by the *saliva,* which flows into the mouth from the salivary glands at the rear of the mouth. The saliva not only moistens the food, it acts upon it chemically, and many of the first stages of digestion are carried on here—starches, for instance, are changed by the saliva in the mouth.

After this preparatory treatment, the food is passed to the back of the mouth, where it reaches the *œsophagus,* which is the opening leading into the stomach. It passes down this tube until it reaches the stomach.

When the food enters the *stomach* (through the "cardiac opening") it is churned about by the muscular action of the walls, and at the same time acted upon by the *gastric juice,* which is poured into that organ by the gastric glands. Further chemical changes take place here—the nitrogenous portions of the foods particularly

being rendered ready for assimilation. When the food has reached this stage, it is known as *chyme,* and is passed through the opening at the rear end of the stomach, known as the *pylorus.*

The walls of the stomach are composed of several layers and studded with tiny glands which pour out their secretions when food is introduced or under certain psychic stimuli. The stomach walls are also richly endowed with blood vessels; and these become filled with blood when food is introduced into the empty organ.

After the food leaves the stomach, through the pylorus, it enters the *duodenum* and here meets with certain fluid secretions, which still further digest the food, particularly the starches and fats. The *bile duct* from the liver and the duct from the pancreas open into the bowel at this point.

From the duodenum the food passes onward into the small intestine, and here the final stages of digestion and absorption take place. The bulk of the food material is now absorbed through the walls of the small intestine into the circulation to feed the tissues of the body. This is accomplished by means of the tiny *villi,* which line the walls of the intestine and soak up, as it were, the fluid nutriment.

The *small intestine*—which is about twenty-five feet in length in the human adult—terminates in the *ileo-cecal valve,* which opens into the *large intestine.* It is just below this that the *appendix* is located—a small piece of blind gut.

The large intestine, which is about four or five feet in length, travels first up the body, then across, and then downward. The ascending bowel is on the right side

of the abdomen; the transverse is about the center of the body; and the descending bowel is on the left side. This last is known as the *colon.* It terminates in the *rectum,* while the lower opening is known as the *anus.*

Only a small portion of the food is digested in the stomach, this being albuminoid food. The rest of the digestion takes place in the intestine. After the food enters the duodenum, through the pylorus, it is acted upon, as before said, by the bile, pancreatic juice and intestinal juices. The bile is antiseptic, preventing the food from decomposing until converted and digested. It emulsifies or converts the fats, and it also stimulates the muscular activities of the bowels.

The pancreatic juice has a triple action: First, it acts upon the albumens, rendering them fit for absorption. Secondly, it converts starches into sugars. Third, it changes the fats into fatty acids, suitable for absorption.

The other intestinal juices are largely devoted to the final conversion of the albumens. The fats are absorbed by the *lacteals,* in the villi, and all the remaining nutriment which the food contains is thus taken up. The refuse is passed on, or deposited, by the blood in the colon, where it is ultimately expelled from the body.

So far, however, we have only considered the stomach and intestinal tract, the direct channels of digestion. Many other organs in the body also play a part in the digestion and conversion of food, however, rendering it fit for the body, or assisting the latter to expel the poisons which may have been generated as the result of metabolic processes. The most important of these are the liver, pancreas, spleen, kidneys and lungs. The kid-

neys we shall discuss later on in connection with the circulation, and the lungs when we come to outline the functions of respiration. The other three organs and their functions we will mention here.

The *liver,* situated just below the diaphragm, on the right side of the body, is an enormous gland elaborately supplied by blood vessels and having several important functions.

The first of these is the secretion of the bile, as before mentioned, which assists in the digestion of food in the upper intestine. Until secreted into the bowel, it is stored up in the *gall bladder,* situated on the anterior surface of the liver.

The second function which the liver exercises is that of changing absorbed foods into appropriable substances.

The third function of the liver is that of a filter. Those portions of the nutriment which are unfitted for the body are changed in the liver into *urea,* and this is filtered out and excreted by the kidneys. If the liver fails properly to perform this function, through overwork or an excess of this material in the blood, the uric acid is thrown into the blood stream, causing many ills.

The *pancreas,* an elongated, triangular organ, placed behind the stomach, secretes the pancreatic juice useful in intestinal digestion, pouring this into the upper small intestine just below the bile duct.

The *spleen,* situated on the left side, between the stomach and the diaphragm, is supposed to have an effect upon the blood stream—though the functions of the spleen are as yet not very well understood. Doubtless it has an influence upon the elaboration and digestion of food material in the intestines.

We now come to the *circulatory apparatus,* which is designed to circulate the blood throughout the system. The central motive power of this is the *heart,* a muscular organ divided roughly into four portions, two upper and two lower, known respectively as *auricles* and *ventricles.* There is no connection between the two auricles and none between the two ventricles, but the right auricle opens into the right ventricle, by means of a small trap door or *valve,* and the same is true for the left side. The auricles have been called "waiting stations," the real power coming from the muscular contraction of the walls of the ventricles. From the heart the blood is conveyed outward, by means of *arteries,* and return to it through the *veins.* All the tissues of the body are supplied with blood by means of a fine network of tiny blood vessels known as *capillaries.* These stop the pulsation noted in the *arteries,* and it is for this reason that no pulsation is noted in the *veins.* It is in the capillaries, also, that the broken-down tissues and poisonous material all over the body are gathered up and conveyed to the lungs for purification, by meeting with the oxygen of the air.

The above description of the circulation is very general in character, and needs further elaboration in order to render it strictly accurate. The circulation of the blood is as follows: Commencing at the left ventricle of the heart, the blood is carried by the *aorta* to the arterial system; through the capillaries and the veins back again to the right auricle, whence the blood passes into the right ventricle, and thence through the pulmonary arteries to the lungs to be purified; and when this is accomplished it is again brought back arterialized

by the pulmonic veins to the left auricle. Thence it passes into the left ventricle, which was our original starting point.

Venous or purple blood, therefore, is present on the *right* side, and red blood on the *left* side of the heart.

There is yet another subordinate circulation called the *portal* or *liver circulation.* Blood carried by the *mensenteric arteries* passes in close contact to the intestines, and, taking up nutriment therefrom, is carried by the *portal vein* to be purified by filtration through the *liver,* and re-enters the venous system by the *hepatic vein.*

The *arteries* all over the body have different names, according to their location. Thus we speak of the *subclavian* artery, the *tibial* artery, etc., since these lie close to the clavicle, the tibia, etc. The main artery leaving the heart in an ascending curve is known as the *aorta,* while the main artery through the abdomen is known as the *abdominal aorta.* Many of the important veins also have specific names which, however, need not be enumerated here. The largest in the body is the *superior vena cava,* which empties the venous blood into the heart.

The *veins* are supplied with numerous *valves,* opening in one direction, to prevent the backward flow of the blood. It is important to remember this, since, when bleeding takes place from a deep wound, when this can be stopped by pressure upon the blood vessel, this pressure should be applied *above* the wound (that is, between the wound and the heart) in the case of *arterial* bleeding, but below or on the *far* side (that is, opposite the heart) in *venous* bleeding, since the valves before spoken of prevent the backward flow of the blood from above. The color of the blood will show whether it is arterial

or venous: crimson if the former, dark blue if the latter.

The *capillary vessels* are extremely minute, and it has been said that one can not prick the body anywhere without rupturing one or more of them. Some of these are so fine that they only permit a single blood corpuscle to pass through them at a time!

The *blood* itself is a fluid plasma containing red and white corpuscles; the former give the color to the blood and are about three-thousandths of an inch in diameter. These *red corpuscles* act as oxygen carriers, and the health of the body may be said to depend upon their number, which is increased by exercise, correct diet, sun and air baths, and by deep breathing.

The *white blood corpuscles* are known as *leucocytes.* They are somewhat larger than the red corpuscles, and one of their functions is to combat disease germs which may be introduced into the system.

In addition to the circulation of the blood, there is also a *lymphatic circulation.* It is not generally known that there is actually more lymph than blood in the body.

The lymphatic system consists of *lymph spaces, lymphatic vessels* and *lymphatic glands.* The first of these consist in microscopic cavities situated in the tissues.

The *lymphatic vessels,* called *lacteals,* are found mostly in the abdomen, about the intestines. The *lymphatic glands* are more nearly filters, separating any harmful substances which may be picked up by the lymph in its passage through the tissues. When this is excessive, the glands swell and become tender; in certain diseased states this is very marked.

We have seen that the blood is purified by its passage through the lungs and its contact with the oxygen of the air, with which it is then brought into contact. Atmospheric air, after passing through the nasal passages, enters the *larynx* in the throat; thence it passes into the *trachea.* This divides into two branches or *bronchi,* one for each lung. These latter again subdivide into a number of small branches, penetrating every part of the lungs.

The substance of the lung is made up of a number of *air cells,* arranged on tubes or *bronchia* like the leaves of a tree. The blood in circulating through the lungs, is converted from the purple venous blood into the scarlet arterial blood. It is important to remember that the division at the lower part of the trachea is more to the left, and consequently when any foreign body is drawn into the windpipe from the mouth, it is to the *right side* it would be carried.

The mechanism of the voice is situated in the *larynx,* and the *epiglottis* closes the larynx when food passes down the gullet to the stomach, and prevents it from "going the wrong way."

Atmospheric air contains about four parts of nitrogen gas to one of oxygen. The former is neutral and acts merely as a dilutant, preventing too much oxygen from reaching the lungs and burning us up too rapidly. The cells of the lungs always contain some air, which is continually being changed by the process of respiration. Air which is continually being changed at each expiration is called "ordinary breathing air"; whilst the air which can be expelled over and above this by forced expiration, is called "complimental air," and that which

remains after this and which can not be expelled is called "residual air."

The *kidneys* are situated one on either side of the spinal column, a little below the center of the back, and act as filters for the blood.

They are abundantly supplied with both veins and arteries, being fed by the *renal arteries* and emptying into the *renal veins,* and thence into the *interior vena cava.*

Issuing from the kidney is the *ureter,* which carries its fluid contents to the *bladder,* where it is retained until expelled from the body.

Above each of the kidneys is the *suprarenal capsule,* also fed by arteries and veins, the functions of which are very important, and injuries to which cause a specific disease.

The *skin* acts as the outer covering of the body, protecting the under tissues and vessels, and at the same time giving beauty to the whole. It may be divided into three layers (1) the *epidermis* (2), the *derma* or true skin, and (3) *subcutaneous layer.*

The first of these is composed of dead cells, and protects the tissues from injury. The derma or true skin is an elastic tissue, richly provided with tiny blood vessels and nerves. The subcutaneous layer is provided with innumerable *sweat glands,* which act as eliminating organs, in that they excrete from the body, in this manner, poisonous material, which may not be carried off by the kidneys or other excretory organs. These sweat glands exude moisture and also vapor, known as "insensible perspiration." The surface of the skin is also covered, over certain areas of the body, by *hair* which

grows luxuriantly. At the roots of these hairs are tiny muscles, which by their contraction pull the hair into an erect position; and also small glands knows as *sebaceous glands,* which secrete an oily substance, lubricating the root of the hair. The evaporation of moisture from the surface of the skin helps to maintain the body at an equal temperature, by reducing its temperature. In very cold weather, on the contrary, the skin contracts, so as to prevent too large a quantity of blood from reaching the surface of the body, and hence, by coming into contact with cold air, becoming chilled too rapidly.

THE NERVOUS SYSTEM

By HEREWARD CARRINGTON, Ph. D.

THE nervous system is the great central power plant which runs the body, and may be said to be in a sense the seat of life. Across its delicate fibers the mandates of the will are carried; along the sensitive nerves currents are passed which keep us in touch with the outer world, and with our own bodies. Without a healthy and vigorous nervous system we should die, no matter how perfect the rest of the human organism might be. If certain nerve centers are injured we become paralyzed, and when this paralysis affects the respiration of the heart, we die practically instantaneously. It is upon the nervous system that we depend, and *in* it we live.

There are two chief centers or main stations in the human body—the brain and the spinal cord. Nature has taken care to protect these most carefully—by the flinty skull in the one case and by the powerful spinal column in the other. Let us consider them for a few moments, each in turn.

The brain is divided into three parts or main divisions: the *cerebrum,* or brain proper; the *cerebellum,* or small brain; and the *medulla oblongata,* which connects the brain with the head of the spinal cord. The cerebrum again is divided across lengthwise by a deep cleft or so-called "fissure," forming the right and left "hemispheres." Each of these are the same in structure, and are united by numerous nerves, crossing from one

half to the other. The surface of the whole brain (both hemispheres) is thrown into innumerable folds, known as *convolutions;* and the more intellectual a man becomes the more of these convolutions there are.

Again, the cerebrum is divided for the sake of convenience into the *frontal lobe,* the *parietal* (or middle) lobe, and the *occipital* (or rear) lobe. In the first of these associations most of the higher mental faculties are carried on (hence the term "high brow"); the parietal lobe is chiefly the scene of motor activities; while in the rear or occipital lobe, the centers of sight are situated, as well as other important centers.

Starting at the top or outer portion of the cerebrum again, and working inwards towards the center, we encounter various "strata" or layers of brain substance. The outer layer is composed of so-called "gray matter," and constitutes the *cortex.* This is seen to be, when examined under the microscope, composed of millions of nerve cells, connected by minute interlacing nerves. The number of these cells is very great—running well into the millions. Beneath this layer is the "white matter," also interconnected with all other parts by a complicated system of nervous fibers.

There are various "centers" in the brain, corresponding to the various sense organs. Thus there is a distinct center in the brain where spoken words and sounds are registered; and this is known as the *auditory* center. Similarly we have the sight center, the smell center, the taste center, etc. All of these have now been located with great accuracy, and their seats are definitely known.

Then there are the so-called "motor areas." Every

part of the body which is moved receives its impulse from some nervous current, from some nerve center. We now know just what localities in the brain move, say the great toe of the right foot, or the tongue, or bends the left elbow. The command of the will goes forth from that center; and this is carried along the nerves to the muscle, which thereupon contracts and moves the muscle desired. Or the impression which we receive from the outer world is borne inwards to the proper center along certain nerves, until it reaches the proper center in the brain where it is registered.

It will thus be seen that there are two classes of nerves; the *motor* and the *sensory*. (These are also called the *efferent* and the *afferent*, respectively). One carries impressions *to* the brain; the other impulse messages *from* it.

Between these two—the incoming and the outgoing nerve currents—the center in the brain lies. It is like the central telegraph station, which after receiving an important message, sends out word for the proper action to be taken upon it. It is in the brain that the message is received, acted upon, and the message sent forth to the muscles to perform a certain action. When this is done consciously, it is a conscious act of will. When it is done unconsciously, it is a "reflex" action; and knowledge that we have so acted may never rise into consciousness. Many of our acts are of this automatic nature.

Behind and below the rear portion of the cerebrum lies the *cerebellum*, the so-called "hind brain," which resembles the cerebrum in many ways, save that it is smaller, less complex, and its functions are entirely dif-

ferent. The cerebellum is thought to render possible the coördination of the movements and sensations of the body, and to be an important factor in the sense of balance. It may for our purposes be considered the organ for coördination.

The *Medulla Oblongata* is situated at the rear and base of the brain, and has been called the connecting link between the brain and spinal cord. It is of the same general shape as the spinal cord, into which it merges and protrudes through the small opening at the base of the skull. Although so small in size, it nevertheless is extremely important in its functions—being the seat of many of the reflex or automatic actions, spoken of above, such as vomiting, coughing, sneezing, dilation of the pupil, respiratory and cardiac influences, etc. The action of the unstriped (involuntary) muscles —such as those round the walls of the arteries—are also said to be under the control of the medulla.

Coming now to the *spinal cord,* which lies within the veterbræ or "backbone," we find this to be the seat of most of the reflex actions of the body, certain impressions of touch and pain, heat and cold, certain motor actions, inhibitions, etc. Unlike the brain, the cord carries its white matter on the *outside,* and the gray matter *within,* in the form of a sort of butterfly, with outstretched wings. Numbers of nerve fibers travel down the cord, and emerge from it in pairs, at the junction of each vertebra. There are thus two roots to each nerve leaving the spine—an anterior and a posterior root—the former being instrumental in conveying motor currents; the latter, sensory. As soon as they leave the spinal cord, however, these nerves join, forming to all

intents and purposes "one" nerve. These composite nerves travel to organs, tissues and many parts of the body, supplying the requisite nervous impulses or inhibitions—the cord reacting to stimuli from within or without, etc. The spinal cord may thus be said to be the fundamental basis of life.

It must be understood that these two nerves (the anterior and the posterior) branching off from the same side of the spine, and combining together into one nerve, are known henceforth as one nerve (having two roots), and a similar nerve (also having two roots) branches off from the opposite side of the spine: so that when we speak of the "pairs of nerves" branching from the spine, we mean these two compound nerves having four roots.

Other pairs of nerves it must be understood also branch out from the brain, but in this case there is only a single root to the nerve, and not a double root as in the case of the spinal nerves.

Taking the pairs of nerves of the brain in their order, we have: The *first* pair, sensory nerves, reporting sensations of *smell.*

The *second* pair, also sensory, report sensations of sight. They are the so-called "optic nerves."

The *third, fourth* and *sixth* pairs are *motor* nerves, and control the movements of the muscles of the eye.

The *fifth* pair of nerves is very important and has numerous ramifications.

Each nerve divides into three branches, and for this reason has been called the "tri-facial." The first of these reports sensations from the eyeball. The second is also sensory, registering sensations from the gums, cheek and nose. The third branch, which is partly sen-

sory and partly motor, controls sensations on the forepart of the tongue, the inner lining of the cheek, the teeth, and the outer cheek, between the eye and the ear.

The *seventh* pair controls the movements of the face.

The *eighth* pair reports sensations of hearing.

The *ninth* pair, which together with the tenth and eleventh pairs spring from the medulla oblongata report sensations of taste on the tongue, and also controls the swallowing muscles.

The *tenth* pair are the so-called "pneumogastric nerves," nerves that send branches to the stomach, heart and throat.

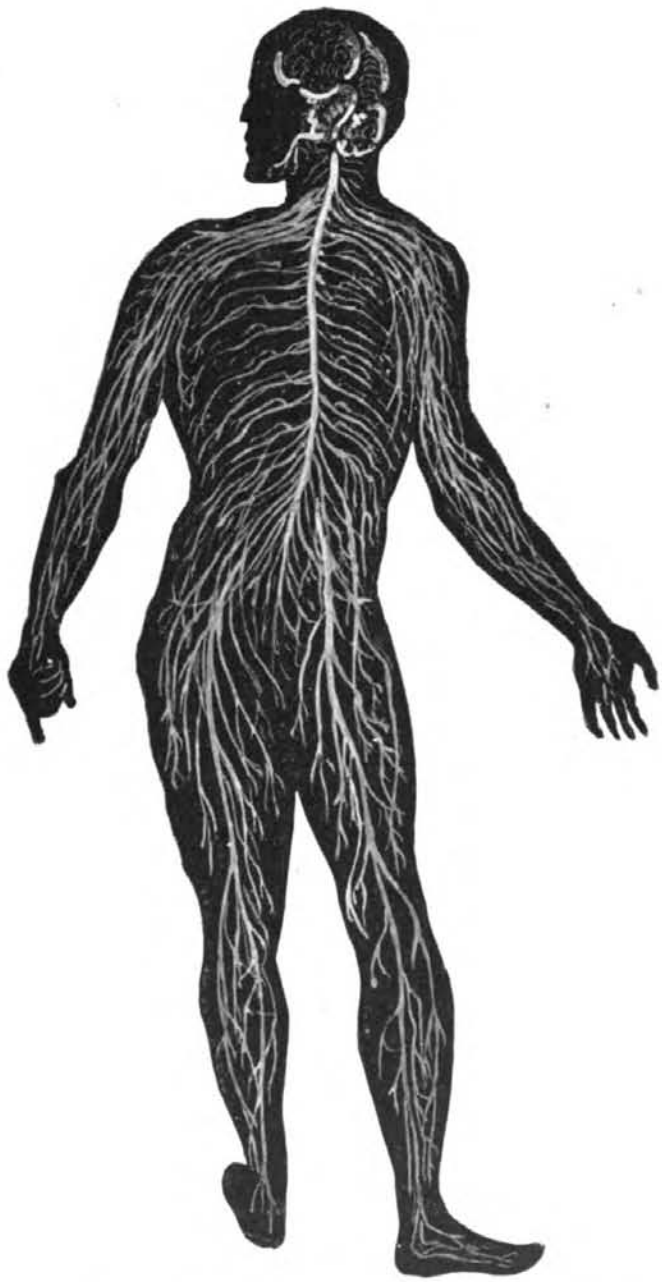
The *eleventh* pair of nerves are motor, and control the muscles of the neck and back.

The *twelfth* pair direct the tongue in the movements of speech.

The above nerves all spring from the brain or medulla oblongata. From the spine, branch thirty-one pairs of nerves. These interlace to form various *plexuses,* or nerve centers. There are several of these—cardiac, solar, etc. They have wide ramifications and are very important.

In addition to this so-called "cerebro spinal" system of nerves, there is also the "sympathetic" system. This is made up of *ganglia,* or masses of nerve matter and nerves proper, which are also gray in color. Nerves from these ganglia travel to the heart and various internal organs controlling them to some extent, and are affected by the emotions—hence the name for this system—the "sympathetic."

Inasmuch as the nerves branching from the spine are relatively near the surface of the body, they can be



Distribution of nerves, showing the spinal cord or Central nervous system and its many ramifications.

reached to a certain extent by massage, hot and cold water compresses, applied to the spine, etc., and this being the case, the very great importance of these measures in certain complaints, in which the roots of the nerves are affected, or in which the organs fed by these nerves are diseased, is very apparent.

As to the nature of the nervous impulse itself, this is still a mystery, to a very large extent. Some authors have felt this to be electric in nature, but this theory is now given up in view of newer researches. If the nervous current were electric, it would be absolutely *instantaneous* in its action—for it would travel with the speed of light. But we know that this is not so; nervous impulses take an appreciable time to travel any great length of nerve. Physical, chemical, vital and other theories have been advanced; but the most that can be said today is this: That, accompanying all nervous action, electrical, chemical, physical and vital changes take place. But which one of these is the primary or most vital one is still undecided!

THE SENSES

By HEREWARD CARRINGTON, Ph. D.

THE five organs of sense are the eye, ear, nose, tongue and skin. These give us respectively the sensations of sight, hearing, smell, taste and touch. All that we know of the outer world is through, or by means of these senses. The importance of keeping them in perfect health is therefore apparent; for to the extent that they are blunted or defective do we cut ourselves off from the world and its pleasures.

By far the greatest amount of our education is derived through the eye. This is the most important of all the senses. What we know as the "eye" is really only one portion of the whole optic apparatus. The two eye-balls are connected by means of the optic nerves, with the sight centers at the rear of the brain, and it is here that the "sensation" of sight takes place. The eye is only the instrument by means of which images from the outer world are conveyed to the sight centers *via* the optic nerves.

The eye-ball itself is nearly spherical in shape in its normal condition; the outer coat being known as the *sclerotic.* Within this is the *choroid,* and in this at the front of the eye is a circular opening known as the *pupil.* Most people think that the pupil of the eye is black; but as a matter of fact this is not so. It is colorless, and *appears* black for the reason that the interior of the eye is not illuminated and does not reflect light rays. It is like looking into a dark cave; it is not black; there is only the absence of light within it.

In the front of the eye is the *cornea,* behind which lies the *aqueous humor.* Part of this is covered from behind by the *iris,* containing the pigment which gives it its peculiar color; and the central portion by the *lens,* shaped somewhat like a magnifying glass. Above and below the lens are the *ciliary muscles.* The whole of the globe of the eye is filled with the *vitreous humor.*

At the rear of the eye, forming the back wall, as it were, is the *retina,* and it is upon this that the images of the outer world are thrown, just as the pictures of the moving picture camera are projected upon the screen. The structure of this retina is very complicated and consists of various layers, one of which—that of the "rods and cones"—transforms light rays into nervous impulses. The retina contains a small opening, which is the beginning of the *optic nerve.* The retina, as all other parts of the eye, is lavishly supplied with nerves and tiny blood vessels.

The eye is supplied with two *lids,* an upper and an under lid. Just above the upper eyelids on the *outer* sides of the eye are situated the *lachrymal glands* or tear glands—connected with the eye by a number of small *ducts.* On the *inner* corner of the eye are two small tear ducts, intended to carry away the tears or the natural moisture of the eye, and convey it to the *tear sac,* and ultimately to the nose. It is for this reason that the nose "runs" with water whenever we cry. If, however, the lachrymal glands secrete tears faster than the ducts can carry them off, the eyes overflow, and then we "cry," the tears running over the edge of the eyes and down the cheeks. Crying is a protective mechanism on the part of nature, affording relief to the person crying.

At the rear and sides of the eyeball, outside the ball and within the head, there are a number of *muscles*, known respectively as the superior and inferior, internal and external *recti* muscles; and the superior and inferior *oblique*. These move the eye-ball in all directions, and give it a wide range of motion. They also are the cause of changes in the shape of the eyeball, as we shall see later, when discussing defective vision and errors of refraction in the eye. The importance of the action of these muscles has never been fully recognized.

The Ear is the organ of the sense of hearing, and is the second most important sense we possess. The ear is divided anatomically into three parts: the outer, middle and internal ear. The first of these is that portion which we see outside the head. The second or middle portion consists of several structural parts: the auditory canal, which runs from the outer ear to the ear drum, and which is lined with small hairs, and contains a number of wax glands, which secrete wax, in much the same way that the sweat glands secrete sweat. The purpose of this is to prevent the entrance into the ear of small insects and to prevent the growth of fungi or bacteria.

We now come to the ear drum or *membrana tympani*. This is a parchment-like film drawn across the ear, like the top of a drum. Beyond this lie the various parts of the inner ear. In order, however, that the ear drum may vibrate freely, an equal air pressure must be maintained on both sides of the drum, for otherwise the outer pressure would be so great that the drum head would not vibrate at all. In order to insure this, a supply of air must be given the *inner* ear; and this is obtained by means of an inner opening or passage, run-

ning from the inner ear to the throat, and known as the *Eustachian tube.* So long as this is open, an equal air pressure is maintained on both sides of the drum, but when this passage becomes closed, through inflammation, congestion, etc., troubles are bound to come, and partial or temporary deafness may ensue.

Within the middle ear are also three small bones, called from their shape, the *hammer, anvil* and *stirrup.* The hammer is attached to the inner side of the ear drum on one side, and rests against the anvil at the other; the anvil in turn is attached to the stirrup. The foot of the stirrup rests within or against the so-called "oval window." The result of this arrangement is that whenever the ear drum vibrates, a to and fro, pendulum-like motion is imparted to these bones; the stirrup moves in and out of the oval window, and pressure is thus exerted upon its fluid contents.

The *inner ear* is divided into three parts. The first of these consists in the so-called *"semi-circular canals"*—three small tubes placed at right angles to each other, and having a common opening. It is now thought that the sense of balance and equilibrium of the body is maintained here and that sea-sickness is caused by certain actions which take place within these canals, as the result of the movement of the vessel or boat.

The second portion of the inner ear is known as the *cochlea.* It somewhat resembles a snail shell in shape, and makes two and a half turns. Within it are contained the end organs of hearing.

The third portion is the so-called *vestibule,* and lies between the two parts just described. It contains a membranous sac, filled with a fluid, known as *endo-*

lymph; this is bathed in another fluid, known as *perilymph.* The auditory nerve runs from the inner ear to the centers of hearing within the brain.

The *sense of smell* of which the nose is the organ, is a very important though a much neglected one. The sense of smell depends upon the functioning of the olfactory nerves, "their end organs being found in the tiny, *peripheral* processes of the olfactory cells placed among the epithelial cells of the mucous membranes, these end organs thereby coming into touch with the air." The nose thus gives us the sensations of odors, perfumes, scents—pleasant and unpleasant, etc. It is not generally known that all our taste sensations, with the exception of four, are obtained through the sense of smell. These four are sweet, salt, sour and bitter. Every other taste which our food may seem to contain is derived through the sense of smell alone. It is for this reason that when we have a "cold" and the nose is "stopped up," preventing the proper sense of smell, we can no longer taste our food. (This is of course a sure sign that none is needed! This, however, is a subject which will be fully discussed later on.)

The *sense of taste* thus depends, as we have seen, partly upon the sense of smell, but also upon the gustatory cells situated in the tongue. The surface of the tongue is covered with numerous very fine, projecting irregularities, known as *papillæ.* These contain the gustatory cells, the tiny end organs of the sense of taste, upon the action of which the latter depends. They somewhat resemble a tiny flower, which is normally closed but which opens under the stimulus of food, and admits the food to enter and come into contact with the taste or

gustatory cells. In this way the nerves of taste are stimulated, and give rise to the "sensation" of taste in the food.

The *sense of touch* is normally present upon the surface of the body and depends upon the presence of the sensory nerves. Certain internal organs are supplied with sensory nerves, while others are not. Thus it is a curious fact that portions of the brain may be removed with no sensation whatever! The sensations of heat and cold, pressure, weight, etc., are measured by the sense of touch; though there is a tendency to divide this sense into two or more others. Certain areas of the body are far more sensitive to touch and to pain than are others.

MAN'S MUSCULAR SYSTEM

By HEREWARD CARRINGTON, Ph. D.

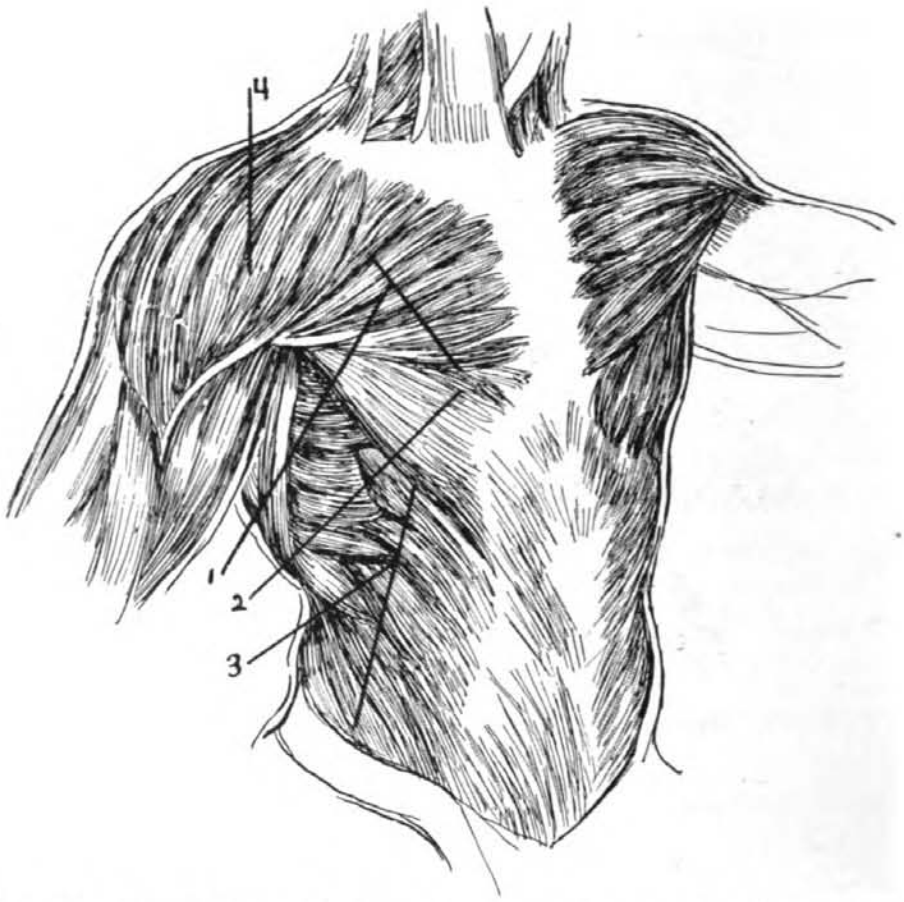
ALL protoplasm possesses a certain peculiar quality, which is known as *contractility*. When stimulated in a certain manner, it reacts or contracts, after its own peculiar manner; and this differs in degree according to the differentiation of the various structures. In muscular tissue, this power of contractility finds its highest expression; and in voluntary muscular activity it is brought under the dominance and control of the human *will*.

Very briefly, muscular tissue is made up of *cells* which may be either elongated, fusiform, nucleated—finely striated lengthwise, but not striated transversely—united by a homogeneous cement substance—the whole constituting nonstriped or involuntary muscle; or long, nucleated fibers transversely striped, covered with an elastic sheath of extreme thinness, bound together into small bundles by delicate connective tissue—these again into larger ones, till what is known as a "muscle" is formed. This in the higher vertebrates ends in tough, inelastic extremities suitable for attachment to the levers it may be required to move (bones).

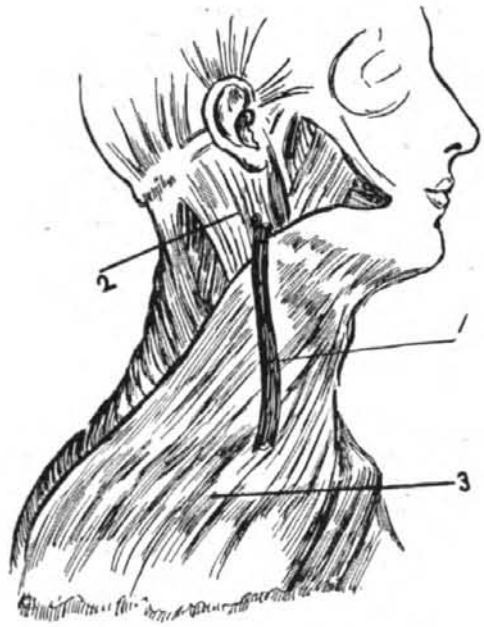
As suggested by the names employed, we have control over the voluntary muscles; and practically none over the involuntary muscles. Unstriped or plain muscle is involuntary; striated or striped muscle voluntary.

Unstriated muscle cells are flat, from 1-4500 to 1-3500 of an inch broad, and 1-600 to 1-300 of an inch in length. They are clear, granular and brittle.

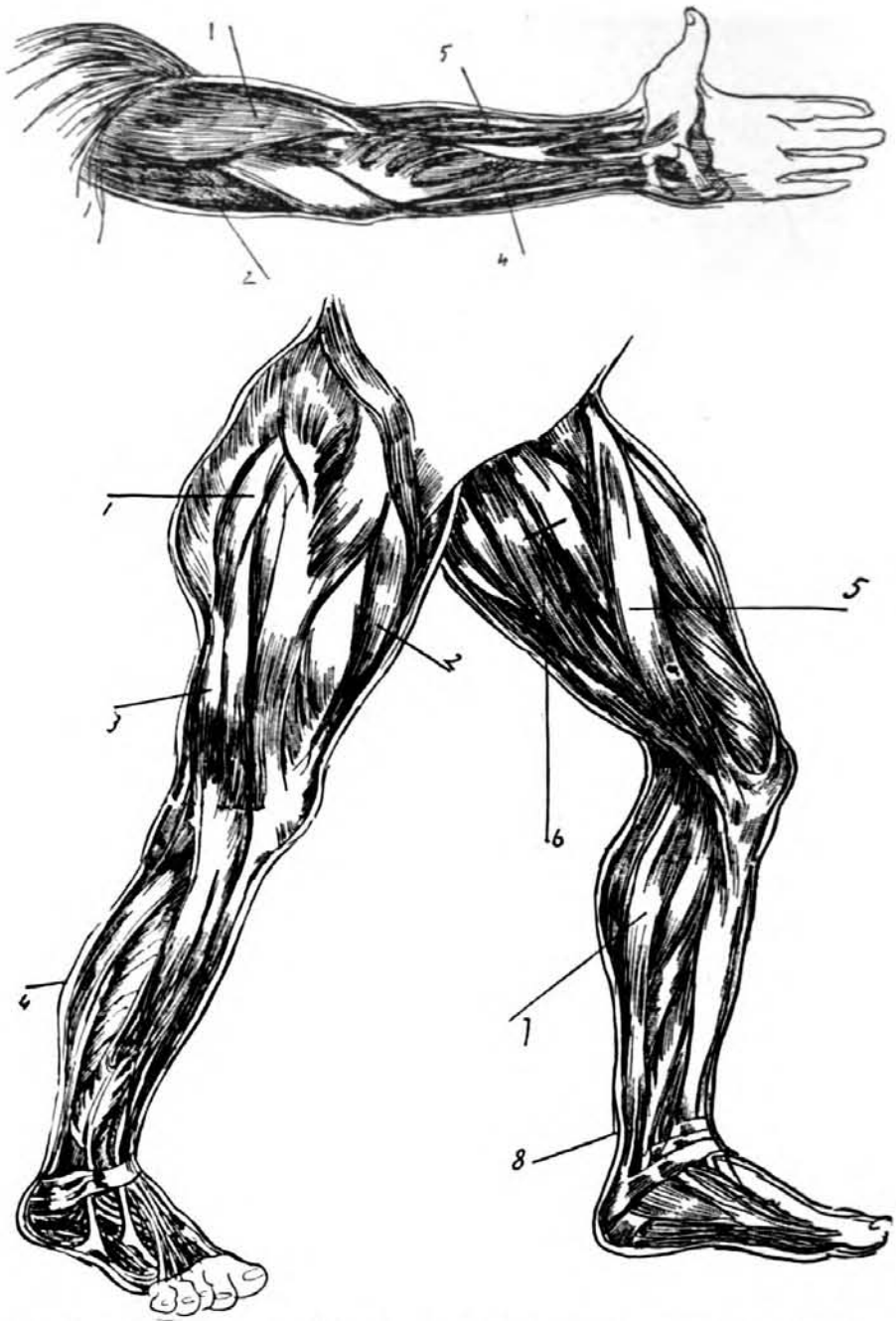
MAN'S MUSCULAR SYSTEM



Muscles of the thorax. 1. The pectoralis major, or pectoral muscles. 2. The external oblique. 3. The transverse muscles, used in twisting or turning the body. 4. The deltoid.



Important muscles of the neck controlling the movements of the head: 1. The course of the carotid artery supplying the brain. 2. Sternocleidomastoid muscle. 3. Myoides, or superficial neck muscles.



Muscles of the arm. 1. Biceps. 2. Triceps. 3. (At shoulder) Deltoid. 4. Flexor muscles of the fingers. 5. Flexor muscles of the wrist. Below, the important muscles of the lower limbs. 1. Abductor of thigh. 2. Quadriceps extensor femoris. 3. Biceps of the thigh. 4. Gastrocmemium or calf. 5. Sartorius. 6. Adductor of thigh. 7. Extensor longus digitorum. 8. Tendon Achillis.

When a voluntary muscle contracts, it changes in form, but not in size. The bulk of the muscle is bunched in one place, but it disappears in another place. This contraction of the muscle passes along in the form of a wave—the size and speed of which are susceptible of measurement. For the frog the wave length is estimated at from 200 to 400 millimeters (7 to 14 inches), and the velocity per second is about 3 or 4 meters (3½ to 4¼ yards). As soon as this contraction is removed, the muscle tends to resume its original form. The stiffness assumed by muscle after death (*rigor mortis*) is not due to contraction of the muscle, but to its hardening, which in turn is due to the action of certain micro-organisms present in the tissues, after death. Fresh meat which is bought at the butcher's is "tough" simply for the reason that it is then in the intermediate stage of *rigor mortis*. When it becomes "tender," decomposition has progressed beyond this point—as in all corpses—and the muscles become "soft" again, as putrefaction advances. If meat were kept long enough, it would become sponge like and semi-liquid. Let us hope that this would be "tender" enough for our friends, the meat eaters!

During the contraction of healthy muscle, poisons or "toxins" are formed, and these are the true cause of muscular fatigue. They have been made the subject of prolonged study by Mosso and others. When muscle is rested, these "toxins" disappear. As well as these chemical changes, thermal and electrical changes also take place when the muscle is exercised. It becomes hotter; electric discharges take place. When greatly overstretched, muscle does not return to its original length—as it does ordinarily; hence the serious nature of sprains.

The chemical constituents of dead muscle in a healthy adult are about as follows:

Water		744.5
Solids: Myosin, elastic substance, etc.	155.4	
Soluble proteids	19.3	
Gelatin	20.7	
Extractives and salts	37.1	
Fats	23.0	255.5
Total		1,000.0

The number of muscles in the human body is very great—several hundred. Yet several of the smaller animals have many more muscles than we; the caterpillar for instance, has several thousand!

The muscles of the *face* run in all directions; and it is because of their action that they are so true to the ideas and emotions of the mind. By looking at a person's face, you can often tell what is passing in his mind. Only a high degree of nervous control will prevent the muscles from "giving us away."

There are certain muscles which we possess, but over which we have less control than the lower animals. For example, we may observe our dog "prick up his ears" when we speak to him; our cat lays back her ears when she is fighting; and the horse does the same thing when he is angry or vicious or ready to bite. This is probably a reaction on the part of Nature to get them out of the way and remove them from injury. We human beings, however, no longer enjoy this privilege; we can not move our ears even if we try to—except in very rare cases, and then we look upon such an individual as more or less of a "freak," and laugh when he exhibits to us his ears and causes them to move for our benefit! The reason for this is that the muscles which control the

movement of the ears—the *attolens,* the *attrahens aurem,* and the *retrahens aurem,* possess but little contractility; and we consequently possess practically no control over them, in the majority of cases. They are no longer active with us.

The muscles of the lower jaw are exceedingly strong. You can prove this to your own satisfaction by trying to force the jaw open with your fingers; when you will find that even a slight effort on your part will be sufficient to close the jaws against the greatest force you can supply. There are five pairs of these muscles, and their power may be seen by the fact that many a circus performer can hang by his teeth for a considerable time—while he would find it exceedingly difficult to hang thus on one arm, even after years of training. The power of these muscles is doubtless developed by daily practice in mastication—and perhaps by conversation!

The tongue is manipulated by five muscles, which give to it every conceivable form of motion, in all directions. The soft palate, the uvula, etc., are all manipulated by different sets of muscles, which work together in a wonderful way. When food enters the back part of the mouth, ready to be swallowed, the constrictor muscles there act and contract upon it, forcing it downward to the œsophagus. It must be remembered that the small trap door in the throat called the epiglottis must open to permit the entrance of air into the lungs when we breathe, and must close when we swallow, so as to permit food to pass to the stomach by way of the œsophagus. If the right movement is not performed at the right time, dire results follow—as we know when anything "goes down the wrong way."

The head is held erect upon the shoulders by two separate groups of muscles, which work in conjunction with one another in a very complicated manner. When you nod your assent to a question, the *platysma myoides* and the *sterno-cleidomastoid* are brought into requisition. When you turn your head to look at the pretty girl in the next seat, the *longus colli* is employed. When you hold your head erect, and "look neither to the right nor to the left," the *rectus major* and *minor* are pressed into service.

The back muscles may be divided into six separate layers, which lie one upon another. The first, or top layer, contains two very well known and large muscles —the *trapezius* and the *latissimus dorsi*. These muscles draw the shoulders backward and also downward. We utilize these muscles when we climb hills or mountains, or when we walk upon crutches, etc.

The second layer, for the most part, lifts the shoulders upward and forward. The third layer deals largely with respiration—the *serratus posticus superior* aiding inspiration; and the *serratus posticus inferior* aiding the expiration. The function of the fourth layer of muscles is chiefly to hold the body erect. This is also the function, very largely, of the fifth layer; while the sixth layer assists in the act of respiration, in holding the body erect and holding the bones in position.

The little spaces between the ribs are filled with muscles known as the "intercostals"—their function being chiefly to raise and elevate the ribs in respiration.

In and about the abdomen there are nine important muscles, the most important of these being the *diaphragm*. This is simply a large muscular screen drawn

across the body, transversely; and dividing the chest or thorax from the abdomen. The diaphragm is punctured with three holes—one for the important artery, the *aorta,* another for the most important vein in the body, the *vena cava,* and the third for the *œsophagus,* which allows the food to pass into the stomach, situated below the diaphragm. The windpipe, of course, does not have to pass through the diaphragm—since the lungs are above it, in the chest, and the windpipe does not extend as far down as the abdomen.

The diaphragm thus divides the body into two parts physiologically; but it does more than this. It is said also to divide it mentally—so to speak. It has been pointed out that any disease above the diaphragm leaves the patient hopeful and cheerful; while any disease below this point leaves him depressed and pessimistic. As a proof of this, it has been said that tuberculous patients, for example—no matter how serious their condition may be—are always confident of getting well; "some day they will be cured." Patients suffering from heart disease also do not as a rule seem to be depressed or worried very much about it. Compare with this the black pessimism which reigns when the liver, the stomach or the bowels go wrong! Then life is black indeed! So the diaphragm seems to act as a sort of curtain between optimism and pessimism and divides the "higher" from the "lower," mentally as well as physiologically.

The diaphragm is also a very useful muscle in the sense that, coming as it does into intimate contact with a large number of the internal organs, it is capable of squeezing or compressing them, when forced against them, and by this means an internal massage can be

given to these organs, by a rapid "up and down" motion of the muscle. This happens spontaneously in *laughing*, and it is because of this fact that laughter is so beneficial. It "jiggles" the diaphragm in just the way we want it to be exercised.

The muscles of the upper arm are those with which the young aspirant for muscular honors is probably most familiar. Of these, the *biceps* is the most prominent and most noteworthy. It is a muscle capable of great development and one that "shows off" to advantage when contracted. Less well known, but equally important, are the *triceps*, at the rear or back part of the arm; and these may be felt when the arm is straightened to its fullest extent. The former of these is employed in all pulling movements; the latter in pushing or hitting motions. The triceps are thus the muscles which should be cultivated in boxing, fencing, etc., and the biceps for rowing. In both these cases, however, it is the muscles of the back and trunk which do most of the work (or ought to), and the arms play only a subsidiary part in the exercise.

In the hand, also, the "flexor" muscles come into play when we clench the fist; and the "extensors" when we extend the fingers to their fullest extent. There are a large number of muscles in the hand—over a number of which we have surprisingly little control. The degree to which the hand can be cultivated is best illustrated when we compare the average hand with that of the pianist, the violinist, the magician, or especially the hand of the blind person. Here actual gray matter is developed in the finger tips! The hand formed the subject of the Fourth "Bridgewater Treatise"—a series of

books specially published to illustrate "the Power, Wisdom and Goodness of God, as Manifested in the Creation." The evidence of design in the human hand and its marvelous powers was held to be a proof of this inherent Design.

The muscles of the thigh are very important, as the legs have to move and carry the body throughout its life. They are devoted chiefly to holding the leg straight, bending and flexing the leg at the thigh, knee and ankle, raising it and moving it forward. The muscles of the lower leg are practically all in the calf, and many of these run into the foot, which is abundantly supplied with muscles, allowing a great freedom of motion in all directions. At the back of the heel is the *Tendon of Achilles*—so named from the legend that Achilles, who had been rendered impervious to arrows of all kinds, by reason of the fact that he had been dipped in the waters of a magic river, yet he was finally killed by an arrow which struck him in the heel—his mother had held him by the heel when dipping or immersing him into the river, thinking that here, surely an arrow could never strike him! As the arrow had been poisoned, he died.

The *strength* of the voluntary muscles depends not altogether upon their size, as might be supposed, but rather upon the degree of vital energy which is capable of being thrown into them at any one time. Thus, the muscles in the leg of the rabbit are, in life, exceedingly strong and are not only capable of carrying the animal over miles of ground at a rapid rate, but they are so tough that they can hardly be pulled straight without the exercise of the very greatest exertion. Even after death, while the muscles are still warm and full of life-

energy, an electric stimulus will cause the leg to contract, and quite a heavy weight can be raised off the floor in this manner. As soon as the life has gone from the cells, however, the muscle itself possesses no strength. It is incapable of lifting even the slightest weight, and may be shredded in the hands like so much poor elastic. We see from this that strength lies, not in the physical structure of the muscle, but rather in the life or vital energy which lies behind it, and animates it.

Oddly enough, the muscles of the heart are *striped,* like the voluntary muscles all over the body; and are not like the unstriped or involuntary muscles which are associated with all other internal muscular movements. Yet the muscles of the heart have peculiar characteristics of their own. The fibers which lie side by side are united at frequent intervals by short branches. The fibers are smaller than those of the ordinary striped muscles and their structure is less marked. The muscle corpuscles are situated in the middle of the fiber, and there is no *sarcolemma,* or membrane usually surrounding muscular fibers.

All muscles grow as the result of the increase in size and number of the individual elements. The number increases, and they also grow larger. In the pregnant uterus, the nerve cells may become enlarged to ten times their original length.

The muscles of our body present many peculiar phenomena, apart from their normal functionings. One of the strangest of these is what is known as "tetanic contraction." It is well known that a weight may be held by the outstretched arm with apparently perfect steadiness for a few seconds, but that presently the arm

begins to tremble or vibrate and soon the weight must be dropped. The arm was maintained in its position by the joint action of several muscles; and usually there are alternating periods of contraction and relaxation; but during the tetanic contraction there seems to be practically no relaxation. One or two experiments of a simple nature may be tried to prove this; and as they are of interest in themselves the student might do well to try them.

1. It has been found that a sound may be heard in a still room when one brings the muscles of mastication into action by biting hard (a pad being placed between the teeth); or if the biceps muscle of the arm be contracted, the sound may be heard by means of a stethoscope.

2. When the wires of a telephone receiver are connected with a muscle, a sound is heard during the contraction of the muscle.

From these facts it has been concluded that a muscle when contracting, gives rise to a sound; that tetanus, as the form of contraction we are describing has been called, is essentially vibratory in character; and that a comparatively small number of individual contractions suffice for tetanus—when caused by the action of the central nervous system—though these may be enormously increased.

Cramp is a condition often experienced while swimming, and is a form of tetanic contraction. It is in reality a prolongated tetanus of the muscles involved, in which there is an unusual muscular shortening of the fibers, and persistence of the contraction. The most important thing to do, in all cases of this character, is to

overcome the contraction, and this is done by straightening the muscles which have gone into contraction—by "kicking out," straightening the arms and legs, etc.—which have contracted in this painful manner. Only in this way can the spasm be broken and safely insured.

The muscular system in man presents a unique property, in that the more it is used the larger and the stronger it becomes. Of nothing else in the world can this be said—except the Will of man. Most things wear out the more they are used; but the muscles, instead of wearing out, become stronger and more full of life! It is a remarkable provision of Nature and shows us the necessity of muscular activity of some kind, in order to develop the best that is within us.

The value of exercise as a means of developing the muscular system cannot be too strongly emphasized. It quickens the circulation, increases the appetite, improves the digestion, does away with constipation—and its attendant troubles—improves the mind and clears the brain.

Exercise withal to produce the best results, must be *systematic, regular* and must develop *every* muscle of the body in turn. If some are developed at the expense of others harm will result. Hence the necessity of this scientifically arranged course of instruction. All periods of exercise should be followed by periods of rest or relaxation; if not, permanent contraction will result, and the subject become "muscle bound."

THE BONES AND SKELETON

By HEREWARD CARRINGTON, Ph. D.

THE *skeleton* is the basis of framework of the human body. It is also the basis for the origin and insertion of the various muscles which move our limbs, as well as forming cavities for the various important organs, such as the brain, heart, special nerve centers, etc.

Bone, of which the skeleton is composed, is one of the hardest structures of the animal body, as well as being at the same time light and elastic.

Its lightness is obtained by the central portion of all bones being honeycombed or cancellated, and in which is contained marrow and nutrient blood vessels; whilst the external portion is more dense and of compact ivory-like structure. Lightness of some of the bones—those of the forehead, for instance—is obtained by their being hollowed out to contain air. This is seen to greater advantage in the bones of birds, thereby enabling them to fly more easily through the air. How heavy the forehead would be if made of solid bone is experienced when suffering from a severe cold in the head; the weight and oppression being due to the accumulation of mucus in the frontal sinuses.

Elasticity of bone is seen especially well in the ribs, which easily bend in the process of respiration. This is well known to the little Arab children, who frequently make use of the ribs of camels for their toy bows.

Bone is made up of one-third of animal matter, and

two-thirds of earthy matter—the former predominating in the bones of young people, the latter predominating in the bones of the aged; tending to rickets or curvature of bone in the former, and liability to fracture in the latter.

Strength and solidity to many of the long bones is given by the firm buttress or ridge of bone extending its whole length; so the bone is not cylindrical, as is generally supposed, but prismatic, and of the same form as the spokes of a wheel, which are made of this shape, so as to impart strength.

Beginning at the top of the skeleton is the head. In the skull, which to all external appearances looks like one bone, we find no less than eight bones entering into its formation, and fourteen into that of the face. They are all immovably united together, with the exception of the lower jaw, or inferior maxillary bone, which is free, to allow of rotary movements in the process of mastication, and of the opening of the mouth in speech. The splitting up of the skull into its several component parts is done by filling the skull with peas and then boiling it. As the peas swell, the skull separates into the several parts entering into its formation.

The globe of the head is supported on the spine or vertebral column, which is made up of twenty-four bones called *vertebræ*. Each vertebra has a "spine" of bone projecting posteriorly; hence is derived the collective term "spine" applied to the whole. Those forming the "neck" (*cervix*) are seven in number, and are called cervical vertebræ; those for the back (*dorsum*) are twelve in number and called dorsal vertebræ; and those for the loin (*lumbus*) are five in number, and

called lumbar vertebræ. They increase in size from above downwards, and for the most part take their name from the numerical order from above downwards. The first cervical vertebra receives, however, the name of the *Atlas,* as Atlas supported the globe; and the second cervical vertebra is called the *Axis,* as it is upon this bone that the head rotates, as it were on a pivot. The other vertebræ are called third and fourth cervical, and so on downwards to the termination of the cervical region; then first and second dorsal vertebræ, and so on, down to the commencement of the first lumbar.

The presence of facets of articulating surfaces on the sides of the dorsal vertebræ helps to distinguish these from the other vertebræ; and the largeness of the lumbar, in comparison with the smallness of the cervical vertebræ, distinguishes these from the others.

At the lower part of the vertebral column is a wedge-shaped bone called the rump bone, or *sacrum,* and which, forming the seat, is composed of five vertebræ welded together; beyond and below this again are four more rudimentary vertebræ, called the *coccyx,* and which is the counterpart of the tail in lower animals.

Springing from either side of the dorsal vertebræ are the ribs or *costæ,* twelve on each side, twenty-four in all. The male has the same number of ribs as the female, although many are apt to say, on the strength of their Biblical knowledge, that the male has one less! The upper seven pairs of ribs are attached by gristle or cartilaginous prolongations to the breast bone or *sternum,* and are called sternal or true ribs; the remaining five, not being so attached, are called asternal or false ribs—the two lowest of which, by reason of their being

perfectly free, are spoken of as free or floating ribs.

The upper extremity is attached to the trunk by a very slender bony attachment, in comparison to the lower extremity; the reason for this is that in the former great mobility is required, whereas in the latter strength and solidity are necessary to support the body weight.

The collar bone or *clavicle,* is the only bone attaching the upper extremity to the trunk, which it joins at the upper and outer side of the *sternum.* As this is the most slender bone in the arm, it is the one most frequently broken by falls upon the outstretched hand.

It is also important in keeping the upper extremity at the requisite distance from the body, to allow of that freedom and variety of movement which are so essential to its usefulness.

Lying upon the back of the ribs, and attached to the *clavicle,* is the wing-shaped bone called the blade bone or *scapula,* suspended from the rounded socket of which is the upper arm or *humerus.*

From the elbow, downwards to the wrist, forming the forearm, are two bones called the *radius* and *ulna;* the former is on the outer side, and the latter on the inner.

When I speak of outer and inner, I mean with reference to a median line drawn through the center of the body; when standing with the little finger touching the seam of the trousers, the radius or thumb side will be outermost.

The wrist or *carpus,* is made up of eight small bones placed in two rows; and beyond the carpus, to form the palm, are five bones called the *metacarpal* bones.

The fingers or *phalanges* are fourteen in number—

three for each finger, and only two for the thumb.

The lower extremity shows much greater strength, and the bones are all much larger than those of the upper extremity, on account of the increased weight they have to support.

Two large haunch bones or *ossa-innominata,* spring out of either side of the sacrum, to form the *pelvis,* and join together in front. Fitting into a deep, cup-shaped cavity, on the under surface of the os innominatum, is the largest and strongest bone in the skeleton—the thigh bone or *femur.* Below this, from the knee is the shin bone or *tibia,* on the outer side of which is the most slender and consequently most easily broken bone in the leg, the splint bone or *fibula.*

The *tibia* and *fibula* are firmly united together, and this fact accounts for the name of the latter bone, fashioned as it is after the pattern of the modern safety pin, or the old world "fibula" or brooch of the Romans.

A small, panshaped bone or *patella,* is placed over the knee-joint, and is what is generally known as the "knee cap."

Forming the instep are seven bones, collectively called the *tarsus;* and beyond these are the five *metatarsal* bones, to form the tread of the foot, and fourteen *phalanges,* three for each toe, with the exception of the great toe, which has only two.

Two "arches" are formed by these bones of the foot, a lateral and an antero-posterior one. These are frequently lost as the result of improper methods of standing and walking, and "flat foot" is produced.

The great similarity between the upper and lower extremities will be seen from the above description.

Also the fact that the bones of the body naturally form two great cavities—one in the skull; and one in the trunk, formed by the pelvis and ribs. In the former is the brain; the various other organs of the body are situated in the latter. We have already described in full these various organs, and their proper uses, or functions.

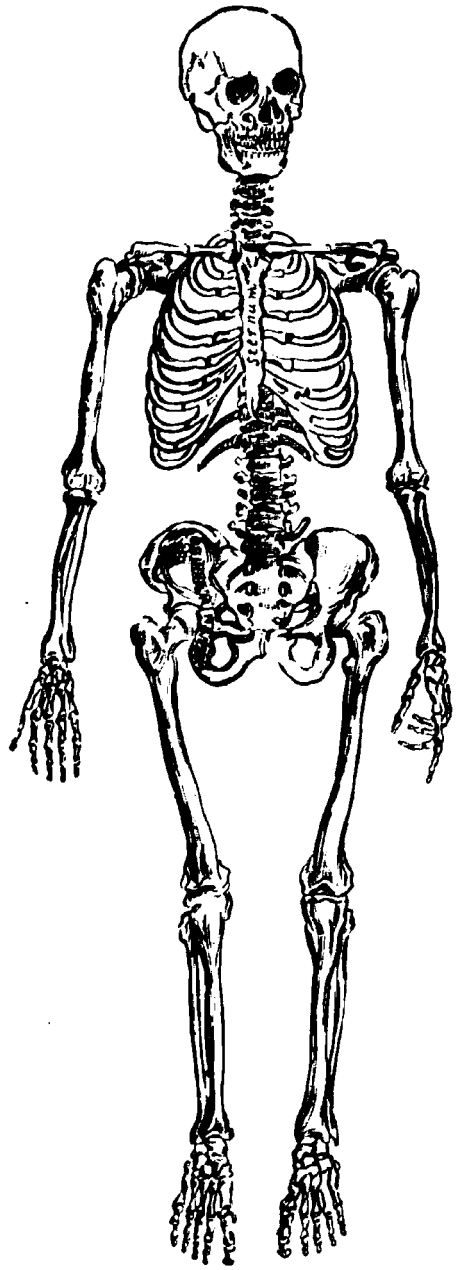
Bones are connected together by *ligaments,* and a "joint" formed. Joints are of three varieties: (1) *Immovable,* as in the joining together of the bones of the skull; (2) *Movable,* as in the elbow and hip joints; (3) *Mixed,* or a combination of the two preceding varieties, as found between the vertebræ forming the spine.

The construction of a movable joint varies according to the required movements, and consequently we find hinge joints, and ball and socket joints.

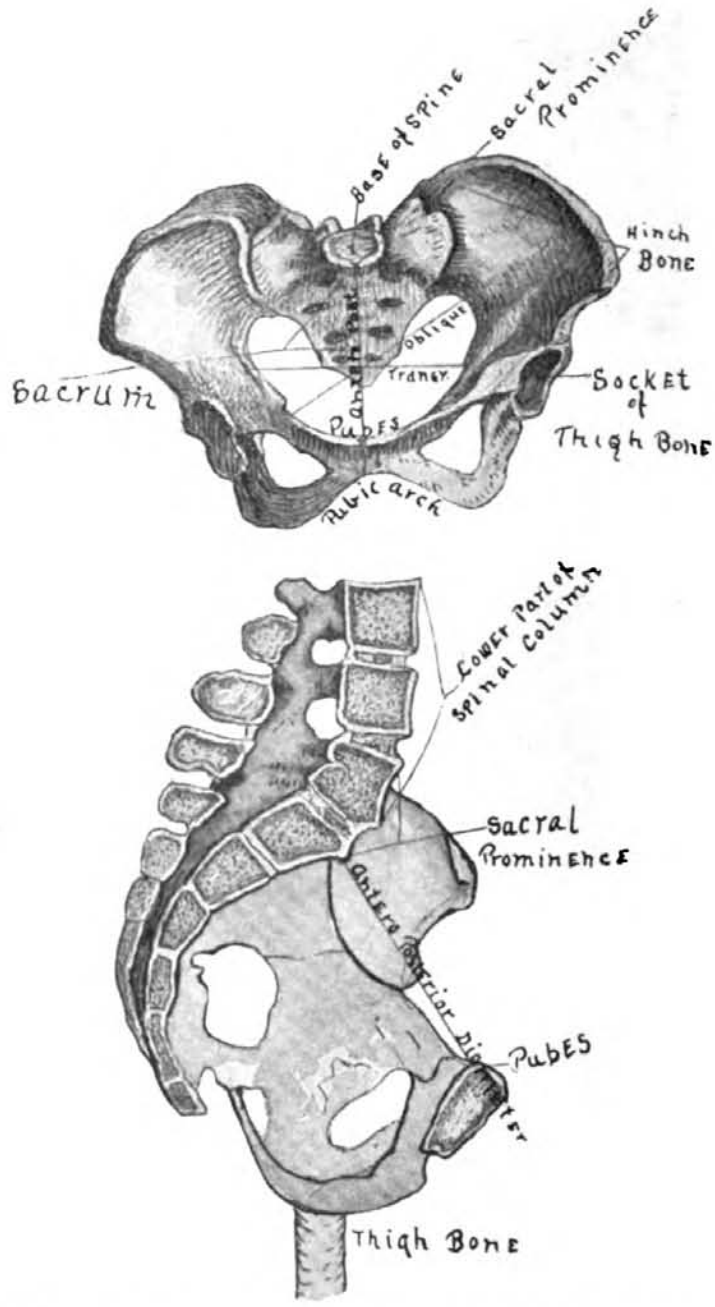
The elbow and ankle joints are the best examples of the hinge joints, and the shoulder and hip joints of the ball and socket variety.

Covering the ends of the bones, where they come in contact, is a mass of *gristle,* called "interarticular cartilage," placed there to prevent any severe concussion taking place between the two bone surfaces. This interarticular cartilage, when situated between the vertebræ, is called "intervertebral substance," which, acting as a buffer, prevents any jarring of the spinal cord, which would otherwise take place in jumping or leaping.

The interior of the joint is closed by a closed sac or synovial membrane—secreting a glairy fluid, called "synovial fluid," to lubricate the joint, and allow of its moving freely and easily. This fluid is excessive when any injury affects the joint, as in a sprain, and is deficient in some diseases—for instance rheumatic gout.



The human skeleton, consisting of two hundred bones and constituting the framework or foundation structure of the human system.



The extraordinary structure of the human pelvis and hip bones, and their relation to the lower spine to which they are attached. Above, a vertical cross-section, looking down.

THE HUMAN "BALANCE WHEELS"—THE DUCTLESS GLANDS

By Dr. EDWIN F. BOWERS

A HALF-DOZEN insignificant appearing little glands, from the thickness and length of a thumb to the size of the head of a pin, are responsible for a man's being either just a little lower than the angels, or a pitiful, drooling imbecile, below the level of a brute in intelligence and reasoning power.

And not alone that: these organs actually determine age—not the number of years we have lived, but the distance we have traveled along our allotted course. We used to say that "a woman is as old as she looks, and a man as old as his arteries," which is true; but we go to the "because" of these facts now, and know that both men and women are just as old as their glands.

For properly functioning glands are back of the causes that make for "looks," or the lack of them, and harden or keep the arteries elastic. When we say 'properly functioning" we have said it all; for if there was never any interference with proper functioning one would never die a "natural" death. One couldn't even dry up and blow away. If her glands keep "young"—that is, normal, and free from disease, pressure of tumors, and either unnatural enlargement or abnormal shrinking—a woman at eighty may be a Ninon de l'Enclos, charming masculine humanity, and a man at the same ripe age a robust youth, doing a man's lusty work in the world.

Of all the glands in the body, the most important are the so-called "ductless glands." These organs have no apparent connection with the circulation through the medium of little tubes or canals, as have most other secreting organs. Some explanation of their wonder-inspiring attributes is given by modern physiologists in the suggestion that these various glands produce an internal secretion which exudes into the blood stream, and by its presence stimulates the proper functioning of the body tissues.

The secretions of these ductless glands contain bodies called "hormones" (from the Greek signifying "to awake" or "excite"). The hormones are little chemical messenger boys, having extraordinary power to arouse activity among the bodily organs, especially when these organs are threatened by an invading army of germs.

So then, these glands stimulate defense, control metabolism (growth, nutrition, and normal development), regulate the intricate chemical interchanges, and act as "governor balls" on that marvelous piece of mechanism we call the body. They are our most indispensable possessions. Yet our knowledge of them is, one might say, almost in inverse ratio to their importance, and what little we do know hasn't yet had time to grow chin whiskers; for it is doubtful if the oldest real facts we have concerning them are more than thirty years old.

However, one of these bodies (the spleen) we know well enough to slap on the back and call by its first name. We feel that we are on easy terms of intimacy with it; whereas, with the others, most of us haven't even a bowing acquaintance, notwithstanding the important relations they sustain toward nutrition, cell development,

and maintenance of the normal physiological "tone" of the body.

The spleen is currently believed to have some wonderful effect in regulating the ratio of the red and white cells of the blood, the iron content of the red cells, and perhaps to some extent "blood tension" in the arteries. It may also be the birthplace of those intelligent and valiant little "Policemen of the Blood," the phagocytes. If it isn't, it is at least a combination Grand Army Hall and corner grocery for them, where they repair to "talk it over"—to recount their valorous deeds "by flood and field . . . . i' the imminent deadly breach," for the white leucocytes swarm among the spleen cells.

The normal functioning of the spleen is also supposed to have a decided effect in preventing tuberculosis —or curing it, if it has not progressed too far; this, because it increases the amount of mineral salts (lime and phosphates) in the tissues. By its work as "medicine" also do we know it; for some forms of splenic extract have been administered with splendid success in diseases of germ origin; notably, malaria, typhoid, and infections of the alimentary and intestinal canal. In diseases where malnutrition is an important factor, as neurasthenia and scrofula, it has also been of value. In some depraved conditions of the blood the effects of splenic extract are most potent. In fact, we are only just beginning to understand the functions of the spleen, mainly through therapeutic experiment and "provings," as our homeopathic friends would say.

Yet, while it is the largest of all the glands, measuring five or six inches in diameter, its importance is in no sense proportionate to its size; for men and animals live

and maintain a tolerable degree of health without it, as when it has been removed because of disease, or for experimental purposes. In fact, among the post-chaise runners of the early Georgian days, many cases are recorded in which the spleen was removed for the purpose of permitting a larger development of the left lung in these runners, and—so they say—with no apparent ill effects. We confess, however, that we have always been somewhat skeptical as to the truth of this. When all is said and done, what little we know of the spleen only serves to make its function the more remarkable and mysterious.

The adrenals, or suprarenal (over the kidneys) capsules rank next in point of familiarity. They are our second oldest friends. These are two little glands situated in the abdominal cavity adjacent to the kidneys, and immediately abutting thereon—legally speaking. They supply an internal secretion which is partly responsible for the proper "tone" and contractile power of the walls of the blood vessels, and perhaps even the muscles of the heart itself.

Occasionally these glands become defective in their operation, and produce that peculiar and pernicious malady known as Addison's disease, characterized by extreme and progressive prostration and muscular weakness, together with a "bronzing" of the skin and eyes, producing a distinct saffron hue.

Fortunately, as if to make amends for thus misusing a few unfortunate humans, Nature furnishes man with the most powerful astringent known and from the very organs that she occasionally assaults and batters! Adrenalin, the active principle of the adrenal glands, is al-

most magical in the promptness and efficiency with which it checks hemorrhage; this because it constricts the walls of the smaller blood vessels—squeezes them shut. So powerful is its action that one part of adrenalin dissolved in ten thousand parts of water and instilled into the eye will blanch the mucous membrane of the eyelid in thirty seconds, permitting an absolutely bloodless operation to be made. And those who have had it used when undergoing "nose and throat work" will appreciate its value to the surgeon.

If it were true (which it is not) that an occasional "jag," by affording needed relaxation, is beneficial to one, Nature would seem legitimately to be entitled to an occasional lapse from virtue. In consideration of the immense benefits of adrenal substance and its derivatives, she may be forgiven an infrequent indulgence in Addison's disease.

We now come to a group of organs to whom we can talk in their own language; for we have them trained to a point where they can hardly say "Boo!" before we are after them with corrective measures. While they will occasionally kick over the traces, we can usually jog them into behaving with a reasonable degree of decency.

The thyroids and parathyroids are little bodies that lie deep in the throat, hugging each side of the windpipe. The latter are hardly larger than a grain of sand. It almost seems as though Nature stood on her head while making glands; for the pin-headed parathyroids are infinitely more indispensable than is the big eight-ounce spleen.

Disease or atrophy of these thyroid and parathyroid glands is attended with the most singular and unusual

results. A weighty mantle of fat may develop and pitiful form of congenital idiocy, cretinism, may arise from some deficiency of the glands. Unsightly goiters also develop and smother the former "bean pole," or that part, because of their shortcomings. And even some forms of insanity follow their removal.

But we can melt off the excessive fat, greatly improve the mentality and physical well-being of the cretins, smooth down the goiters, and cure certain forms of insanity by judicious and careful administration of thyroid extract. We have proved that the patient can and does minister to himself—with a little of the substance of the very gland that is causing his trouble.

And now animal experimentation has indicated a still more complex and peculiar office for this little set of governor balls; for the removal of the parathyroids in animals has been followed by serious nervous disturbances, including muscular twitchings and convulsions. Perhaps from a closer study of the workings of these tiny bodies may come a means of curing that mysterious disorder, epilepsy. Almost any day some conscientious investigator, working patiently in laboratory and dissecting room, may put the point of his scalpel upon the cause of epilepsy, and we shall have a new weapon with which to banish one more disease and make this earth a somewhat more desirable place of residence.

It would be difficult for the uninitiated to conceive of any relationship between bow-legs, "chalky" teeth, crooked spine, and soft bones, and the little thymus gland in the chest; yet the improper functioning of this organ is a prominent cause of rickets—which can cause any of these conditions—in children. The thymus gland

seems also to have an action very similar, or supplemental to, the thyroids. Disease or deficiency of the gland has been demonstrated to be a frequent cause of marasmus (malnutrition) and goiter, and on the principle that "a little of the hair of the dog that bit you is good for the bite," thymus substance has been given with great benefit in these disorders.

And last and most marvelous of all, is the pituitary body (hypophysis), a body no larger than the tip of a girl's little finger, situated at the base of the brain, and splendidly protected by the dense bone at the back of the skull. It is well established that this gland exercises control over all the organs of the body, stopping their growth at a point that we recognize as normal, thereby preventing the accumulation of abnormal quantities of fat or tissue. One does not grow too big in any direction when the pituitary gland is bossing the job.

The pituitary consists of two lobes, an anterior or front, and a posterior, or back lobe, each with a different function. They have diametrically opposed natures. The front lobe is a Dr. Jekyl—benign, virtuous, and absolutely indispensable for the continuance of life, liberty, and the pursuit of happiness. It exerts some wonderful influence upon the heart and vascular system, regulating the amount of blood that is forced through the body by that fleshy pump and system of conduits. Also the cells of this lobe secrete a remarkable substance called thaon, which is discharged directly into the blood stream. It may turn out some day that thaon is the veritable "elixir of life." Ponce de Leon may have carried the fountain of youth right around with him, inside his head; for when this front lobe is removed from animals they

die. None has ever been known to live long after its extirpation.

On the other hand, they survive the removal of the back lobe. This lobe, on certain rare occasions, exemplifies all the characteristics of Mr. Hyde. When it gets the upper hand it proceeds to make life miserable for its unfortunate owner. A favorite method is to influence the nutrition in tangible and obtrusively visible ways. In some instances the victim proceeds to "put on fat." With absolutely no change in diet or the amount eaten or drunk, he gets fatter and fatter—until eventually he qualifies for an unenviable position among the freaks of a side-show, a typical mountain of flesh.

Experiments on animals have shown that the normal function of the back lobe of the pituitary gland is essential to the taking up of sugars and starches by the system, and any diminution of or interference with this power leads to a high degree of tolerance for sugars, with the resultant accumulation of fat. Happily, "there is hope"—as we shall see later.

For hundreds of centuries men have asked, "Why do we merely grow to an average height and breadth? What stops us from continuing to grow so long as we are alive? Why should growth be a gradual process? In fact, why should individuals of the same species stop growing at practically the same age and size?"

We gave it up. We recognize average height, breadth, and thickness as normal; also that the farther we deviate from these arbitrary dimensions the more nearly we come to being classed among the freaks. We have even idealized our sense of proper proportions, and a David or a Perseus with hands like hams, or the long,

knobby-hinged arms and legs of a giant, would be unthinkable. Also an Aphrodite or a Juno six feet high and six feet round would excite ribald mirth—excepting in the case of certain African tribes, among whom fatness in women is esteemed the greatest of all earthly blessings.

And, further, giants and the unnaturally fat are notoriously weak in the knees, and we might add, almost without exception, weak in the head. So much vital activity has gone into developing bone or adipose tissue that little has been left for energizing their huge mass, or putting "speculation" into their brain. When Cæsar said, "Let me have men about me that are fat, sleek-headed men, and such as sleep o' nights," and decided that the lean and hungry Cassius was too active, too alert, he knew his business; for the stall-fed ox and the excessively fat man are built upon the same general plan. A brain can not act when the greater proportion of the bodily energy is devoted to attempting to oxygenate a mass of obese tissue that weighs its wearer down, and chains his feet and his thoughts to the earth by the very pull of gravity.

The erudite Darwin wrestled with these questions of normality and growth, and explained them by saying that "they follow the law of adaptation." Those organs and members of a size best calculated to do their most efficient work would tend toward perpetuation; first, because of the principle of "natural selection." A man and a woman would choose each other for the absence of abnormal or monstrous traits, and thereby permit that particular abnormality to die out with the individual afflicted with it; and, secondly, because Nature

herself tends to eliminate abnormal characteristics, to "revert to type." The children of pathologically fat parents, or giants, are most likely to run to the other extreme, even to being "skinny" or "runty."

This explanation sufficed fairly well, for want of a better; but we insisted on knowing "what is back of this racial return to normal size? How does it come that freaks are fortunately deficient in the power to perpetuate their kind?"

For many years we answered after Darwin's formula. We stated a fact, without explaining the reason back of the fact. A glib answer ofttimes turneth away strong suspicions of ignorance. Giantism ("gigantism," some call it) and excessive obesity—where they do not result from gluttony or some thyroid imperfection—are due to hypertrophy (enlargement), compression by a tumor, or atrophy (contraction) of the pituitary and the defect, the pathological cause, is obviously but rarely transmitted; for we do not transmit a tumor, or the physical results of a nervous shock, or a bump on the back of the head.

But now we know the function of the gland. We are no longer indulging in rambling theories. Scores of post-mortem examinations of giants, both tall and thick, have disclosed the fact that in every instance the hypophysis was atrophied, enlarged, or otherwise diseased, or pressed upon by a tumor that inhibited the normal functioning of the pituitary.

And now that we know all this, what do we purpose doing about it? There are two special lines of treatment that suggest themselves in "hypopituitarism," as it is called for want of a longer name, which means "too

much pituitary." The most satisfactory and direct method is to open the skull, go right into the base of the brain, and remove the pressure of the tumor, or the excessive part of the enlarged gland, so that it will stop feeding such quantities of its powerful secretion into the blood. This has been done many times with over-developed patients, and in almost every instance—where they lived—improvement has been manifested. The lengthening of the bones or the accumulation of fat has been stopped at once. The mortality from the operation is about one in eight—rather reasonable when we consider the location of the pituitary body, and the difficulty in gaining access to it.

A safer method, though less likely to be followed by success, consists in the administration of pituitary extract. As it is the function of the posterior part of the gland that is usually at fault, the extract of only the posterior part is employed to correct the deficiencies and shortcomings—or more accurately the excesses and longcomings—of its insurgent brother within the skull of the patient. Scores of cases are recorded where the "fat just melted away" and the patients became mentally and physically regenerated. Where children, from no apparent cause, begin to gain abnormally in weight or height, the advice of a physician should be sought as to the feasibility of checking this enthusiastic activity.

The famous founder of the Cartesian philosophy, Descartes, claimed that the brain glands were the "seat of the soul." This hypothesis is being substantiated in a physical sense at least; for the pituitary is now recognized as the most important "governor" in the body of every animal that owns one of these glands.

Among the ductless glands of the body physiologists now include the sex glands, which likewise have an important influence in the phenomena of growth and development. Take, for instance, the ovaries in women. In addition to the primary reproductive function of the ovary, this gland also produces an "internal secretion" which has a far-reaching influence not only on bodily development, but upon mental energy as well. The effects of castration upon animals, and even upon human slaves in Oriental countries, show very clearly the influence of the "harmonies" produced by these important glands.

We should thank our lucky stars that Mother Nature is a pretty steady, level-headed sort of old girl; that, with all her opportunities for mischief making, she rarely throws off the "governor belt," and permits the physical engine to race without restraint. And we should also thank them that when she does go on a spree, and "gets tuck" with a spell of raving mania, there are some who understand how to restrain her boisterous activities, soothe her fevered brow, and slip her riotous cogwheels back into their appointed places.

Our knowledge of the marvelous functions and intricate chemistry of the ductless glands is still limited; but it was noticeably more so—very recently.

The Olympian System
of
Physical and Mental Development

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THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART FOUR

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EFFICIENCY

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The Olympian System of Physical and Mental Development consists of Charts, Instructions, Text Material and Discussional Lectures as follows:

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General Chart for Daily Normal Exercise.

Charts for Men	*Charts for Women*
Spine Flexibility.	Back and Spine.
Strengthening the Stomach.	Abdominal and Digestive.
Chest and Shoulders.	Overcoming Weaknesses of Women.
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Three Charts of Instructions for the above.

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PART TWO DIET	Section One—Essentials of Nutrition. Section Two—Hygienic Eating and Food Preparation. Section Three—Curative Diet.
PART THREE PHYSICAL FITNESS	Section One—Keeping Young. Section Two—Health Guarantees. Section Three—Dodging Disease. Section Four—The Body Anatomical.
PART FOUR EFFICIENCY	Section One—Improving the Human Race. Section Two—The Body. Section Three—Personal Attractiveness. Section Four—Practical Psychology.

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THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART FOUR

EFFICIENCY

SECTION ONE

EUGENICS

By CARL EASTON WILLIAMS

HOW can we produce superior children? What is a eugenic child?

Simply speaking, the eugenic child is one that is well born.

Now the first thing necessary to produce a perfect child is to produce a perfect parent—or as nearly perfect as possible for the family stock to which he belongs. There are not many who are all that it is possible for them to be from a physical standpoint, internally clean, functionally vigorous, organically active. And yet one's physical vigor and general condition has an undoubted influence upon the quality or at least the vitality of his progeny. Viewed from this standpoint, the whole previous life of the individual is or should be more or less a preparation for parenthood. His potentialities in this direction are probably influenced somewhat by antenatal conditions, his feeding in infancy, his welfare during the whole period of growth and especially during adolescence, which is pure and simple a period of preparation for parenthood.

All influences that affect the nutrition and general health of the body at any time probably have some effect on the germplasm, even though this effect is nothing more than a question of vigor or vitality. All conditions of life may even have something to do with the question of fertility or sterility. Among wild animals confined in zoological collections, and also on "fur

farms," their sterility in some cases, and lessened fertility in others, due to the unnatural life, are significant. The question of ill-adapted food seems especially important. Professor Houssay of the Sorbonne, in France, found by experiments that fowls fed on a meat diet became extinct in a few generations. Dr. Chalmers Watson's experiments in England in 1906 showed that rats fed on a meat diet tended to become sterile, with diminished power of lactation and other general deterioration. And there remains the question as to whether too much meat eating may not have a similar effect on the human race, though the excessive refinement and denaturing of so many of our common foods would probably have as much or more to do with tendencies of this kind. It has been suggested that over-nutrition, combined with luxury, might tend to reduce fertility. Of course the point is, in this connection, that reduced fertility doubtless means inferior offspring at the same time, when there is offspring. Dr. C. W. Saleeby suggests that the widespread failure of breast feeding among women may indicate a general decline or weakening of the reproductive function. Unquestionably it is associated with more or less lowered vitality or faulty nutrition.

In short, all conditions that raise or lower the general vitality of the body probably have some effect also on the vitality of the germ plasm, and while the faculties and temperamental qualities of the offspring may not be altered in that way, yet it may mean a great deal in determining the amount of physical vigor with which one gets his start in life.

For this reason the age of the parent is a matter to

be considered. In the case of women, at least, Nature has to some extent provided for this by limiting the child-bearing possibilities to a period of life when her energies are at the highest, though she seems to have made a mistake by placing the first possibilities of reproduction too early. Very early parenthood is not desirable. Satisfactory fruit is yielded only by the tree that has had an opportunity to reach maturity before bearing, and this is a rule that holds good throughout all vegetable and animal life.

The truth probably is that the age at which the best children will be produced is the time of greatest physiological energy, and this of course generally means the first few years after reaching complete maturity. Remember that this does not mean attaining full stature. Maturity in men may be reached in some cases anywhere between twenty-five and thirty years of age, and in women perhaps two or three years earlier. Any time of life when their vitality is at its maximum would be the proper time, whether or not it conforms to this rule of the best age for parenthood.

It is quite true that we do not know as much about eugenics yet as we should like to know. It is quite true that it is much more difficult to breed human beings for certain results than it is to breed race horses or Plymouth Rocks. And yet the principles are the same in both instances. The difficulty, where human beings are concerned, arises largely from the fact that the human animal is not merely an animal, but has so many mental and moral aspects that the problem becomes correspondingly more complex. And yet these mental characteristics or capacities, being the expression in each

case of the brain and nerve organization of the individual, are transmitted precisely according to the same laws of inheritance which govern the various other bodily characteristics.

The different characteristics and traits, bodily, mental and temperamental, are not transmitted as a whole, but in the form of isolated units of character, spoken of commonly as unit characters, or character units. Each individual is made up of a total of these unit characters, but they are found in different combinations in different individuals. And since there were many different character units among the parents and grandparents, some of these are inherited by a particular child and some are not. Further, while an individual realizes in his own person and character only a part of the traits and faculties that are found among his many ancestral lines, yet he carries in his germ plasm other of these traits which he is as likely to transmit to his children as those which are manifested in himself. From which, of course, it appears that one can really get a better idea from the study of the grandparents than of the parents as to the possibilities that one may expect in children.

For the present, one of our difficulties in the field of eugenics is to know just what are character units, and while something has been learned in this direction, there is still a vast amount of study and investigation to be pursued before anything positive can be said on a great many questions. I am not going to attempt any technical discussion of these things. However, it may be said that there is nothing more certain and persistent than the force of heredity, and if a certain individual comes from a family stock that is sound and vigorous,

characterized by energy and ability, and free from serious defects of mind or body, then we may absolutely depend upon it that his offspring will be sound and capable, reflecting the qualities found in his ancestors, provided he mates with someone of equally good antecedents. It is all a matter of cause and effect. An idiot, for instance, is not an accident. A healthy couple in whose families there have never been feeble-minded or defective children could not possibly produce an idiot, except through the influence of alcohol, syphilis or some "race poison." And you can depend upon that. You don't need to be a scientist, nor technically versed in the problems and mysteries of heredity, to size this thing up to a certain extent. All you need is a little common sense. And if you wish to get a general idea of what you can expect in the way of children by marriage with a certain person, just look over the parents, brothers, sisters, relatives, and if possible, especially the grandparents of that person, and balance their general qualities with those of your own family. For instance, if your intended is musical and her family generally distinguished for musical talent, and if you and your family are also musical, you can count upon having very musical children by this mating. In another case, if some of the parents and grandparents are musical and some are not, some of the children will be musical and some will not be. And there you have the heredity aspect of the problem as simply as I know how to state it, without going into the Mendelian laws.

Contrary to an impression that seems to have spread in many quarters, it is not the desire of the eugenists to tell people that they may or may not marry. The

eugenist program is chiefly educational, so that people may know for themselves whom it may be best for them to marry, and so that such a public opinion will be built up that no one would think of contracting a marriage that was not eugenic. It is not the marriage but the parenthood that is to be regretted in certain cases. Marriage may be highly desirable in some instances where parenthood is not.

Where certain extreme types of degeneracy are concerned, it certainly is desirable to exert some influence, whether of a rigidly preventive or merely persuasive nature, to check their multiplication. Most eugenists seem to believe in the strictly preventive means of segregation or sterilization. It is all very clever to ask as to who is to be the judge of fitness or unfitness, and to add that the would-be judge who declares others to be unfit may himself be unfit. That sounds plausible enough, as related to those of average qualities for whom such a program was never intended, but probably even those who ask such a question—as some have asked it—would not seriously advise the mating and reproduction of a pair of the feeble-minded, who are incapable of producing anything but a feeble-minded offspring. Have we the right to give life to those who are only half made up, and who therefore can only suffer? Or is it right that we should permit such life to be given, through ignorance and stupidity? What, indeed, are we going to do with the growing strains of degeneracy? That, however, is part of the national aspect of eugenics, whereas it is my purpose here to deal with the more personal aspects of it. The question is to know what each one of us can do to have superior children.

It is really a question of two factors, that of heredity on the one hand and of nutrition, care and environment on the other. It is a question of "nature and nurture," as they sometimes say. On the one hand we are limited by heredity as to the possibilities of our offspring. But on the other hand, where nurture is concerned, we are not limited in our control of all those factors that determine whether or not the innate possibilities of the individual are realized. It is quite true that we can not, merely by promoting health and nutrition and providing ideal conditions, evolve an artist or inventor out of a near-ape. But there are some things that we can do. Every child should be a manifestation of the very best and fullest possibilities of the stock from which he came, and should not come into the world burdened with weaknesses and defects, mental, nervous or physical, because of hostile influences.

It is true enough that it is not every one who can hope to have eugenic children. But those who would be undesirable as parents because of unsatisfactory heredity are really a comparatively small percentage, and most people, probably ninety-five per cent or perhaps even more, would make satisfactory parents under proper conditions. Of course no one should attempt to become a parent except under proper conditions. And I am writing this not for the few weeds in the human population, but for the many who are normal, healthy representatives of the race. I am speaking for the average man and woman. The average human stock is, on the whole, pretty good stock, for it represents the surviving strains of those who have been on the earth for a million years. In all that time the weak and the degenerate

have been dying off. Probably some of the best strains of human blood have disappeared as well, but you can be sure that the survivors in the strenuous struggle for existence that has been going on around this globe are not the worst. Some are far from brilliant, but for the most part they are substantial, and in many cases their possibilities have been obscured by lack of opportunities. And probably most of the really superior types of the past are still represented among us. So that the average man or woman, without any special defects, should be capable of having first class children.

Again, what is a eugenic child? Not necessarily a genius, not necessarily a prodigy in size or muscular strength, but a normal child, mentally and physically sound. We should not strive for genius. Genius is really the result of a peculiar combination of traits or faculties, a combination that, when attained, is likely to be an accidental result. Such a combination could not be predicted even when the qualities making it possible were present in the parents, because the essential unit characters might not happen to combine in just the right way in any son or daughter. So we need not think about genius. It is going a long ways if we can make sure of talent and ability in our children, which is a simple matter of heredity. Ability runs in families. And aside from that, what we want are well-balanced and vigorous youngsters.

It may be said that most influences that affect the body of the parent, while they may lessen the vitality of the germ plasm, do not alter the character of the germ and prevent normal offspring. For instance, if a man has an arm taken off in an accident or loses his

eyesight by an explosion, his children will be born with both arms and with normal eyesight. But an inborn defect of sight would be passed on. It is the qualities that one is born with that he passes on down to posterity, though there is also much evidence that increased parental development, mental and physical, is transmitted. Apart from such increase of one's powers, however, ordinary influences do not stamp themselves on the germ plasm. The exceptions are found in the so-called race poisons, which include syphilis, alcohol, lead, and doubtless various other narcotics and poisons. These so permeate the structures and tissues of the body that they even reach and saturate the germ plasm, so that the child of such a parent is deprived of his natural birthright of health, strength, and sound mentality.

Syphilis is the most terrible of all of these. It is the only disease that is directly inherited. The other venereal plague, gonorrhea, has a two-fold eugenic significance, first, in its influence in causing sterility, and second in its danger of causing blindness in new-born infants.

To have eugenic children, parents must be free from taints of this kind.

The old-fashioned theory of the danger of "marking" a child by shocks and frights and sights is an outworn superstition, for there is and can be nothing in it, but one can poison the unborn child through the mother's blood the same as it is nourished through that channel. And when it comes to "marking" the child with health and vitality and strong nerves as a result of good food and exercise and sleep, we can not say too much. The woman who sits indoors to study philoso-

phy through the mistaken idea that she will thus make her child a philosopher, or to study music to make him a musician, should forget all about it and spend her time outdoors so that he may be vigorous and strong, and thus able to make the most of any faculties that he may have inherited. All of his characteristics are determined at the time of conception, and from that time until birth it is a question of nutrition, oxygen, elimination and freedom from poisonous influences. The pregnant woman should not even use tea or coffee. Even the sex is determined at conception, and efforts to influence it are useless.

Some scientists have recently thought that they were approaching the secret of sex determination, but all claims to progress in this direction should be taken with a grain of salt. They are a long ways from it, rest assured. It has often been thought that better nutrition favors girls, and that less nutrition is inclined to produce boys, but the only practical result of a theory of that kind would be for a foolish pair of parents to deprive themselves of the proper amount of nutrition in the idea that they could thus make sure of having a boy, and thus deprive their offspring of vitality. And with an even chance of its being a girl at that. Another theory that the time of conception, whether following immediately after the menstrual period or several days after, is a factor in determining sex, remains as it probably always will remain, only a theory. It is best to ignore this question of determining sex, and let the offspring, whether boy or girl, have the benefit of the best health and the purest blood that the parents can attain through intelligent physical culture.

ALCOHOL AND EUGENICS

By CARL EASTON WILLIAMS

YOU have often seen an intoxicated man. And you've laughed at him.

You have seen him stagger unsteadily along the sidewalk, and lean uncertainly against a lamp-post. You've noted his blear-eyed look, the weak and toneless features, the relaxation of his muscles, his partial or sometimes almost complete paralysis. You have observed the muddled state of his brain, his insanity, his imbecility. And as you looked you have seen him clumsily lose his hold and glide grotesquely into the gutter.

And you have laughed.

And through your laughter you have looked upon him with disgust. And then you have passed on, dismissing the spectacle from your mind's eye with the cheering thought that the condition is only temporary. In a day or two he will be all right, or practically so.

But—

Did it ever occur to you that while his drunken state of debility and idiocy may be a more or less temporary condition, it may be the cause of passing down to a son or a daughter a condition of debility or idiocy that will not be temporary—a condition of feeble-mindedness, insanity, paralysis or deformity that will be life-long? Did that ever occur to you?

Alcohol and eugenics. Is there any phase of the alcohol question more important? Everybody knows that we have far too many mental and physical defect-

ives, too many criminals, too many good-for-nothings. But outside of these we have far too many men and women of mediocre caliber, and far too few of those shining lights that rise above the mental level of the crowd. Why does not the human race improve? There are great gains in our social heredity, our knowledge, our institutions, our machinery. Why not an improvement in our brain heredity? Authorities regard our intellectual level as considerably below that of the ancient Athenians. Why?

The problem is without doubt complex. But there is good reason to suspect that the chronic poisoning of the human race through narcotics, particularly through alcohol and tobacco, has been in part responsible for our failure in the matter of racial development. Worse than that, there is good reason to believe that these narcotics are responsible for a degree of degeneracy that threatens racial extinction, at least of those strains affected.

At this point in the discussion an imaginary chorus of tipplers, brewers, distillers and bartenders will cry out, "Rubbish! Prove it!"

Every once in a while one is confronted with the problem of demonstrating, or proving, something that should not need to be proved, because it is obvious or self-evident. In this respect, however, science is something like the law.

The question is somewhat complicated by the theory that alcoholism, instead of being the cause of degeneracy, may be only one of its symptoms, the manifestation of a neuropathic constitution. To prove anything, therefore, it would be necessary to eliminate all other possible factors that might be responsible for, or contribute to, the

condition of mental or physical defect in any case. And this is not always easy.

If parental alcoholism is responsible for the production of inferior offspring, it is because of some injury to, or change in, the parental germ cell. The chromatic material, or chromosomes, in the germ cells carry those potential qualities which we call "heredity." If this chromatic material is healthy, hereditary qualities are transmitted in a normal manner. But it is possible to injure the chromosomes through poisoning or devitalizing influences. There are various infectious diseases which are capable of accomplishing such a result, temporarily at least. The disease, syphilis, is the most conspicuous of these, being universally known as a race poison because it affects the germ plasm itself, resulting in sterility, abortion, stillborn children, early infant mortality, and deformity or mental deficiency in most of the surviving children. Alcohol appears to be the other most conspicuous race poison, having a similar injurious effect upon the germ cell.

Various studies have been carried on with the idea of developing the facts of the case. Probably the most interesting and convincing have been those of Dr. Charles R. Stockard, Professor of Anatomy, Cornell University Medical College, New York. Doctor Stockard carried on a series of experiments on guinea pigs extending over a period of more than five years, which demonstrated a definite injury to the germ cells, at least in these animals, as a result of alcoholic treatment. The results, in the form of sterility, early abortion, stillborn litters, early mortality, and weakness, deformity and nervous diseases in the survivors, followed uniformly,

whether the alcohol treatment was administered prior to conception, to either parent or to both.

Doctor Stockard, through these experiments, further showed that not only did the immediate descendants of the alcoholized animals suffer in this way, but that the second, third and fourth generations, although themselves not treated with alcohol, had retained the power of transmitting the conditions of weakness or defect, in turn, to their young. In fact, the grandchildren showed degeneracy to an extent even greater than that of the immediate offspring of the alcoholized guinea pigs.

It was found that the introduction of alcohol into the stomach disturbed digestion and upset the health of the animals very seriously. Naturally animals with disturbed digestion would not offer a completely satisfactory test. For this reason the treatment was administered through inhalation of alcohol fumes. Care was taken to insure that any results secured would be due exclusively to the alcohol and, for this reason, thoroughly healthy stock was used. Not only that, but two entirely different stocks from different sources, obtained one and one-half years apart, in 1910 and 1912, respectively, were employed in the experiments. Also each animal used was tested by one or more normal matings before being introduced into the experiment. Only those giving normally strong offspring were selected. The results of the experiment were finally checked off in a comparison with the normal breeding of the same stock, untreated with alcohol.

An interesting development, which tends to emphasize the race poisoning effect of alcohol, is found in the fact that the animals treated did not themselves appear

to suffer in any marked degree. That is, the direct effects of the alcohol, aside from the temporary drowsiness, stupidity, or stimulation of the animals, did not involve any material impairment of their general health. The alcoholized animals were usually fat, but otherwise apparently in fairly good condition. The fact that the offspring of these animals suffered seems to suggest that the injury to the germ plasm is out of all proportion to the visible impairment of the health of the alcohol consumer himself. It leads one to the conclusion that even though a man may personally withstand the destructive influence of alcohol with considerable success, he may, nevertheless, be entirely unfit for parenthood.

Another very significant result of the experiments is seen in the far greater injury accomplished by the alcoholic treatment of either parent before conception, as compared with the results of alcoholism after conception, that is to say, during pregnancy. In the first case, the germ cell itself is damaged. In the second instance the parental germ cells were normal and healthy and the alcoholic treatment during pregnancy may be regarded as having been simply a matter of unfavorable environment. The results of these experiments indicate that normal and healthy seed is apparently more important than environment, or what is often called "nurture." As a matter of fact, the treatment during pregnancy did not cause any material or apparent injury in the cases studied. This does not mean that alcohol, during pregnancy, in the case of the human mother would not be detrimental. It only means that in the guinea pig, at least, the poisoning of the germ cell before conception is infinitely more detrimental.

In one group of experiments alcoholized males were mated with normal females. The tendency towards sterility is clearly shown by the 40 per cent of negative results (failure to conceive) and early abortion. Still-born litters resulted to the extent of 10½ per cent. In just half of these matings were living litters brought forth and of these, containing in all 91 young, 89, or 43 per cent, died soon after birth. Counting those still-born, 57 full-term litters resulted, in all 111 young. Of these 59, or 53 per cent, died at birth or soon after, and only 52 individuals, or 47 per cent, survived. Almost all of the offspring were excitable, nervous animals, four were paralyzed and three showed gross deformities of the eyes.

The results of the experiments in mating normal males with alcoholized females were only slightly better. The mating of alcoholized males with alcoholized females was naturally most unfavorable of all. To give figures covering all of these experiments would take up considerable space and might prove tedious to many readers. Full particulars will be found in Doctor Stockard's article "The Hereditary Transmission of Degeneracy and Deformities by the Descendants of Alcoholized Mammals," published in the *Interstate Medical Journal*, June, 1916. (Metropolitan Building, St. Louis, Mo.)

So far the experiments demonstrated that the chromosomes in the germ cell, whether in the case of the spermatazoon or the ovum, may be injured or so changed by alcohol as to give rise to abnormal or faulty development in the offspring. But what is of equal, if not greater, significance is the evidence that such injury may be transmitted for several generations, at least in

the case of the guinea pig, or until complete sterility and extinction finally result.

Surviving offspring of the alcoholized parents were subsequently used in a series of experiments in which they were mated with normal animals and also among themselves. These experiments were carried down as far as the third generation, with results going from bad to worse. In other words, it was found that the grandchildren suffered even more than the immediate offspring of the alcoholized grandparents, even when the second generation was untreated with alcohol and mated with normal untreated animals. The figures presenting the number and percentages of sterility, early abortion, stillborn litters, early mortality, paralysis, nervous disease and deformity among the survivors, become monotonous. We quote a few lines from Doctor Stockard's interpretation of his table of statistics:

"The next line of the table, the tenth, indicates further how the effects of the original modification are transmitted to the great-grandchildren or through three generations since the injury. Sixty-two inter se matings of F_2 animals gave the results here shown. Almost 37 per cent of the matings gave negative results or early abortions. About 11 per cent of such matings gave stillborn litters, 7 in 62 matings, which is remarkably high when compared with any of the above combinations.

"Thirty-two living litters were produced, containing in all 54 young; 31 of these, almost 60 per cent, died soon after birth, and only 23 survived. Six of the 31 that died were paralyzed and unable to stand, while 8 of them, a strikingly high proportion, were grossly de-

formed. Six had one or both eyes deformed and two were anophthalmic monsters, being completely without eyeballs, optic nerves, optic chiasma or any gross signs of optic tracts.

"Sixty-eight full-term young (including those still-born) were produced by the F_2 matings, but only 23 of these, or just 34 per cent, were able to survive, while about two and one-half times this proportion, or 82 per cent of the full-term young from control (normal) matings, survived as vigorous, healthy individuals. The 23 living F_3 animals are all rather weak and degenerate and almost completely sterile according to a considerable number of careful matings with strong, fertile guinea pigs. The alcoholic race seems at this stage of the experiment about to fade out in the fourth generation, while normal control lines from the same original stocks have passed far beyond this generation, continuing to breed normally and showing no signs of degeneracy, and never in any case giving rise to a grossly deformed animal."

An interesting feature of the results of the experiment was found in the production of deformities, particularly of the eyes, showing various degrees of degeneration, such as opaque cornea, cataract, small defective eyes, complete absence of one eye and complete absence of both eyes. In some instances the animals became blind a year or more after birth. These results parallel certain experiments in which the treatment of the eggs of fish with solutions of alcohol produced similar eye conditions. Practically the same results also followed the alcoholic fume treatment of hens' eggs before or during incubation. These results

suggest the probability of a special susceptibility of the eyes to injury through parental alcoholism.

The structural defects manifested in the descendants of alcoholized animals are developed most strikingly in the central nervous system and the organs of special sense. Professor Stockard found that the female offspring of alcoholic males were less likely to live and suffered more than the male offspring, also that the male offspring of alcoholized females were inferior to their sisters.

While it is true that these facts demonstrate only the effect of alcohol on guinea pigs, nevertheless they are interesting inasmuch as guinea pigs represent a rather highly developed type of mammal. But what data have we in respect to the influence of parental alcoholism in the human race? Impressions on the subject do not count. What has science to offer?

In the same number of the *Interstate Medical Journal* will be found an article on "The Influence of Alcohol on the Progeniture," by Alfred Gordon, M. D., of Philadelphia; and one on "Alcoholism and Feeble-Mindedness," by Henry H. Goddard, Research Director at the Training School for the Feeble-Minded, at Vineland, New Jersey. Doctor Goddard is probably our foremost authority on the problem of the feeble-minded. He has studied the families of 300 children placed in his institution. In all 11,389 relatives have been investigated, about 40 to each family. Of these eleven thousand and more he finds that 3.2 per cent were alcoholic, using the term "alcoholic" as meaning drunkard. In the first place, this limitation of the meaning of alcoholism is open to question, for it is well known that the chronic

alcoholism of moderate or steady drinking is far more detrimental than the occasional debauch, with considerable intervals of abstinence. In other words, the liver and kidneys of the man who becomes "soused" once a month will suffer less than the man who drinks moderately, but daily. The latter is more truly "pickled" than the former.

In considering those families in which alcoholism is found, Doctor Goddard raises the question as to possible other factors, such as syphilis, insanity and epilepsy. To reach a scientifically valid conclusion it is, of course, necessary to eliminate such other factors. However, while the purpose of science is to discover the truth, it unfortunately happens that in many cases the methods of science serve beautifully to conceal, or obscure, the truth.

At the same time, the attitude of the scientist is essentially one of extreme caution.

Of the 800 families represented by the children in the Vineland school, 160 families showed no alcoholism in the immediate parents, parental alcoholism was found in 80 families, 60 more showed alcoholism, and also paralysis, epilepsy, insanity or syphilis. In many of the alcoholic families the condition of feeble-mindedness was strongly hereditary. This, of course, raises the question as to whether or not the alcoholism may not have been the result of the feeble-mindedness instead of the feeble-mindedness being the result of alcoholism.

Another presentation of the figures yielded more significant results. Counting not simply the parents of the children in the institution, but every mating found among the families represented, they were divided into

two groups; alcoholic and non-alcoholic. Then counting the children of the two groups it was found that 31 per cent of the children of the alcoholic parents were feeble-minded, while only 18 per cent of the children of the non-alcoholic parents were feeble-minded. It was found also that 17.6 per cent of the alcoholic group died in infancy as against 8½ per cent in the other group. Furthermore, 8 per cent of the conceptions in the alcoholic families resulted in miscarriages and of the non-alcoholics only 3.5 per cent.

These figures are very significant, though in Doctor Goddard's view scientifically inconclusive. He feels that most feeble-mindedness is accounted for by neuropathic ancestry, disease and injury, with the possibility that in many such instances the addition of alcohol may throw the case into the feeble-minded group where without the alcohol it would have escaped. The great difficulty in Doctor Goddard's mind is the task of eliminating the possible other causes of inherited defect, so as to place the blame unmistakably upon the alcohol.

Doctor Gordon, however, takes a less uncertain stand. He realizes the importance of caution in collecting data concerning heredity and the necessity for excluding all other factors that might create pathological conditions. But, observing the utmost caution, he has presented the pedigrees of three families who have been most carefully investigated. Each surviving member, for instance, was submitted to a Wassermann blood test with negative results. The facts in these three families point conclusively to alcohol as the only, or at least the most conspicuous, agent that created the abnormalities in several successive generations.

In one of these families in which there was alcoholism in one parent and grandparent, the grandchildren show various degrees of mental deficiency, epilepsy, choreiform movements, tremors, eccentricity and violent temper, together with instances of miscarriages and dead born children, and only two normal children in a group of fourteen children and grandchildren, excluding five cases of miscarriage or dead born. The other two families, likewise, parallel in a striking way the results of Doctor Stockard's experiments with alcoholized guinea pigs.

The Bureau of Public Health Education of the New York Department of Health has issued a little educational pamphlet under the title "Do You Love Babies?" from which we quote the following paragraphs:

"In one of the European countries it was found that when the parents did not touch liquor, only 13 out of every 100 of their children died. Parents who drank only small amounts lost 23 out of every 100, and heavy drinkers lost 32 out of every 100.

"These are the results of parents using liquor before their children are born. But if people drink before their children are born they don't stop afterward. That means that any weakness which babies have at birth is later increased by presence of alcohol in the home. If a nursing mother habitually drinks much beer or whisky, her milk becomes watery and of poor quality, and harmful to the baby. But poisoning the babies' food isn't all that alcohol does. It causes the father and mother to spend their good money, and so lessens the family bank account, which is usually none too large when a baby arrives. The money spent for liquor should go for

wholesome food, warm clothes and decent rooms. Finally, to finish the deadly work, alcohol gets such a grip on father and mother that baby is neglected, becomes ill and dies.

"Do you love babies? You can't keep on drinking and have strong babies. Stupefying alcohol or healthy babies—which? Take your choice."

On the whole, the case against parental alcoholism seems fairly well established. As the matter stands, it is still possible for those with an axe to grind to raise the question as to whether science has indisputably proven the case against alcohol from the standpoint of eugenics. But, for practical people the lesson is clear, and the truth—which is greater even than science—is evident.

No one lives for himself alone. No one can say that what he does is his own business. He cannot say that if he wishes to drink it is his own affair. Each one is not only responsible for his personal welfare, but he is at the same time the custodian of the health and lives of future representatives of the race. One has no right to poison or destroy the life of the race of which he—being the link between the past and the future—between ancestry and posterity—is the temporary guardian.

SHOULD COUSINS MARRY?

By CARL EASTON WILLIAMS

THERE is no valid religious or superstitious objection to cousin marriages. But there is a scientific, biological reason why many such unions should not take place, and why they are contrary to the principles of eugenics. The mere fact that a married couple are cousins does not necessarily mean that their offspring will be defective. The objection lies in the danger and likelihood of bringing together two germ cells carrying the same defect. It is possible to conceive of a family so perfect, so absolutely free from taints of every kind, that only sound and normal children can be produced by the intermarriage of members of that family, no matter how closely related. In fact, some families are more nearly perfect in this respect than others, and the result is seen in those instances in which such marriages turn out well, producing splendid children.

The subject has been much confused in the past through the fact that varying results have been secured by different investigators. But these variations are really just what one should expect, considering the differences in the human material under observation. Statistics are tiresome and take up space, so I will simply say that some reports have shown a high percentage of defective children in certain groups of consanguineous marriages, while the reports of other locali-

ties or groups have shown little or no unsatisfactory results.

Again, where the results have been unsatisfactory, the character of the defects noted in various localities has differed widely, which is also to be expected. In one place, consanguinity has produced many deaf-mutes and hermaphrodites (the latter being a matter of imperfect or arrested development); in other sections the results are a high percentage of idiocy and insanity; in other districts feeble-mindedness and dullness of mind are produced; in another locality it is loss of fecundity that follows; dwarfed stature is the penalty in one place and in still another it is idiocy and blindness. But where there has been fairly complete freedom from taints or weaknesses of any kind, the children of cousins will average well. The only trouble is that very few of us are in a position to know, positively, that our family germ plasm, or what they used to call "blood," is entirely free from any type of defect.

Various experiments in animal inbreeding have been carried on, and, as might have been expected, with varying results. Some of these with rats and mice, twenty years ago, seemed to point to the conclusion that while in many cases inbreeding may not immediately produce bad results, yet after a number of generations there is a distinct loss of fecundity, and sometimes in size and vigor. But more recently the opinion has prevailed that most bad results of inbreeding can be avoided by the careful selection of the strongest and best animals of each generation to become the parents of the next. At least the theory has worked out well in the case of rats, though not with swine.

Dr. Helen Dean King, at the Wistar Institute, Philadelphia, carried on such an experiment for six years, producing about 10,000 inbred rats in twenty-two generations. Doctor King started with a stock litter of four albino rats, two males and two females. About twenty carefully selected females were taken from each generation to continue the experiment, each one being mated twice to a brother from the same litter. The result has been startling, in that the inbred rats have been larger and heavier than the general stock rats from which the original parents were taken, the inbred males being fifteen per cent heavier. One of these, the largest albino rat ever recorded, was the product of six generations of this close inbreeding.

But with larger animals less happy results have been obtained. Lord Derby's experiment with nine generations of race horses, mating brother and sister, was a flat failure. The descendants of a pair of goats inbred for nine generations by J. Cossar Ewart, simply "ran out." And in the case of swine, in recent experiments at the Delaware Agricultural Experiment Station, even careful selection of the best animals of each generation for further breeding did not prevent failure in every line of descent. That's one difference between pigs and rats.

It is too early to set down any rules, but it would appear from what we have learned that inbreeding is less injurious in the case of the smaller animals, like rats and mice, than with the larger and more highly evolved species. Very far down in the scale of life it would naturally make even less difference. Just as a machine of many complicated parts carries more chances

of getting out of order than a simple machine of a few parts, so a more complex organism carries a larger number of channels through which defects of one kind or another may be manifested. The plan that served in the case of the rats did not work out in the case of the swine. It would probably be even less applicable to human life, with its extraordinary complexity.

It is true enough that the so-called Mendelian laws of heredity as applied to distinct traits or unit characters work out in the human race just as they do in roses or in rats, in corn or in cattle. But that does not mean that inbreeding experiments will work out just the same in all species, high and low. Also, we must not forget that some defect in the common ancestors would have spoiled that pretty experiment with the rats. And just there is the point. Any defect or abnormality in the common ancestor is likely to reappear in the offspring of cousins and may be intensified.

We can not go into the technicalities of heredity here. It may be sufficient for ordinary purposes to say that when a trait is derived from both parents, it is a case of *duplex* inheritance. When derived from only one parent, it is *simplex*. Duplex inheritance naturally means a stronger degree or development of a particular trait. Where crossings of white and red flowers may be concerned, red and pink may represent the difference between duplex and simplex inheritance of coloring. In the mating of cousins, it is likely that in some of the children produced there will be duplex inheritance of some of the characteristics of the common ancestor. You can readily see that if this happens to apply to some form of ability or aptitude, it may mean excep-

tional talent. Just as in the rats, it may mean increased size. But when such duplex inheritance applies to some undesirable factor, you can see that it also is accentuated. For instance, the weak eyes and poor sight of the common great-grandfather may even mean complete blindness in the great-grandchildren.

If the germ cell of one parent carries a defect, but that of the other parent carries the determiner for a normal make-up, then the child resulting from this union will be normal in that particular, through simplex inheritance of the necessary character, even though the germ plasm of the child will still carry the defect. That is why outbreeding usually turns out well, even when there is some taint in the nature of a defect in the family stock of one of the parties. The other supplies when the one lacks, and the children are normal.

We must remember, also, that the marriage of persons from two unrelated but tainted families may be as bad as the marriage of cousins, at least if the same type of defect prevails in each. If there is a certain neuropathic strain on both sides, the fact that they are not related will not help the situation, for there will almost surely be some children, in a large family, that will be defective in that direction. But, of course, this does not happen so often. When relatives marry, however, the chances are great that the weak point will be manifested in some of the children.

Why do not all the children of a given family suffer the same way? The fact is that no two children of the same parents receive precisely the same inheritance.

Taking everything into consideration, we may say that when the stock is sound in every respect, cousin

marriages would produce very fine children, possibly with exceptional talent or genius, through duplex inheritance of some desirable quality or special ability. In fact, inbreeding would offer the one surest way in which one could hope to reproduce, in equal or greater degree, some quality possessed by a gifted individual. And this might often be desirable were it not that possible weak points in his make-up might also be brought out and much exaggerated. Furthermore, since it is known that what we call genius is often found in connection with a constitution more or less unbalanced, the experiment would be a very risky one. In general, the chances of bad results make consanguinity inadvisable. It is not sufficient that the parents themselves are healthy. It is a question of faultless germ plasm.

What are the chances of unfortunate results in the average case? What proportion of the general population carries the possibility of unsound progeny through consanguineous marriage? So far as physical abnormalities and disease susceptibility are concerned, I am not aware of any data from which we can draw any conclusions. We only know that there are great differences between families in regard to "resistance" and susceptibility to various diseases. But in reference to nervous and mental weaknesses, a great deal of light has been thrown upon the subject by a series of studies of the heredity of insanity, in the light of the Mendelian theory, conducted by A. J. Rosanoff, M. D., and Florence I. Orr, B. S., Kings Park State Hospital, Kings Park, N. Y. The conclusions were that between 1.5 and 2 per cent of the general population are affected by some neuropathic condition, only one-fourth of these

cases showing indications for commitment to sanitariums or public institutions, and that about 80 per cent of the general population, without being actually neuropathic, carry the neuropathic taint from their ancestors and are capable of transmitting it to their progeny under certain conditions. In other words, practically one-third of us carry some defect or other in the germ plasm or race material of which we are temporarily the custodians.

Our present point is that outbreeding commonly prevents these defects from being manifested. Inbreeding would bring them out. In outbreeding it may happen that both family stocks are defective, *but in a different way,* in which case good results are secured in the way of healthy children, each contributing strength where the other is weak. Inbreeding, on the other hand, means that the same defect will be carried on both sides.

Obviously, the proportion of germ plasm carrying some defect or other is such as to make consanguineous marriage in the general population a menace. The "safety first" policy is apparent. No writer or speaker is justified in declaring that cousin marriages in "healthy" families are unobjectionable. Nor is any one warranted in saying that "science justified inbreeding in the human race," simply because it has turned out well in some experiments with rats.

DOES DELAYED PARENTAGE PRODUCE SUPERIOR MEN AND WOMEN?

By Dr. CASPER L. REDFIELD

AT some time in the past there was a common ancestor for man and the ape. At that time the mental ability of the man was the same as that of the ape, because at that time man and the ape were the same person. From that common ancestor there have survived two main lines of descent, one leading to man and the other to the ape of today.

In the line leading to man, mental ability has increased little by little so that today the mental ability of the man is far above that of the ape. While it may not be literally true for each and every generation between that common ancestor and man of the present time, still we will commit no error if we divide the total increase in mental ability by the number of intervening generations and say that each generation in turn was a little superior to that which produced it. Now it happens that mental ability is something which is inherited —is transmitted from parent to offspring. Take that fact with the fact there has been a regular (or irregular) increase in mental ability in the generations leading to man and it will be seen that each generation in succession transmitted to its offspring more than it inherited from its parents. But a parent can not transmit something which he does not have. Where and how did those generations get that ability which they transmitted but did not inherit?

Our cattle are descended from wild stock which

man domesticated at some time in the distant past. We have Holstein-Friesian cows at the present time which will produce their own weight in milk in two weeks' time. Milking qualities are known to be inherited, but the wild cattle of the past produced no such quantities of milk as are now produced by the Holstein-Friesian cows. Young calves could not possibly absorb such vast quantities of milk, and it is quite certain that no wild animals produce milk vastly in excess of what their offspring can absorb. To get what we have today, generation after generation of cows must have transmitted to their offspring more milk-producing power than they inherited from their parents. Where and how did those generations of cows get that power which they transmitted but did not inherit?

High speed at the trot is an artificial gait which never existed in any breed of horses until forced there by the art of man during the nineteenth century. Running is the natural high speed gait for horses, and until very recently, any trotter forced to high speed would break into a run. Now we have natural born trotters which will stick to the trot no matter how hard they are forced.

Seventy years ago there was only one horse in the world capable of trotting a mile in two minutes and thirty seconds. Now we have nearly a thousand capable of trotting a mile in two minutes and ten seconds. Trotting power is known to be inherited. We get fast trotters only from parents having trotting power, and those horses which transmit trotting power transmit it with great regularity. A few records will indicate how trotting speed has increased during the past century.

EVOLUTION OF TROTTING POWER—CHAMPIONS AT DIFFERENT DATES

1818	Boston Blue	3:00
1830	Bull Calf	2:47¾
1845	Lady Suffolk	2:29½
1859	Flora Temple	2:19¾
1884	Jay-Eye-See	2:10
1892	Nancy Hanks	2:04
1912	Uhlan	1:58

Look at that table carefully and consider what it means. Clearly, each generation in succession transmitted to its offspring more trotting power than it inherited from its parents. Where and how did those generations get that trotting power which they transmitted but did not inherit?

In 1825, Edward Laverack of England bought a brace of setters, Ponto and Moll, from a neighbor. It is not recorded that there was anything unusual about either Ponto or Moll. Laverack never bought any other setters or introduced any outside blood, yet at the end of forty years of strict inbreeding, the descendants of Ponto and Moll were the best setters in the world. These setters were hunting dogs, and the good qualities of a hunting dog are a combination of both mental and physical power. These are inherited qualities. Looking at the history of the Laverack setters it is evident that the successive generations transmitted to their offspring more mental and physical power than they inherited from their parents. Where and how did those generations of setters get that mental and physical power which they transmitted but did not inherit?

Within historical times each century has shown the existence of a few men, sometimes only one or two, who stood out prominently for their superior mental ability.

These men arose in all manner of unexpected places from ancestors who a few generations previously formed part of the ordinary population. In cases where the matter can be traced, it is found that these remarkable men were culminations of improvements extending over several generations, which means that successive generations transmitted more than they inherited. Where did those generations get that "more" which they transmitted?

In all of these cases those intermediate generations acquired before reproducing those things which they transmitted but did not inherit, and we have direct evidence bearing on every one of these cases. To understand this matter it is necessary to give a little consideration to the manner in which acquirements are made. With the trotting horse we have the mile track and the stop watch by which we measure trotting power with extreme accuracy. With cows we have scales for weighing milk and by which we can measure milk-producing power with extreme accuracy. We will take these for illustration because the facts are beyond all dispute.

It is known that a trotting horse will gain in trotting power as a result of being trained, and that he will not gain if not trained. This power thus gained is something "acquired" in the strict meaning of the term. The facts show that the amount of trotting power thus acquired is measured by the amount and quality of trotting work done, and that a horse will continue to make such acquirement as long as trotting work is continued. In other articles I have given the records as they stand at the present time, but in this case we will go back to

the records as they stood at the end of 1900, which is before trainers specialized so much on very young trotters.

HIGHEST TROTTING SPEED PER MILE AT END OF 1900

One-year old	2:23
Two-year-old	2:10¾
Three-year-old	2:08¾
Four-year-old	2:05¼
Seven-year-old	2:03¼

Going back to still earlier dates, it may be noted that Dexter reached his highest speed at the age of nine, Maud S. reached hers at the age of eleven, Flora Temple reached hers at the age of fourteen, and Goldsmith Maid reached hers at the age of seventeen.

HOLSTEIN-FRIESIAN MILK PRODUCTION. OFFICIAL TESTS, YEAR ENDING JUNE 14, 1913

Ages of Cows	Av. Milk in 7 Days
Under 2 years, 6 months	322.7 pounds
2 years, 6 months to 3 years	348.8 pounds
3 years to 3 years, 6 months	400.3 pounds
3 years, 6 months to 4 years	418.2 pounds
4 years to 4 years, 6 months	446.8 pounds
4 years, 6 months to 5 years	459.2 pounds
Over 5 years (av. 7 years)	473.8 pounds

Both of these tables represent official records of responsible and reliable associations. The table for the cows shows what occurs when cows are regularly milked year after year under uniform conditions. The table for the horses does not show results of uniform training from year to year because those horses raced as yearlings have not been trained during later life, and those reaching their highest speed at eight or ten or older were not trained as colts. It does, however, show that a horse will continue to acquire trotting power un-

der trotting exercise long after he has ceased to grow in size.

In the case of the cows, tabulation showed the average cow at that date was 4 years, 3 months and 21 days old when her calf was born. In the table given that would mean an average milk production of 448.8 pounds in seven days. But taking all of the dams, grandams and great-grandams in the pedigrees of the 144 cows producing the greatest quantities of milk, it was found that they averaged 5 years, 8 months and 18 days old when their calves were born. In the table given that would correspond to a milk production of 465.5 pounds in seven days. The difference is 16.7 pounds of milk per week, and that difference is a numerical measurement of the average excess acquirements made by each and every one of the dams, grandams and great-grandams in 144 pedigrees before they reproduced in the lines leading to the improvements found.

I took the first 180 trotters to trot a mile in 2:10 and extended their pedigrees back to a time in horse history when there was no such thing in the world as a 2:30 trotter. This gave me a large number of generations, five in each pedigree, in which it was definitely known that each generation transmitted to its offspring more trotting power than it inherited from its parents. I then made a detailed investigation of the life histories of the different animals in those generations and compared what was found there with what was normal in ordinary horse breeding operations. That investigation showed that those generations, each and every one of them without any exception whatever, did in fact acquire (before reproducing) the identical thing which

they transmitted in greater quantity than they inherited. In those generations which led to the first 180 trotters in the 2:10 list, animals scientifically trained and raced were from ten to fifteen times as numerous as they were in ordinary pedigrees of the same dates. Those not raced were hard worked road horses averaging about forty per cent above the average age of horse parents. They made their acquirements gradually and not rapidly.

In the case of cows I picked from the official records 144 cows credited with producing greater quantities of milk than any others, and extended their pedigrees back to imported stock. Those cows descended from three generations of female ancestors averaging thirty-three per cent above the normal age for dams in ordinary pedigrees of the same stock. This shows that these large milk producers came from successive generations of female ancestors which had acquired an unusual amount of milk-producing power before reproducing.

Edward Laverack did not buy Ponto and Moll for breeding purposes. He bought them for hunting purposes, and the records show that he was a very strenuous hunter. The records also show a very small number of generations in the forty odd years during which Laverack kept his dogs. In other words, Laverack compelled each generation of his dogs to acquire by hard and long continued work an unprecedented amount of that mental and physical development which was characteristic of his final product. Each generation in succession acquired by work the identical thing which it transmitted in greater quantity than it inherited.

It is not known at what ages apes reproduce, but

the average time from birth of parent to birth of offspring may be assumed as being in the neighborhood of fifteen years. It is certainly more than ten years and less than twenty. There will be no error in our argument if we assume that the nearest common ancestor of man and ape reproduced at the same age that the ape does now. The point to be made is that at one time man and ape reproduced at the same average age whereas now they reproduce at widely different ages.

Going back to the time when man and ape separated, our ancestors survived by physical and mental activity in securing food and escaping from enemies. As time went on man depended more and more upon the use of his wits in his struggle for existence. Also as time went on, man reproduced at later and later average age until now he reproduces at about thirty years from birth of parent to birth of offspring. When time between generations stretched out in the man line more than it did in the ape line, the man acquired more mental development before he reproduced than did the ape, and he did this because he was mentally active more years before reproducing. The successive generations leading to modern man transmitted to offspring more than they inherited from their parents, and the generations which did this are the same generations which acquired, before reproducing, the identical thing which they transmitted in excess of inheriting.

Coming now to those rare men of whom we have only a few in a century, how were they produced? It should be noted that each one had two parents, four grandparents, and eight great-grandparents. Also,

that they are certainly improvements over their great-grandparents. If they were not such improvements, then there would be many "rare" cases in a century.

In looking into the pedigrees of these great men, it is found that they were sons of parents of nearly all ages, but were predominantly sons of elderly parents. While we sometimes find comparatively young parents in the pedigree of a great man, we never find a succession of young parents. Neither do we ever find an intellectually great man produced by an average pedigree extending over three generations. The great man is produced only when the average for three generations is on the elderly side of what is normal. The average age of one thousand fathers, grandfathers and great-grandfathers in the pedigrees of eminent men was found to be over forty years. Great men arise from ordinary stock only when several generations in succession acquire mental development by mental efforts in excess amounts before reproducing.

PREPARATION FOR MOTHERHOOD

By EDITH M. B. WILLIAMS

MANY women seek to avoid motherhood because they fear it will rob them of their youth and good looks, ruin their figures, impair their health and lessen their attractiveness. There could be no greater mistake, for sterility is far more fatal to good looks and youth and health. Most extremely old women are those who have had large families. Maternity is a normal function and is conducive to physical maturity. Sterility is more often followed by a fading of beauty, a withering of true womanly instincts and qualities, a flat-busted condition and a gaunt, "old-maidish" aspect that is recognized at a glance. It may also mean life-long loneliness and regret. Great numbers of women have found motherhood to be almost a vital stimulant, gaining in healthy flesh as a result of it, feeling better and looking better than ever before in their lives. When they fail in health, as a rule it is not because of maternity in itself, but because of domestic overwork, the loss of sleep, uncongenial marital conditions and other hardships generally, or probably in many cases, violations of the ordinary laws of health. They would be sick just the same, children or no children.

That previous good health is an essential factor in ideal motherhood is so obvious that it is scarcely necessary to mention it. We may assume at the very outset that both parents are mentally sound and physically normal, otherwise parenthood is nothing short of criminal.

The prospective mother is always more or less concerned about the symptoms and discomforts of pregnancy and how to alleviate them. Certain symptoms may perhaps be expected in a moderate degree, owing to the fact that the condition of pregnancy has a far reaching and powerful influence upon the entire organism of the prospective mother. There is a good deal of readjustment of the bodily functions, and there may be much nervous disturbance in case of general bodily weakness or if all conditions are not right. The nausea or "morning sickness" so commonly experienced is the result of a reflex nervous action. The poorer the state of the general health, the more intense these various symptoms. It is this intimate relation of pregnancy to the general condition of the body which makes the former such a powerful factor, in normal cases, in improving the general health. It should be said, however, that the extreme symptoms of pregnancy and the severe discomforts often experienced are largely the result of the wrong conditions under which most women have lived in the past, including confinement in the house, improper foods, overwork, insufficient rest and other factors which involve more or less nerve-strain and impairment of the general health. Many healthy women escape discomfort of any kind, and it is possible for any one suffering from these various symptoms to either remedy them entirely or at least so palliate them as to avoid any marked degree of annoyance. The suggestions following will not only make for a healthy and vigorous condition of the child but will work for the comfort and welfare of the mother as well. Nausea, for instance, will be combatted by suitable foods and by

plenty of outdoor air. Heartburn, which women have sometimes absurdly ascribed to irritation from the child's hair, is merely a symptom of indigestion. Besides from the time the unborn begins to have any material growth of hair, it floats head downward in the amniotic liquid or "bag of waters." Again, swollen ankles, a dropsical condition indicate overworked kidneys, a condition which may be relieved by increasing the eliminative activity of the skin as referred to a little later. And so with practically all discomforts of pregnancy.

Generally speaking, we may say that there are five or six important aspects of prospective motherhood to be considered, having to do with air, food, exercise, sleep, clothing and mental conditions, together with a few other general considerations.

We all know that fresh air is always important, but in the case of pregnancy it assumes a unique and special importance. This is due not only to the need of doing everything possible to improve a woman's health under these unusual conditions, but also to the peculiar arrangement of the circulatory system in the unborn. After birth, as every one knows, only fresh, pure, oxygenated blood travels through the arteries, while the veins carry back to the heart the impure blood, charged with the wastes. In the fetus, however, oxygen and nutrition are received through the placenta from the mother, and carbonic acid and other wastes are eliminated through the same channel, calling for a somewhat different scheme of circulation, the detail of which is perhaps too complicated to describe here. It should be known, however, that only a part of the child, the

head and upper part, receives approximately pure blood, while the lower part of the body receives a mixture of fresh and venous blood. It is for this reason that the newborn infant is so much better developed in the head and upper body than in the lower part. Now, since a large part of the body of the fetus, even under the best conditions, secures blood only partly charged with oxygen and nutrition, and containing a considerable amount of waste, then it will be clear that when the mother is breathing impure air, and thus obtains an insufficient supply of oxygen, she is still further depriving the unborn of this vital and essential element. A limited supply of oxygen for the mother means a condition which approaches suffocation as far as the lower half of the body of the fetus is concerned.

How criminal, therefore, the old-fashioned habit of staying in the house during the entire period of pregnancy. It was the theory of our mothers and grandmothers in the good old days of prudery, that the prospective mother should not "be seen," that she should closely confine herself for the sake of decency! This at the very time when she needed most of all to be out-of-doors. But happily this monstrous view of life is gradually passing.

If there are tendencies to nausea in the early months, fresh air will be invaluable in relieving it and in promoting a normal appetite. If possible, one should live entirely in the open air, even sleeping outdoors. This holds true even in winter, for with windows closed to retain the warmth of the rooms the quality of the indoor air is far worse than in the summer time. If necessary, one should dress up warmly to maintain comfort,

and should use plenty of covering at night. Many women sacrifice their health during this period as well as at other times to the claims of extremely arduous housekeeping.

Others again voluntarily confine themselves month after month for the sake of interminable sewing on fancy baby clothes. Of course it is a pleasure to make baby clothes, one of the keenest pleasures of this entire period, but the physical welfare of the child is more important than its clothes, and depends upon the condition of the mother and the air she breathes. Fancy clothes are objectionable for young infants, in fact. The very simplest garments are always the best and one does not need many of them. Besides, such sewing as must be done can be done in the open air, for during a period of nine months there are sure to be many weeks of such weather as will permit sewing outdoors in comfort. Housework should be simplified, the cooking should be simplified and in other respects everything should be done to provide for a practically outdoor existence during the entire term of pregnancy.

Nearly every woman realizes more or less, as if by instinct, that the question of food has much to do with her welfare and especially with that of the child, but in the majority of cases her ideas upon the subject are incomplete, unintelligent or altogether mistaken. In many cases, women feel that they must eat as much as possible, because of "feeding two." Never was there a greater mistake, for the always detrimental influence of overeating is doubly injurious under these circumstances. Above all things, there should be no forcing of the appetite, and no eating without appetite. Since

people usually eat too much under ordinary circumstances, the same amount of food that one has been accustomed to will invariably be sufficient or more than sufficient for all needs at this time. The appetite and instinct may be trusted absolutely. If one lives outdoors as much as she should, she will not fail to have an appetite.

Fruits and fresh, green salads are particularly necessary during the early months to combat the tendencies to nausea, if there are any. As a matter of fact, it would not do any harm to live almost entirely upon these for several days at a time if the appetite should fail and one cannot relish heavier and more substantial foods. Oranges, grapes, peaches, berries, grape-fruit, apples and the like are particularly gratifying. Do not attempt to eat meat, eggs or other rich foods simply from a sense of duty, for anything not relished will only make trouble and more than offset the fancied or intended benefit.

In all cases, foods should be simple and wholesome. Fried dishes and complicated mixtures should be left alone. All palatable raw foods are particularly recommended. For instance, it is better to eat the raw, fresh cherries or apples, than to eat apple pie or cherry pie. In the way of desserts, baked apples, simple rice puddings, tapioca and other similarly wholesome foods are best. Whole wheat bread should be used exclusively in place of white flour products, if only to combat tendencies toward constipation.

Owing to the crowding of the abdominal cavity there is often a tendency to aggravated constipation, for mechanical reasons, and it is most important to eradicate any other contributing causes. If the condition can not

be relieved by diet, exercise and general attention to the health, then enemas should certainly be used as often as necessary to keep the alimentary canal clear of accumulations. Many of the distressing symptoms which some pregnant women experience, including bearing down sensations and supposed pains in the womb, are directly the result of constipation and may be relieved by proper attention to this disorder.

There is a theory which has been advocated a great deal, to the effect that it is advisable to follow a special limited diet which is deficient in bone-forming elements, in order that the bones of the child may be soft and so make the birth easier. Experiments of this kind, however, are highly inadvisable. Not only are the intended results doubtful, but they may be harmful. The bones of the newborn infant are naturally cartilaginous, anyway, and it is questionable if there would be any advantage in having them still softer, if it were possible, which is also doubtful. Nature will attend to these things much better than we can by our theories. The chances are that the child will in any case appropriate such tissue building elements as are needed, and if there is a lack of bone-forming elements in the food, the teeth and bones of the mother will suffer, instead of the child being deprived. It is a well known fact that women of poor health or poor circumstances who have borne many children suffer a rapid loss of their teeth. There is a bone disease, osteomalacia, characterized by a progressive softening of the skeleton and resulting deformity, which is found for the most part only among women who have been pregnant repeatedly and at short intervals. Any diet for the purpose of softening the bones

of the child for an easy birth would be of a nature to invite such a disease, or conditions approaching it, or perhaps hasten the loss of teeth from lack of the necessary nutritive elements. It seems to be a law of Nature and a good one, too, for the benefit of the race, that the child will be nourished if the tissue-building elements are at all to be found in the blood of the mother, and that if either must suffer, it is the mother.

Such a diet, therefore, if one could really find a combination of foods which would eliminate the bone-forming elements, would be disastrous. What we should desire is a well balanced diet such as will maintain the most perfect degree of health and keep the blood as pure and as well charged with vitality and all necessary nutritive elements as possible. Let the mother and child both be perfectly nourished. We do not yet know enough about diet to place arbitrary restrictions, especially when they conflict with the instincts and appetite of the woman concerned. I know of one case where a theorist dictated certain restrictions in the diet of his wife which proved to be a continuous hardship for her during the entire term of pregnancy. His theory prohibited just the foods which her appetite craved. She actually suffered for lack of the desired articles, and though the child was strong and normally fitted to begin the battle of life, the mother was greatly run down. Such a method of outraging normal instincts is a sad mistake. For making birth easy, we should depend upon building the maximum of health and upon other factors.

In connection with the subject of food, it is important to understand the destructive influence of al-

cohol and drugs. It is quite a common thing for women to take "tonics" and medicines during pregnancy for the sake of stimulating an appetite or for other reasons. Most of these tonics contain a high percentage of alcohol and usually other drugs. All drugs are poisons, to a greater or less degree, and are taken into the circulation of the child just as sure as they are present in the circulation of the mother. The newly forming tissues of the unborn child are extremely sensitive and infinitely more susceptible to the destructive action of alcohol and other poisons than the well organized structures of the adult body. In extreme cases they may even have the effect of stopping the development of organs and tissues, giving rise to congenital deformity or to mental defect.

Exercise during pregnancy is important for the same reason that it is indispensable at any other time if one wishes anything like true health. It is essential for maintaining functional tone, an active circulation, all around bodily vigor and a healthy state of all tissues, muscular and otherwise. The womb is a muscular structure of remarkable power when healthy, and is reinforced by the external muscles of the abdominal walls. It is well, therefore, early in the course of pregnancy, to devote considerable attention to exercises for strengthening the abdominal region. Some of these exercises may be continued to the very end of the term, but the more vigorous or violent among them may gradually be discontinued with the increasing size of the body. The function of birth really depends upon the contractile power of the muscular tissue of the womb, and surely one can not expect this organ to be vigorous if the gen-

eral external muscular system of the body is flaccid and relaxed. One may, indeed, judge of the condition of internal muscular structures by the development of those externally placed. It is not simply strength that is desired, but elasticity as well—elasticity above all things. And this elasticity is not to be found, can not be expected in a body that is weak and inactive—stiffened by inactivity.

As to the kind of exercise, it may be said that what may be satisfactory for one might prove to be too much for another. Fast horseback riding, hard rowing and the like are questionable. Remember that the fetus is placed in a quantity of the so-called amniotic liquid, contained in a membranous bag, the "bag of waters," of which one hears, and that any rupture of this membrane, with the leakage and loss of this fluid, will result in an immediate miscarriage or premature labor. It is for this reason that violence during the later months should be discouraged, though moderate exercises should certainly be kept up to the very last. Walking is undoubtedly the greatest of all beneficial exercises for the prospective mother, and if possible, it will be well for her to cover from three to five miles daily.

If there are bearing down pains and a sense of weight in the pelvis, and these symptoms are not relieved by the cure of constipation, then exercises on an inclined plane, with the hips a little higher than the level of the shoulders, will be advantageous. Movements of the legs chiefly should be used in this case. The mere position of lying upon an inclined surface, with the feet higher than the head, without any exercise, is a valuable resting position to be assumed frequently for short periods to

relieve the pressure on the bladder as well as the bearing down sensations.

Plenty of sleep and rest will do a great deal for the pregnant woman, for under the circumstances she often finds that she needs even more sleep than during the ordinary course of life. All conditions in the home should be so arranged that she may be able to enjoy all the sleep that Nature calls for. Visitors in the evening who have not sufficient sense to go home at a reasonable hour should not be tolerated. There are "stay lates" of this kind in every community, and they should be told early in the evening, frankly but without offense, that such and such an hour has been made bedtime for the present on account of the health of the wife and mother of the family. Aside from the mere matter of sleep, there should be plenty of opportunity for rest while awake, such as sitting in the open air for the afternoon. A reasonable amount of work may be kept up with advantage, but continuous overwork, in the kitchen and home generally, is exhausting and undesirable.

Clothing for the prospective mother should be of a nature to give absolute freedom and comfort. Corsets should be avoided altogether, and corset substitutes are just as bad as the corset itself, as a rule. Any attempt to disguise one's condition and appearance with the aid of a corset is not only unworthy of any high-minded woman, but almost sure to prove injurious to her and perhaps to her child. Corset wearing, under these circumstances, is almost criminal. The woman who has always worn and depended upon a corset may feel the need of something, but exercises in early pregnancy will soon strengthen her body so that she will not need any

such support, though if she still insists on having a "maternity corset," it should be a waist without steels or stays, and laced at the sides as well as at the back, so that it may be enlarged as necessary and never worn tight. It should only serve to support clothing.

All clothing, however, should be suspended from the shoulders. This is true at any time, but it is especially an important rule during pregnancy. Even the garters should be hung from the shoulder by means of strips of webbing arranged in a simple harness, or very much like the suspenders worn by men. One-piece or combination garments should naturally be used, both for under and outer wear, so that everything will hang from the shoulders, and that there will be no constricting waistbands. Union suits should be purchased one or two sizes larger than ordinarily to allow for the enlargement of the body. In the external gowns it is advisable to follow Grecian styles, perhaps with a high bust girdle and draping straight and loosely from the bust down. Trimmings should be of a nature to make the throat and shoulders conspicuous. Large, wide collars, though not high collars, or anything else that will fill out the extreme upper part of the body, will help to balance the figure and make its general lines more symmetrical.

Shoes should be flat-heeled or low-heeled and thoroughly comfortable. The woman who attempts to walk through pregnancy on high-heeled, fashionable shoes is only making trouble for herself and placing an extra strain upon already burdened tissues. I have found most shoe clerks so stupid that it is practically impossible to convince them that a woman can want anything but the fashionable style of shoe. In some stores they

will practically refuse to show you or to sell you anything else. The best way is to tell them that you wish shoes for your mother or your grandmother, and that she wears the same size as yourself, whereupon they will immediately produce a good, generous, square "grandmother's shoe" that you can wear with solid comfort.

Not the least important requirement of pregnancy is peace of mind. All possible should be done to provide for a state of happiness and content during these important nine months, because of the influence of such mental conditions upon the general health and nutrition. Nerve strain should especially be avoided and also exacting mental work. Worry that causes the loss of a night's sleep, excitement, quarrelsome visitors whose unpleasant personalities leave a sense of disturbance behind them, newspapers filled with morbid, disquieting tales of murders and horrors, and other unwholesome mental influences should all be avoided, and the family should work together to that end. It should be understood, however, that these should be avoided only because of their immediate influence in disturbing digestion and their generally depressing effect upon the health and not because of the fear of "marking" the unborn.

A great deal has been said by our grandmothers about "maternal impressions," or prenatal influences, but the doctrine is now absolutely discredited by all scientific and competent investigators. Children are not "marked" in the way that we have been told. The doctrine has done much harm in causing women to worry and lose sleep night after night in the fear that their

precious charge has been marked and "cursed before birth," because of the accidental sight of a blind man, or a cripple, or a dead dog, or some other unpleasant sight. It does not happen. Some will say that they know many cases of marking, but we also know millions where the theory failed.

So far as "prenatal culture" or "education before birth" is concerned, the theory is pernicious inasmuch as it is misleading. Laboring under the delusion of this doctrine, a young woman is likely to marry into a family burdened with bad hereditary traits on the supposition that she can overcome or counteract these through prenatal impressions.

There are physiological and biological reasons why the supposed "marking" can not and does not take place. To begin with, there is no direct nervous connection between mother and child. It is often assumed that the blood of the mother flows through the veins of the unborn child, but this is not true. The blood in the baby's veins and arteries is its own. It is an organism as distinct from the life of the mother as the unhatched chick. The only difference is in the matter of nutrition. The chick's nutrition is stored up in the egg. That of the human embryo is passed through thin membranes in the placenta. Poisoning of the maternal blood-stream, or lack of food or oxygen, would thus affect the child, but mental impressions would not, except as prolonged grief might affect the mother's blood and prevent satisfactory nutrition. The lesson is that we should lay stress upon ideal physical conditions for the prospective mother.

Why do the stories of "marking"—usually dating back into the indefinite past—nearly always refer to the

mouse that scared the mother, and therefore appeared upon the child? Why not a grasshopper, turtle, alligator, rhinoceros, giraffe, runaway horse, vicious dog, or cat having a fit, any of which under certain conditions might so startle a woman as to lead to marking, if there were anything in the theory? Simply because an ordinary mole, covered with hair, can be imagined to look like a mouse. The "strawberry," presumed to be due to the mother's craving for this fruit, is simply a plexus of enlarged capillaries, or sometimes a mole on a very blonde skin.

And why is not everybody marked? All women see cripples and animals, without affecting their children thereby. Many women are extremely nervous, irritable, sometimes half insane, at this time. And yet their children may prove to have cheerful, happy dispositions—"mother's little Sunshine." We all know of such instances.

Credulity, not science, is the basis of the belief in maternal impressions. The psychology of it is interesting. An unexpected phenomenon is noted, whereupon a mental search is made to discover the cause. Eventually the mother recalls some sight or experience, usually trivial, which in some ingenious way can be connected with the phenomenon, and behold, the theory is proven! Or perhaps the mother was musically gifted. The child is likewise. The mother recalls that she heard or played considerable music before the birth, hence the result. The truth is that the musical faculty is *inherited* from the musically inclined mother.

So far as results in "prenatal culture" are concerned, careful study will show that they are to be explained

through heredity rather than prenatal impressions in practically all cases where they do not actually disprove the theory, as when the woman who studies music has an unmusical child. This question needs scientific study rather than primitive guess work. As for monstrosities, exact explanations are not to be expected, but they are far more likely to be due to the deforming pressure of corsets, the poisons of drugs or disease or some radical defect inherent in the germ cell.

As to the painless childbirth, we may say that it appears to be a possibility in some instances, but it can not be made certain in all cases by any means. Much may be done in this direction by following a suitable diet, including considerable uncooked food, an outdoor life, suitable exercise and other conditions which make for the highest degree of health, strength and elasticity of tissue. Probably the most effective immediate measure in this direction is the hot sitz bath, taken two or three times a week for the last month, and taken for a half hour or more when labor pains begin. The immediate effect is to produce a relaxation of tissues which is favorable to an easy birth. There appears to be a tendency to a larger loss of blood following such a hot sitz bath immediately preceding birth, because of the dilated condition of the blood vessels, and it may be wise to avoid the bath in the case of a weak woman, or one who is known from previous experience to be subject to free hemorrhage. In the ordinary case, however, especially if one is strong and vigorous, there is nothing to fear in this direction, and the birth will be made much more comfortable.

It is not to be expected that civilized women can

have such an easy time as the savages, on account of the larger head common in intellectual races. The question depends a great deal upon peculiarities of individual build, for though physical culture methods will reduce the trials of parturition one-half or more, and will make for rapid recovery, yet there may still be some who will have a more or less difficult time. Among those who will give no attention of any kind to their health, there is a certain proportion who have a very easy time, in spite of their weakness, because of a favorable build. It is really well to have measurements of the pelvic bones taken by a competent expert in obstetrics.

Cold sitz baths are of great value in the first three months in building vigor and functional tone, but in the later months they should be avoided. Some women might take them safely, but in other cases there is a risk. Cold sitz baths, by their reflex nervous influence, tend to cause contractions of the womb, and might possibly cause premature labor. Cold foot baths have the same reflex effect.

It may be well to have an examination of urine from time to time, especially if there is a swelling of the feet and ankles, or if there are other dropsical symptoms in any part of the body. Such swellings during pregnancy indicate an overworked condition of the kidneys, which may give rise to serious complications before or during birth. Uremia, perhaps, attended by violent and sometimes fatal convulsions is the result of the retention in the system of the wastes and poisons that should be eliminated through the kidneys. The preventive and also the remedial treatment is a series of full hot baths for removing these poisons through the pores of the

skin and little or no meat in the diet. In a general way it may be said that swellings of the legs should call for hot baths from three to five times weekly, in addition to attention to diet, outdoor air and the other considerations which we have mentioned in this article. The water should be from 105 to 112 degrees Fahrenheit, according to the limits of comfort, and should last from ten to twenty minutes, though always getting out of the bath immediately at the first feeling of weakness or unusual discomfort. If the heart seems weak, take a bath at the temperature of the body, or 98 to 100 degrees. A bath thermometer will cost about fifteen cents and should be in every house. In addition to these baths, dry friction rubs, air baths and the wearing of light clothing will help greatly in insuring the desired activity of the skin.

The question of fasting and the general treatment of illness during pregnancy is one that will often arise. Sickness at this time should be treated the same as at any other time, and if physical culture methods are used it will not last long. The unusually active function of the body at this time will very quickly overcome disease if conditions permit. Fasting for a prolonged period is not advised, but if there is a loss of appetite or if a digestive disturbance requires a short fast, it is certainly better to fast than to eat and prolong the disorder.

All of the suggestions given here are conducive to a rapid recovery. In some cases it will be possible to be up and about in a few days without harm, but as a general rule it does not pay to take chances. It depends upon the individual.

MATERNITY EXERCISES

By DOROTHY PEARL BUCHANAN

WHATEVER else one may think of the lack of necessity for physical vigor on the part of woman, at least one must recognize the advantage of a sound, strong body in that supreme crisis of a woman's life—maternity. There is no occasion in the life of any human being that more imperatively demands a state of physical perfection than the ordeal of pregnancy and childbirth. It should be every woman's sacred duty to so live as to prepare herself to meet as safely and easily as possible the demands of this critical experience.

It is true that some of the perils and unfortunate after results of maternity are due purely to the serious character of the event. But what is of far greater importance is the fact that much of the danger and the failure to recuperate properly in many cases is due to the weakness and general physical unfitness of the mother herself. But weakness is an avoidable condition. In these days of understanding of physical culture methods there is no longer any excuse for it. Any woman can make herself strong and fit if only she wishes it.

Remember that exercise is necessary not purely for the sake of strength, but for the sake of what strength means in the way of healthy, elastic tissues. Tissues that are healthy and kept thoroughly alive will not readily tear. They have an elastic quality that is un-

known to the person who fails to exercise and whose entire body consequently lacks what is called "tone."

This health and elastic conditition of the body is vitally important in the crisis of maternity. It usually means that one will pass through the experience more easily. It always means freedom from lacerations. Even in a case of more or less difficult delivery there is usually less danger of lacerations when the patient is strong. But particularly, strength means a quick recovery. It is widely known that among the American Indians childbirth is experienced with comparatively little trouble. But even among certain tribes where much difficulty is encountered the strength of the women practically insures immunity from serious lacerations and invariably quick recuperation.

In the medical profession there is considerable skepticism as to the value of muscular strength in childbearing women. It is often pointed out that the excessively athletic woman frequently suffers unusual difficulty of delivery through an overdeveloped muscular condition and a degree of rigidity of the bony framework and other tissues which has been developed by the strain of violent athletic exertions.

There seems to be a pretty good foundation for this opinion so far as the unusually athletic woman is concerned. Extremes of athletic life up to the immediate time of childbirth do not appear to be conducive to easy delivery in many cases. But while this may be true, there could not possibly be a greater mistake than to draw from this the conclusion that the building of strength is undesirable in all cases. The vital truth is that while the athletic woman may have had "too much

of a good thing," yet nine women out of ten suffer from a degree of weakness which is equally, if not infinitely more, serious.

In other words, the woman who has lived a vigorous athletic life does not need any special attention in the way of strengthening exercise in preparation for motherhood, but the average woman suffers from a degree of laxity of the tissues which makes a certain amount of physical training imperative. The special weaknesses of women are only too well known. More or less prolapsus, or what is commonly called falling of the womb, is doubtless experienced by a great majority of women. This is a condition due entirely to weakness, though of course aggravated by corset wearing or lacing. And where there is one woman who has gone too far in athletic activity there are perhaps a hundred who sadly need to build up strength and muscular tone. If you are the average woman, therefore, pay no attention to the alarm of the physician over the prospects of trouble from your athletic activity. The chances are in favor of trouble from the opposite condition. If you have spent years playing tennis, basketball, swimming, horseback riding, skating and perfecting your ability in other open air games, then you will need no further muscle building activity during pregnancy. All that you will require will be plenty of outdoor air and such an amount of walking as will enable you to keep the highest degree of general health. The continuation of a game like golf would be advantageous under such circumstances, but you will need no special developmental exercises. Any exercise that you may use should be of a nature to develop great elasticity and suppleness—exercises which

stretch the tissues. But you will do well enough if you stick to walking.

On the other hand, if you are the average woman, particularly if you do not consider yourself especially strong, you could not possibly harm yourself by a strength-building course of training and you can be sure that you will thereby not only improve your health and the quality of your blood, but you will increase the degree of safety and comfort with which you can pass through the ordeal. Most of all you will insure satisfactory recuperation.

In any case, what is required is not so much a marked degree of muscle building as a normal and healthy condition of elasticity. Exercises that tend to develop suppleness are ideal for the purpose. For this reason, the simple practice of kicking, not only forwards, but sideways and backwards, can be especially commended. The improved circulation, due to the exercises, is further conducive to that healthy state which makes for elasticity.

The physically untrained woman should, of course, first adopt an all around system of physical culture to strengthen and tone up the entire body. Indeed, the weak woman should simply make it a point to cultivate as much strength as possible. It is not likely that she will overdo it. It is understood that the most vigorous types of exercise should not usually be continued during the entire nine months of pregnancy, but, invariably, they can be continued throughout the first three months.

If you hesitate to practice energetic movements the first two or three months because of the fear of producing a miscarriage, then you may be assured that there is little likelihood of it from this cause at this time, and

that you are really far less likely to meet with such a mishap if you strengthen your body. In the case of a thoroughly healthy and vigorous woman, indeed, a miscarriage through physical activity is a practically impossible thing during the early months of the period. Unless you are already strong simply make up your mind to develop as much strength as possible during the first three months. A miscarriage at this time is invariably due to disease or to some special local weakness. Exercise will help you to overcome that.

During the later months of pregnancy it may be wise to tone down your exercises; i. e., make them less strenuous. Some women can continue to do the most violent work throughout the entire time and "get away with it," as they say. I recall a case of one woman, a circus acrobat, who continued her performances up to the day her child was born and then resumed her work two or three days after. But "safety first" is a much better plan. Your instinct will guide you. As you feel less capable of very vigorous or active exercise, simply modify its character, but do not discontinue it altogether.

There is a very prevalent idea that the pregnant woman should not raise her arms above the head. This is one of those old superstitions that our grandmothers loved. All kinds of terrible consequences were pictured. Pay no attention to the idea that raising the arms above the head will "entangle the cord around the baby's neck and choke it," or silly notions of that kind. Such a result could not possibly be accomplished in that way. What you should do, however, is to avoid strain. If stretching the arms upward involves strain, then it

should be avoided for just the same reason that any other form of physical strain should be avoided during the last few months. And that is all there is to it.

One of the difficulties of advanced pregnancy is found in the sense of weight and pressure incidental to the constantly growing burden which the mother carries. Comfort depends, to a large extent, upon relief from this sense of weight and pressure. It is such a simple matter to secure this relief that it is astonishing that physicians in charge of maternity cases permit their patients to suffer the chronic aches and continued distress which so many experience.

A suitable exercise for this purpose consists in simply walking about on "all fours," as it were; that is to say, on hands and feet. This is a reversion to the primitive status of the quadruped for two or three months during the creeping period of infancy. Go back to this position during pregnancy. Instead of the downward pressure in the erect position, with the incidental crowding of all of the organs of the body, both above and below, one secures in this position an entirely different suspension of the burden and its weight, so that all of the other organs and parts are relieved from the pressure. You will probably find that this will give you a delightful sense of relief and comfort. It particularly relieves a sense of prolapsus and at the same time is good for all around bodily exercise.

Probably the ideal means of relief from the uncomfortable sense of weight is found in the inclined ironing board position. You can either take an ironing board, resting one end securely on a chair, or you can tip up one end of a couch. Place a folded blanket or pad and

pillow on the board, if you choose. Simply to assume this position gives a delightful sense of rest, but further this position is ideal for the practice of strengthening exercises. In other words, while in this inclined position, with the hips somewhat above the level of the shoulders, you can perform various exercises to strengthen the parts most concerned in the ordeal of motherhood, without experiencing any sense of strain while doing them.

Apart from the strength building value of exercise the constitutional factor should especially be kept in mind. For this reason outdoor walks are vitally important. The old tradition that a woman should stay in the house at this time "for fear of being seen" is one of the most vicious of all customs handed down by our grandmothers. There is no reason why a woman should not be proud of her condition, just as she is proud of her baby after it is born. If you will commence by walking several miles each day in the beginning of pregnancy you will have better health, less nausea, far greater comfort throughout the entire period, and, also, the ability to walk several miles each day without difficulty up to the very time of confinement. Your health is all important and walking is perhaps the most important factor in maintaining your health.

Massage will also be found extremely helpful. It improves the circulation without taxing the energy of the person treated, and has a restful and refreshing effect. Where there is any swelling of the feet and ankles, which is very common in pregnancy, this will be greatly relieved by means of massage applied either once or twice each day. On the limbs all massage move-

ments or strokes should be upward. Indeed, the entire body should be massaged each evening if there is anyone about who can apply it, or learn how to give it. The constitutional effect is valuable.

The use of olive oil is especially commendable in connection with massage of the abdomen. This may be self-administered. It is particularly valuable because of the help it affords in the stretching of the skin and the prevention of the scarring which so often follows this stretching process.

THE NEW BABY AND ITS CARE

By EDITH M. BATES WILLIAMS

THE first step in preparing for the arrival of the new baby is the making ready of the childbirth bed by the attending nurse. An airy, warm room is selected. The bed should preferably be narrow and high, with a firm mattress. It is placed so that it can be approached from all sides. A rubber sheet is stretched over the mattress, fastened with safety pins and covered with a sheet which is well tucked around and under the mattress. This constitutes the permanent bed. The temporary bed consists of a drawsheet and a small rubber sheet underneath. On top of the small rubber sheet and draw sheet is placed a large absorbent pad. A soft, flat pillow at the head and a sheet or an old but clean blanket to cover the patient completes the outfit. A chair is placed at the foot of the bed. On the floor, which is covered with oilcloth or thick paper, a bucket is placed to receive the waste. On a small table within easy reach is placed a bottle of vaseline, a half-dozen towels, a large sponge, a pair of sterile scissors and sterile silk tape, a basin filled with a sterile solution of boric acid, containing several dozen pledgets of cotton.

The woman is usually encouraged to remain on her feet until the external orifice of the neck of the uterus dilates to the size of a silver dollar. Where the pains are not strong, it may be to her benefit to stay up longer. As soon as in the judgment of the attending physician

the bag of waters threatens to rupture, the patient is placed in bed. A premature rupture of the fetal membranes must be guarded against as much as possible, as an escape of liquid at an early stage means a difficult and prolonged labor, which is commonly known as "dry labor." Usually the membranes burst when the orifice is fully dilated; the large sponge is held in readiness to catch the outflowing liquid.

Labor is usually divided into three stages. During the first stage the neck of the womb (the cervix) becomes slowly and gradually distended and the orifice of the womb opens widely. When these changes have about reached their limit the fetal membranes burst and the "waters" (amniotic liquid) surrounding the fetus escape. This ends the first stage. During the second stage the fetus is born. After birth of the fetus the placenta is expelled from the uterine cavity. This constitutes the third stage of labor.

The newborn baby announces its arrival with a lusty cry. It is placed on its right side, with its face turned away from the mother, care being taken that the cord is not stretched tight. As soon as it is absolutely certain that the cord has ceased pulsating it is tied securely about two inches away from the baby's abdomen and cut a little above the ligature. The other end of the cord need not be tied. The baby is now wrapped in a warm blanket and put in its crib.

After the mother has received all necessary assistance the attendant examines the cord and, if necessary, reties it. Next the baby's entire body is wiped with a soft sponge dipped in warm olive oil. Especially should this be done if the skin is covered in part by the

cheesy deposit known as the "vernix caseosa." Next the child should be diapered, and may be wrapped in a very soft flannel cloth or blanket without the need of immediate dressing, and put down to sleep, wrapped and covered warmly. This olive oil may be applied after the sleep and before the bath, in some cases. Lard may be used for the same purpose and is very effective.

The child is at the first opportunity thoroughly examined to ascertain the presence of any injuries or deformities which might require immediate treatment. If there is the slightest suspicion as to the existence of gonorrhea in the mother a drop of a one per cent solution of silver nitrate is instilled in each of the baby's eyes. The cord is now wrapped up in sterile gauze and an abdominal binder adjusted loosely around the abdomen, after which the child is diapered and dressed. As soon as the mother wakes from her first sleep, the baby may be placed at her breast, nursing every four hours during the first day, but from the second day on every two hours in daytime and every four or five hours during the night.

The period during which the mother should remain in bed after childbirth varies in different cases. Usually during the first and second weeks after delivery, while the womb is still very large, the mother should be kept in bed. Cleanliness is most essential in her management. During the first few days absolute physical and mental rest are required. There may sometimes be experienced some difficulty in urination. Hot poultices to the bladder may induce urination. If necessary the woman is catheterized twenty-four hours after delivery. Two days after delivery an enema is given; after this any

tendency toward constipation is combated in the usual manner.

During the first week of its life the child need not be bathed in a bath tub; instead it receives daily spongings with warm water and soap, care being taken that no water enters the ears. About the seventh or eighth day the cord, which has gradually dried up, falls off and from now on the child is bathed daily.

The temperature of the room for the baby's first bath should preferably be fairly warm, perhaps from eighty to eighty-five degrees. The temperature of the water for the bath should be approximately that of the body itself, or from ninety-five to one hundred degrees Fahrenheit. It is advisable to secure a bath thermometer in order to make certain of the right temperature. The thermometer should be placed in the water beforehand, so that it will have time to register accurately. Only a pure castile soap should be used, never the perfumed or fancy varieties.

"Hardening" by means of bathing may be taken up gradually after the first month or as soon as the baby shows a material improvement in weight and general growth. The best plan is to give a regular warm bath first, and then immediately upon taking the child from the water, quickly pour over additional water a little cooler than that of the bath.

Powdering after the bath is a common practice but not to be commended, though if it seems desirable for the sake of dryness, fine pure cornstarch is to be preferred. If the parts about the groin and buttocks become inflamed, olive oil should be applied, which will protect the skin against wetting.

Air baths and sun baths (carefully given) are of great value both in babyhood and childhood. After the first week or two the child should gradually be made accustomed to exposure to the air, though in the beginning the room should be warm, perhaps eighty degrees, and the time of the air bath limited. It is necessary that the child maintain such warmth and circulation that its feet and hands will be comfortably warm. A little rubbing will help in this.

The perfect food for the human infant is that intended by Nature for its sustenance during the first year or longer. Failing in the supply of mother's milk, substitues may be used. That supplied by the maternal organism is exactly suited in its constituents and proportions to the precise needs of the human body.

The stomach of the newborn infant is small, being perpendicular and looking somewhat like a part of the intestines which has been dilated. It has a capacity of only about two or three tablespoonfuls at first, so that during the first week it is well to give the feedings at intervals of two hours, and giving nine or ten feedings per day. With the second week the intervals should be two and a half hours, with seven or eight feedings per day, and after three months intervals of three hours should be observed with not more than six feedings per day. At seven or eight months intervals of three and a half hours should be allowed, with perhaps five daily feedings.

The nipples must be well cared for. They should be thoroughly cleansed, both before and after nursing, boracic acid being a good cleansing agent. If there is a scaly coating, olive oil should be applied, to be washed off before the next nursing. Nursing by a very strong

baby sometimes causes great tenderness, and this should be counteracted by an attempt at hardening the nipples.

It is sometimes well in the case of the first baby, to commence treatment for this purpose before the birth of the child. An equal mixture of water and alcohol is often recommended for this purpose, while glycerine is considered to be both healing and hardening. In using these preparations, special care should be used in washing the nipples before nursing. When there are fissures or cracks in washing the nipples which make nursing very painful, a nipple shield may be used until they heal.

The weaning of the baby will depend entirely upon the mother and the continuance of a sufficient milk supply. In many cases nursing may be continued for the entire first year. It is quite important, especially in the case of a weak baby, that it should have mother's milk for the first three months at least, and in the event of the death or illness of the mother a wet-nurse would be recommended for at least a time. But if the baby is strong and vital, it will thrive on modified cow's milk if it is properly taken care of and is not overfed. Condensed milk seems to be fairly satisfactory in some cases, but in a general way is the least desirable form of artificial feeding.

Regular activity of the baby's bowels is of great importance in infancy. There is usually a movement of the bowels immediately after birth, or within a few hours thereafter, and there should be normally two or three each day for the first week thereafter. During the first two or three days a dark greenish, sticky substance is passed, known as *meconium,* but after alimen-

tation is established the passage is a natural yellow and of a soft, smooth consistency. After the first week a healthy child may have either one or two movements each day, or perhaps even more.

Constipation should never be neglected, and for immediate relief a small injection of pure water, at ninety-eight to one hundred degrees Fahr. is the best treatment.

Training of the child in regularity is an important matter, as well as a great convenience to the practical mother, since in this way the unpleasant task of washing soiled diapers can be practically avoided. This training can be advantageously begun at the age of one or two months, by having the child's bowels move at the same time each day.

The newborn infant, having a limited capacity for generating heat, and a larger surface in comparison with the weight of the body than when it gets older and larger, requires sufficient clothing to keep it thoroughly warm during the early weeks of its life. Freedom of movement is important, and all binding or pressure upon any part can not fail to interfere with the circulation and otherwise produce bad results. All clothes should be changed, from the skin out, each day. They should not be starched.

The necessary garments for the baby immediately after birth are as follows: Woolen abdominal bandages, shirts, diapers, pinning blankets and slips.

The abdominal bandage should be a strip of flannel perhaps five inches wide, and running twenty-seven inches or whatever the width of the goods may be. This will probably go around the body about twice, and

should not be hemmed, for this will interfere with its fit and comfort.

Notches like the teeth of a saw may be cut to prevent ravelling, with a slight gore in the middle of one side to make it conform better to the shape of the body, this gore placed downward in putting on the band. It should preferably be sewed or basted on, though tiny safety-pins may be used placed horizontally.

Woolen garments may be washed satisfactorily if only white soap is used in a light suds of medium warm water, and then rinsed in water of the same temperature. If it is feared that they will shrink too much, they should be dried stretched over an improvised frame. Frames are manufactured for this purpose, but any clean boards or household objects of appropriate size will answer the purpose just as well with no expense. Shirts should be very loose and free about the neck and body, and around the armpits especially.

Diapers should be provided in a sufficient number to be able to use them clean and thoroughly dry at all times. Linen or cotton bird's eye, plain cotton flannel or any other suitable cloth may be used. The wet diapers should never be dried and used a second time without washing, for the salty deposits of the urine will prove irritating. The wet diapers should be scalded in hot water and very thoroughly rinsed in several waters. They should be dried in the sunshine, if possible. Soiled diapers should be well washed and boiled. It is a splendid labor-saving plan to place small squares of clean old linen rags inside the diapers when they are put on, or pieces of absorbent gauze, so that these squares will hold all or most of the bowel movements, then to be burned.

Petticoats and dresses may with great advantage be replaced by pinning blankets slips mentioned, during the first three or four months.

The pinning blanket, or "barrow," is made out of a light weight flannel, and cut in such a way that the band part comes around the body and laps over, conforming to the size and growth. It should be put on so that the opening lies in front, which is very convenient for changing the diaper. It should be made longer than the other clothes so that the bottom may be folded over and pinned, thus enclosing the legs and keeping them warm. The slips should be made without trimming and as simply as possible. It is less disturbing if they are put on over the feet.

At three or four months the pinning blankets and slips may be discarded entirely in favor of the regular petticoats and dresses. A length of twenty-seven inches is recommended, for the great length once in vogue for infants' clothing was only a bother and a waste. Economy, however, sometimes suggests a greater length for the petticoats, so that later, when the child is put in short clothes, each one may be cut in two, making two petticoats. Flannel petticoats for winter are best cut all in one piece, the flannel running up to the shoulders, and buttoned down the back, this style being much warmer than one made with a band.

From the time that short clothes are adopted, and this should be soon for the sake of freedom of movement, knitted "booties" may be worn until the child commences to stand or walk. It is better to put on shoes before this time, for the little toes should have the utmost freedom. Socks may be worn from the beginning, if

the baby is born in the winter, and should be white. They should be pulled up to the groin and pinned to the diaper.

Waterproof diaper coverings are of great advantage. Rubber sheeting should not be used for this purpose, but there are other prepared sheetings of unobjectional texture on the market. These waterproof "pants" or coverings may be purchased ready made, but it is much less expensive and often more satisfactory to make them at home to suit and fit each individual baby.

As a rule teething begins at six or seven months and ends at about two years, with ten teeth in each jaw. According to their development they usually appear in groups, the first two lower incisors at six to eight months, the four upper incisors at eight to ten months, the two lateral lower incisors and four first molars at about one year or a little later, the four canines or eye teeth and stomach teeth at about a year and a half, and the four second molars about two years or a little later.

Teething sometimes gives rise to considerable disturbance of the nervous system as a result of the irritation, thus affecting the appetite and functions of the body generally. As a rule, the more healthy and vigorous the child, the less trouble. If the appetite fails, do not attempt to enforce feeding. Even a fast of one day will often be advantageous. Give plenty of pure, cool water.

A healthy child will sometimes cut teeth without any trouble whatever. Sometimes disorders due to improper feeding or other sources are mistaken for the results

of teething. Sometimes the first tooth does not appear in the first year, and though this is often the result of imperfect nutrition or retarded development, perhaps following some severe infantile illness, yet it does not always indicate anything abnormal and need not occasion alarm if other conditions of health are normal. At about the sixth year four additional molars are added, the "first molars" of the permanent teeth. At this time also the temporary teeth commence to fall out and to be replaced by the permanent teeth, in the order of the first appearance. At the age of twelve the second dentition of childhood is completed, with twenty-eight teeth. The four remaining molars of adult life, the so-called "wisdom teeth," arrive at or near maturity, varying in different individuals from the age of seventeen to twenty-five years.

The baby's mouth should be washed daily, after the bath being a convenient time. If a finger is used in washing it, the little finger is preferred, wrapped around well with absorbent cotton or a soft cloth. Either boric acid or salt water should be used, in the latter case employing a weak solution, a pinch of salt to a glass of boiled water.

Breathing is the most vital of our activities, and it is important that the habit of nasal breathing should be established from earliest infancy. Upon this depends not only the satisfactory oxygenation of the blood but also the prevention of adenoids and other disorders. The nostrils should therefore receive attention each day, following the bath, along with the eyes, ears and mouth, and if clogged should be attended to many times each day.

The best method of cleansing the baby's nostrils is to use a small piece of absorbent cotton twisted into a tiny "finger-like" shape of the appropriate size, and dipped into boric acid solution. Insert and twist this around in each nostril. The same may be used for baby's ears. No hairpins or other hard metallic utensils should be used in ears or nose.

The young baby's eyes should be washed every day with boric acid solution, using a clean piece of cotton for the purpose, first dripping the boric acid into the corner of the open eye, and then washing the lid and corners of the closed eye.

MAKING THE BABY STRONG

By EDITH M. BATES WILLIAMS

WHEN I mention my baby's exercise in conjunction with her vigorous health and fine appearance, some women ask as if in surprise, "Exercise? What for?"

One would think that "what for" would be obvious. But I have to explain that exercise makes a baby healthier just as it makes anyone healthier; that it means better appetite and better sleep. All the tissues become firm and strong, full of activity and resistance. It makes a child grow better.

If the mother who has a child that is restless at night will strip the baby early in the evening and allow him to enjoy an air bath and plenty of exercise for half an hour or an hour, she will usually find that the child will sleep soundly all night.

One woman said to me, "I don't see that it makes any material difference whether a child sits alone or walks early or late. They all do these things finally." "Certainly," I replied, "but these things are not the object of the exercise any more than being able to chin oneself or walk five miles is the object of exercise for grown-ups. It is the bodily results produced in this way that count."

Remember that a baby is first of all very much of an animal, for it has not yet developed any degree of mental life, at least in the first few months. And the normal state of all young animal life is activity.

Give the baby a chance. Most mothers don't. They keep the poor little thing in the carriage practically all day. They get exercise for themselves in pushing the carriage. But they wonder why the baby won't eat or sleep and doesn't grow. It is largely because it stays in that carriage, sitting there like a crippled old woman all day long. If they would only put the child down on the floor now and then they would soon see a difference.

The first lesson for every mother to learn is to give the baby a chance to exercise by placing it upon its stomach. The prone position is the natural position of all forms of life, worms, insects, reptiles, mammals, birds. The flounder is about the only exception I know of, and he is only a freak fish. Even the flounder goes belly down when he's a baby. But the human baby, poor thing, is very carefully laid upon its back, in defiance of the rule in all animal life. True, the child may kick its legs and wave its arms when on the back, if not too much restricted with clothing. But this is nothing like the exercise against real resistance which a baby secures when placed upon its stomach and allowed to struggle with its own weight.

When Rowine was born, she was able to hold her head up easily and vigorously when placed upon her stomach. She did this a few minutes after she came into the world, when the nurse had turned her over and was rubbing her back with a little oil. Probably most babies can do this if they get the chance. But most mothers begin to handle a brand new infant as if it were an empty eggshell or something that is likely to break in two. Healthy babies don't break—at least I have

never seen one break. Nor have I ever heard of one breaking.

I have even been warned two or three times that exercise for the baby would break her back, cripple her for life and all sorts of other horrors. They overlook my other two sturdy children, who were similarly trained and who have never needed a doctor. When my boy was only eight years old he used to lift and carry me all over the place. Weak back! I weigh one twenty.

From the first day Rowine has had an opportunity to exercise against the resistance of her own weight by being placed upon her stomach. Very soon she was no longer satisfied with simply raising her head, but by pressing down with the arms she worked hard to raise her chest as high as possible. As the result of this particular training, any child will develop such strength as to creep much earlier than usual. You can not expect a baby to creep if you do not give her a chance to learn how. Rowine, as a consequence, was able to crawl across the table or the rug at the age of five months. She did this, of course, lying flat on her stomach, and we called it the "caterpillar stage" of development. She also learned how to squirm over from her back to her stomach or from her stomach to her back when she was between three and four months old.

You can't exercise a baby conveniently on your lap. The only satisfactory plan is to do it on a table. Lay out a folded blanket or pad for the purpose. It has been my plan to give Baby a little exercise each morning before she has her bath, and then to let her have an air bath and more nude exercise in the evening before the long sleep of the night.

One naturally begins with very simple movements during the first few weeks. For instance, I would take hold of Baby's ankles and push her little knees alternately up and down in a movement similar to that of running, calling out "Run fast, run fast." She always laughed and enjoyed it, and soon learned it so well that when I would call in the same tone "Run fast, run fast," she would begin to kick her own little legs. Another movement I used from the first was doubling both knees up against the stomach together.

I used simple little calisthenic exercises for the arms, bringing her hands from the sides alternately above the head, and also far out to each side. In doing this I whistled or sang a little tune of my own and kept time with it. Always use the same little tune, and soon when you sing or whistle it your baby will try to duplicate the exercises of her own account, even if imperfectly.

Lifting the baby by the legs and by alternate arms and legs, that is to say, lifting first with the right arm and left leg, and then with the left arm and right leg, are splendid for strengthening the ligaments and tendons.

An exercise all babies will like is that of letting them take hold of your fingers with their hands and then lifting or partly lifting. All babies have a surprisingly good grip and many can hold their own weight when born. However, one should be careful in the beginning. By letting Rowine take hold of my two fingers while lying on the back, I would gently raise her to a sitting position, and then lower, doing this several times. It seemed to interest her more if I said "Up-i-dee!" and "Down-goesy!" I soon found that she took hold so

securely that it was perfectly safe to lift her weight entirely. Later I used a child's cane for her to grip for this purpose. She has therefore enjoyed this particular exercise practically all her life, and has never yet let go or fallen.

A particularly good exercise that I have always used is a little spine stretching movement. With the baby lying on her back and holding her feet down with one hand, I place the other hand under her hips or back and raise her little body until it forms an arch.

After the bath, the towel rub and care of eyes, mouth, etc., I give her a quick massage, rubbing round and round and up and down on the back with the bare hands to make the back strong. I massage the arms and legs chiefly by rolling them between the hands. All this takes but a few minutes, perhaps not over ten minutes for exercise, bath and all. Then feeding and a three hour sleep.

It should be understood, of course, that exercise for babies should never be forced. I have never forced Rowine in any respect. I have only let her do the things that she could do easily and enjoyed doing. Her exercise is always play. For all her strength and beauty, Rowine is not exceptional in any respect. She is just an ordinary baby, but has had an opportunity of securing exercise that other babies have lacked.

All kinds of little stunts and exercises will suggest themselves. For instance, rising to a sitting position when lying on the back. When Rowine was not quite five months old she was lying on the bed trying hard to raise up. Unaided she could scarcely lift her shoulders. Seeing her effort, I held her legs down and she came

right up to a sitting position like a flash. I tried it again and she did it twenty times in succession without being tired, and laughing each time she did it. I am sure most babies would sit up much earlier than they do if given an opportunity. Rowine sat up a little on my lap between the ages of two and three months, and before she was four months could sit up and balance herself nicely on a table. You need not be alarmed about hurting the back. When a baby is ready to sit up and wants to, it will not hurt her.

From being able to sit up by herself it is only a step for a youngster to be able to stiffen her body and keep herself erect when held firmly by the thighs or knees.

Another stunt which Rowine learned to do at about the age of seven months is that of holding her body out rigidly in a horizontal position. I lift her by the feet and back of the neck, saying "Stiff, stiff," and she arches her little body so that I can raise her to arms' length overhead. It is a very picturesque little stunt.

As I said, Rowine could crawl across the rug or bed or table when she was five months old. We would place one of her toys out of her reach and she would struggle to get it. Long before she was ready to get up on her knees she developed a surprising technique of "swimming" across the rug flat on her stomach. She used a clever little push-off with her toes to start the "stroke," and at the same time pulled herself forward on the elbows. She would thus go forward in a series of jerks. The accompanying photographs were taken when she was between seven and eight months old. She weighed seven and one-half pounds at birth, and twenty and one-

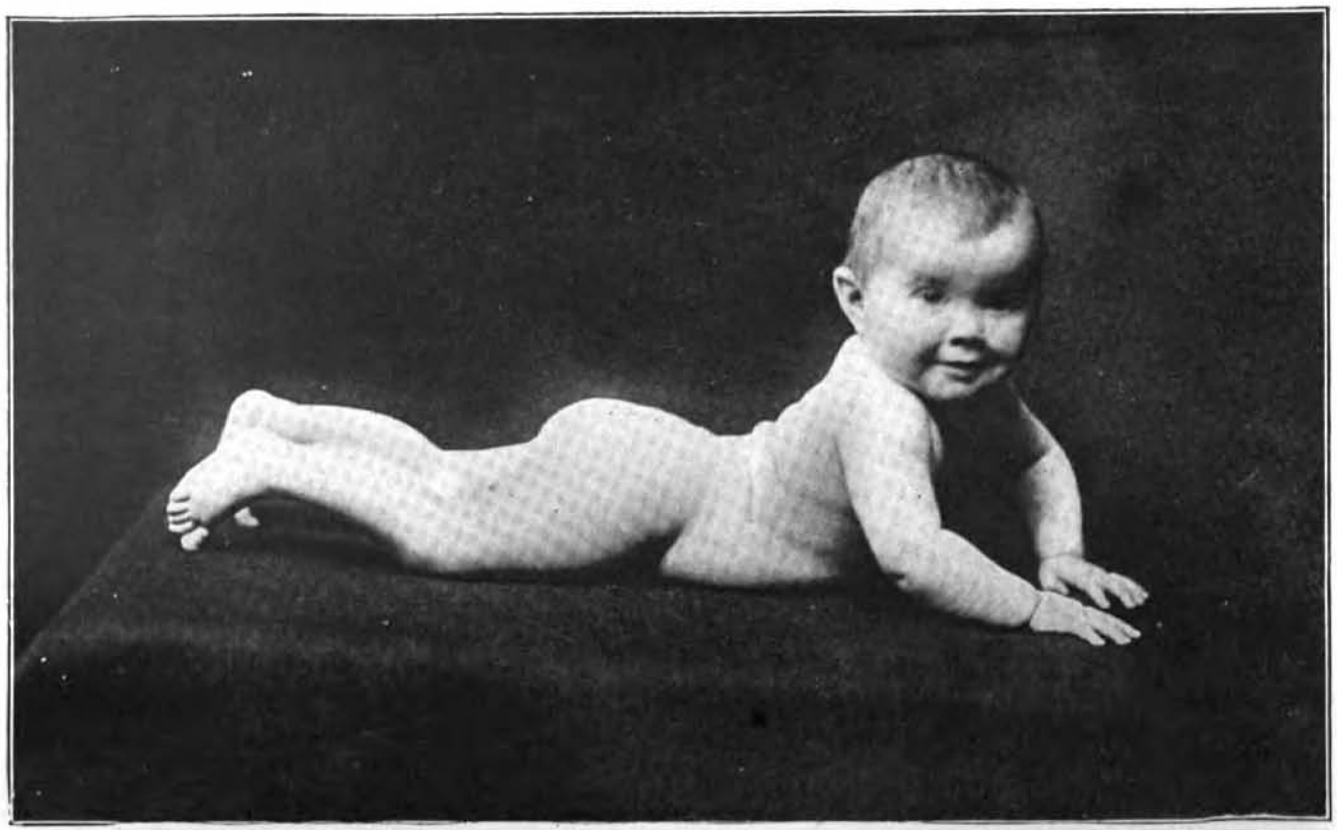
half pounds at the age of nine months. She started to stand up, taking hold of chairs, at eight months, and at nine to walk a little by pushing the chairs in front of her.

After reaching the standing and walking stage, almost any child can be depended upon to take enough exercise on its own account. It is therefore during the first six or eight months that most mothers should give most thought to the matter of exercise.

One woman who had decided to follow my example placed her ten months' old baby on the floor for the first time, and because the youngster bumped her head and cried, the mother was discouraged. "Never again!" I asked her if she intended to keep the child in a high chair all its life. Let them get a few bumps. Mothers take bumps too seriously, anyway. They are part of a child's education. Babies will learn. After Rowine fell out of her little toilet chair twice she was exceedingly careful not to fall again.

Of course, exercise doesn't solve all of a baby's problems any more than our own. But it does build up a strong little body, able to resist most of the ills that may befall one in early childhood. And it gives the little shaver the courage to try to stand alone and walk, and the energy to progress and develop in every way.

MAKING
THE BABY STRONG



This and the following are photos of Baby Rowine Williams at the age of eight months. The best baby exercise known is found in the simple practice of placing the child upon the stomach for a short time each day from earliest babyhood, so that she may hold up her head and contend with her own weight and gain strength in doing so.

A passive exercise for the arms, which may be commenced during the first week or two. The arms are moved **up and down and to each side, keeping time with a little tune. This promotes circulation and stretches the tissues, as well as gently using the muscles and building strength.**

A passive exercise for the legs. "Run fast." Every baby will enjoy this.

A simple spine-stretching exercise. Holding the feet to the table with one hand, very gently arch and raise the back with the other, without strain.

This is an exercise for a little more advanced period, although vigorous babies will do this at six months. Laying baby on the back, on bed or padded table, hold the legs down at the knees so that she may sit up unassisted. (See next photo.)

(Continuation of exercise shown in preceding photo.) As soon as baby can accomplish this sitting-up exercise, she will consider it great sport. Exercise of this kind should not be attemped except in the spirit of play and when accomplished without strain.

Here is a simple stunt that many babies will be able to do at six months or younger. Hold the child firmly at or above the knees, so that easy balance is maintained. No sommersaults or throwing-up tricks should be attempted. "Safety first" and freedom from strain are the first principles of babyhood exercise.

TEACHING THE CHILD SEX-TRUTHS

By EDITH M. BATES WILLIAMS

THE problem of what and how to tell the child about the mystery of his or her origin, and the important facts of life associated therewith, is one of the greatest with which the mothers of today have to deal. It should not be so, but nevertheless it is so. The question should really be a very simple one, merely requiring candid truthfulness, and in a higher state of civilization, in which people generally entertained a decent respect for the functions of the human body, it would be a truly trifling matter, indeed no problem at all. It is the prudish, false and generally vicious attitude toward the subject of sex that makes it a problem, and for the average woman of the present time the difficulty of telling her own children these things is so great that she is utterly unable to cope with it, and so she ignores it completely. Even among others who realize that ignorance is danger and who think that parents should instruct their children rather than first to have them acquire false and filthy conceptions from the gutter, there is still much uncertainty as to just how to handle the matter.

One great difficulty, just at the outset, is that so many mothers themselves have the wrong attitude toward the subject. How can a vulgar-minded woman give her child a pure and wholesome conception? It can only be explained seriously by one who regards it seriously. I have known some women whose little daughters would never recover from their sense of shame if

they should ever learn some of the things their mothers think and say, and some of the stories they tell.

The first and most important thing is to keep the child's confidence, and in this the average mother fails pitifully. It is not difficult. It is the very easiest thing in the world, for from the very beginning the child has been accustomed to look to the mother for everything, both in physical and mental requirements. The little one will naturally and innocently come to you with everything from the first, and it is to these first questions that you should listen attentively and patiently, answering carefully. The educational possibilities of the child's questions are almost unlimited, and the time when any certain question is asked is just the time to answer it correctly, for it is then that the young mind is receptive upon that point.

And just here is the turning point—here is where you gain or lose. Do not say, "Don't bother me," or "Run away and play," or "I'll tell you later, when you are older," for such a course will surely send the little boy or girl to some other source of information. The child will not wait, for now he *is* curious—you have only fanned the flame of his curiosity—and you can depend upon it that he will find out what he wants to know before long. He will not really get the truth, but a distortion of the truth, a discolored, hideous misrepresentation of the sacred facts of life, but it will satisfy him just the same. And when your little boy, or, as the case may be, your little girl has acquired this supposed knowledge and imbibed the usual prudish, shameful attitude toward the entire subject, rest assured that he or she will never "bother you" about it any more. The

subject will be closed between you. Any reference to the mysterious subject will be made in secret and away from you. Not only will you have lost her confidence but in all probability her respect as well. She thinks she knows *now, why* you were so reticent, and perhaps she does.

One should encourage her little son or daughter to ask questions of every kind, and under no circumstances should she laugh at, ridicule or chide the little one. Do not fear that the youngster's mind will dwell morbidly and continuously upon the question of sex, for this will not be the case unless it is made a mystery. Life is full of interesting and fascinating facts, all of them just as interesting as this, unless by your attitude you emphasize this one matter. If you do not evade the question the child will directly go back to absorption in his engine or her doll, as the case may be.

But, unfortunately, the average mother is the most cheerful prevaricator in the world. After the first few little stories or fibs she gradually develops the habit of "getting rid" of the child in this way until before long she is ready to fabricate on every turn. She does not think that she is doing any real harm, because she is used to it, and policy seems to call for it. Perhaps she only begins with the Santa Claus story, but she goes on from this through the whole list of "bogey man," "bears," "black man," and the like, none of which ever materializes to wreck the vengeance invoked. And the child very quickly learns that mother is lying, lying all the time, until mother comes to be the one person not to be believed under any circumstances. The stories about the new baby, like everything else, are only taken by the child for what they are worth.

Unwise punishments are without doubt often responsible for much loss of confidence. We must concede that punishments are sometimes necessary, with some children, but certainly a child should never be punished for an accident, for this invariably breeds deception. Almost every child is practical enough to lie to get out of a whipping for spilling the milk. He learns that the mother's judgment and wrath are to be dreaded and avoided if possible, and in many cases regards the punishment as merely the evidence of ill-temper. Anyway mother soon comes to be a person to whom *not* to tell things. The little one's confidence, therefore, is gradually lost, and once lost, is most difficult to regain. Especially should the young daughter confide in her mother. No girl can know naturally and instinctively how to behave under all circumstances. We think her manners and clothes are important enough, but outside of a very few hints we allow her morals to take care of themselves. And then when anything happens women throw up their hands in horror and say, "She ought to have known better!" Certainly she should, but how could she?

Of course many women feel that they would prefer to have their children remain "innocent," which of course means ignorant, until they reach an age when greater intelligence and discretion will enable them to understand matters better. Many women think that nothing need be said until just before puberty. But even though this were desirable, which is doubtful in any case, such a result could not possibly be realized at the present time. Such mothers fail to take stock of the outside influences. They forget that their children are bound to see things

and hear things away from home, and things of the most demoralizing character. Even when protected against vicious companions, there is always more or less curiosity and discussion among other children of good families. Their parents practically drive them to it by their own silence.

One of the greatest difficulties is found in this problem of the "other children" and outside influences generally. Even if one gives her own child a proper conception of life, she knows that at school and at play the young mind will come in contact with vicious and vulgar interpretations. The little man, perhaps, learns things from the stable boy, the little girl, perhaps, hears like things from a similar source and both have to face the corrupting influences at school and elsewhere of other children whose parents have neglected or have been incapable of their duty in this matter. The child absolutely can not escape coming in contact with these contaminating influences in this day and age. We might as well regard these influences as a fixed and certain quantity and prepare for them. However, all this makes it the more essential and important that each mother should not neglect her duty.

The child should be so prepared at home, so well informed in the right way, that these influences will do the least harm. We can not escape them, but should insure against them, a moral "antitoxin," as it were. To the pure in heart, all things are pure, and if the child is rightly informed and has a serious, true understanding of her bodily functions, then the dirty stories, vulgar jokes and nasty names will be only disgusting. They will not appear in an attractive light, but in a repulsive

light. They will not take root, and therefore will not work any real harm. One should explain to the child the attitude of the average person and show how wrong it all is, so that she will know what to expect. It may even be well to suggest that it will be better not to discuss what you have told her under penalty of being misunderstood. Let her know that to some minds ignorance is regarded as purity, and even knowledge of such things a disgrace, but let her see the hypocrisy and impossibility of such an attitude.

I have never been able to understand the sublime, stupid faith of many mothers in the supposed absolute innocence of their daughters. One would think that recollection of their own childhood would teach them better. And yet this assurance of complete ignorance on the part of children is very common. I know one woman who is the mother of four girls, the oldest fifteen years, who still talks in a veiled manner in their very presence, confident that they do not understand. "Why, they never even ask me a question"—of course not! "They're not even curious; their minds are as pure as angels," etc. They did not need to ask questions, for they knew just about as much as she did. But they understood with the usual misunderstanding of the real truth.

A girl soon learns that she is expected to be ignorant, and so she lives up to her expectations, making herself a deceitful hypocrite just because mother insists. We all remember how we *pretended* to be surprised and mystified about the new baby. I know a mother who was firmly convinced that her nine-year-old girl still believed in Santa Claus. When I asked the child what

Santa Claus had given her she was highly amused, and declared, "Papa is Santa Claus, but don't tell Mamma that I know it." If a child will deceive in an innocent matter like that of Santa Claus, depend upon it that she will not hesitate in connection with the great mystery. We must face this fact, not shut our eyes to it. Another little girl of ten, also supposed to be absolutely innocent, having noted my appearance some months before the birth of my last baby, calmly asked me when I expected the baby. She asked it in all seriousness, just as would a woman of fifty years. And why not?

I would suggest constant watchfulness of the child's companions, but without seeming to watch, and without any appearance of suspicion. Have the boys and girls come to your house, so that you may be acquainted with them all, and be good friends with all of them. However, it is always well to have the children spend their nights under their own roof. There is no doubt that much harm is done in some cases when children stay over night with friends, for there is too great an opportunity for mischief.

Companionship between parents and children is an important factor in bringing them up right. It is far more effective than preaching. The mother should be a companion of her daughter or son, but especially of her daughter, and the father should be one of the best companions of his son, also to some extent of his daughter. Parents should go about with their children, share their interests, play with them, keep on close terms with them, instead of holding to the usual parental attitude of severe dignity and authority. It is true that this may seem difficult in some cases, for mothers are com-

monly very busy people. Sometimes they are so occupied in providing for the physical needs of the children that they neglect everything else. Sometimes a mother's one thought is to get the children out of her way, and she is anxious to have them start going to school or to kindergarten only for the advantage of having them "off her hands." This is all a mistake, for the physical needs of children are only a small part of their requirements.

Children should be kept busy at all times. It is well to have each child, even the youngest, taught to help somewhat in the house. They should be made to feel themselves an integral part of the home, each bearing some share of the burden of the family duties, regardless of sex. The mother should not wait upon the children too much. Then when the work is finished she can join them in their pleasures. They should be encouraged to romp and play out of doors and generally to be as active as they can, therefore eating and sleeping well. With good health, strong nerves and a wholesome mind, there is no chance for morbid curiosity or bad habits. And I might suggest here, briefly, that any marked changes in disposition should be closely observed. If a usually affectionate boy discontinues his habit of being affectionate to his mother, if a boy or girl develops a tendency to solitude, or becomes unusually bashful and timid, or perhaps irritable, such manifestations may be regarded as grounds for the suspicion of bad habits. However, all things of this kind are made practically impossible if the child's confidence is maintained from the first and he is rightly informed.

Instruction along these lines should not be forced in the beginning. Everything need not be told at once.

Instruction should come naturally in response to questions, as the young mind is from time to time ready to learn more. This simplifies things very much. There should be no mystery about anything, no lowering of the voice, nothing to indicate that it is a shameful or forbidden subject. It should be treated as though it were all natural, which it is, like digestion, or breathing, or the beating of the heart to circulate the blood. Young children are not by nature religious, and the "sacredness or holiness" of any part of the body may not be understood or wholly appreciated, but the utility and naturalness of all parts is readily accepted by the youngest child. And if you talk about maternity and allied subjects to others in the child's presence, do so frankly and openly.

The advent of the new baby is always an occasion for fearful and wonderful tales. The doctor brought it in his instrument bag, even though the child got a look into it when he first opened it and saw that it was full of instruments and bottles, and empty of babies. The nurse brought it. It was left on the doorstep. A silly, old bird called a stork flew in the window with it. It grew on a cherry tree—yes, like toys grow on Christmas trees, tied on with a string. Papa bought it down at a store. And more of the same. Apparently mamma had nothing to do with it, she who is most closely related to it—she whom the doctor comes to see every day for a while after. Flossie, the cat, "has kittens," whatever that means, and Mollie, the cow, has a calf, but mamma doesn't *have* her baby. That just comes from away off somewhere, in various ways, with several confusing, conflicting sources for the same baby. Think

not that the child is not wise, for not a word of all this is believed. It is only through our own stupidity that we can give the children, so bright in other ways, credit for such stupidity that they cannot see through all this. They can put two and two together, and very early in life at that.

If the latest one happens to be of a different gender, the children are sent from the room while baby is bathed and dressed. But the children know why, or, if very young, they know that there is some secret somewhere which they naturally mean to fathom at the earliest opportunity.

While giving a young child his or her bath is an appropriate time to teach general hygiene and respect for the body. The importance of rigid cleanliness of certain parts may be explained for otherwise irritation and disease may result. Let it be known that aside from keeping these parts scrupulously clean, they must be untouched, and that the penalty will be extreme weakness, trouble with nerves, eyes and brain, perhaps insanity or consumption, and other serious diseases of various kinds. Just here, also, is a good time and place to impress upon the child the importance of heeding the calls of Nature, pointing out the illness that may come from such neglect. Naturally, a child does not wish to be sick and endure pain. Do not be satisfied, however, with mentioning these things once, for children are busy and preoccupied little things and are prone to forget, so that it would be well to speak to them frequently, even when at play. Regularity in these matters is closely related to sexual hygiene, and if the right habits are formed early there will be little trouble later.

A wise mother will teach her children the proper names for all parts of the body, the scientific names for the most part, at least later, but always the polite and respectful terms by which they may be designated, so that there need never be any hesitation in speaking of them.

Just how life generally is perpetuated is a subject that can be made fairly simple and very interesting. Take first the star-fish and other creatures, any part of which, taken off, will grow again into a complete new animal of the kind. Then the seeds of plants may be considered, even with experiments in planting the seeds and watching them sprout and grow to reproduce their parents. Then the eggs of fishes and birds may be taken up, being the reproductive cells of these creatures. The child will probably have known already how the little birds hatch out from the eggs, while their mothers keep them warm and take rare of them. All of these matters may be taken up in more or less detail, but we have not the space here to elaborate on such details. Finally, then, may be considered the comparison between bird life and human life, with that of the higher animals generally. The child will see that the human mother has by far the better plan of reproduction, for her unborn babe has better protection, being nourished by her own blood and cared for in a little nest which she carries under her own heart, until large enough and strong enough to live in the outside world like the rest of us. Such a simple explanation, at first, is amply sufficient, and the child will accept it as naturally and simply as the equally wonderful fact that we have lungs into which air must be breathed continuously to keep us alive. If

there should be anything morbid or too pressing in the child's interest, one may make much over other incidental facts, such for instance as the change to lactation after the baby comes, which is a very wonderful device of Nature, and also the importance of health and strength for the sake of having a strong and healthy baby, as well as for being able to nurse the beloved little creature.

Of course it is the question of the relation of the sexes that will prove to be the most difficult problem in most cases, and the one which will most perplex the parent. However, here again it is chiefly our attitude toward the subject that determines whether it will be an easy or a hard matter. The fact is simple enough in itself, but it is a matter that need not be taken up as early as the mystery about the babies. Nevertheless it must not be postponed beyond the first questions regarding it or the first signs of interest. If you don't tell the child properly, some one else will be first to tell him improperly. It is upon this feature of the subject that vulgarity is chiefly centered, and it is all the more important to handle it right.

The man or the child who understands the great biological principles which apply not only to human life but to all forms of both vegetable and animal life, can not entertain other than a respectful and decent attitude toward the subject of reproduction.

There are two important phases of the subject of reproduction, the parental and the sexual. These two aspects are intimately identified with each other, and for purposes of education it is important that they should be seen together, in their relationship to each other, the

sex instinct being inseparably associated with the function of parenthood, by reason of which it exists. Without doubt the low ideals and vulgarity associated with the sex impulse among the mentally unclean, are to a considerable extent the result of regarding it by itself and apart from its purpose, parenthood. But the moment one understands clearly the biological significance of sex and realizes its fundamental relationship to parenthood, this mental association instantly lends dignity to the entire subject and makes it impossible to regard this instinct as anything else than the pure and clean manifestation of Nature and of life that it is.

THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART FOUR

EFFICIENCY

SECTION TWO

THE BODY

WHAT IS YOUR CORRECT WEIGHT

By MILO HASTINGS, B. Sc.

WHY do we think fat a sign of health? Racial memories the psychologist might say, hand-me-downs of tradition from a time when to be fat meant to live, because the fat men weathered the frequent famines better than the lean.

The careless thinker of today is apt to consider portliness a sign of health because those who eat heaviest are fattest and heavy eating is at once a sign of a good appetite and a good purse—two equally desirable things as the world runs.

Thinness is synonymous with poverty, starvation and disease. The way to get away from this undesirable state is to fatten up. Fatness spells inactivity and inactivity means luxury and wealth. In hard times, prosperous and comfortable people are fat, therefore, thin people are stingy and miserable.

Races who love the good things of material life naturally include a surplus of flesh as one of the list; ideals of beauty are built accordingly. The Oriental has no more admiration for a slender lady than an Iowa farmer has for a slender hog.

So the presumption in favor of fat was born and entered into the idioms of language and the axioms of our firesides.

Today, few men are so ignorant as not to have some glimmer of the broad truth, that human fat, like a standing army, is a provision against trouble—and a burden-

some one. A civilized man may provide against the day of scarcity in a better fashion. His bank roll is the modern substitute for the layer of fat on the millionaire caveman's ribs.

Today nine men out of ten, even though when carelessly speaking infer that surplus flesh is synonymous with health, haye in their hearts a deep dread of a growing waist line. But how and when does overweight endanger health or life? And how does it compare in this respect with underweight?

Thanks to the medical directors' association of our progressive life insurance companies, these questions can now be answered with a relative degree of certainty.

The data used in this article is taken from reports of the American Actuarial Society. These reports are published for the benefit of the medical examiners and statisticians of the insurance companies and are made up of countless pages of tables. Out of this sea of figures there are a few good fishes of truth, that should tell every man just how excited to get about it, when he next steps on a scale platform.

We can safely leave it to the big muscled man to class himself as an exception and turn our attention to the sedentary bank-clerk sort of a person. If such a man weighs two hundred pounds although he is undersized—how sick is he?

In order to answer intelligently, we must ask two other questions. How tall is he? and how old is he?

Average Weights of Men Between Twenty and Thirty Years of Age

5 ft. 1 in.	123 lbs.	5 ft. 8 ins.	148 lbs.
5 ft. 2 ins.	126 lbs.	5 ft. 9 ins.	152 lbs.
5 ft. 3 ins.	129 lbs.	5 ft. 10 ins.	156 lbs.
5 ft. 4 ins.	132 lbs.	5 ft. 11 ins.	160 lbs.
5 ft. 5 ins.	136 lbs.	6 ft. 0 ins.	165 lbs.
5 ft. 6 ins.	140 lbs.	6 ft. 1 in.	171 lbs.
5 ft. 7 ins.	144 lbs.	6 ft. 2 ins.	177 lbs.
		6 ft. 3 ins.	182 lbs.

Average Weights of Men Between Thirty and Forty Years of Age

5 ft. 1 in.	130 lbs.	5 ft. 8 ins.	155 lbs.
5 ft. 2 ins.	132 lbs.	5 ft. 9 ins.	160 lbs.
5 ft. 3 ins.	135 lbs.	5 ft. 10 ins.	165 lbs.
5 ft. 4 ins.	138 lbs.	5 ft. 11 ins.	170 lbs.
5 ft. 5 ins.	142 lbs.	6 ft. 0 ins.	176 lbs.
5 ft. 6 ins.	146 lbs.	6 ft. 1 in.	182 lbs.
5 ft. 7 ins.	150 lbs.	6 ft. 2 ins.	189 lbs.
		6 ft. 3 ins.	194 lbs.

Average Weights of Men Between Forty and Fifty Years of Age

5 ft. 1 in.	135 lbs.	5 ft. 8 ins.	160 lbs.
5 ft. 2 ins.	137 lbs.	5 ft. 9 ins.	165 lbs.
5 ft. 3 ins.	140 lbs.	5 ft. 10 ins.	170 lbs.
5 ft. 4 ins.	143 lbs.	5 ft. 11 ins.	176 lbs.
5 ft. 5 ins.	147 lbs.	6 ft. 0 ins.	182 lbs.
5 ft. 6 ins.	151 lbs.	6 ft. 1 in.	188 lbs.
5 ft. 7 ins.	155 lbs.	6 ft. 2 ins.	195 lbs.
		6 ft. 3 ins.	202 lbs.

The reason that height needs to be considered is obvious. It is purely a matter of mechanics. The reason for the correctives for age is not so apparent but is none the less real.

Two points are here to be considered; firstly the muscular development of the old is less than of the young. *Hence a given bodily weight in an old man indicates a larger proportion of fat to muscle than in youth.* Secondly, an element of selection may be involved. In a given number of fat or thin men at an advanced age, a larger proportion are those whose systems have become adapted to the handicap. Those who could not thrive under the abnormal conditions have dropped by the way.

The tables accompanying this article divide men into three groups and women into two groups as to age, each table giving the average weights for each height for the age period of that table. Note that these are *average* weights, not *ideal.*

From these tables and further similar data, it appears that *ideal* weights for men would run a little over the *average* weight for men in their twenties, passing rapidly down to the average, which seems the ideal at about thirty-five.

By the time the age of fifty is reached, it is evident that the man who is about fifteen pounds short of the average is really the safest weight. While the average weight of man increases about fifteen pounds from the age of twenty-five to the age of fifty, yet the safe or ideal weight decreases at about a like rate. Thus the man of five foot, eight averages 146 at twenty-five and 162 at fifty-five; the reverse of these figures would mean greater chances of longevity.

From the data, we conclude—first, the greater customary activity of the young man means the normal existence of a heavier muscular system; second, the heavier weight of the old man means an accumulation of fat;

third, the tendency to accumulate fat in the active young is an evidence of superior digestive or assimilative organs, whereas fat on old men is more frequently merely a sign of inactivity.

Recently published ideal measurements have been based on the assumption of the same ratio of weight to height, at all heights. At the time those standards were formulated, the fact was brought forth that the average short man was "heavier set" than the tall man. However, the general idealistic opinion was found to favor small men of the agile and big men of the Herculean type. The facts of things as they are and the hope for things as they ought to be, were considered as offsetting each other, and hence the ideal measurements were formulated on the assumption that men of all statures were similar in build, varying only in mathematical proportion to the varying height.

We are considering here, the men of average muscular development in relation to the amount of bodily fat carried, hence we are interested in ordinary men rather than in gymnasts. Of such average men, the tallest are found to be the slenderest, the very tall ones being eight per cent lighter in proportion to height than the medium men; while the young five-foot men are nineteen per cent heavier.

Tall old men are heavier built than average height young men, but not as heavy as the short young ones. Short old men are thirty-five per cent heavier than young men of average height. On the whole, the tendencies of short men to be stout increase with age.

Young women of average height are six per cent heavier, height considered, than are young men. The

effect of both height and age on build is much greater with women. The slenderest humans alive are tall young women, and the chunkiest of all are short old ladies.

The change due to age alone is 15 per cent for women as against 11 per cent for men. The variation due to height is 38 per cent in young women as against 27 per cent in men, and 47 per cent in old women as against 42 per cent in men.

AVERAGE WEIGHTS OF WOMEN BETWEEN THE AGES OF TWENTY AND FORTY

4 ft. 9 ins.	113 lbs.	5 ft. 4 ins.	130 lbs.
4 ft. 10 ins.	115 lbs.	5 ft. 5 ins.	134 lbs.
4 ft. 11 ins.	117 lbs.	5 ft. 6 ins.	138 lbs.
5 ft. 0 ins.	119 lbs.	5 ft. 7 ins.	142 lbs.
5 ft. 1 in.	121 lbs.	5 ft. 8 ins.	146 lbs.
5 ft. 2 ins.	123 lbs.	5 ft. 9 ins.	150 lbs.
5 ft. 3 ins.	126 lbs.	5 ft. 10 ins.	153 lbs.
		5 ft. 11 ins.	156 lbs.

AVERAGE WEIGHTS OF WOMEN BETWEEN THE AGES OF FORTY AND SIXTY

4 ft. 9 ins.	126 lbs.	5 ft. 4 ins.	143 lbs.
4 ft. 10 ins.	128 lbs.	5 ft. 5 ins.	147 lbs.
4 ft. 11 ins.	130 lbs.	5 ft. 6 ins.	151 lbs.
5 ft. 0 ins.	132 lbs.	5 ft. 7 ins.	156 lbs.
5 ft. 1 in.	134 lbs.	5 ft. 8 ins.	161 lbs.
5 ft. 2 ins.	137 lbs.	5 ft. 9 ins.	165 lbs.
5 ft. 3 ins.	140 lbs.	5 ft. 10 ins.	168 lbs.
		5 ft. 11 ins.	172 lbs.

To give an extreme picture of this range in build due to age, height and sex, I have figured out that if a young man, six feet, four in height had the same build as a short old lady, he would weigh 312 pounds, as a matter of fact, the average young man of that height

does weigh only 188 pounds. This is a surprising difference when we realize that we are not talking of individual specimens, but in each case, of an average of many thousands.

The insurance companies gathered some data on the effect of height on the death rate but as the effect is not marked, the statisticians do not attach significance to the figures. Dividing heights into three groups and combining all ages, gives the following mortality ratios: Short men, 105; medium men, 108; tall men, 111. Divided by ages, the short men are especially good risks as young men and the tall men relatively better risks as old men.

The statistics available in the insurance records are not so numerous in the case of women and hence there is more possibility of chance results and less evidence of the establishment of fundamental laws.

For that reason, we group the women into two age groups only. Because of this and also different weight grouping direct comparison with men is unfair.

The effect of under and over weight, particularly among women in younger life is less than with men, although the same general tendencies are revealed. At the older ages, underweight, even in a marked degree, is clearly in advantage, and overweight a disadvantage, increasing with age.

As the young woman carries more fat than the young man—this being a purely sexual characteristic, it is evident that an average elderly lady is carrying very much more surplus than any other member of our hypothetical average family. What should we expect—she is the least active of the group. But if grandma will not join the

gymnasium and must be "stout," at least she can prove by the statistics that she has her gray-haired partner badly beaten at the business of keeping away the undertaker. After the age of forty-five is past, the mortality of women is markedly less than that of men.

Relation of Weight to Mortality in Men Between Fifty and Sixty

15 pounds underweight to 45 pounds underweight—mortality 14% below normal mortality.

10 pounds underweight to 10 pounds overweight—mortality practically normal.

15 pounds overweight to 45 pounds overweight—mortality 14% above average weight.

50 pounds overweight to 80 pounds overweight—mortality 45% above normal mortality.

Average Weights of Men Between Fifty and Sixty Years of Age

5 ft. 1 in.....138 lbs.	5 ft. 8 ins.....163 lbs.
5 ft. 2 ins.....140 lbs.	5 ft. 9 ins.....168 lbs.
5 ft. 3 ins.....143 lbs.	5 ft. 10 ins.....172 lbs.
5 ft. 4 ins.....146 lbs.	5 ft. 11 ins.....179 lbs.
5 ft. 5 ins.....150 lbs.	6 ft. 0 ins.....185 lbs.
5 ft. 6 ins.....154 lbs.	6 ft. 1 in.....192 lbs.
5 ft. 7 ins.....158 lbs.	6 ft. 2 ins.....199 lbs.
	6 ft. 3 ins.....206 lbs.

When we consult mortality statistics, we rarely find the cause of death set down as being due to either simple emaciation or obesity. No doctor could afford to sign such a death certificate, yet the absence of these terms in death certificates is no proof of guiltlessness.

Abnormal conditions of weight may be the cause of the specific disease to which death is ascribed, or the specific disease may be the cause of the abnormal weight,

or both disease and condition may be caused by a third factor. In any one of these three cases, the relation of weight to mortality should appear in the tables, but we must remember that these tables are taken from insurance data and men are not accepted for insurance, when they have specific diseases. Hence, the abnormal weights have antedated the appearance of the specific diseases, usually by a period of several years.

According to Dr. Symonds of the Mutual Life Insurance Company, overweights have until recent decades been accepted for insurance on more favorable terms than have underweights. A statistical study of insured lives has now shown how very far from correct this viewpoint is; in one group of data comparing under and overweights with over a thousand records in each group, there were no overweights (of 50 pounds or more) that passed the age of 80, while there were 44 underweights (25 pounds or less) that passed that age.

Abnormal weights are usually an indication of greater probability of premature death. More rarely they appear to be a fortification against some particular disease. There are very few diseases that prey alike upon the fat, the medium and the thin. In some cases the mortality is increased by underweight, in some cases by overweight and in some by both. Thus the number of deaths ascribed to influenza is reported to be more than doubled by abnormal weight in either direction.

With heart disease, the fat people show nearly twice the normal death rate, while thin people show a slightly lower death rate than the average. Note that in such figures as this, the standard of comparison available is the average death rate of all. So that the lowest death

rate, apparently associated with thinness, in this case may be explained in the fact that the *average* rate is *higher* than the rate of the slender people, because it includes in the average the very high death rate of the fat folk.

Pneumonia seems to be more destructive in case of underweight, and tuberculosis is markedly so. In fact, the death rate in tuberculosis is nearly ten times as great for the extreme underweights as for the ultra overweights. This fact would strongly indicate that incipient tuberculosis is present and is the acute cause of the underweight of many men at the time they are examined for insurance. Another view is that dyspepsia is the cause of both the underweight and the tuberculosis.

Perhaps the most striking cases of diseases being definitely associated with overweight is that of nephritis, of Bright's disease and of cirrhosis of the liver. The former is caused by overeating and the latter by alcohol, and both these bad habits result in obesity. In these cases, the death rate is nearly five times as great among the fat as among the thin. Apoplexy and diabetes follow almost as strongly; in fact, taking out consumption, it looks as if the cards are stacked pretty heavily against the heavyweights. The death-rate of women is less than that of men.

Despite the foregoing formidable array of statistics, it is impossible for anyone to prophesy definitely as to the effect of weight in a particular individual. Idiosyncrasies not only disprove all the general conclusions of statistics, but so numerous are the exceptions, that statistics gathered from a few hundred or even several thousand cases often point to conclusions at variance

with the more general laws. The figures on which this article is built are, in most items, based upon tens, or even hundreds of thousands of individuals.

It is well to know these statistical facts about the hypothetical average man and take precautions accordingly, but undue personal worry over one's weight shows as great a lack of mental balance as was evidenced by the old gentleman in Kansas, who, when the papers were full of tornado news, refused to take his clothes off at night, as he didn't relish the idea of being blown trouserless into the public street.

HOW NOT TO BE FAT

By Dr. C. S. CARR

SOME people are fat simply because they are built that way. Heredity. Some are fat because they take too little exercise. Lazy. Others are fat because they eat too much of fattening foods. Gluttony. And still others are fat because they are sick. Invalids.

Are you too fat? To which class of fat people do you belong? The first, second, third or fourth class to whom I have alluded? Now, if you could answer this question with absolute certainty, then perhaps I need not write any more on the subject. All you would need is action in the direction of a cure, which would almost suggest itself.

To cure the varying forms of obesity or fatness I have mentioned, it would only be necessary for the one who is fat because he takes too little exercise, to take more exercise. For the one who eats too much fattening food, eat less. And for the one who is sick and is accumulating an undue quantity of unwholesome, fatty tissue, take the proper remedies to get well. Those who are naturally fat may let it go so—not try to do anything about it. Well, this would seem to dispose of the whole matter and preclude the necessity for further remarks.

But you do not know exactly which class of fat people you belong to. Try to make sure on this very point.

I happen to be about the conventional weight for my height and age. One hundred and eighty pounds; height, five feet eleven inches. I say I happen to be, for

it is by neither management or prearrangement that this condition has come to pass. I have not thought of adding one ounce to my weight, or taking away an ounce. I am too busy for self-indulgence of any kind and too busy to worry about my body.

But if I happened to weigh two hundred pounds instead of one hundred and eighty, and if I felt as well as I do now, could move about as freely, enjoy walking, able to run a moderate distance, take part in ordinary sports without heavy breathing, if I could do all these things as I can now, and yet weigh two hundred pounds, I should pay no attention to it whatever. Because some one has made a table in which people at a certain age and height and sex ought to weigh exactly a certain number of pounds, because some wiseacre has done this, it does not follow that I should be bothered by his notions at all.

There are some people that are just naturally stout. Some of the finest people in the world that I have ever known are stout—overstout. People capable of active labor, mental quickness, mental acuteness and great endurance. Overstout, and yet they can easily walk down people who are lean and haggard.

It is generally thought that stout people are stupid, or at least slow mentally. I never actually believed that way myself, and yet I am unconsciously swayed by that notion.

I remember very distinctly the first time I saw John Fiske. I had been an ardent admirer of him for a long time. I doted on his cosmic philosophy. As a historian he made things so easy to remember that I felt under lasting obligations to him.

It happened that he was to lecture where I could have the privilege of hearing him. I went to the lecture to see the man whom I had so long revered. Without intending it I had formed a mental picture of what he was like. I expected to see a large, massive head, joined to a body of correct proportions.

On the platform sat two men. One, the chairman of the meeting, who was angular, long, quick of movement, restless and wiry, whom I supposed to be John Fiske. The other man on the platform was exceedingly large. He had a thick neck and a red face. His lips rolled out in redundant redness. I supposed him to be the chairman, who would probably arise and with wheezy voice introduce the agile speaker. But the reverse is what happened. The long man, on spiral springs, was the man who did the introducing, and a very poor introduction he gave, too. He floundered around, tried to say something witty, and at last pronounced the name of the speaker and sat down.

Mr. Fiske arose clumsily, wobbled forward, ponderously stood before the reading desk, and with pursed lips and thick voice began to read his lecture, without a preliminary remark. And what a lecture! I shall never forget it. Scintillating with humor. Packed with philosophy. With just the right proportion of historic illustration to make it digestible. His huge stomach pushed out against the reading desk. His feet far apart. His shoulders projected backwards to preserve the center of gravity.

What a disillusionment was mine! There he was, the same mental John Fiske that I had admired for so many years, but in a huge body that seemed so in-

compatible with his wonderful, versatile mind and beautiful diction.

How many times similar things have happened to me concerning fat people. It has become no surprise to me finally to find people of huge corporosities that are nimble of foot and quick of mind, much beyond the average.

Acquaintance with the habits of such people discovers them to be moderate eaters. Their selection of food does not in any wise account for their stoutness of body. Therefore, I would say to any such stout men or women, "Do you feel well? Are your mental faculties alert? Can you walk without fatigue? If so, then there is nothing for you to do about it. Instead of prescribing for you I should be inclined to congratulate you."

That sort of fatness seems to be a protection, rather than a danger. It is generally associated with a very active skin, free perspiration, and almost indefatigable strength and vitality. With such people the envelope of fat in which they are rolled up seems to be a non-conductor of the petty annoyances to which lean people are often subject. Happy without pretense, jolly without trying to be, with a broad smile that is never practiced before the mirror. Yes, I like such people mighty well. I know a multitude of them, both men and women.

There is only one thing they really need to know about themselves. It isn't always easy for them to believe it. It seems too good to be true. All they need to know is to let well enough alone. They do not need anybody's treatment or advice. They need not befuddle

themselves with dietary schedules, or make themselves wretched with special exercises. Just go on being jolly. Shake the superfluous fat from their ribs by hearty laughter. Keep the internal organs active by wholesome and attractive exercise, and that is all there is to do.

There is a constant tendency, however, for such people to get a little fatter, and gradually they find themselves oppressed with their weight or heaviness. In such cases a little dietary restriction may be necessary. Everybody over forty-five years old is apt to eat too much. Not only of starchy foods, but of nitrogenous foods. Eat too much. To eat more of the raw foods, such as radishes, lettuce, cabbage, onions, watercress, spinach, dandelion and other greens, in fact, a partial adoption of the raw food diet is not a bad plan, especially at intervals.

It is frequently stated that drinking water increases fat. This is not true of this class of fat people. The fat people that I am describing now should drink water freely. They need a great deal of water as their skin is naturally active and needs the water to sustain perspiration. As bulk increases, the square surface of the body does not increase in proportion. Consequently a given area of the skin has to cool by perspiration a greater quantity of flesh than with lean people. Such people are naturally great water drinkers, and many of them have the notion that it is drinking water that causes them to be so stout. The fact is, however, that drinking water freely is one of the effects of their being stout and is the best thing they could possibly do. A great deal of injury has been done stout people of this class by restricting the amount of fluids drunk. My

advice is to drink nothing but water. Such people do not need stimulus of any kind. Neither tea nor coffee. Water is all they need. Any other drink is not only superfluous, but harmful.

Now we turn to that other class of fat people who are simply gorging themselves with food. Nature generally protects such people against over-fatness by dyspepsia. Over-eating is followed by indigestion, then the glutton is obliged to hold up for a while and thus he is saved from becoming too fat. But it occasionally happens that the digestive organs are strong enough to receive almost anything and in almost any quantity. Such people are doomed to become fat.

Eating with them has become a passion. Instead of fighting booze, they are fighting food. Occasionally in restaurant or dining car I have sat next to such a man or woman. It is astonishing to see the amount of food that such people can eat, followed with strong coffee, and in the case of men, cigars are added.

It is a wonder that such people succeed in living at all, but they do. The fat is tucked away in every available place. At first the superfluous fat is deposited in the usual place, in the connective tissue underneath the skin. Then the abdominal cavity is next used as a storehouse for the fat. And finally every organ of the body is packed in huge flakes of fat, which in the end impede the circulation and destroy the functions of the internal organs.

There ought to be a cure for such people, just the same as there is a liquor cure. Food with them has become a dope, an abnormal craving. Their senses become dulled. Movements slow. Interest in life flags.

And nothing but incessant gourmandizing seems to have any attraction for them.

There is little or no use in trying to advise such people. They are as intractable to guidance as a dope fiend. So long as they are able to afford the indulgence of their appetites nothing but a lock and key can keep them from it. Roughing it in some wild country has brought many such cases to their senses.

These are the people who go to water cures and receive actual benefit. Drinking vast quantities of water, putting themselves under the dietary schedule of the doctor in charge, they come out considerably improved after three months' siege, only to go right back to their old habits again, which bring them once more to the water cure. Without such people the water cures of this and other countries would have to suspend business.

Then there are the lazy people. Not great eaters, necessarily, but just lazy. Their business allows them to sit all day, and they soon form the habit of doing so. They generally smoke too much. Perhaps drink too much. But the quantity of food they consume is not excessive. They hold some position with good salary, with subordinates to do the work while they loaf. Little by little fat takes the place of muscular fiber, until exercise becomes very disagreeable and finally impossible. Fatty degeneration of the heart, of the liver, of the kidneys, occurs.

These are the fat people who have large paunches and small legs and small arms. They are not fat symmetrically, like the stout people first described, nor even like the large eaters. Paunchy people, they are. Flabby. Their eyelids and under lips sag. Eyes dull

and watery. A dreadful condition of body. Many a time have I seen splendid young men converted into such miserable old ruins by the circumstance of having attained a political office in which there is nothing much to do except to draw a salary.

Women who have nothing to do but to ride about, with no more exercise than to visit the dressmaker or to play a game of bridge, will become unsightly.

These are the patients who are benefited by a fixed and definite course of physical exercises. That is all they need, more exercise. The food that they consume may not be in excessive quantities, but there is no use for the food after it is assimilated. An excess of nutrition can be acquired in two ways—an excess of supply or a diminished use. These people have little or no use for nutrition. Their bodies are kept warm artificially. The muscles require no sustenance, and thus the fat accumulates.

Now we approach a little more serious phase of our subject—the fat people who are sick. The extra accumulation of adipose tissue depends upon some derangement of body for which they are not at all responsible. This has been called anemic obesity to distinguish it from the other varieties, which are sometimes called plethoric obesity.

It may occur at any age. During childhood it is more apt to occur among girls than boys. Chlorotic girls. White skin with lardy consistency of flesh. Suddenly begin to grow fat. Such cases are sick and should be treated accordingly.

Both men and women are subject to a morbid accumulation of fat at about the age of forty-five. It has

been called oily dropsy. There is not an over consumption of oily foods, necessarily, nor can any fault be found with the habits of life. It may be associated with gout or rheumatism. Some forms of kidney diseases provoke it. It is a disease of metabolism, and requires very careful dieting to overcome.

It is in this class of fat people where a rigorous diet is necessary. The quantity of food should be small, and yet so selected as to convey the largest possible proportion of nourishment. It is well to withhold water from such patients. In doing so the system is compelled to make use of the superfluous water which is deposited with the fat.

Unfortunately the different dietitians do not agree exactly as to a dietary schedule. The older dietitians were inclined to give too much of the nitrogenous foods, such as meat and eggs, with too little of the starchy foods, such as bread and other cereals. An up-to-date dietary schedule which has been carved out of past controversies and has stood the test of actual clinical experience with a large number of observers is as follows:

For Breakfast—Fruit, which may be oranges or peaches or grapefruit. Without sugar. Or a sour apple. Bread should be limited to an ounce and a half. One soft boiled egg. Milk, not to exceed one ounce. Coffee is allowed, a small cup without sugar.

For Noon Meal or Luncheon—A small quantity of caviar; a quarter of an ounce is enough. If meat is used, not over three or four ounces. A good salad is allowable with French dressing. Rye or brown bread, half an ounce, with a small portion of cheese. A very small quantity of water not to exceed four ounces.

For the Evening Meal, or Dinner—Three or four ounces of clear soup. Two ounces of fish. Four or five ounces of roasted or broiled beef. Some vegetable such as spinach, string beans, green peas, celery, asparagus, raw tomatoes, Brussels sprouts. A little dessert is allowed, plain rice pudding, junket, custard, which should be sweetened with saccharine instead of sugar. Fruit, except strawberries and bananas, either raw or cooked, four or five ounces. Or four or five ounces of water may be used instead of the fruit. Except as above designated, no fluids should be taken.

Now, there are people who actually need this sort of rigorous diet. People who have not brought upon themselves obesity by their habits or diet, who find themselves suddenly becoming overfat and short-winded, should stick pretty close to the above dietary schedule. Everything possible should be done to increase the oxidation of the food within the system. This is brought about by active or passive exercise. The best active exercise is walking in the open air, gradually increasing the distance and pace. Exercises in the gymnasium, if taken at all, should be done very cautiously, as it is easy to overdo such things. Massage, either instrumental or hand, is of great assistance. It should be vigorous massage, consisting of kneading, pounding, not merely rubbing the skin.

There are absolutely no drugs of any service to this class of patients. It is a folly and a delusion to suppose that there are medicines that can decrease obesity without doing great injury.

The thyroid extracts have been found useful for fat subjects with which great weakness is associated. Some-

times fatty degeneration will produce a condition in which the patient is unable to take exercise. Such people are frequently killed by bad advice as to exercise. They simply can not bear exercise, and any attempt to take it will only increase their difficulty.

I wish to drop a word of general advice to all people who are inclined to over-accumulation of fat. Adopt the plan of eating one food at a meal. Eat all you want of it. Anything you happen to fancy. You will find that the next meal you will not want the same food again, but your fancy will select another food. And so keep it up, meal after meal, day after day, confining yourself to one food. This plan of diet will regulate all disorders in which a diet is necessary, whether it be gout, obesity or diabetes.

The enjoyment of food is actually increased, instead of diminished, with such a diet. Instead of getting hungry in the ordinary sense, a craving for some particular article of diet is experienced. In other words, Nature is dictating to you what she needs most. You eat it, slowly of course, chewing it well, but eating all you want of it. Then wait for Nature to speak again. She will do so in no uncertain terms. You will find that the craving for another food will appear. And so you go on, food after food, meal after meal, following absolutely the leadings of your appetite.

This plan of diet can only be carried out successfully by those who are absolutely temperate in their habits. The use of tobacco or alcohol in any form, the use of tea or coffee, blunts all of those finer feelings and instincts which are necessary to guide any one in such a selection of food.

I would not recommend it to others if I did not know by experience the wonderful results which follow such a course of diet. If for no other reason than the enjoyment of food, it is worth while. But its effect upon all the bodily ills and the result in a well-balanced dietary arrangement is much beyond the results which follow any other dietary schedule.

But if you cannot measure up to the one-food-at-a-time diet, at least you can approximate it by making each meal a simple one. No one ought to expect to enjoy good health who will eat at one meal the variety of food that is ordinarily served at a dinner. One cereal for breakfast is enough for anybody. Some meat and one vegetable is enough for anybody's dinner, if he is eating to live instead of living to eat. A glass of milk or buttermilk, with some stale bread and butter, is a lunch sufficient for anybody, whatever his vocation happens to be.

HELP FOR THIN FOLKS

By Dr. C. S. CARR

ARE you too thin? If so, there may be a reason that can be analyzed and corrected. For instance, worry, overwork, too little sleep, badly selected or badly cooked food, the want of the right kind of exercise. These are reasons that can be analyzed and corrected.

Or there may be a reason that cannot be analyzed. Heredity. You come of a thin race of people. Tall, thin and scrawny.

Or it may be a personal peculiarity. You have always been over-tall. Arms and legs surprisingly long. And the same diet that makes other people fat has no sort of influence upon your thinness.

A person who has once been plump and afterwards thin, can be quite sure that there is some cause for thinness that ought to be found and corrected.

Thinness may be purely a physiological affair. See that boy and girl together, about the same age. Eight, nine, ten years old. The girl is the plumpest. She is the heaviest. The boy is scrawny, thin legged. Both are healthy, and they eat the same kind of food.

Watch them. Let them grow up together. Thirteen, fourteen, fifteen years old. Now the girl begins to get slim and the boy begins to get stout. They have changed places exactly. He weighs the more, is thicker of limb and body. She weighs the less and is slim. They have not changed their habits or diet. Perhaps they have romped together all these years, taken the

same sort of exercise. Unless something happens to interrupt their physiological career the man will remain the heavier of the two all through the active part of life. Finally at about forty-five or fifty, they both begin to get stout. The woman may become quite fat. The man is not so apt to, but he will get heavier than he has been during his twenties, thirties and forties.

This is what I would call physiological thinness and stoutness. It is something that can not be changed very much, ought not to be changed.

I have seen many times tables pretending to give the weight that ought to go with a certain height. That a person five feet high ought to weight 110 pounds. And for every inch added to this five pounds should be added in weight. This applies to adult males.

In case of adult females it is allowed that three pounds should be added to every inch. By some this is reckoned to be the correct weight for a given height.

But I would not advise any one to give much heed to this sort of table. Large boned people require much more flesh than small boned people. Two persons undressed, weighing exactly the same, one will look scrawny and the other well nourished. The difference is in the size and length of the bones. I have attended thousands of clinics and conducted a great many personal examinations myself. And with all this experience it is impossible to tell before the clothing is removed whether a thin looking person is really too thin, or a stout looking person is really too stout.

Are you too thin? Answer the question yourself by standing before a full length mirror, without clothes. Bony projections here and there. Joints bulging out.

Flatness of body and angularity of limb. If these things appear you are too thin, from an esthetic point of view, but there may be some good reason of far more importance than beauty for your thinness.

There are three kinds of fat people. First, people who have a proper proportion of fat intermingled and blended with the other tissues of the body. This is called interstitial fat, and it is the right kind of fat for any one to have. It is what might be called healthy fat.

This kind of fat is only to be obtained by proper diet, conjoined with wholesome exercise. For instance, if a person was to begin a diet of milk, eggs, bananas, baked potatoes, and so forth, and while on such a diet would take a sufficient amount of exercise to keep in good condition, the fat accumulated in this way would be evenly blended throughout the whole body, and would become a useful constituent of the body. Some pugilists grow heavier under severe training. The reason for this is partly the accumulation of interstitial fat, and partly, of course, the increase in the size of the muscular fiber.

Any lean person wishing to accumulate more fat will therefore take notice that the wholesome way to acquire fat is by the use of fattening food, conjoined with a sufficient amount of muscular exercise to maintain the proper digestion, assimilation and appropriation.

There is another kind of fat which is of no use to any one. This is the sort of fat that tuberculosis patients take on at the sanatoriums. The patient comes there, lean and hungry from improper food and exposure to the ravages of tuberculosis. He is immediately put upon milk and eggs, baked bananas, baked potatoes, and

the like, and without taking any exercise he is fattened, just exactly as a farmer fattens a goose or a turkey for market. Such fat will not be found intermingled with the muscles and the different tissues of the body. Such fat is deposited within the abdomen, in large flakes or layers. It is a kind of fat that does the body no good, although it increases the weight.

Then there is another sort of fat-tissue, which is called fatty degeneration. That is to say, the fat cells take the place of the muscle cells. The muscles lose their power, and the person becomes a great, huge lump of unwholesome fat. This sort of fat is acquired by sickness, laziness, long continued gluttony. It may be acquired of course by disease, under circumstances beyond the control of the patient.

Now of course it is the first kind of fat that a lean person would like to acquire. That is to say, you would like to take on interstitial fat. I wish to repeat, that this sort of fat can only be acquired by the sternest kind of muscular training, at the same time an excess of fattening food is taken. A person of sedentary habits can scarcely eat fattening foods without digestive disturbance. That same person, subjected to active exercise in the open air, exercise that produces the proper amount of exhilaration, would be able to eat the same fattening food with impunity.

I was in a doctor's office the other day. Several doctors were present. I asked the question:

"What proportion of the human body is fat? And what proportion is bone? and what proportion is muscle? And what proportion in weight is the viscera and internal organs?"

The reply was prompt, and what I expected. "It depends upon the person."

"Well," I said, "for instance, take that girl yonder, your stenographer. What proportion of her body would you judge is fat?"

After some discussion it was concluded that one-fourth of her body was fat, and one-fourth bone, and one-fourth muscle, and one-fourth viscera and internal organs, which would include the brain and spinal cord, lungs, heart, and all the internal organs with their contents, including the larger blood vessels.

This girl weighed 141 pounds, and was five feet, five and one-half inches high. In my judgment, these proportions were practically correct. There might be a doubt as to whether her muscles would actually weigh one-fourth of the rest of the body, but for all practical purposes these proportions may be assumed to be correct.

The girl in appearance was slightly stout. A little under height, for the width and size of her body. Not much, however. A fairly well proportioned girl. Not slim. Not stout.

There were several other girls in the office, not one of whom would present these proportions.

Assuming then that one-fourth of the weight of a well proportioned body is bone, and one-fourth fat, and one-fourth muscle, and one-fourth viscera and internal organs, we have all sorts of variation from this proportion. Thinness may be caused by small bones. Or the thinness may consist of undeveloped muscles. It may be the result of too little fat. Or may be that the internal organs do not carry their usual size and weight.

It takes but very little fat and flesh to cover small bones properly. Such a person may appear very small indeed dressed, but the naked body presents a roundness and plumpness quite surprising.

The bones may be overlarge, when it will require a great deal of muscle and fat to cover them properly. With the clothes on, such a person may present the appearance of being overstout. The clothing removed, however, shows the proportions to be pleasing and in every way correct.

The abdominal organs may be overdeveloped, producing entirely too large an abdomen for the rest of the body, to be in proper proportions.

All these things have to be taken into consideration, and in attempting to correct thinness the exact reason why the subject is thin should be first ascertained.

I am consulted quite frequently by people who would like to be stouter. After ascertaining to my satisfaction that they really are too thin, that is to say the bones are not properly clothed with fat or muscle, my next step is to inquire into the habits and occupation.

Suppose I find domestic difficulty; or financial burdens that weigh heavily upon the mind, and no other apparent reason for the thinness. My treatment will be directed toward the removal of these troubles. If they can not be removed there is little or no use in attempting any treatment.

It may be that the occupation is a trying one, requiring the subject to be indoors, in ill ventilated rooms, putting in long hours at some very unwholesome work. Change of occupation of course is the first step.

But suppose I find none of these things. My next

inquiry would be as to the amount and kind of food and water. If I found these things very faulty the correction would be a dietetic one.

I met a young man. He was haggard and sallow, much under weight. It being none of my business, I made no inquiries, but it impressed itself on my mind. Something was the matter with the young fellow.

A year afterward I met the same young man. I was surprised at the change. He had taken on flesh. Seemed to be in splendid proportions. I sought an opportunity to inquire what was the cause of the difference. He told me the first time I saw him he was an inveterate smoker of cigarettes. He had some other bad habits that I need not mention. Very shortly after, he quit these things. Gave Nature a chance to do something for him. The result was that his body assumed the proper proportions of fat and bone and muscle and internal organs.

I saw a young girl. She had a pretty face, but was so scrawny. She was pale. Almost emaciated. A year afterwards I saw the same girl, and I could scarcely recognize her, she was so round and rosy and beautiful of form and figure.

She told me what had caused the change. When I first knew her she was piecing between meals constantly, eating such things as chocolates, drinking soda water and the like. She was also spending a large portion of the night in frivolity, when she ought to have been asleep. She was impressed by a lecture she heard on correct living and its effect upon the body. She reformed. Eats an orange for breakfast. Eats only two meals a day. How quickly her body responds to the change in her habits.

In the office where I have been for the last twenty-five years, a number of girls are employed. Sometimes twenty, sometimes over one hundred. I see these girls without knowing their names or having very much acquaintance with them.

I recall one girl—a beautiful girl. Rather slim, but round. Mahogany colored hair, with a skin as white as milk and beautiful teeth. Round, brown eyes. Well, I won't attempt to describe her further than by saying she was beautiful.

She left the office. Some one else took her place. I heard that she was married. Two years afterward I met her. I did not know her. She introduced herself and reminded me that she was the office girl I used to know. She was coarse, bloated, pudgy. The white skin was red. Even the hair had turned to a sort of a tawny color. I pretended not to notice the change. I found afterwards she had married a convivial sort of a fellow, who was employed in a beer bottling establishment. She joined him in his convivial habits, and became a constant beer drinker.

The thinness brought on by worry, anger, jealousy, emotions of any sort, shows first in the face. The body may not suffer noticeably. The face becomes pinched, with deep lines and furrows. The internal organs suffer. The muscles may remain quite well developed, and even the deposits of fat on different portions of the body continue tolerably well. But the face, on which is registered the varying expressions of hatred and fear, becomes bony and unsightly. Such a person needs only a change of heart. All the fattening foods and health remedies in the world are futile without a change of

heart. Most people who apply to me because of thinness are women. Especially young women. It occasionally happens, however, that a young man thinks to improve his figure by medical advice. I have in mind a case. A young man, six feet, four inches high. He weighed only 120 pounds. He certainly was thin to look at. His mother brought him to me. He was in a small college town, where he was attending college. The boys guyed him so about his lankness that he sought some way to improve.

He felt perfectly well. He showed no sign of any bodily derangement. Was not even troubled with cold feet, as such long people usually are. His arms and legs were very long and slim. He took considerable exercise. The muscles were fairly well developed.

What this young man needed more than anything else was to be persuaded that his thinness was nothing to be ashamed of or feared. This I tried to do. By the assistance of his mother, after several visits, he concluded that the desire to change his bodily proportions was vain and entirely uncalled for.

I cured him of his real disease, and that was the notion that he must carry a certain amount of flesh in proportion to his height. Any jokes as to his length, instead of hurting him, he learned to join in with the mirth, like Bill Nye, who was very bald. No one ever invented more jokes on baldness than Bill Nye himself.

He scattered all over this country exaggerated pictures of himself without a hair on his head. He got a great deal of fun out of his deformity. So this young man had changed his attitude toward his slimness, and

he actually became heavier. The worry and discontent being removed, he deposited more fat than ever before.

It is often absolutely necessary to precede any treatment for thinness by getting the mental coöperation of the patient. By dwelling upon the subject of thinness and having before the mind constantly the imaginary deformity of being too thin, the tendency is to grow thinner. This is especially true of women.

The arms, shoulders and neck are the special concern of women who wish to make a good appearance. It very frequently happens that these very parts are the thinnest. This comes about from the habits and vocations of the women. Most women walk and use their bodies sufficiently to give them ordinary muscular development. But the upper arms and shoulders and neck do not have the muscular exercise they require to maintain a desirable plumpness.

Indian clubs are the best exercise a woman can take who is dissatisfied with her neck, shoulders and arms. I have taught the Indian clubs to many classes of young ladies, with especial reference to improvement of the upper chest and neck.

The change is almost marvelous in some cases. In all cases there is benefit. Certain muscles of the neck and shoulders being brought into use by ordinary Indian club swinging, enlarge and fill up the hollow places and give the neck a round and comely appearance. This is true also of the elbow. There is a large muscle on the back of the upper arm, which when developed will change an unsightly elbow to a smooth, or even dimpled contour.

It is not necessary to go into fancy Indian club

swinging. Just the ordinary swings used by pugilists to develop the chest and arms.

A fine neck and bust is the special desire of most ladies. Modern modes of dressing make it almost necessary.

A great deal can be done to improve the neck.

There is a muscle known as the platysma myoides. This muscle is attached to the lower edge of the jaw, on either side, extends down over the neck, and is fastened to the bones of the upper part of the chest. The muscle is a broad thin one just beneath the skin, and if it is well developed it will give a smooth appearance to the neck.

To develop this muscle requires a special exercise. I do not know how I can describe it. Make the chin rigid, by throwing it forward. Then by drawing down the corners of the mouth severely, the platysma myoides can be tightened. The teeth should be clenched tightly together, with the chin projected as far front as possible. If the movement is made correctly the so-called cords of the neck will raise up so as to be seen under the skin.

The proper development of the platysma myoides muscle, which can be done in six weeks, will wonderfully improve the neck. It will also fill out the cavity just above the collar bone, which is so common.

As a rule, the figure of any woman can be improved by all-round muscular exercise, such as swimming, rowing, boxing, horseback riding.

As to the diet, the thin person should to the extent of her digestive abilities, seek a liberal diet. Well boiled beets are perhaps the most fattening of all vegetables. Vegetables rich in starch are more fattening than

meat, even fat meat. I do not approve of the use of malt liquors to increase the fat. Such fat is not permanent, and not of a quality to be desired.

A merry heart and willing hands to serve with plenty to do, interspersed by a great deal of recreation, will do much to give any one a presentable body.

"Who by taking thought can add one cubit to his stature?" This is scripture, to be sure, but no better physiology was ever written. It is not by taking thought of these things that a desirable figure can be produced, as a rule, but it is by leading a wholesome and healthful life. Genuine laughter is much better than remedies. Laughter does not come to him who is narrow and selfish, or overstrained with haggard desires. But it comes to him who is willing to take the world as he finds it, content with things as they are, striving only to take some wholesome part in the business of the world.

RELAXATION EXERCISES FOR NERVOUS MEN AND WOMEN

By CARL EASTON WILLIAMS

OH those nerves! Wonderful servants, but terrible masters.

It is true that we all have nerves, but do we know that we have them? And if so, what are we going to do with them?

Nerveless as a nation we are not, but "nervous" we are. We are keyed up to a state of high tension. The stress of modern life, the hurry and excitement, the late hours, the sensation-seeking recreations, and certainly not least, our denatured foods, all combine to undermine the most precious and highly specialized form of protoplasm in our bodily composition. Our "gray matter" is overworked, abused, consumed too fast, and so it often retaliates through those particular varieties of torture that only nervous persons know.

One of the greatest needs of the present day, therefore, is for relaxation—relief from nervous tension. Better food, more outdoor activity, more natural conditions of life—all are sadly needed, but the first essential for the nervous man or woman is to learn how to get away from the exhausting state of tension. One should know how to "let go."

Relaxation is something that can be learned—something that should be cultivated. It is a simple enough matter to tell one to relax, or to "stop worrying." But how? The characteristically nervous person is unable to do it. He lives in a state of mental strain and sus-

pense which keeps his muscles rigid, interferes with free breathing, prevents restful sleep, and consumes needless energy. He should save this strength, or use it in some profitable channel. He can not voluntarily relax, however, because he can not control his nerves. To a large extent they control him. He can only accomplish this purpose by acting through some agency that is directly under control of the will. Now it happens that the muscular system is the only part of the body that is under voluntary control and exercise of the right type constitutes not only the one effective means, but the ideal method through which voluntary mental and nervous relaxation may be accomplished.

To appreciate this fact, it is only necessary to point out the intimate relationship between the motor nerves and the muscles. Neither would mean anything without the other. Through these nerves the mind is so closely linked to the muscles that mental development in the beginning is accomplished almost entirely through muscular action. The baby first learns to think through his muscles. We must remember that developing what we call coördination is really a matter of educating the nerves and brain cells. In other words, training the muscles chiefly means training of the nerves and brain.

Therefore, if you cannot directly get control of your nerves, at least you have such control of the muscles that they can be contracted and relaxed as desired. But by acting through the muscles, that is to say, by thinking through them and relaxing them, one may accomplish mental relaxation and relief from nerve strain.

It will probably help you in grasping the underlying principle of the exercises shown in the illustrations, if

you will first firmly contract the muscles involved. A nervous person commonly finds his muscles in a state of more or less rigidity; often he clutches something tightly with the fingers. The mere impulse to relax under such conditions is not easily brought about, but by first voluntarily causing a vigorous contraction of the muscles concerned and thus connecting the mind with them, so to speak, it becomes easy to relax them by way of contrast immediately after. Following a decided contraction you can more readily "let go."

As a general thing the person of nervous temperament requires an exercise program somewhat different from that which would apply in the case of a phlegmatic temperament. As a general rule, the high strung person does not need so much exercise. Curiously, however, it is just this type of person who is inclined to be too energetic in physical activity of this kind, just as in all other matters. He is inclined to be too strenuous and thus to use up too much energy. A very nervous person, however, has no energy to waste.

In many cases of this kind there is need for real developmental exercise. The muscular condition is poor and building up is necessary. The movements used for this purpose, should be those calling for moderate resistance. They should be neither too heavy nor too light. It is probably a mistake in such cases to undertake a lot of light quick calisthenic work. It requires many repetitions of these very light movements to accomplish results, and too much energy is used up in a drill of this kind. A very few movements involving real resistance, but which do not seriously tax one's strength, would be more appropriate.

In this connection, I would also call attention to the fact that quick active movements are inclined to be too stimulating. They wake one up. They are especially valuable for those of phlegmatic temperament on this account. They arouse one's energies, stir up the nerve tissues, and are to be highly recommended if one feels mentally dull. Slow movements, however, are quieting in their effect and are better suited to the high strung nervous types.

It is also important to discontinue one's strength-building exercise, whatever it may be, while it is still a pleasure and before it begins to be "too much like work." A very little muscular exercise goes a long way in some cases. If you experience any sensation of trembling or nervousness following your exercise, you may interpret this as an indication that you have carried the exercise too far. It is of course understood that I am speaking now of ordinary strengthening exercise, which is a very different thing from the relaxing movements shown in the illustrations.

Aside from the special relaxation exercises suggested, nervousness and mental excitement can often be relieved to a large extent by some moderate muscular activity suited to the condition of the individual. Walking for instance is ideal for the purpose. Exercise of this kind relieves congestion of the brain through the better distribution of the blood, that is to say, through the vigorous circulation in the large muscles of the body brought about by the exercise. Moreover, walking is probably one of the most important of all means for overcoming neurasthenia. One should at first walk only until very slightly fatigued, but as improvement in

strength and endurance is noted the walks should be gradually lengthened. By the time one is able to walk ten miles or more without special fatigue, a remarkable improvement in the nervous condition is usually realized.

Relaxing exercises may be practiced while standing up by relaxing certain parts of the body at a time. For instance, holding one arm out on a level with the shoulders, suddenly relax it and let it drop limply at the side. Likewise you can relax the muscles of the neck and let the head drop loosely upon the chest or to one side. Similar relaxing movements may be practiced while sitting down. Imitating an intoxicated person is in itself a study in relaxation and is well worth trying.

The only really perfect exercises in relaxation, however, are those performed lying down. In this case you can utterly relax every muscle in the body. For the purpose it is best to use a bed or couch with a good spring, on which you may be absolutely comfortable. The plan is first to contract certain parts in order that the contrast of complete relaxation may be more perfectly realized. The muscles are used first to raise a part of the body a few inches, holding the position for a moment, and then letting this part drop limply upon the bed, which means complete relaxation. It is best to thus exercise different parts of the body, one after another, so that a general sense of relaxation and restfulness is induced. First perform the exercises with the legs and arms, then that of raising the hips very slightly, and finally that of raising the head and shoulders, or perhaps only the head, an inch or two, if not strong. In each instance allow the respective part of the body to drop loosely, with utter abandon. If the bed has a good

spring you will bounce slightly upon dropping the hips, and this will usually increase your delightful sense of relaxation. This hip raising movement is more general and probably more restful in its effects than the other exercises.

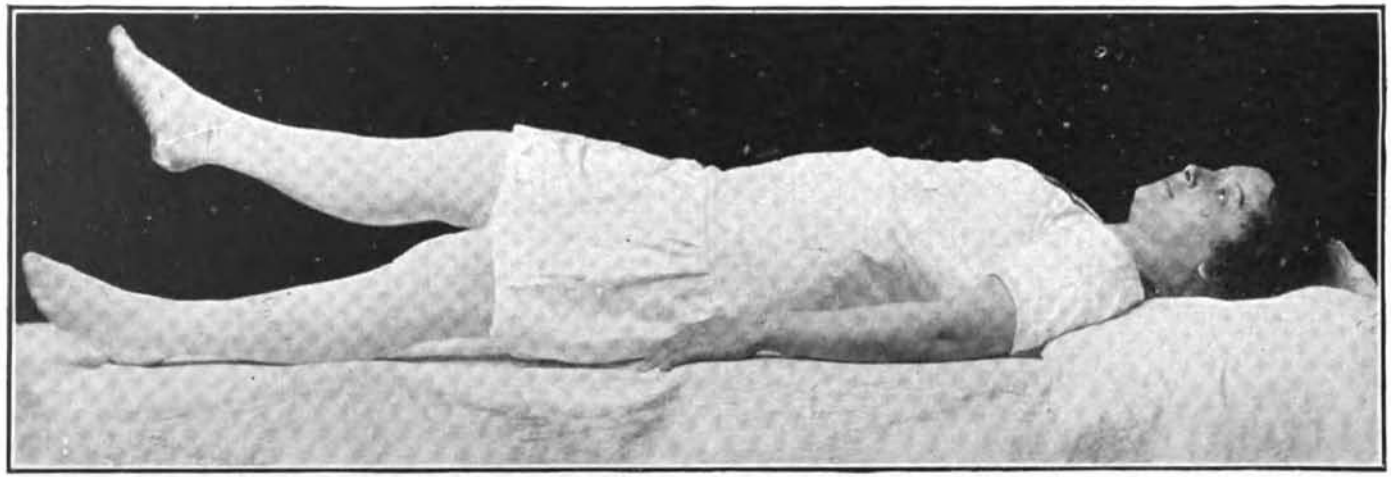
For those who are unable to sleep, these relaxation movements are invaluable. In such a case, however, other sedative measures may be helpful. Where there is mental excitement a hot foot bath combined with cold applications to the head will tend to draw the blood away from the brain. The drinking of a cup of hot milk or hot water on going to bed to draw the blood to the stomach and away from the brain is a method of inducing sleep with which many are already familiar. Sufficient exercise, particularly in the form of walking, will usually help one to sleep, not only because this relieves any congestion of blood in the brain, through the more equalized distribution of the circulation already referred to, but because of the natural fatigue thus brought about.

An air bath for some time before going to bed is another extremely effective method of toning up and quieting the nerves. Also massage of a very light stroking character has a soothing effect. Anything which affects the surface of the body as a whole is likely to influence the nervous system because of the million or more tiny nerve endings located in the skin. It is for this reason that the most effective sedative treatment known is the neutral bath, in which the body is immersed in water at about blood temperature or slightly lower. This bath differs greatly in results from hot and cold baths, being neither stimulating nor weakening, but hav-

RELAXATION EXERCISES
FOR
NERVOUS MEN AND WOMEN

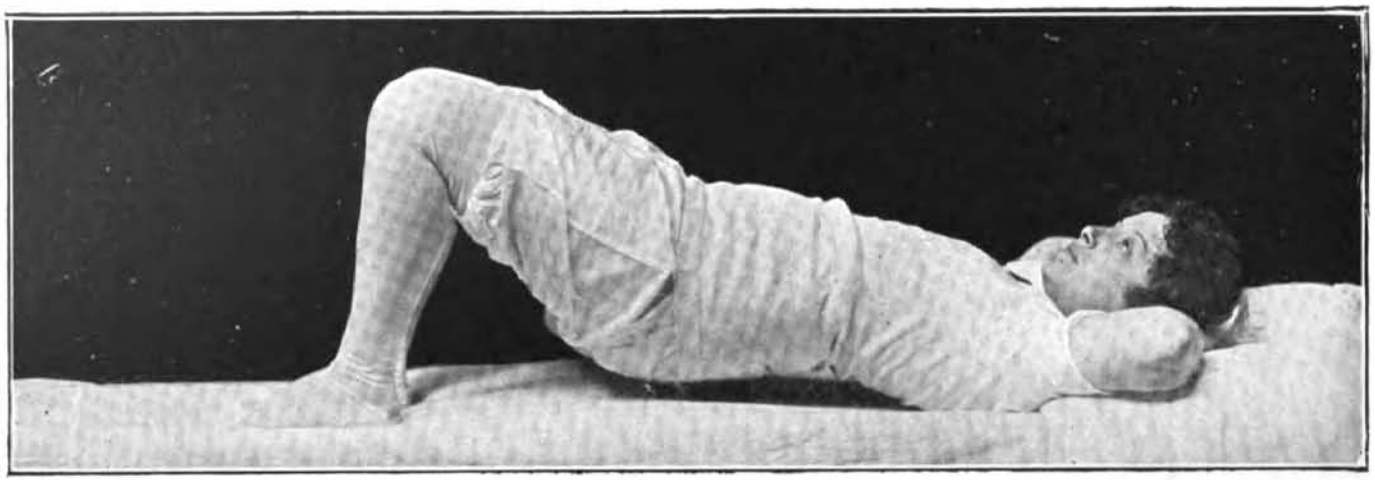
This relaxation exercise should be practiced in a comfortable chair. Holding the arms forward as illustrated for a moment, suddenly relax all tension, let them drop, and swing lifelessly at the sides. Let them be absolutely "loose."

Lying on a comfortable couch or bed raise the arms from the side six or eight inches, holding for a moment, and then letting them drop absolutely relaxed upon the bed. There must be not the least tension.



Lying on the couch, raise one leg eight or ten inches in the air, hold for a moment, and then let it drop loose and lifeless. If it "bounces" this will indicate complete relaxation. Same with the other leg.

Lying on a couch, raise the head two to four inches as illustrated, and then let it drop loosely upon the pillow. This release from tension will help you develop the capacity for voluntary relaxation.



With the heels doubled under the knees, raise the hips three or four inches from the bed or couch, as illustrated. Hold for a moment and then let the trunk of the body drop lifelessly on the bed. It will give you a sense of relaxation throughout the entire body.

ing a remarkably soothing effect upon the entire nervous system. It is now used as a means of quieting maniacs in hospitals for the insane, and has practically done away with the necessity for padded cells and straight-jackets. One may remain in this bath for hours or for days without harm, though twenty or thirty minutes is sufficient in most cases to bring about a relaxed and quiet condition of the mind and nerves if one is angry, excited or otherwise nervous.

Outdoor air is a factor of tremendous importance in overcoming any form of nervous weakness. Outdoor sleeping is the ideal plan. Plenty of sleep is absolutely essential, for while the nervous person often has difficulty in sleeping, it is he or she who needs sleep more than anyone else. This applies with especial force in the case of women.

Serious difficulty is often found in connection with overwork. For the person with lowered vitality, lacking a reserve of nerve force, even a moderate amount of work may be overwork. For indoor mental workers it is more than ever important to get sufficient sleep and to spend every available hour out of doors.

The diet likewise is an extremely important factor in most cases. All foods should be used in their natural condition as far as possible. Those which are palatable uncooked should be used in that form. Salads and green foods as well as fruits are of great value. If seriously run down, there is no question that the exclusive milk diet is usually the quickest and most effective means of building up the nervous system. Eggs likewise contain in large measure the nutritive elements necessary for reconstructing the nerve cells. It may be noted

that widely advertised food tonics for the nerves are derived from milk. It is really much better, however, to secure these elements direct and without loss of their vitality, by using the fresh milk. For those who do not relish milk, buttermilk or fermented milk will be found invaluable for the same purpose.

Finally it may be said that everything which is conducive to building up of the general health and improving the quality of the blood, will always be helpful in toning up the nerves. If you will make a practice of the relaxing exercises suggested, you will gradually gain such control of the muscles, and through them, of your mental and nervous states, that you will finally become able to relax voluntarily without the necessity for special movements for the purpose. Relaxation means poise, conservation of energy, reserve power. It means greater readiness for action and greater power of concentration when concentration and action are required. You will never have perfect control of yourself, you will never enjoy your greatest possible efficiency, you will never be perfect master of yourself and of your affairs, until you have acquired the power to relax.

BREAKING THE DRUG HABIT

By Dr. HARRY B. GALATIAN

IN the treatment of the morphine or other drug habitue, it should first be considered, after a careful examination, whether a cure really should be effected, as in such painful conditions as incurable cancer and some other malignant lesions the drug may be a merciful relief. Next, any painful condition for which the drug was originally prescribed must be relieved by appropriate treatment, as for instance a painful nerve lesion uncorrected will necessitate a much harder fight on the part of the patient than if it were reduced.

Present day treatment does not employ substitute drugs, but uses measures which combat the symptoms arising from the withdrawal of the habit-forming drug as well as those resulting from its long continued use.

Immediate stoppage of the morphine is essential. Our successes have been those in which this was the rule, regardless of a certain amount of suffering on the part of the patient, and constant attention by physician and nurse, and our failures have been those which were compromised by gradual withdrawal.

In those cases where there is a desire for cure and a willingness for co-operation by the patient, it is our belief that the habit may be permanently cured by physical methods exclusively, but where the will is gone and there are not at hand the facilities and attendants skilled in the use of the measures which we will mention, drugs will be necessary at least in the first week of treatment.

In one of our cases, that of a lady who had used up to twenty grains of morphine daily for ten years, becoming first addicted in the hope of relieving headaches, the measures outlined below were used, and the cure has been permanent. Another case, that of a man using the drug to relieve tabetic pains, the treatment failed.

It must be remembered that the drug addict is a sick person—sick because he has been poisoned, and he must be treated as a sick person. His energy is depleted, his elimination is deficient, his nerves are irritated, his organs fail to functionate, and his moral fibre is weakened—not very unlike any other chronic poisoning.

Any treatment, therefore, whether drug or otherwise, which will relieve the symptoms and conditions found, is efficient treatment.

The patient must be isolated with a reliable nurse and all steps possible taken to prevent his getting any of the drug. Elimination is next in order and this means that all of the four emunctories of the body are to be urged to do their best. The alimentary tract must be cleansed and kept so. Use a brisk saline purge, for three mornings, and an enema every evening. No food should be given while the stomach is disturbed, which it probably will be for three or four days, but quantities of hot water should be taken—a glass every half hour is none too much. This helps skin and kidney elimination and also assists in relieving pain. Fruit juices may be allowed if the appetite calls for them. Fresh, cool air in the room is beneficial and a source of stimulation.

Skin elimination is hastened by the electric, steam or hot air cabinet bath, by the wet sheet pack, and the hot blanket pack. Pain, which is the worst symptom,

is sometimes real, but more often is auto-suggestive, because the patient expects pain when the drug is withheld. About the best remedy for this is the continuous warm bath. The patient may have to remain in the tub for several hours, and often for a whole night, the water being kept constantly at a comfortable temperature (preferably 98° Fahr.). A cold towel should be around the patient's head. When removed from the bath the patient must be rubbed briskly with a cold, wet towel and then covered up warmly in bed. The pulse must, of course, be watched very closely.

When the reaction comes on and the need for stimulation is manifested, the cold tub bath, or better, the percussion douche or the cold mitten friction, is used. For we have here a method which takes the place of the drug substitutes, and it should be repeated hourly if necessary. The patient must be rubbed and slapped after the cold bath until the skin is in a glow. If able, mild exercises should follow the bath. In regard to exercise in general, we would say that if the patient is strong enough, systematic movements furnish a happy means of occupying the patient's attention and of developing will power and stamina. These exercises should be used throughout the whole course of treatment, especially during the period of convalescence.

A daily massage treatment with spinal manipulations by a careful operator is of inestimable benefit. Hot and cold compresses applied alternately over the whole length of the spine will quiet and soothe the restless patient and induce sleep.

When the stomach quiets down and all vomiting ceases, we would advise the milk diet for several rea-

sons. First, it stimulates circulation and builds blood more quickly than any other food. Second, it is less subject to putrefaction in the atonic, secretionless intestines, and is the one food which will most quickly restore these to normal. Third, it helps skin and kidney elimination. And, fourth, it is easily administered, while the frequent dosage necessary helps to occupy the time and attention of the patient. A glass of milk should be given every hour on the first day and every half hour thereafter. Don't give one or two quarts of milk a day and a few meals and call it a milk diet. Give nothing but milk, a glass every half hour, and continue this for several weeks, the longer the better.

It is needless to mention the other factors necessary in the after treatment for they consist in living according to the principles taught by the Olympian System—a physical culture life.

Will this method always succeed? Perhaps not—there are back-sliders from all treatments. It may have to be repeated. A sick man is sick until he learns better habits, and a drug habitue will return to his dope until his will power is strong enough to resist temptation.

The above regimen will, of course, also answer well in the treatment of chronic alcoholism or serious tobacco addiction. Both alcohol and nicotine are narcotics and therefore belong in the same classification as opium. Doubtless it is often the use of tobacco that sets up the craving for a stronger narcotic that leads to drink—when one can—alcohol, and the use of both tends to give rise to a physiological condition predisposing toward the use of the more powerful drugs.

HOW TO CURE THE TOBACCO HABIT

By Dr. T. H. TRINWITH

WHAT connection is there, if any, you say between tobacco and health? When you pause to consider the large number of men, and women too, who are users of tobacco, it might be well to give this matter some consideration.

As I have conducted an anti-cigarette clinic and treated thousands of cases of all forms of tobacco habit at this clinic and in my private practice, my observations may be of some interest.

Though I had practiced medicine for a number of years before taking up this work, and had specialized on the treatment of alcoholism and drug addictions for some time, I was not prepared for the startling discoveries made. My sole desire in the inauguration of an anti-cigarette clinic was to assist young boys to overcome the habit, and I was greatly surprised at the great numbers of men and women who applied for relief.

Hundreds of men, women and children applied for treatment. The clinic was public and many of the men had to stand in line for an hour or more awaiting their turn. No coercion was in any way used, their attendance at the clinic being entirely voluntary on their part.

The statements of many of these patients were so amazing that I began to gather data and make a more complete study of the tobacco habit. I approached the subject with an open mind and not as an enemy of tobacco.

Many people believe that comparatively few women

smoke. This is not true however. Much of their smoking is done in private and only their most intimate friends are aware of their habit. I have treated a great number of women who used tobacco and nearly all of them have remarked that most of their lady friends were addicted to the use of the weed. Of course it is natural for women who smoke to associate as much as possible with other women who smoke. The reason for this is obvious.

Many conflicting statements regarding the use of tobacco are heard, and it is small wonder that misunderstanding should arise. There are several reasons for this difference of opinion. Nearly everyone who uses tobacco is apt to judge all other tobacco users, to some extent, at least by his own case, while as a matter of fact, there may be a wide difference between two given cases. There can be no comparison between the smoker who inhales and the one who does not inhale. There are also men and women who have never tasted tobacco but make general statements regarding the habit. These sincere but mistaken people place all users of tobacco in one class and dispose of them with one sweeping criticism. They will not take the word of any smoker on the subject of tobacco unless it is in harmony with their own belief. On the other hand, the tobacco user, knowing them to be wrong in some particular, will not accept any of their statements regarding the tobacco habit.

A tobacco habit as a rule is not a single habit but a combination of habits. There may be primarily a physical craving; there may be a desire for the pleasure to be derived from the taste of tobacco; and there is the force of habit which sometimes causes a man to reach

for a smoke without realizing that he is doing so. There is more or less of a psychological craving connected with the tobacco habit; patients sometimes complain of this for a week or more after they have been cured of the physical craving. They may be going about their business and not thinking of tobacco when they see someone light a cigarette; the suggestion is often so strong that it is a hard fight for a few minutes to overcome the desire to smoke. Broadly speaking, there are two general classes of smokers—the one that inhales and the one that does not inhale.

The man who does not inhale smokes for the aroma and taste he receives, or thinks he receives from tobacco. If he smokes in moderation and does not chew the end of his cigar or inhale any of the smoke, he receives little or no injury from the use of tobacco. When buying a cigar, he is actuated by the same motives as a man choosing his favorite dessert at a restaurant.

The same is also true of the average pipe smoker, if he uses a clean pipe and does not inhale any of the smoke. If a dirty pipe is used, however, considerable juice may be drawn into the mouth and some of it carried into the stomach without the knowledge of the user. Those who chew tobacco are likely to permit a quantity of the juice, mixed with saliva, to be swallowed. In either of these cases, the user may not realize that swallowing some of the juice may be necessary to satisfy the craving and that satisfaction is not complete until some of the juice reaches the stomach.

The man who inhales his smoke can not get any satisfaction from tobacco in any other way. He smokes for effect and is not interested in the taste of tobacco.

These two classes of smokers are subject to considerable variation. A number of cigar and pipe smokers are addicted to the inhalation of some smoke without realizing it; some who inhale do so superficially and promptly exhale the smoke, while others inhale deeply, holding the smoke in their lungs for some time.

Cigarette smoking is the most injurious of all forms of tobacco using, because it usually means inhalation, in the course of time, and inhalation causes the greatest damage. The explanation of this is very simple: The circulation of the blood in the lungs is both generous and delicate, so that the oxygen may be readily taken up and waste material given off. The poisons taken into the lungs with tobacco smoke are thrown into the circulation about as quickly as if injected under the skin with a hypodermic syringe. The amount of nicotine from each cigarette may be very small, but it is a powerful drug and is accumulative in the same manner as morphine. When a number of smokes are taken each day the system may retain considerable nicotine. Nor is this all; in the smoking of tobacco some carbon monoxid gas is given off, and the more rapid the combustion, the greater the quantity of carbon monoxid. This gas is a deadly poison, because it interferes with the oxygen carrying power of the blood. Pyridin, a poisonous product, formed from the dry distillation of organic compounds, is also found in tobacco smoke. The addition of these two poisons to the nicotine causes tobacco smoke when inhaled into the lungs, to carry a "kick" that in some respects is even more injurious than morphine.

The most damaging testimony against the cigarette

comes from the cigarette smoker himself. When strong men, men with the fighting jaw, confess that they are powerless when it comes to stopping the use of cigarettes, there can be no doubt as to the enslaving power of the cigarette.

The extent to which the cigarette may bind its victim can best be illustrated by describing a case I treated recently. A man aged forty-five years began the use of cigarettes at the age of seven years and smoked two years before his parents suspected that he used tobacco. At the age of fourteen years he learned to inhale the smoke and shortly after this he was very much surprised to find that he could not discontinue the use of cigarettes with comfort. At any time previous to the time he learned to inhale he could be deprived of cigarettes without missing them. As he grew older he made many efforts to break the habit but without success. On one occasion he made a long trip into the country where there was no tobacco to be had to forcibly cure himself of the habit. He claimed that he had to make a hurried return trip in the night to obtain tobacco.

This is not an isolated case, as I have had very many similar to it. Cases of this severity are very much more common than is supposed. Withdrawal of the cigarette produces definite symptoms, and the inhalation of a few puffs from a cigarette always relieves these symptoms. They could not be faked and are not a product of the imagination. Furthermore, a number of patients who have been cured for a week or more have attempted to inhale the smoke of a cigarette simply as a matter of curiosity or defiance. Invariably the patient was greatly surprised to find that the cigarette made him

dizzy, in further proof of their true nature. Some of these patients had to lie down until this feeling passed away.

Some people, especially women, seem to become addicted to the cigarette much more quickly than others and to receive more injury than others. I have had cases who had used the cigarette for many years and who had a very light addiction, while many became victims to the cigarette in a short time. Any person who inhales, however, and has a light addiction can not tell how soon the habit may become severe. No person can tell to what extent he is chained to the cigarette until he tries to quit, not for a few days, but for at least several weeks. If he can not discontinue the use of the cigarettes without help he should consider himself a drug slave.

I have had a number of women tell me that they were under the care of a nerve specialist for some nervous ailment, but that they had not told their physician that they were addicted to the use of cigarettes. They said that the doctor was puzzled to account for their lack of improvement, and that they believed the cigarettes were responsible for it. I have asked some of these women why they did not tell their doctor of the cigarette habit, and nearly all of them remarked that the physician would simply have told them to quit and they knew they could not do so without help. I have had a number of cases who were being treated for some nervous trouble and found that upon being cured of the cigarette habit their nervous trouble disappeared.

The question is often asked why boys begin the use of cigarettes when they should know better. Boys are

great imitators, especially of the habits of men whom they admire. The boy may be able to tell you as well as his parents or his teacher of the injurious effects of the cigarette, but if some man whom he likes smokes cigarettes and is apparently enjoying good health the boy will naturally think they must be harmless.

Many magazines carry attractive cigarette advertisements suggesting indirectly that the smoking of cigarettes is a manly thing to do and that men of prominence use cigarettes. The boy is prone to reason that what the advertisement suggests must be true, no matter what his parents or his teacher may say. Many young men smoke cigarettes because they feel that it is a light, short smoke and do not have time for any other kind of a smoke. They gradually acquire the practice of inhaling, and do not find they were mistaken until it is too late to break away without help.

The treatment for the tobacco habit is medicinal, hygienic and psychological but is not routine. As these cases sometimes differ greatly, it is impossible to adhere to any hard and fast rule in their treatment.

Many of the appeals that come to me are from parents asking for help to cure their sons of smoking cigarettes. Most of these boys have no real tobacco habit and can stop smoking if they want to without treatment. Many parents attempt to cure the boys by scaring them with absurd statements regarding the effects of tobacco; the boys realize this and believe that because no convincing argument is used against the cigarette, there is none. I have known of boys, when once convinced of the danger of cigarettes, to not only stop using them but try to induce their friends to stop their use also.

Most young boys who smoke cigarettes have not learned to inhale and can stop the habit if only they are convinced that cigarettes will injure them. I usually accomplish this by having men who have been cured of the cigarette habit, or wish to be cured of the habit, talk to the boy. As soon as the boy learns that a man may appear to be healthy and yet be a wreck from the cigarette, his confidence in his own judgment regarding tobacco is greatly shaken. There are a number of young men who are slightly addicted to tobacco; their habit is not firmly fixed but they feel the need of cigarettes. In these cases some straight talk, with a mouth wash of a silver nitrate solution[1]—about one-fourth of one per cent, once or twice daily for a few days, is usually sufficient to break their habit. These cases are cautioned to not swallow any of the silver nitrate solution.

We now come to those who have a true tobacco addiction. This class is very numerous, much more so than is generally believed, and rapidly growing. I regard these people as drug habitues and treat them as such. We may as well face the facts as they are; when a man or woman must have a certain drug several times each day or suffer, and can not stop without help, I think we are safe in classing such a person as a drug slave.

Many of these patients complain of failing memory, inability to concentrate their thoughts, lack of energy and a depreciation of all the functions of the body. Others do not complain of any particular symptoms; their physical and mental depreciation has been so slow that they did not notice it, and it has been so long since they

[1]See page 172.

have been normal that they no longer know what their normal condition should be. Some of these cases say that their will is strong in everything except cigarettes. Very often this seems to be the case, not because their will is weak, but for the reason that they have underestimated the enslaving power of the cigarette.

In the treatment of a genuine tobacco addiction, I regard the case purely as a drug habit. A silver nitrate solution alone in any strength will not cure these cases; it may assist, but silver nitrate is local in its action; while a tobacco addiction is constitutional. Some of these cases while being cured complain of yawning, sneezing, aching in limbs and some bowel disturbance. These are the symptoms one expects to find upon withdrawal of morphine from a morphine addict.

In order to obtain a cure in these cases it is absolutely necessary to have a sincere desire and earnest co-operation upon the part of the patient. Should the nervous reaction be great, sedatives that do not contain opiates may be given; the excretions of the body should be regulated; habits of eating, living, and of exercise should be corrected if necessary. Some of these cases are anemic and should receive a tonic. I have found that exercise in the open, especially walking, is very beneficial in combating the nervousness. Proper bathing may be found useful also. Part of the treatment is educational in its nature; patients are told the meaning of a true tobacco addiction and are expected to be able to analyze, and describe their own symptoms and to be able to differentiate between the craving that is real and that which is purely imaginary.

(The constitutional treatment for nicotine addiction

should follow the general line of treatment used in the cure of other drug habits as outlined by Doctor Galatian in the preceding chapter, consisting of outdoor life, increased elimination through water drinking and prolonged warm baths [at 98° Fahr.], natural measures to combat constipation, daily massage, systematic exercise, gardening and sports within the strength limits of the individual, and perhaps the milk diet or an uncooked diet, all in conjunction with the use of the weak nitrate of silver solution as a mouth wash and gargle.)

After being cured there are a few things that the patient must not do for some time in order to prevent a return of the craving for tobacco. Patients must abstain from drinking any beverage containing alcohol; the bowels must be kept regular; the patient must not overeat; and any article of food that does not agree with the digestion of the patient should not be eaten.

One of the most interesting features of this work is found in remarks of patients who have been cured for some time. Nearly all speak of an improvement in health; many claim to have better memory; some who had stomach trouble have said that they do not know that they now have a stomach, and others feel better in various ways. Perhaps the most surprised of all are some of those who claimed before treatment that the cigarette was not hurting them. If they had been using cigarettes for many years, their decrease in efficiency was so slow as to pass unnoticed, and when they really began to feel better the change came as a happy surprise.

Most of my work naturally has been with those who wanted to quit tobacco and were quite willing to freely discuss their case with me. I have talked with many,

however, who did not care to stop the using of cigarettes and frankly said so. While I do not claim to be a reformer in the accepted sense of the term, I have been very much interested in obtaining the viewpoint of these men.

One of the favorite arguments of these people is to point to men holding responsible positions who use tobacco. This proves nothing, as there is no way to test the efficiency of the man in question. Or he may smoke a pipe or cigar, moderately without inhaling. It is futile for the cigarette user to hide behind the man who does not inhale, as there is no similarity between them. Another argument advanced by these men is that men who smoke cigarettes often live to a ripe old age. There also are many cases addicted to the use of morphine who live to a ripe old age, and who will say that it does the victim no harm.

The injury from the cigarette is so slow and gradual that the user is not always aware of the hurt. It is not possible to judge the extent of the injury a cigarette addict is receiving from his appearance. I have seen men who were little more than nervous wrecks from the cigarette, but who had the appearance of being in good health.

I have had cases of cigarette habit who said at first that the cigarette did not injure them but afterward applied for treatment. They then said that the reason for their earlier statement was that they did not like to admit even to themselves, that they were a slave to any habit.

In conclusion, I will say that any person who uses tobacco can learn the extent of his addiction by stopping

its use for a few weeks. If he has no addiction, there will be little suffering. If he can not stop for such a period, lowered efficiency of both mind and body is the price he must pay to continue the habit.

CURING THE ALCOHOL HABIT

By Dr. EDWIN F. BOWERS

THE most important element in the cure of a drunkard is the drunkard himself. If he is really and truly in earnest, and if he is not merely trying to obtain a modicum of maudlin sympathy for his "heroism" in battling John Barleycorn, he can be cured.

But if he is merely "playing to the gallery," if he is only interested in "taking the cure" because his wife, or his relatives, or his employer are interested in him, he is hopeless—he is impossible.

This is the sad, stern fact. Lacking the full co-operation of the victim, and lacking a resolution to cut the bonds that bind him to his crippledom—as the murderer of old was bound to the corpse of his victim—he can not be cured. His craving will be just as great, his nerves just as vacillating, and his efforts just as jelly-fishy.

But if a man has really made up his mind to "stand the gaff" for a little while, and bravely to fight off his old enemy, most certainly and surely he can be cured.

For there is no man on earth so sodden, so drink-drenched, so supersaturated with the protoplasmic poison alcohol, but that he can not be retrieved, whose tissues can not be scoured clean, whose nerves can not be built up, whose resistance can not be bolstered—if only he makes up his mind hard enough.

But *he* must do this. There is no one else that can do it for him. If he doesn't care enough about himself, or about anyone else on earth who is near and dear to

him to do this, the sooner he drinks himself to death the better for himself, his family, and the world he encumbers.

And it must be remembered that the re-making of a man is not the labor of a day or a week. Some may and many have shaken off the alcohol shackles in a day—in one supreme heaven lifted moment.

But in the great majority of cases, the guerdon is to be won only after a gruelling contest, the haven is to be reached only after a protracted struggle with the Thing that is implacable.

And let no wife or mother hold the illusive hope that the husband or son can be "secretly" cured. There is no drug, there is no sweet antidote that can be "dropped into his coffee" or administered without the drinker's knowledge, which has the slightest effect in eradicating the alcoholic desire.

It is a great pity that such a remedy does not exist. But if it does, no honest medical man in all the world, no scientist who has devoted a lifetime to experiment and study, knows anything about it. And if these do not, it is not at all likely that any quack does.

So I repeat there is *nothing* that will compel a man who is not willing to be compelled, to quit drinking. He may be "doped" with apomorphine or tartar emetic, until his very soul revolts at the taste or odor of alcohol. But as soon as he can get his "booze" without emetics, as soon as he can get unmedicated liquor, he will pursue again the uneven tenor of his alcoholic way. He will know that he isn't cured, and nothing and nobody can convince him that he is.

Old Doctor Johnson said that every sick man is a

rascal. This statement proves that the redoubtable Samuel knew nothing of sick men, and less of rascals. If he had he would never had made such a ridiculous statement.

But every drunkard is a sick man. His tissues are suffering from chronic poisoning. His body and nerve cells are saturated with under-oxidized material, his elimination is hampered and "slugged," his resiliency is reduced, his digestion is impaired, his circulatory system is unfavorably affected.

Metabolism and the assimilation of food are abnormalized, and even his "muscle tone" is lowered. In fine, the drunkard is an invalid, not a bed-ridden invalid, but still an invalid. He must be made whole and sound before the Genii of the Bottle can be banned from his system.

Herein lies the great value of sanatorium treatment —of skilled and expert direction which surrounds the victim with scientific restraint. First and foremost, because among strangers, the psychological influence of changed environment and association is gained.

And secondly, because the misdirected sympathy extended to the drunkard, who is at the same time a dear relative, can be avoided.

The drinker's family can not bear to "see him suffer." Hence only a small amount of wheedling, cajoling, weeping, or cursing is required to persuade relative attendants to administer the "one little drink" that keeps the system toxin-laden, and that makes the ultimate cure difficult—if not impossible.

Therefore, one necessary adjunct to the successful treatment of an alcohol addict is a firm dispositioned

nurse, who has any amount of sympathy for a man who is sick, but who doesn't thrill in the slightest to the maudlin ravings or pleadings of a man who is bent on keeping himself sick.

There are a number of "treatments" which have had a greater or less degree of success in relieving alcohol cravings.

One of the best known of these, and one which has received high scientific endorsement, is the system elaborated by Mr. C. B. Towns, of New York, and popularized by Dr. Alexander Lambert.

This method I am credibly informed, has been employed in thousands of cases of alcohol addiction. It is not universally successful. Nothing is. It can not be employed with safety, for instance in cases in which there is grave constitutional debility.

But the man who earnestly desires to be freed from his habit, can be freed. Especially if he can be brought to realize that he is mentally and physically impaired, and that for a time his system is not fitted to withstand the strain of mental worry or hard physical labor.

This treatment can not well be undertaken except under the guidance of a physician competent to handle such cases. For Towns and Lambert have concluded that it is practically impossible to relieve a victim of rum while the pathological effects of a drug are still rampant in his system.

Their first endeavor, therefore, is to relieve the system of the accumulated effects of the depressive poison. This they bring about by giving the patient a tremendously thorough course of "bluemass" and compound cathartic pills, followed by drastic saline purgatives.

This scours the alcoholized protoplasm free from the toxins of alcohol. It leaves the victim rather limp and "raggy" for a time. But if he keeps up the process, and if he brings his system up to its highest pitch of physical efficiency by rest, recreation, tonics, and gentle exercise in the open air—gradually increasing the demands upon his muscles as his strength returns—his system can usually be built up to withstand the craving.

This may require from three weeks to a month. At the expiration of this time, the organism will have elaborated a reserve of vitality that will overcome the desire to indulge in that dangerous "tippling" that has contributed to the relapse of thousands.

The man who thinks that he can "take a little drink and let it alone" usually doesn't. No excessivist can ever—at any time, or under any circumstances drink alcohol, even as a "medicine"—which it never is—without imminent danger of a relapse into his former serfdom.

The very first drink—even the "social sip"—is likely to cause all the old craving to flare up like a forest fire.

The reason is evident. For the poison of alcohol and the nerve cells of one who has been its victim are incompatible. Alcohol effects a union with the fat in the brain and nerve cells to form a poisonous combination, which prevents absolutely the normal functioning of the brain cells. So no man whose habits of drinking have become chronic, can ever hope to drink "moderately." If he tries it, he is flirting around the edges of a whirlpool, that sooner or later will suck him under. Thousands have been cured, only to relapse, because they could not resist the temptation to "nibble at

it"—all of whom might have remained permanently cured had they maintained a steadfast teetotalism. The only safe place for a drunkard is directly in the middle of the straight and narrow path.

Perhaps the most difficult of all drunkards to cure are the "periodics"—those who, without any apparent cause, break out every month or six months, or at some recurring period of time as regularly as the lunar cycle.

The best medical opinion now inclines to the belief that dipsomania—as it is called—is a mental disease resulting sooner or later—if not drastically eradicated in the meantime—in a complete nervous or even mental breakdown.

Heredity seems to play an important part in this excessivism that transforms a loving and solicitous husband and father into a cruel, raving beast, or a drooling incoherent ape.

It is possible that blastopthoria—that bar sinister that Nature stamps upon the germinal cell, blighting for life the product of that cell—plays a large part in this pitiful condition.

The child conceived while one or both its parents are under the influence of drink—the product of a honeymoon gayly festooned with wine bottles—is more than likely to bear the degenerate stigma of this dalliance to an early grave.

He may, unless his general health is particularly good—unless his environment and associations are most favorable—be called upon to expiate the crimes of his parents. To cure him of his obsession—for this is actually what it amounts to—courage, skill, tact, and infinite patience are required.

I am convinced, however, that one important predisposing cause for these periodic "sprees" has been hitherto quite generally overlooked. This cause is chronic poisoning by nicotine—affecting more particularly those who are addicted to the cigarette habit—or else who make a practice of inhaling pipe or cigar smoke.

These dipsomaniacs smoke until their systems become supersaturated with furfurol, the aldehydes, and the other poisonous products of tobacco combustion, or tobacco absorption. They pass beyond the sedative condition that usually follows moderate smoking, when there is a sufficient accumulation of nicotine and its associated products within the system. These act powerfully upon the central nervous organism, producing irritation, restlessness and insomnia, and all those distressing conditions that arise when the nerves cry out against being poisoned.

Finally the nervous irritability becomes so acute (even though the patient may never be aware of it except through vague undefined feelings of restlessness and dissatisfaction) that he turns to narcotic solace. And when he does, there stands his old friend John Barleycorn with open arms.

The jaded and irritable systems haven't much resisting power left, and so a very short sojourn in the midst of the Barleycorn welcome is sufficient to put these patients mentally "to the bad." (And by the way, the dipsomaniac usually gets drunk in his head before he does in his legs or body—directly reversing some of the other varieties.) Then they subconsciously decide that nothing matters, and they throw the reins over the dashboard, or they "step on the gas"—and away they go.

So to cure the habit of drinking—and this applies to all the forms of drinking—first cure the habit of smoking. It's just as easy to quit them both while about it—and then assurance is made doubly sure.

A mouth wash and gargle composed of

1 dram of silver nitrate,
30 grains of pulverized alum,
2 drams of hydrogen dioxide,
1 pint of distilled water,

will help amazingly in this. Rinse the mouth and gargle the throat with this mixture every time there is a desire for a chew or a smoke. The combination is harmless, even though continued over long periods, although, of course, it should not be swallowed. If faithfully employed, nausea will generally follow attempts to use tobacco. And, in any event, the tobacco will no longer "taste good," thereby making it easier to relinquish.

Sugar has given excellent results as an antidote for "booze." It is contended that the alcohol craving may be a cry on the part of the system for a rapidly oxidized carbohydrate—that food element that contributes to heat and force. If so, sugar adequately replaces and completely satisfies this carbohydrate craving.

In any event, it is most unusual to find a heavy drinker who is also a large user of sugar, or who is fond of candy. Indeed, many drinkers use no sugar in their coffee, and have a positive aversion for "sweet stuff." In consequence, the body, receiving, as it does, a minimum of sugar, demands a maximum of alcohol to replace the sugar.

So, rich ice cream, chocolate caramels, cereals with

cane sugar, sweet fruits, honey and all forms of sweet desserts, may constitute a pleasant and most effective alcohol cure—especially for mild cases.

Where there is much distaste for sweets, the change should be gradual and increasing, so as not to arouse rebellion. In these cases a dram or two of lactose every two hours in the form of a medicinal powder (for its psychic effect) gives admirable results.

As the amount of sugar taken is increased, the demand for the alcohol is decreased. Alcohol, if taken at all, should consist of highly sugared liquors, the alcoholic content of which should be rapidly reduced in quantity. Toddies, juleps, sweet wines and cordials give best results.

Under this plan the excessive craving for alcohol is relieved in from one to four weeks, while many alcoholics omit their "booze" entirely in from three to five days.

During the treatment, which has, to my knowledge, been quite frequently effective at home, elimination should be increased by every known means—purgatives, hot drinks, sweats, baths, etc. And the excess sugars are to be gradually withdrawn after the patient becomes once more normal.

It has also been proved that drunkards and apples are rarely found in combination. In fact, the liberal use of apples, in many cases, has completely obliterated the craving for alcohol. Apples create a certain distaste for liquor, so that after one has eaten an apple or two, he has little relish—and frequently a distinct aversion—to whisky.

Dr. Samuel Bailey, of Iowa, is sponsor for this idea.

He writes me that he has cured several hundred alcoholic patients by feeding them apples every time they wanted a drink. So it may be possible that the forbidden fruit, which, in the intellectual childhood of the race, used to be held responsible for our reputed downfall, may now become a means for our rehabilitation.

Dr. Samuel McComb, of the Emanuel Church in Boston, has inaugurated, in what is known as the Emanuel Movement, a practice that has achieved a noteworthy success among drunkards.

This contemplates combining prayer and mental suggestion in an attempt to pierce the sodden armor of the man, and to reach his hidden resources—his reserve fund of energy—and arouse in him a spirit that will dominate his habit of weakness and self-distrust.

Scientifically, this principle is sound. It is founded upon well known and clearly defined psychological laws, upon methods that tap the well-springs of faith and hope and courage and determination.

And who knows? Maybe, after all, there *is something* out there—something big and wonderful and all-loving—that can, with cosmic arms, envelop a man and lift him up out of his degraded self into a higher plane—into something a little further removed from a brute beast and a little nearer a god.

Treatment by hypnotic or by hypnoidal suggestion has been employed by psychologists with excellent results. For powerful suggestion, given under the favorable conditions brought about by complete relaxation of the objective mind, frequently induces a curative spiritual nausea—an actual revulsion against John Barleycorn and all his works.

It is most important in the treatment of alcoholism to remember that the diet should be easily digested and carefully regulated, so that the patient receives all the nourishing food he can digest—and no more.

The helpful effect of the proper sort of physical exercise in these conditions can not be overestimated. Daily exercise, in the open air—but never to the point of exhaustion—exercises that stimulate the circulation, that increase the oxidation of the blood and neutralize the poisons generated in the system by the alcohol—all these are of paramount importance.

So drunkenness is curable. But it requires whole-souled co-operation and "spunk" on the part of the addict. It also requires confidence that the ultimate perfect and permanent results will follow effort intelligently applied and heartfully undertaken.

THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART FOUR

EFFICIENCY

SECTION THREE

BEAUTIFYING THE COMPLEXION

By VERA LUDLOW

CONSIDERING the amount of money spent by women and the amount of care and trouble to which they go in the endeavor to improve the complexion, one may almost take it for granted that if only for the sake of beauty, as manifested in a lovely complexion, most women would be willing to go to considerable trouble to acquire the very foundation of beauty. That foundation is health. Just as soon as one realizes that her appearance does not depend upon cosmetics, powders, rouges and other accessories of the beauty parlor, but primarily upon her physical condition, the purity of her blood, good circulation and strong, healthy internal organs, she will be willing and ready to adopt a scheme that will enable her to realize these fundamentals.

The girl who lacks color needs outdoor life, a certain amount of sunshine every day, a distance to be walked measured by a number of miles, depending upon her strength, and finally a sufficiency of sleep. Food is important, but if one walks, sleeps and lives enough hours outdoors she will have a normal, robust appetite and will both eat and assimilate a sufficiency of nourishing food.

Color and clearness of skin are both matters depending upon the building of vigorous health. Therefore, everything that pertains to your general condition of

body pertains equally to the question of improving your personal appearance.

Of all the ills that complexions sometimes seem "heir to," pimples and blackheads are the worst. Of what avail are sparkling eyes or fine features if their background be disfiguring red spots or distressing little black-tipped specks?

The only good thing about such a complexion is that its owner never becomes resigned to it and so he goes on trying, using one thing after another, with little or no success, until he finally gets to the stage where he begins to think that perhaps the best plan for him to follow is to use nothing, but do something.

The kind of skin generally disfigured by these blemishes is the rather thick, so-called greasy skin, mostly found in sallow complexioned people. It is this skin whose accompaniment is, unless great care is taken, a shiny nose and polished forehead.

A certain amount of natural oil (secreted by the sebaceous glands) is necessary to keep the skin soft and smooth and supple. Indeed, it is because of an insufficient supply of this natural oil that some skins are dry and harsh looking—but of that later.

In the greasy skin the oiliness is due to over-activity of these glands. Where this condition is present, special attention must be paid to insure constant cleanliness. The excess oil deposited on the surface of the skin must be removed promptly else the pores of the skin become clogged and the action of the skin—one of the eliminative organs—is interfered with. That, however, is but one of the resulting evils.

Through its millions of tiny pores there is constantly

being exuded upon the skin (invisibly, of course), effete matter. Perspiratory fluids are known to contain salts, bile, acids, etc., all waste matters of the body. Evils have an affinity for each other, and so a skin surface laden with impurities offers a fertile breeding place for infection. The medium may be almost anything: a finger-tip, a towel or a wash rag not surgically clean; the very atmosphere is laden with organic matter so that a speck of dust or dirt may be the outside influence that is apt to set up an irritation that sometimes results in a discouraging crop of blackheads and pimples.

While this is true of any skin, the greasy skin is especially prone to such disfigurement, particularly the blackhead, the improper treatment of which results in pimples and even enlarged pores.

Most people find it most convenient to attend to the care of the complexion at night before retiring. The greasy skin needs washing in plenty of hot water *with* soap. The friction should not be too vigorous and where pimples are present, a soft wash rag or bath mitt made of Turkish toweling should be used. The friction of a camel's hair complexion brush is good for the skin, but would, of course, prove too irritating to pimples. The warm, creamy lather should be rubbed well over the forehead, nose and chin with the cloth. Then it should be rinsed off with tepid water and the face finally washed with cold water to which has been added a few drops of simple tincture of benzoin or other astringent, or the face may be sponged with lemon juice very much diluted with plain cold water (say three parts water to one part juice). This is cleansing and astringent and helps to contract the pores. It is, of

course, recommended only for greasy skins. If it is convenient the face may now be gone over gently with a piece of ice. This may be used plain or, if it feels too cold, wrapped in a soft old silk handkerchief. The face should now be patted dry—not rubbed roughly with the towel.

So much for the care of the face that is necessary to avoid trouble.

Where blackheads are already formed one must set about getting rid of them. It is understood that these blackheads or comedones are the accumulated oily secretion of the sebaceous glands. When not expelled through the pores of the skin they harden and the tiny end of the opening becomes black. Frequently they are not even painful and so are neglected until they become very numerous. They should not be expelled by force else there is danger of bruising the skin around them and causing ugly red blotches. For this reason once a blackhead has formed it should be removed by means of a blackhead or comedone extractor, never, never by squeezing with the finger nails. But never try to press out blackheads without first softening the skin and opening the pores. The easiest way to do this is to wash the face with hot water and then apply cloths wrung out of hot water. Steaming is also good, but it is often inconvenient and is regarded by some authorities as *too* relaxing. Another way is to apply a wet cloth to the face and hold a hot water bag directly over it. In this way the cloth is kept hot without the trouble of changing and wringing it out of the hot water every few minutes. The comedone extractor should now be used—pressing the skin immediately surrounding each

blackhead with gentle firmness, and the tiny openings where the blackheads were should finally be sponged with an antiseptic. Failure to do this often results in infection and a disfiguring pimple makes its appearance.

Where the blackheads are very thick the use of "green soap" is often advised. The skin is frictioned with a soft cloth on which a little of the soap is applied. It is then very thoroughly rinsed off. If the treatment is severe the face should be bathed with a toilet vinegar to counteract the alkali of the "green soap."

Where pimples have resulted they must be treated with scrupulous cleanliness. The face must be washed very gently and the pimples lightly touched with an antiseptic. Dioxogen, listerine, and even iodine are often recommended. Make a swab by winding a bit of cotton about the end of a toothpick. Dip into the antiseptic and apply to the pimple. Just touching the pimples with the dioxogen will often dry them up and cause them to heal without scars. Rubbing and irritating them causes them to grow larger, and when they do heal leave a scar or enlarged pore. Indeed some one has said, and it may well be true that "enlarged pores are pits—the graves of a thousand pimples."

In direct contrast to the problem of caring for an oily skin is the attention that a thin, dry skin needs to keep it from looking harsh and scaly. The dry skin is deficient in the natural oil that helps to keep it soft and elastic, hence its care must consist of the avoidance of any measure that would tend to further deprive it of these oils. The use of toilet vinegars, acids (even of the lemon) and any lotions containing alcohol must be avoided. Even a too free use of soap is inadvisable.

Almond meal, so often advised for such skins, is excellent, but it is too expensive. But equally good results are obtained from the use of small cheese-cloth bags filled with raw oatmeal mixed with a small amount of fine Castile soap shavings. These are cleansing and soothing, while the friction with the cheese-cloth exterior is sufficient to keep the skin free and active. If a delicate perfume is desired a little powdered orris root may be mixed with the oatmeal and shavings. The bags should be about three inches square and about half full. They are thus economical and convenient to handle.

Frequent sponging with hot milk is very good for the skin, dry skin and red rough blotches often give way to this simple treatment. The milk should be hot but not boiled, as its healing property is then said to be impaired. Apply with a soft cloth or a bit of cotton and allow to dry on the skin.

About once a week during the bedtime care of the skin apply a good face cream to the skin immediately after the hot water bath. In this warm and relaxed condition the dry, or as it is sometimes called "hungry," skin will absorb the cream almost greedily. It should be left on the face for ten or fifteen minutes and the surplus cream gently wiped off with a soft cloth. The skin will be soft and smooth as satin afterwards.

This chapter would be incomplete without an attack on that old bromide, "beauty is but skin deep." A more misleading statement never was made. Beauty, real beauty, is blood and bone deep. Any good skins would be more in evidence if people regarded the skin more in the light of what it really is—an organ with a distinct function—instead of merely a covering for the body.

Our manner of living has as much an effect upon our skins as upon our hearts or lungs. Harmful, constricting clothing, carelessly chosen, or even worse, carelessly chewed food, intemperate habits, lack of fresh air and insufficient bathing, all take their toll in red noses, sallow, rough, blotchy skins, pimples and blackheads.

Pimples and blackheads, when not due to local carelessness, are often the direct result of disturbed circulation of the blood, nervous disorders, inactive eliminative organs or indigestion caused by wrong dietetic habits. The cure—and there is one—is found in simple, easily digested foods, with little if anything fried, fresh vegetables and fruits, especially oranges and apples. Masticate your food thoroughly and if your noonday mealtime is limited cut out your hastily bolted sandwich and slab of soggy pie. In its stead take a bowl of soup, a cup of hot milk or chocolate or some fruit. Take plenty of water, both hot or cold. And this is most important, the excretory organs must be kept active. With your morning cereal use figs or prunes that have been first well washed and then soaked in a little water over night. Mix a little bran with your cereal or include bran biscuit or muffins in your diet. Occasionally, on retiring, eat a large apple and drink a glass of cold water right after it. There are any number of such harmless means to prevent costiveness.

It is these constitutional methods that must be relied upon primarily when acne (as pimples and blackheads are medically called) develops in boys and girls during the period that ushers in manhood and womanhood. The sebaceous glands of the skin at this period of rapid bodily development are excessively stimulated, and very

commonly become disaffected, the disorder usually taking the form of blackheads and pimples. In such cases, treatment often seems unavailing, but the afflicted one nevertheless should not become worried or discouraged, as almost always the condition, even when severe, disappears or seems to remedy itself in the course of a few years. Nevertheless in these cases there should not be neglect, but scrupulous local cleanliness should be practiced together with those general hygienic observances already described that conduce to a healthy condition and appearance of the skin.

There is unfortunately, no get-pretty-quick method that I can recommend. The road to beauty is a long one, but if you take it—and keep to it—you are at least sure to get there. It is comforting to know that to a great extent beauty and charm can be cultivated. It must be understood that individual peculiarities need special attention. But nearly all cases can be improved if not actually entirely remedied. And if in connection with right and simple living, a few minutes daily, say fifteen or twenty minutes every night before retiring (or whatever time is most convenient to one's mode of life) are devoted to local treatment any complexion can be kept in good condition or a bad one improved or even banished.

The one really valuable and helpful feature of the beauty parlor is facial massage. This has an unquestionable effect in toning up the flesh of the face, a smoothing out of the skin, and in giving one, temporarily at least, a younger, brighter and more healthy appearance.

It should not be supposed, however, that massage

BEAUTIFYING
THE COMPLEXION

Probably the best cosmetic treatment in the world is the application of ice to the skin, closing the pores and producing a reaction of vigorous circulation. Wrap the ice in a cloth for the purpose. The effect is really wonderful.

In drying the face after washing do not rub too roughly with a towel, especially if your skin is thin and sensitive. It is far better to pat it gently and take up the moisture in this manner.

Perhaps the first rule to learn in caring for the skin is never to pinch a pimple. A pimple can be driven away quickly by touching with tincture of iodine on the end of a match or tooth-pick as soon as its appearance is noted. Do this before retiring.

Probably this is as familiar as it is unpleasant, being the wrong way to treat a "blackhead." Do not pinch or squeeze out a blackhead with the fingernails. It bruises the tissues and usually causes a large red pimple to follow. (See next photo.)

A blackhead can best be removed by the use of a blackhead remover, a simple device to be procured in any drug store, producing pressure around about it and causing the blackhead to "crawl out" seemingly of its own accord.

This simple treatment for wrinkles applied at night is often very effective. Bits of soft muslin cloth are dipped into white of egg, applied to the wrinkled parts which are first smoothed out, and allowed to remain over night.

The massage treatment for removing wrinkles should consist of stroking parallel with, and never across the wrinkles. For lines across the forehead, for instance, strokes should be from the center to the side, as in the photo.

This is a form of facial massage treatment that does not pull and stretch too greatly the adjacent tissues. It is largely a matter of pressure applied by the palm and heel of the hand in conjunction with a slight twisting movement of the wrist. It improves the circulation without breaking down the tissues.

In the massage of the eye region for overcoming puffiness or hollows underneath the eyes, the heel of the hand is used with a gentle pressure, combined with a twisting action of the hand.

Massage depends for its efficacy upon the gentleness rather than upon the amount of strength used in its application. Never pinch the face severely. In this type of massage very gentle stress should be used, thus improving the circulation without breaking down adjacent tissue. The ideal plan is to contract or exercise the underlying muscles at the same time that the massage is applied.

can work wonders in bringing back youth and beauty to one whose health is unsatisfactory. Massage while beneficial has its limitations. It can not make up for poor nutrition, lack of sleep, poor blood, poor circulation and other adverse conditions.

Massage is valuable chiefly because it improves the circulation. This improvement in the circulation may also be accomplished by alternately dashing hot and cold water over the face, or by alternate applications of hot and cold wet cloths. Indeed any woman who lacks color may do well on going out for a social evening, to bathe her face with hot and cold water alternately in this manner, making at least ten to twenty changes, using cold water finally. This will so stimulate the circulation that the face will remain in a glow for a considerable time.

This hot and cold water treatment may be advantageously combined with massage, or may follow the massage treatment. Massage of course has the advantage that it not only improves the circulation but has some directly stimulating effect upon the building up of the muscular structures and other tissues of the face.

It is easy to make mistakes however, in the administration of facial massage. The most common of these mistakes is the use of too much strength in the treatment. If the masseuse "works hard," perhaps trying to give you your money's worth, and uses up considerable strength in the application, it is more than likely that harm rather than benefit will be the result. Too much stress in facial massage is likely to cause the breaking down of the tissues, including the connective tissue under the skin, giving the face a sagging and wrinkled aspect. To be effective massage should be very light,

just enough to stimulate the circulation and promote the healthy improvement of all the cells.

The other chief mistake is that of too much stretching and pulling of the skin. Massage as ordinarily practiced consists partly of stroking. Vigorous stroking means too much pulling and stretching of the skin at least of the face to the detriment of the underlying tissues, often with the result of producing rather than remedying wrinkles. Light stroking in the right direction will be of value, but it should not be overdone.

Other forms of massage treatment consist of kneading, pinching, and what is technically called "friction." Friction consists of a circling movement under slight pressure. There is no friction of the skin; the friction is in the tissues underneath, due to the circling or "round and round" movement imparted by the finger tips, which is calculated to loosen, so to speak, and slightly stretch the structures under the skin. This is perhaps the most commonly used form of massage for the face.

Probably the best treatment of this kind is one in which the muscles of the face are used in conjunction with massage. This will more perfectly build up these muscular tissues, giving the face more tone, more fullness, and preventing the sagging and drooping appearance which goes with weakened and relaxed muscles. The treatment is really very simple. All that is necessary is to contract the muscles of the face while under slight pressure with the hand. If the heel or palm of the hand is placed against the cheek or mouth for instance with moderate pressure, the contraction, stretching or pulling of that part of the face, "as in making faces," will bring these muscles into action and improve

the circulation. If the hand is moved in a twisting action or a circling action at the same time, it will help. The pictures will make the method more clear.

The muscles of the face may also be exercised by "making faces." Children like to do this to make themselves as grotesque as possible in the effort to be "funny." Fond mothers usually discourage the practice, but it is beneficial rather than harmful. You may first yawn, then pucker the mouth, pull it from side to side, raise and lower the eyebrows, possibly one at a time, stretch your eyes wide open, squeeze them tight shut, knit your brows, wrinkle then stretch your forehead and do almost everything except looking cross-eyed. Making faces in this manner will help you to "wake up" the muscles of the face, stretch and contract all of the tissues and greatly improve the circulation and ultimately your appearance. Two to five minutes of making faces followed by five to ten minutes of facial massage according to the suggestions given, will amply repay any woman.

HEALTHY AND BEAUTIFUL HAIR

By VERA LUDLOW

PRIDE of hair like pride of race is an old human vainglory. And when we consider the gold-dust strewn heads of the horsemen of Solomon and the satisfaction that Cæsar is said to have derived from the privilege granted him by the Romans to wear at all times his crown of laurel to conceal his baldness, why we of today, with our henna shampoos and permanent waves—are only just about up-to-date. I suppose it might even be news to some of our distributors of aids to hirsute adornment to learn that the preference for blonde hair was so great in Athens that turning dark locks into golden ones was a very lucrative business.

All of which, however, is of no benefit to those sparsely locked ones who are seeking crowns more worthy of the name.

Beautiful hair is always healthy hair and healthy hair properly cared for is always beautiful—beautiful because of its life and luster and elasticity. Venders of tonics and get-hair-quick pomades to the contrary, the chief factors that make for a luxuriant growth of hair are, when all is said and done, just three: Cleanliness, fresh air and a free circulation of the precious life stream to nourish the hair roots. Perhaps I should have put the last first, but cleanliness and fresh air are so revivifying and preservative that they wrote themselves first.

With these three fundamentals in mind it is really a simple matter to care for the hair and keep it in sc

Plentiful brushing of the hair is the first secret of keeping it beautiful. The results depend almost directly upon the amount of time spent each day in brushing.

healthy a condition that it will indeed be a "thing of beauty" and "a joy forever."

To begin with cleanliness: To obtain a condition of cleanliness of the scalp that is conducive to a good growth of hair, it is not necessary to shampoo or wash the hair with very great frequency. The daily "sousing" that so many men give their hair or the weekly shampoo with strong cleansing fluids that some women think necessary to hair health are often just the means of bringing about the condition they try to combat. The shampoo liquids remove (along with the dust and grime) the natural oil upon which the hair depends for its luster and elasticity. Thus where the scalp is naturally inclined to dryness these too frequent washings only aggravate the state, in the end leaving the hair thin, dry and brittle.

Under ordinary conditions all that is necessary is to wash the hair twice a month. For further cleansing, a daily brushing and a thorough cleansing of the scalp with a soft cloth once or twice a week will be ample. High sounding are the names and many the virtues that are attributed to the various shampoo mixtures; but perhaps the best thing to use is pure Castile soap or an egg or a combination of both, as when a little of the soap jelly (made by boiling the soap shavings in water) is added to the egg which has been well beaten up with say half a tumbler of water. Whenever an egg is used for the shampoo, the water used must be *warm, never hot,* else the egg will be cooked and it will prove no end of a trial to remove the coagulated egg particles from the hair. Tar soap also is splendid for shampoo purposes.

The simplest procedure for a shampoo is as follows: Wet the hair with only a little water, and apply the cleansing agent. Rub well into the scalp and from time to time add more water to make a good lather. Part the hair to expose the scalp and rub well with the finger tips. Go over the entire scalp in this way and then rinse with several waters, using cold water for the last rinsing. Dry carefully with towels, or, in warm weather, by exposure to the fresh air and sunshine.

The best way to dry long hair without tangling is to take up strands and rub them from the roots down between the towel covered hands. Move the hands down gradually to the ends of the hair, drawing the hair out to its full length. Needless to say the hair should always be thoroughly dry before it is dressed or braided after a shampoo.

Once or twice a week, the scalp should be given a dry cleaning with a soft cloth. Part the hair and with a bit of cheesecloth or old muslin that is wound round the finger tip, rub the part briskly and rather vigorously. Properly done the entire scalp can be gone over in this way and made clean and glowing without tangling the hair in the least. The rubbing loosens and removes dandruff and dust, and the friction draws the blood to the surface encouraging circulation.

This dry cleaning is not to be confused with the dry shampoo which I consider a most harmful practice. In the dry cleaning the skin is by friction stimulated to greater activity while yielding all morbid impurities that are there deposited. In the dry shampoo—but a description of the process will be its own condemnation. Corn meal, orris root, or a specially prepared powder

is sprinkled and rubbed into the hair and then brushed out again. Sounds very simple. So it is, to rub it in. But did you ever try to brush anything like a powder out of your own hair. You may get most of it out, but it is the little that remains that works the havoc. Mingling with the perspiration and the scales the skin is naturally shedding all the time, it forms a deposit that coats the scalp, choking up the pores, and interferes with its action. The natural oil which is so necessary to the health and beauty of the hair is imprisoned, as it were, in the glands, which consequently become distended and further hamper the nutrition of the hair. These dry shampoos are often advised for oily hair, but most of you will agree with me that oily hair is better than no hair and that is just what this pernicious advice actively followed would bring about.

Where dandruff and dry scalp are being treated, this dry cleaning with a cloth is absolutely necessary to make any treatment helpful. It is by now understood that tonics or oils to be of benefit must be absorbed by the scalp, not merely applied to the head or (as most frequently results) the hair. And so the scalp must be put in a receptive state.

It should be thoroughly cleaned with a cloth or brush, or better still both. The hair should be parted and the exposed scalp rubbed vigorously with the cloth covered finger. This will loosen the dandruff and it can now be brushed out of the part in the hair with quick short movements with a scalp brush. Do not brush down the entire length of the hair. This treatment is only to remove the dandruff, not to smooth the hair. When the entire surface of the scalp has been cleaned in

this way it is time to apply the oil. Fill a medicine or eye dropper with oil (olive, castor, cocoanut or sweet almond), make a part in the hair and release a drop or two of the oil right into the part. Rub with the finger tip for a minute or so and proceed to the next part. Applied in this way, most of the oil will be absorbed by the scalp and the hair will not be saturated or look unsightly.

The scalp is now ready for massage, but whether or not massage follows the application of the oil, the scalp should in a day or two again be given a dry cleaning. This will prevent any of the oil that has not been absorbed from combining with dust, etc., and forming a coating on the scalp. For above all things the scalp must be kept clean and free to "breathe" as it were.

In massage we have the most efficient way of bringing about an improved circulation to the scalp and hair follicles upon which the growth and actual nutrition of the hair depend.

What physical culture does for the body, massage does for the hair. By such manipulation of the scalp, a free flow of blood (the only hair grower in the world) to nourish the hair roots is made possible.

It is not very easy to treat one's own scalp, and wherever it can be done the help of another person should be enlisted. Where this is impossible one must learn by practice and patience to do it for oneself.

For self treatment there are three distinct movements that one should become proficient in for a satisfactory and helpful massage.

Loosen the hair. Then with both hands press firmly on the back of the head and move the scalp backwards and forwards on the skull. Do this a number of times,

If there are snarls or tangles in the hair, it should be brushed first at the tip ends, later proceeding upward, until all tangles or snarls disappear.

Beautiful hair is worth taking good care of. Careful braiding before retiring will not only save trouble in keeping it in order, but will help to keep it healthy through the gentle tugging at the roots.

Massage of the hair roots is an indispensable form of treatment for maintaining good scalp circulation. Improved circulation means bettet hair nutrition, therefore better color, more beautiful sheen, and more life in the hair generally.

Above shows "dry cleaning" of the scalp, the hair being parted and the scalp rubbed with a soft cloth wound around the finger. Especially helpful in cases of dandruff and oily scalp. Excessively dry hair can be improved through the application at the roots of olive, cocoanut, or sweet oil. After thorough cleansing of the scalp, part the hair and with a glass dropper apply a drop or two of oil directly upon the scalp.

say fifteen, and repeat the movement on the front and sides of the scalp. Now go over the scalp with the following movement: With the thumb and forefinger try to pick up a fold of the scalp and knead or roll it between the fingers. Most likely in the beginning you will be able to just attempt to pinch the scalp but with continued treatment the scalp will become looser and a fold of skin can then be taken up and actually rolled between the fingers. You will be encouraged to treatment as well as interested to know that the tight scalp is generally the quickest in becoming the bald one. Lastly rub the entire scalp with the finger tips in this way: Place the finger tips against the head and rub the scalp with round movements describing little circles all over the scalp.

Given a bi-monthly shampoo, a dry cleaning and massage once or twice a week and a few minutes' daily brushing, the average scalp will respond gratefully and an improvement be noticed in a few months.

The daily brushing helps to keep the hair clean and also makes the hair smooth and glossy by distributing the natural oil over it. The friction of the scalp by the use of the brush is also of benefit though there is a diversity of opinions regarding this point among authorities. Those in favor say it is a form of massage while the others contend that very vigorous brushing pulls out the hair, the wire hair brush being their especial aversion. Concerning the wire brush, its use has always seemed to me like scratching the hair with a pin-studded shingle. As for the rest why "go at" the hair with a hair brush and a vengeance. A brush can be used with intelligence; with firmness, yet gently. And any doubts

regarding it as a cleansing agent can quickly be dispelled by wiping the bristles on a cloth after every few strokes.

Personally I regard it necessary to the health of the hair to brush it out carefully and braid it each night before retiring. And physical culturists will appreciate the advantage of this brushing if it is done where a current of fresh air can blow through the hair. A good way to keep the hair clean and sweet is to brush it and leaving it hang loose, sit quietly and rest near an open window. One could even practice breathing exercises the while but any way the hair would be getting an air bath as well as a relief from the strain of the way in which it is dressed for the day. It might also be well to add here that an occasional change in the mode of dressing one's hair is very advisable.

All brushing of the hair should be done after it is combed out, not before, and many a pull and pain will be avoided if this little trick is introduced when combing out tangles or the snarls that curly hair so often gets into. Divide the hair into strands and holding the hair just a little above the tangle comb beneath it. Hairdressers, in fact, always comb hair that way. They never start at the roots and comb down, but begin a few inches from the end, comb out, and grasp the hair a few inches higher. In this way by the time the roots are reached the hair has been stretched and straightened out and any possible tangle avoided or smoothed out without pulling the "head off" as the children always say.

HYGIENE OF TEETH AND MOUTH

By BERNARR MACFADDEN

HEALTH to a large extent depends upon the teeth. Food can not be properly masticated without sound molars. The modern tendency of teeth to decay early in life clearly proves that something is wrong with our dietetic or chewing habits.

Like any other part of the body, the teeth must be exercised in order to be properly preserved. Our foods are so frequently macerated to a fine consistency and they are so often cooked to a mush before they are eaten, that the teeth have little to do. They decay and become soft or brittle because of lack of use. It will be found that peoples living upon grains, coarser fibred food products and uncooked foods which demand vigorous mastication have strong, healthy teeth.

It is necessary to give the teeth a reasonable amount of regular use. Cultivate the habit of eating zwieback, hard crackers or other hard food substances that require real vigorous chewing. If this is difficult, then make a habit of exercising the teeth in some way. Do not, however, depend upon the chewing of gum for hours each day as a means of exercising the teeth. Chewing a hard gum for a few minutes after a meal might be of advantage, but continual gum-chewing wastes and weakens the digestive elements of the saliva. In other words, if you sit down to a meal after chewing gum for two or three hours, the saliva that you mix with your food will not have the normal digestive elements. One might

say that the "strength" of the saliva has been lost while chewing gum.

If your teeth are decayed the offending members should be removed or the cavities filled. It is always wise to retain every tooth you can until extraction is practically compulsory. Decayed teeth should be filled promptly. As long as a tooth can be filled it should not be extracted. A good dentist should be consulted at frequent intervals.

If tartar has collected on the teeth, it should be removed by a competent dentist. One good method of keeping the teeth free from tartar is to rub the gums and teeth daily with table salt containing considerable grit. Dampen the finger, place a quantity of table salt thereon and then rub the teeth where they meet the gums. Make the process sufficiently vigorous to rub off any tartar that may have accumulated. The mouth should be rinsed with moderately warm water immediately after this process to remove the salt. Any good tooth wash that is sold in the form of paste can be used instead of salt for this same purpose. This rubbing process is of more value to strengthen the gums and to cleanse the teeth than brushing the teeth with an ordinary tooth brush.

Tooth brushes, however, are valuable and should be used morning and evening. In caring for the teeth the following plan is suggested:

Soon after rising rinse the mouth out thoroughly with a mild antiseptic tooth wash; soap, or salt and water, is fairly good if nothing better can be obtained. Plain water will also serve the purpose. Lemon juice to which considerable water has been added, also makes

a good mouth wash. Orange juice can also be recommended.

A very good improvised or emergency tooth "powder" is bicarbonate of soda, the ordinary baking soda or saleratus that Mother uses in cooking. It is alkaline and very cleansing. If you have run out of your usual supply of tooth powder, baking powder will serve just as well, though it is not flavored or made attractive by any kind of "camouflage."

It may be said that most of the standard tooth powders and tooth pastes on the market at the present time are fairly reliable and satisfactory, particularly those of which the formula is printed on the wrapper. When brushing the teeth, avoid using a brush with the bristles too hard. A medium—or even a soft bristle brush is preferable. The lateral action of the tooth brush, commonly used, is of limited value. One should use a vertical or up-and-down movement, so that the bristles will reach the crevices between the teeth. It is the spaces between the teeth that particularly need cleaning and the brush should be used in such a way as to reach these. It is here that decay usually begins.

After having brushed the teeth then rub them in the manner previously described. Spend two or three or even four or five minutes at this rubbing process. If the teeth are free from tartar do not use the salt more than once or twice weekly, though any good tooth paste could be used daily to advantage, not for brushing the teeth, mind you, but for rubbing the gums and the teeth.

For removing accumulated food substances from between the teeth silk or linen floss can be recommended. Holding the thread between the fingers of each hand

force it down between two teeth and bring it back and forth. If you have no regular dental floss, use any white silk thread for the purpose. It does not do one much good to brush the teeth if he does not remove decaying and acid-forming matter from between the teeth. The use of dental floss is fully as important as the use of the tooth brush. Where Rigg's disease, or pyorrhea, is present, an antiseptic can be used to advantage two or three times daily after rubbing or washing the teeth. Massage of the gums may prove helpful, if gently applied, though in a serious case of pyorrhea a fasting and general blood purifying regimen is advisable.

The condition of the teeth is influenced to a large extent by the state of the stomach. Where the digestion is perfect, the breath free from all foul odors, the teeth are less liable to decay and tartar rarely accumulates. Where there is any stomach disorder, however, very great care must be taken to avoid a number of unpleasant symptoms associated with the gradual deterioration of the teeth. If the various suggestions given for maintaining superior health are followed with a reasonable amount of care, and the tooth brush is used regularly, in addition to proper attention being given to thorough mastication, the teeth should be retained as long as there is use for them. Remember also the value of fruit acid in cleansing the mouth and teeth. If you will rinse the mouth out at frequent intervals with the juice of an orange or lemon, you will be surprised at the cleansing influence, of this type of acid fruit. Almost any acid fruit will be of value, but that of the orange or lemon is perhaps the best for this purpose. The free use of water to insure alimentary cleanliness together

with the acid fruit habit will form a very superior insurance for our teeth.

Finally and of not least importance, the character of the diet has a great influence on the teeth. You can not keep the teeth sound and strong if the foods you eat do not contain the material out of which teeth are built. If the food elements that build teeth and bone are lacking, you can not expect the teeth to last long. A great hue and cry has been raised about the poor teeth of the school children of today, and an effort is being made to teach the children to brush their teeth. Of course this is good as far as it goes, but it does not go far when the children are fed upon a diet that is defective. When you find the child of a poor family given a diet of little more than white bread and coffee you can absolutely depend upon it that his teeth are crumbling and decaying. No other result is possible, no matter if the greatest of care is used to keep the teeth well brushed and clean.

Therefore, the injunction to avoid refined foods will apply particularly in the case of teeth. A satisfactory supply of lime in the diet is especially necessary for the building of teeth and bone. Whole wheat bread will supply the material for building sound teeth, while oatmeal and other whole grain foods are almost equally satisfactory for this purpose.

Some women lose their teeth rapidly as a result of pregnancy, because the diet upon which they live is really a starvation diet so far as these important elements are concerned. Eggs are rich in lime and elements required for building strong teeth, while vegetables and fruits in their natural state are valuable in this way. Good milk is of value for its supply of lime and

other organic minerals in the case of young children. Furthermore, all natural foods that provide good exercise for the teeth through the necessity for mastication are valuable on this account for strengthening the teeth, as I have already said.

Dentistry is one of our most useful professions. But there would be need for few dentists if the suggestions given in this chapter were closely followed by men, women and children, the whole country over. One may have strong teeth in practically every instance, as a result of proper care and suitable diet, just as he may have strong muscles, strong organs and strong nerves.

In conjunction with the care of the teeth the general requirements of mouth and throat hygiene should be carefully considered. It may be said generally that a coated condition of the tongue indicates a similar condition of the alimentary canal. If one experiences a "dark brown taste" in the morning it is because the stomach is not in good condition. Hot water drinking is the quickest means of bringing about an improvement in this direction. The use of more fruit and more water drinking generally, combined with less eating of meat and greasy foods, will prevent the coating of the tongue.

Certainly one should endeavor to keep the mouth clean and sweet. Strong antiseptic mouth washes have often been recommended but probably nothing is so valuable for this purpose as juicy acid fruits. Orange juice, grape fruit, grapes and lemon juice, particularly lemon juice, are valuable for cleansing and sweetening the mouth. If one eats a sufficiency of fruit, he or she will have little to complain of in this direction. However, if one desires an antiseptic mouth wash or

throat gargle, a common salt solution is perhaps as good as anything. Boric acid is another ideal solution for the purpose, being non-irritant and harmless to the mucous membrane. You may use it as a gargle or as a mouth wash after thoroughly cleansing the teeth.

Peroxide of hydrogen, listerine and other mild antiseptics sometimes diluted may be employed. Diseased tonsils of course should be cared for. Progressive physicians no longer approve of the wholesale cutting out of the tonsils, for they are now believed to serve a useful purpose, protecting against infection. Only when hopelessly diseased should they be removed. Lemon juice or other acid fruit juices should be used freely, though swabbing with a mild antiseptic, such as a dilute saline solution, applied with a swab made by curling tightly a small portion of absorbent cotton around the end of a small stick, has been highly recommended by physicians.

THE EYES: HOW TO CARE FOR THEM

By HEREWARD CARRINGTON, Ph. D.

THE eyes have rightly been called "the windows of the soul," and we fail to realize how much sight means to us until some accident has deprived us for a time of the sight which we normally enjoy. Then we perceive for the first time, that we keep in touch with the outside world and all its multitudinous interests by means of sight alone, and all the other senses seem blind indeed when compared with it! In sight alone we seem to get outside ourselves, to see the world as it really is, as though we were projected without our own heads. Our eyes are our most precious possessions; and it behooves all of us to care for them with the utmost rigor—for once the sight is lost, it can never be replaced. Once the eyes are gone, they have "gone for good," and nothing we can ever do will bring back sight again.

The means by which we see an object is one of the most wonderful and interesting in the world. If we look at and "see" an object, what really happens is something like this: Light rays, being reflected back from the surface of the object in question, strike the eye (as electro-magnetic waves), and by means of a peculiar and unknown property possessed by minute structures within the eye itself known as the "rods and cones," these waves are converted into nervous stimuli. What the nature of this change is has never been elucidated, but it is one of those transformations which occur within and only within a living organism.

These nerve impulses are then conveyed by means

of the optic nerve, to the sight centers at the rear of the brain; and when they reach those centers, another mysterious and wholly unknown change takes place, and the nerve impulses are somehow transformed into the "sensation" of sight. The physical "push" becomes, apparently, a psychical happening! *How* this can be so is a very puzzling question; and one on which hundreds of volumes have been written, and about which philosophers have speculated from the time of Aristotle, and before to the present day. But the problem is as yet unsolved!

However, we deal in daily life with facts, not theories. We all of us desire to preserve our eyes in the best of health, no matter how or why we see with them. We take the facts as we find them, in short. On this more practical side of the question, there is a great deal to be said.

The tendency of civilized life is to strain the eyes, and cause them to become "short-sighted." This is proved by the fact that, as children increase in age, an increasing number of short-sighted boys and girls result; and an increasing number possessing weak eyes. Such an unfortunate state of affairs seems to be inherent to our boasted civilization—with its close, stuffy rooms, its glaring lights, its sedentary life, and its perverted food habits. All these causes tend to produce weak eyes, no less than the actual strain and incessant eye work which children are forced to do, in these days. Indeed there is good reason to suppose that healthy eyes can stand a great deal of strain without showing signs of wear and tear, if the health and general strength be maintained.

Much has been said of the advantages and disad-

vantages of various lights. The electric light is doubtless the best for all practical purposes. Its prism closely resembles that of daylight, which it resembles in many respects. The electric light can also be adjusted so that it is not reflected directly into the eyes of the student. This is very harmful. Other forms of light are less healthful in this respect.

Of course one should avoid work under artificial light as much as possible. If you are bound to work under its rays a good part of each day, see to it that your general health is good; bathe the eyes each night before going to bed, and eat a good deal of fruit in place of other food whenever possible. (The reason for this will be made apparent later on.) As for the other conditions, see to it that your eyes are protected from the light rays by an eye-shade (this is a great saver of the eyes), by avoiding highly glazed or polished paper, and by always placing the paper at such an angle that the light rays are not reflected into the eyes, but in some other direction. It is best to walk away and rest the eyes every hour or so throughout the day, for otherwise what is known as a "spasm of accommodation" may result—that is, the continuous stimulation of the muscle of accommodation may result in a sort of artificial short sight which is very harmful. Rest will relieve this condition; but if glasses are worn, under the impression that *myopia* (short-sightedness) has really set in, these will make the eyes worse, for the reason that they will give a false sharpness of vision by stimulating the already overstrained muscle to increased action.

Minor defects and diseases of the eye are common. Accidents are also frequent. Of these, the most fre-

quent are cases in which tiny specks of dust or cinders have lodged in the eye. In all such cases, the treatment is the same. The eyelid should be everted, or turned back, and the eye swept out by a small camel's hair brush. Keeping the eyes closed and allowing them to water will frequently wash out the offending substance. If it is a small piece of iron or other metal, this may be abstracted by means of a horseshoe magnet. Under *no* circumstances should the eye be rubbed, as this will have the effect of rubbing the sharp grit into the eye itself, and causing it to be lodged there until removed. Keep the hands away from the eye, allow it to water, and have the grit removed at the first opportunity.

Bloodshot eyes frequently result from over-strain, or occasionally from dissipation, or from a blow on the eye, etc. Whatever the cause, the result is the same. The tiny blood vessels within the eyeball are ruptured, and the "red" which we see is suffused blood, which has infiltrated into the surrounding tissue, and remains there until absorbed. Owing to the small size of these vessels, this is not, as a rule, a serious condition, but may become so by neglect. If the health is good, and if the general tone of the system and walls of the blood vessels throughout the body were good, bloodshot eyes would rarely be found. Rest and bathing the eyes in cold water is the best means of cure; ice packs may be applied in some cases with benefit. Reduce the blood supply in the head by every means in your power.

Watery eyes are generally a sign of a run-down, debilitated condition, and require a general building up régime.

Cold compresses to the eyes may benefit them in some

cases; but constitutional treatment alone can be relied upon to benefit this condition to any extent.

Dark rings under the eyes generally betray either one of two things—lack of sleep, with a general run-down devitalized condition, due to sexual abuses, etc.; or incipient disease of the kidneys, which often shows itself in this form. Dropsy may also become manifest in this way. Radical measures adopted to remove the causes of these conditions will also effect a cure of the symptoms.

Many persons suffer from dancing black spots, formed apparently in space, and technically known as *muscæ volitantes*. They sometimes form shapes such as strings of beads or roses, circles, threads, etc., and float about in the field of vision. They are caused by shadows cast upon the retina by microscopic opacities in the vitreous humor of the eyeball, which do not usually attract attention. Many persons watch these spots, and become fearful in consequence—thinking that they are "going insane," and that this is one of the early symptoms! They are unimportant as a rule. Constitutional treatment will eradicate them in due time. Care must be exercised that an undue blood pressure is not exercised on the back of the eyeball—by strain, etc., as this tends to induce black spots in space also.

If otherwise healthy eyes show signs of weakness, it may be concluded with small fear of contradiction, that this condition is due to a general run-down and devitalized condition of the whole body—including of course the optic nerves and muscles throughout. Rest is essential; but often vigorous constitutional treatment is all that is required in order to bring back a perfectly healthy

sight. When the blood supplying these parts is rendered pure and clear, they will respond and become strengthened at once. If any other radical defect is present, this will at once bring that fact to light.

Cataract is a disease of the crystalline lens. The latter becomes opaque, shutting out the light, and causing more or less complete blindness. Cataract is not "on" the eye as many think, but *in* it. The only radical method of cure is a surgical operation, which removes the stone-like growth. Proper care in diet—especially a liberal quantity of fruits—will however, *prevent* it without doubt.

Glaucoma is a disease in which the excess of fluids in the eye makes the ball tense and hard—exerting a harmful pressure upon its fluid contents. It is extremely painful, and may destroy the optic nerve, by excessive pressure upon it. In its early stages it may be checked by an operation, which consists in cutting out a piece of the iris; but when once paralysis of the nerve has set in, there is almost no chance of recovery. So far as I know, fasting and allied measures have never been applied in cases of this character. It is to be hoped that they will be in the near future.

Granular lids are sometimes very difficult to cure. The lids become thickened and rough, like sand paper, and cause pain when blinking takes place. Vigorous constitutional measures must be adopted. Fasting would be especially useful, followed by an exclusive fruit diet. Cold baths and cold compresses for the eyes are sometimes very beneficial. If allowed to progress, discharge of matter, etc., may take place; but this should be treated in the same manner.

Catarrhal Ophthalmia is in reality inflammation of the conjunctiva. It is similar in its effects to catarrh of the nose and throat. The treatment may also be similar. There is a form of this disease known as "purulent ophthalmia," which is far more serious, and requires prompt and radical treatment. In many of these complaints one eye becomes diseased, and the other eye becomes affected by "sympathy." In cases in which one eye has been injured, and the sight is lost, it is best to remove the injured eye soon; for if this is not done, the healthy eye may become affected and then total blindness will result.

The cornea may suffer from a number of minor diseases, chief among them being a form of ulcer, which gathers and discharges, after causing intense pain. Unless care be taken, these may be mistaken for cataract, and an operation undertaken for the removal of the latter, which does not exist!

Iritis is an inflammatory condition of the iris, which if taken in time yields readily to treatment. Fasting for a few days would effect a cure; or a fruit diet. Warm and cold cloths should be applied to the affected eye.

Color blindness is not, strictly speaking, a disease of the eye; but is inconvenient to the sufferer. It is usually more or less hereditary. Other peculiarities which you may encounter are: "night blindness," in which the patient can not see except in the brightest light; "nyctalopia," in which the patient can see very well in the dark; "astigmatism," in which the sight of the two eyes is uneven; "old sight" in which there is a partial loss of power to accommodate the eyes to different dis-

tances; and "squint," in which one or both eyeballs are drawn to one side by the muscles of that side having become unduly contracted—pulling the ball out of its proper place. Constitutional treatment should be tried in all cases, as any improvement possible will result when the body has attained its highest possible standard of health. However, glasses will have to be worn in some cases—particularly in astigmatism.

The interior of the eye may now be examined by means of an instrument known as the "ophthalmoscope," which enables the physician to see right into the interior of the eye, examine the state of the retina, etc. It is generally believed that the color of the pupil is black. This is a mistake; it has no color. It *appears* black to us for the reason that the light rays within the eye are neutralized by what is known as "interference." Overcome this and the interior of the eye may be seen clearly.

Eyes may become strained in various ways—by using them too constantly in one focus; by using them in artificial and inadequate light, by looking through glasses of great magnifying or minifying power, etc. Spectacles are examples of this latter cause, and their use has doubtless been much abused in many cases. They act as "crutches," and tend to keep the eyes weak, instead of strengthening them, as they should be strengthened by proper exercise, diet, etc. At the same time, certain eye troubles, such as astigmatism, etc., should have glasses. The function of the glass lens in these cases, is to adjust the incoming light rays to the shape of the eyeball immediately. It is hardly necessary to say that rest is the prime requisite in all cases of eye strain.

The principle upon which near sightedness (*myopia*) and far sightedness (*hypermetropia*) depend is simply this. The human eyeball is of a certain shape. Normally the light rays are so converged in passing through the lens that they meet upon the retina at the rear of the eye. In near sightedness, the eyeball becomes squeezed out of its proper shape and position, as shown by the dotted lines in Illustration 2, and the result is that the light rays instead of meeting on the retina, pass beyond it, and meet somewhere in the rear. In long sightedness on the other hand, the reverse is true (Illustration 3), and the light rays meet in front of, instead of upon the retina. Here the eyeball has become squeezed out of its proper shape by pressure from behind. The function of the glass in both cases is to correct the angle of the incoming light rays, and cause them to meet upon, instead of in front of or at the rear of the retina.

Now the question arises: *Why* should the eyeball assume the shape it does, causing *myopia* or *hypermetropia?* What causes these changes? And how is it that such persons can see at all at short or long distances —as the case may be, when—according to all known laws of physics—they should be unable to see at all?

To answer the last question first. Such persons would be entirely unable to see if it were not for the fact that the *lens* of the normal eye is soft and pliable, and can be bent by unconscious muscular effort into this or into that position—made thinner or thicker, as the case may require. But as age advances, this power is slowly lost; the lens can not be adjusted in this manner and the result is that glasses must be worn, to accomplish the results which Nature alone performed up to that time.

I believe that the cause of this degenerative change within the lens and of the eyeball itself is due to the one primary factor—the character of the diet. Living as most people do, upon cooked food, full of mineral and earthly matter, the tissues and structures throughout the body become dense and hard, lacking in fluidity and the necessary animal pliability which are characteristic of youth and health and strength. We all know the difference between the bones of the young and the aged. This applies to the fluids of the body no less than to the solids. They, too, become dense and loaded with earthy matter, instead of remaining plastic and virile. The body throughout has become hardened, ossified, filled with earthy matter. The only way to prevent this is to eat plenty of *fruit,* which contains no earthy matter at all; indeed fruit will help to remove and dissolve it. Drs. DeLacy Evans and Bostwick both pointed out the fact that fruit prevented the formation and accumulation of these earthy deposits, and counselled their use as regular articles of diet on this account. Similarly, if the eyeball and the lens of the eye were preserved in a soft and pliable condition, by means of plenty of fruit in the diet, they would always retain their elasticity, and near or far sightedness would rarely result. As in the case of nearly all other diseases, therefore, *diet* is the chief predisposing cause; and diet alone will often go far towards effecting a permanent cure.

Of late years a system has been devised by means of which it is believed possible to diagnose the condition of the patient from certain markings on the iris of the eye. Dr. Lane is the modern disciple of this system—which has, however, never found much favor. The corner

stone of the system is this: That certain markings (white spots, scars, etc.), upon the iris of the eye denote corresponding peculiarities of disease in various parts of the body! Dr. Lane has mapped out the exact portions of the body corresponding to the sections of the iris; and these may be found in full in his book devoted to this subject. Whatever truth there may be in the system, I should not advise any one to rely upon it alone, in making his diagnosis, but rather upon other symptoms; and these may be checked off if desired, by the markings upon the eye.

HEARING AND HOW TO IMPROVE IT

By HEREWARD CARRINGTON, Ph. D.

THE ear is divided into three natural parts—the external, the middle, and the internal ear. It is a most complicated organ, its important parts lying deeply hidden in the hardest bone in the body—the "petrous" bone—while its other extremity is situated on the very outside of the head—absolutely unprotected.

The *external* ear comprises all we see outside of the head and all parts as far as the drum; the auricle, the auditory canal, and the drum head. The *middle* ear consists of an air space and passage, terminated at the extremity of the ear drum, and leading in the other direction into the Eustachian tube which connects it with the throat. The middle ear contains the smallest bones in the body—namely, the hammer, the anvil, and the stirrup—so called because they resemble these familiar objects. The *inner* ear is highly complex in its structure, and some of its functions are not yet fully understood. It is contended by some that the semi-circular canals are the organs endowed with the sense of equilibrium; and that when these organs are diseased, we can no longer tell when we are properly maintaining our balance. This, however, is disputed by other authorities.

The physiology of hearing is probably too well known to need recapitulation. All sound depends upon vibrations in the air, the difference in the pitch being due to the variation to the length and frequency of the sound waves. These unlike light and electrical waves,

travel in the air. The lowest note which the human ear can perceive is thirty-two vibrations per second. The highest is about 32,000, which would represent the shrillest note capable of being perceived by the human ear.

It is an interesting, and at first sight an inconceivable truth that there is, strictly speaking, no such thing as sound in the world! There exists only vibrations in the ether, or in the air—which vibrations are themselves absolutely soundless. When they strike the drum head they cause it to vibrate. Still there is no sound. The oscillation of the drum head causes the small bones of the ear to oscillate in turn; and these vibrations are passed on to the auditory nerves, which carry the vibration to the centers of hearing in the brain—where certain changes (just *what* we do not know) take place. Up to this point, there has been no sound. Only when these peculiar changes (whatever they may be) take place in the centers of hearing within the brain, do we perceive the external vibration as sound. We *perceive* it as sound, that is, but sound itself does not exist—only still, soundless air vibrations.

The ear like any other portion of the body is subject to accidents and diseases. Foreign bodies find their way into the ear, or are frequently poked in by children, and have to be removed. It may safely be said, however, that practically none of these bodies will be in the least harmful, *if let alone;* the chief harm from most foreign bodies introduced into the ear results from the introduction of various primitive instruments, in the hope of extracting the foreign body. If one goes poking about in the interior of the ear with pins, etc., as is frequently done, one is almost sure to injure, more or less

the delicate membranes lining the auditory canal, and many cases are on record where the drum has been ruptured by this means. If the solid substance is let alone it can not penetrate far into the ear normally, being prevented from doing so by the wax, to which it adheres. A syringeful of warm water is all that is necessary to extract any foreign substance, except it be a pea, bean, or other body which is likely to swell when brought into contact with water. When such is the case, a surgeon should be employed to extract it. The same is true of insects, which may have found their way into the ear. Generally speaking, they have been prevented from reaching the drum or any vital part by the wax lining the auricles, or inner passages, and a syringeful of warm water will both kill and remove them. Sometimes it is advisable in such cases to introduce a little warm oil into the ear for the purpose of killing the insect immediately, before its removal.

Let me say a few words here regarding the wax invariably found in the healthy normal ear. Some persons have a great objection to this, and, with a morbid idea of cleanliness, frequently wash and swab the ears in an attempt to remove it. This is not only useless, but possibly detrimental. The wax is placed there by nature; its uses we have just seen, and there are special glands situated in the ear to secrete it. While any excess of wax about the orifice may be removed with impunity, constant washing and syringing of the ear should by all means be avoided. If a syringe is employed for any purpose, the water should be injected slowly, and not in jerks. A bowl or cloth should be held under the ear to catch the return water as it emerges. Never use cold

water in the syringe, but always water at or about blood heat.

Boils, or fungi in the inner auditory canal are at times exceedingly painful and irritating. A common habit is to drop warm oils and fats into the ear, but this serves merely to feed the growth, without accomplishing any useful purpose. The broad general rule is that warm oils and fats should never be introduced into the ear except for the purpose of killing some insect that may have found its way there. The only rational method of treatment in such cases consists in syringing the ear with warm water, and adopting a general hygienic mode of life. Abundant exercise, strict attention to diet—which should be rigidly abstemious, both as to quality and quantity—can alone effect a permanent cure. By this means the purulent matter is absorbed into the circulation, and disposed of by the body's great eliminating organs.

If a patient is attacked by a violent pain in the ear without any other accompanying symptom, he may be sure that the pain is probably neuralgic. Frequently, this is associated with toothache, and upon examination it will be found that one or more teeth are decayed. With the removal of the tooth, this pain frequently disappears. Syringing the ear with warm water, and applying warm compresses externally, will frequently relieve the pain temporarily; but if this is not due to a decayed tooth, there is no other permanent cure than building up the general health—since neuralgia, like all kindred nervous disorders, depends almost upon the quality and quantity of the blood supply.

Rupture of the drum head is of course a serious in-

jury, but not so directly harmful as many suppose, and hearing is frequently retained in spite of the fact that the ear drum is ruptured. Loud concussions in the form of sudden explosions and boxes on the ear, have been known to rupture the ear drum, because of the sudden concussion of air from without. Indeed it has been asserted that boxing the ear is the most common of all causes of ruptured ear drums. Parents should remember this.

When the drum is ruptured one rule is of primary importance: Nothing whatever should be introduced into the ear, as this injected fluid, whatever it may be, being no longer prevented by the drum from entering the inner ear, flows in, and is liable to produce inflammation and injury to the various delicate structures and membranes contained within it. No home treatment is advised in such cases, but a competent surgeon should be called in at once. But little can be done, and that little only by the skilled operator.

The growth of fungi upon the drum itself frequently results from too much swabbing and picking of the ear. The only rational method of treatment, should such a condition arise, is the syringing the ear with warm water, to which has been added twenty-five per cent of hydrogen peroxide. This will tend to destroy and remove the parasites.

Excepting boils in the ear, no pain is equal in severity to the excruciating earache produced by an inflammation of the cavity of the drum. It is here that most earaches in children arise. There are many causes for this, and but little can be said by way of positive treatment. Vigorous blowing of the nose may give re-

lief by opening the Eustachian tube. If the child is too young, this tube may be opened by surgical means. However, the pain may not be due solely to the closure to the tube, but to absolute inflammation of the drum cavity. In such cases syringing the ear with very warm water, or breathing into the ear with the mouth wide open will give relief. Cloths wrung out from very warm water may be placed round the painful ear, *but never over it.* Such inflammation, however, may be speedily reduced by profuse water drinking, and a few days' absolute fast. Inflammatory processes in any part of the body may speedily be relieved by this method.

Diseases of the Eustachian tube amount to diseases of the ear. Inflammations in this tube cause the passage to be practically blocked, the result of this is that inflammation and other disorders of the inner ear follow—not the least difficulty being partial deafness. The reason for this is that for the ear drum to vibrate freely, there must be an equal air pressure on both its sides; and if the Eustachian tube be closed, there is more or less of a vacuum formed in the inner ear—since the pressure from without would be greater than the internal pressure. The effect of this would be to force the ear drum inwards—because of the outward pressure—and it could no longer vibrate freely. The result of this would be partial deafness. The way to relieve this, therefore, is to equalize the air pressure, and the only means of affecting this is to open up the Eustachian tube; and the only rational method for doing this is to relieve the inflammation, and this inflammation is reduced in the same manner as any other inflammation—namely, by a few days' fasting, or great restriction of the diet. It will

thus be seen that there is no necessity for the elaborate and expensive surgical operations which are performed for this malady; simple hygienic measures are, generally speaking, by far the most efficacious and the most permanent.

Discharge from the ears is not so serious as might be supposed in most cases, for the reason that the gathering is *outside* the ear drum. Syringing with warm water is the best treatment. If the gathering is *within* the cavity of the ear—and the discharge has ruptured the ear drum, in order to break its way out—this is far more serious, and may necessitate surgical care. An absolute fast is essential, water drinking, fresh air and exercise are also good. Do not attempt to put anything into the ear yourself.

Roaring in the ears is generally due to an excessive blood pressure, congesting some of the inner blood vessels. It may be relieved as a rule by standing up very straight, with the arms raised high over the head; and taking a number of deep breathing exercises. A short fast, followed by an abstemious dietary, will prevent the recurrence of the trouble.

Outstanding ears had best be treated by bandaging them tightly to the sides of the head at night. During the daytime, see that hats and caps are worn so that they press the ears to the head, and not away from it.

Deafness and defective hearing may be due to so many causes that it is impossible to state in detail any exact treatment suitable for all cases. The trouble may be catarrhal in nature—and if that is the case, a short fast, followed by an abstemious dietary, and plenty of outdoor exercise, will relieve the trouble in every case.

Again this may be due to closure of the Eustachian tube; and again the treatment is constitutional. Defective hearing is nearly always due to causes which such methods will remedy and relieve. An accumulation of wax in the ear is of course a cause in some cases; and this must be removed by means of a syringe and warm water. Constitutional methods are the only rational ones to apply to causes which lie deeper than the ear itself—for instance, in the brain centers connected with hearing. Until one experiments, one can never be sure of the exact cause of partial deafness, but physical culture methods will benefit *all* such conditions, no matter what the cause may be.

The human ear is a most delicate and complicated mechanism, and should be carefully guarded. The instructions that have been given comprise all that can be safely followed by the layman, without expert medical advice, which should be called in, in all serious cases. Our sense of hearing means too much to us for us to lose it for lack of proper care.

THE OLYMPIAN SYSTEM

"Mens sana in corpore sano"

PART FOUR

EFFICIENCY

SECTION FOUR

PRACTICAL PSYCHOLOGY

THE SOURCE OF BRAIN POWER

By BERNARR MACFADDEN.

ARE you making the most of your brain?

Are you achieving the success that you might realize if you had more mental energy?

These are vital questions.

Brain power—can it be cultivated? A thousand books on so-called mental science will tell you that the mind is supreme, that there is no limit to its power, and that by intensive culture of some mystic kind, simply by placing yourself in tune with goodness knows what, you can become wise and great! Perhaps.

But let us put aside all such extra extravagant claims, and keep within the limits of purely scientific fact.

There is so much said about the power of the mind over the body that it is time to learn and declare the truth about the power of the body over the mind, and to emphasize it with all the driving and irresistible force of the drum-fire bombardment with forty-two centimeter shells.

We are practical, intelligent people. We want results, not theories. And so we must first not only recognize the power of the body over the mind, but we must even come to see that in a large measure the body is the mind—that the mind is only one of the manifestations of the life-force which is in the body.

This sounds like radical doctrine. But let us see.

In the beginning, it may be well to note that the

mind is first built up through the body. This is true of the individual, just as it has been true in the evolution of all animal life. Our earliest mental processes consist simply in correlating our impressions of feeling, sight, hearing, smelling and tasting, and in co-ordinating our motor impulses accordingly. To put together our various sense impressions so as to gain what may be called a perception, is an act of mind, a very early and primitive one, but yet one which the new-born babe does quite imperfectly. Then, going beyond this to organize and direct our bodily movements, so as to adjust ourselves to our requirements as learned through these perceptions, involves a further development of the mind. The infant really learns to think through the use of his muscles. Our whole mental structure, in short, is built up in the beginning through our bodily activities. We could say a great deal about this, but let us take up the subject from another and more practical point of view.

What is brain power?

What is consciousness? What is the power that thinks—that feels—that wills? What is life?

No one really has anything definite to say upon these points. But for all that, we do know that life and thought are forms of energy. We know that some of us have more and some of us have less of this energy than the average. Some of us are more alive, some of us are more nearly dead.

Now, the man who is vital can *feel* his mental energy, just as he can feel his physical strength. But the mistake that nearly everyone makes is to suppose that mental energy and physical energy are fundamentally different. They are really only different manifestations

of the same power. They take different forms because they are expressed through different channels.

In the mechanical world, energy exerted through one machine will be manifested as movement. Expressed through another machine, it may take the form of electricity. Transmitted through another medium, it is made evident in the form of light. And so, in the human body, the basic power is simply the life-force generated in the organism. It is this force or energy that we use in the functional work of our vital organs. It is this force that we use in muscular exertion. And it is this same force that we consume when we think, when we feel, and even when we keep awake.

Did you ever stop to think what consciousness means? Did you know that you can exhaust your body even when doing no muscular work, just by keeping awake? Be as lazy as you can, both physically and mentally—try to rest completely, and yet if you will remain awake for a period of five or six days the drain on your bodily energy will be such that you will die of vital exhaustion. This plan was long a favorite method of punishing and executing criminals in China.

The scientific world is just beginning to learn that thinking is a physical process. It draws upon the body as a whole. Mental work is a test of physical endurance, just as surely as any form of muscular effort. The man with a large capacity for brain work is necessarily a man possessing the physical backing that makes for endurance.

It is quite true that the brain is the special and particular organ of the mind. But the larger truth is that the mind is really the product of all of the organs of

the body. You think not only with your brain, but with your blood, and whether the blood is red or blue makes all the difference in the world. You think with oxygen, and for this reason the working capacity of your lungs and the quality of the air you breathe will help to determine your mental power. You think with your stomach, liver, pancreas, spleen, because of the work performed by these organs in supplying nutrition for the brain cells and blood cells. Your mental efforts depend in part upon your kidneys, because of what they do in keeping the blood pure and free from the poisonous products incidental to life.

You will by this time have seen clearly the relation of physical culture to brain power. It is not simply a matter of building up the body for the sake of the body, but of building up the body for the sake of the brain. We may see more clearly the foundation for the ancient truth, "Mens sana in corpore sano." (A sound mind in a sound body.) It is true that there have been instances of men with seemingly weak bodies and great minds, but they have been the exceptions who have attained eminence because of extraordinary gifts. Even they would have accomplished far more had they had the bodily power with which to back up their work. But the vast number of brainy and successful men have been those possessing a foundation of great constitutional vigor.

The lack of energy usually means timidity, indecision, a lack of confidence in emergencies, a small degree of the power of concentration, a lack of endurance in contending with mental problems, and most frequently a general lack of character.

But the successful man is the embodiment of just the opposite qualitites. His chief characteristic is energy. He has the driving, forceful, dominating, overwhelming personality that goes with exceptional vitality. He has the quality known as push—not that he pushes others so much as that he is able to push himself. He has ambition, enthusiasm, self-confidence, concentration, determination, persistence—all qualities based upon energy. The power to "come back" after failure, to try again and again, to go on in the face of innumerable discouragements, to overcome seemingly insurmountable obstacles and to keep on doing so—that is energy. And it is this energy that is at the basis of exceptional brain power.

Perhaps you are skeptical about all this. Perhaps you doubt that the purity and quality of the blood really have as much to do with purely mental activity as I have suggested. If so, I can convince you very quickly.

Or rather, you can convince yourself. All you need to do is to modify the quality of your blood by swallowing one ounce of the best and purest whiskey every fifteen minutes until you have experienced successively the characteristic exhilaration, the subsequent stupor and finally the suspension of your mind of consciousness. If your powers of discretion are such that you do not care to try the experiment on yourself, it may not be very much trouble to observe these effects upon the brains of someone else who has so few that he voluntarily makes the experiment at more or less regular intervals.

Or perhaps you already know the effects. Perhaps you know that even the slightest poisoning of the blood-stream with alcohol affects the clearness and efficiency,

of the mind; that even a moderate amount of it deprives one of the higher intellectual faculties, leaving the lower faculties capable only of the rudest operation, and that more than a little makes a man something worse than a pig. You perhaps know that a few drinks takes from a man the results of hundreds of thousands of years of human development, and that a few more will take away from him the results of millions and millions of years of evolution. Interesting, isn't it? But the important point here is the effect upon the mind of an impure or poisoned blood supply. The mind can not work. In fact, if this particular detrimental influence of the bodily condition is carried far, the mind simply shrivels up and disappears entirely.

There are other poisons than alcohol. I do not mean nicotine, though that is one of them. There are the poisons generated in the body itself in time of poor health. The man who is poisoned through constipation can not think as clearly, as much, as intensely as he should. The dyspeptic, the man with a bad liver, or the man whose blood is charged with impurities or poisons from any other cause, is not capable of the best brain work. Particularly the mind is powerless in the presence of fatigue poisons. You can not think when you are tired, and the blood and tissues are burdened with these waste products. They are toxins which weaken, stiffen and choke the mind, just as they weaken, stiffen and obstruct the muscles. The important question is, how quickly and easily do you become tired?

Why does the mind work clearly in time of acute illness? Why does one become delirious in a fever, when the body is saturated and choked with the poisons

of the disease? The fact is that the far-famed "power of the mind" fails to assert itself under such circumstances. Indeed the mind is often absolutely strangled, disappearing entirely in the condition known as coma.

Why when the physical structure of the brain is attacked and destroyed by the virus of a certain disease, should there be developed a condition known as general paralysis, or "softening of the brain?"

Again why the mental senility of extreme age, the development of "second childhood," with the ultimate loss of all the faculties?

If the mind is an all-powerful entity in itself—as many modern mystics claim—why should it not rise above these limitations of the body? The fact that it does not and can not is conclusive evidence of the truth that we are pointing out, namely, that strong nerves, strong organs, red blood and bodily energy, are the true sources of brain power.

Again the mental effect of various vices and influences that debilitate the body lend emphasis to what we have said. Curiously, the most prominent and discomfiting effects of certain abuses which undermine the body are seen in the loss of memory, a condition of brain fag, an inability to think or concentrate in mental work, and even the development of an extraordinary timidity in meeting and facing others. These are mental and nervous symptoms growing out of a physically debilitating cause.

An analysis upon a broader scale of the forces and qualities involved in brain work will disclose three chief fundamental factors: Heredity, education and energy.

Heredity determines the temperament, the physical

structure of the brain, the possibility of mental activity, and the particular channels of thought in which the individual mind works most readily. Heredity is the one factor beyond the control of the individual. Manifestly, a child born in the Darwin family, has a tremendous natural advantage over Zip, Barnum's famous museum character, originally called "What Is It?" And yet, so far as the average of human life is concerned, it often seems that the quality of brain work and the degree of success attained depend not so much upon one's natural endowments as upon the use which one makes of them. Very few of us make the most of ourselves—realize all that is in us. We all know instances of men of high native gifts, rare talents, who have never succeeded or made anything of themselves, while on the other hand, men of limited natural powers and much less native ability have accomplished a great deal more. The latter have been able to drive on to the goal of success simply because they had the energy. The ordinary man of average endowments is, after all, really well gifted with the basic qualities of intelligence and mental capacity in general, if he will only use them. The degree of brain power which he may develop, and his success, will then depend upon the other factors of education and energy. These are both factors to a large extent within our power of control and modification.

The world, for no one knows how long, has placed its whole faith in education.

But what is education?

Is it wholly a product of the schools? If so, it would seem of little value, judging from the hosts of educated failures, graduates without the ability to think, as com-

pared with the many well known unschooled successes.

It is learning by doing. There seems no question that this is true brain building in its best sense.

Education is most complete when it combines theory and practice, being the result of practical experience in acquiring information, thinking and working. We grant that education and mental training of the right kind are necessary parts of the attainment of mental power and efficiency. But the fact remains that the real secret of mental energy in any unusual degree lies in the nervous energy generated by the body. In short, it is literally true that you think and feel with your whole being.

The great truth about the building of brain power is that this essential factor of energy is within our power to cultivate and increase. We can determine the amount of "horse-power" available for brain work.

Pure natural highly vitalized food has much to do with it. If every cell of the body is healthy, clean and vigorous as the result of faultless nutrition, the total of energy in the human system thus brought about is tremendous. It means vitality plus inexhaustible nerve force, and this means a capacity for untiring mental activity.

Furthermore an empty stomach may be regarded as a source of brain power, if one is otherwise strong and vigorous. It is not only what you eat, but how and when you eat that counts. The brain worker should eat a light breakfast and a lighter lunch, if any. One can not have a full stomach and a full head at the same time. The man with extraordinary vitality may do some brain work in spite of abuses in this direction, but he can not

do the best that he is capable of when his blood is diverted to his assimilative organs. Furthermore, a clean alimentary canal is absolutely essential to avoid the poisoning of the blood. Constipation must not be tolerated.

It is not necessary here to go into details in regard to oxygen, outdoor life, breathing, bathing, healthful clothing, and other of the general requirements of constitutional vigor. The teachings of this system will cover all these essentials. A special word, however, may be said on the subject of sleep. This is an age of brain work, and yet it is the very brain working classes who most need sleep who attempt to stay up late at night. Don't be afraid of sleep. You can not get too much of it.

Finally the building up of a vigorous bodily development is indispensable. An active circulation is not possible under conditions of muscular stagnation. Irrespective of our mental and educational progress, in body we have not varied in one tiniest particular from the structure and physiological qualities of the cave man. If we would have energy, we must develop and maintain the same standard of vigorous animal life that made him powerful enough to survive and able gradually to develop the brain which we have inherited from him. We need stamina, hardihood and endurance as sorely as did the men of the stone age.

Health in every particular must be cultivated. Dissipation that wastes nerve force must be avoided. Most of all, sexual excesses and abuses undermine the nerves and brain. A high degree of virility is invariably associated with exceptional brain power.

You may be able to do a certain amount of mental work—you may be able to "get by" in your job or your various undertakings. But if you are looking for the big prizes, if you want success in its larger meaning, if you want the unusual mental capacity and efficiency that come with a surplus of nervous energy, if you want a better quality of brain work, a more powerful degree of concentration, and all the snap, penetration, force and brilliancy of mind that go with these, it is up to you to improve upon the foundation, to make your body a more perfect dynamo, so that you may increase the supply of energy available for your purpose.

BETTER THINKING—THE PHYSICAL ESSENTIALS

By MILO HASTINGS, B. Sc.

HAVE you ever wondered why the highest civilizations in ancient times were in the subtropical countries, whereas in modern times the highest civilizations are located in the cooler parts of the temperate zones? The explanation of the geographical transfer of the world's centers of civilization is the invention of the chimney, which made possible the heating of a house without filling it with blinding smoke.

Without artificial heat to make him physically comfortable, it was impossible for a man to think effectively in cold weather. While we decry the enervating effects of luxury that cause men to cease to think and to give themselves over to sensuous enjoyment, on the other hand, a vital essential to prolonged thinking is physical comfort. Excessive warmth checks both physical and mental action; excessive cold stimulates physical activity, but checks the concentration of the mind in deep thought.

Elaborate tests have shown that men do their best thinking when comfortably clothed and at air temperatures of from forty to sixty degrees. Because of the necessity of writing with the hands and exposing the bare fingers, the somewhat higher temperatures from sixty to seventy degrees are used in modern buildings. The application of these principles to your personal work is that you should keep the room in which you work

at the lowest temperature consistent with physical comfort. If the temperature rises much above seventy degrees, the mental efficiency falls off rapidly. At a temperature of eighty-five degrees the New York State Ventilation Commission found that the mental efficiency was reduced in all forms of tests.

Physical comfort is essential to thought because the mind must be as free as possible from outside sensations. But physical comfort does not mean physical indulgence. Nothing is more destructive to mental energy than the excessive indulgence of the physical appetites.

One of the best known efficiency engineers of New York City, in supervising the working methods of a large force of buyers for a series of chain stores, made a rule that these buyers should not close any deals after one p. m. A second rule was that they should not go to lunch before one p. m. This was merely a clever way of circumventing the salesman's usual trick of taking a buyer to luncheon and winning and dining him until his mental powers are drugged by excess of food and he becomes less critical and more agreeable to the persuasive arguments of the salesman.

One effect of heavy eating is to induce sleep. Many would-be thinkers eat and sleep themselves into sheer stupidity. Without the wholesome blood building effects of prolonged muscular activity, they indulge in the size of meals and hours of sleep required by the manual laborer.

The position of the body has a considerable influence upon the power of thought, but here again we can follow no fixed laws, and each must work out for himself and for the particular types of thinking the positions that

will give the best results. David Graham Phillips, the novelist, did all his work at a stand up desk. Mark Twain wrote a great deal in bed with his head propped up on pillows. Both methods attract our attention because of the novelty, but neither indicates abnormality, for lying down and standing up were originally more normal human attitudes than the highly artificial posture of sitting upon chairs.

Many men in thinking out problems or in dictating, stand up or walk about. Taking outdoor walks as a means of thinking out problems is almost universal. When such movement or physical activity is resorted to, it is often only for the preliminary stage of thinking out a problem, for after the problem is nicely going, the thinker often quietly settles down and finishes the work at his desk.

Vigor and speed in thought can be consciously developed by the cultivation of vigor and speed in physical action. The reason for this is that all physical activity has its corresponding mental process and hence physical activity is merely an external sign of mental activity. However, as physical actions become reflex through habit, their association with the higher planes of mental activity grows less. Therefore the type of physical activity which will be most helpful towards the increase of the mental speed powers is not the routine action that one has well mastered, but a variety of physical action calling for constant novelty in mental processes. The thinker should, therefore, indulge in vigorous sports and pastimes and cultivate in all activities of life quickness and dispatch. As the mental part of the action precedes and dictates the physical, it follows that the type

of physical action which is under the best control of the mind, rather than a blind rushing hither-thither by emotional impulse, is the sort that will best develop the mind. That is why constantly taking up new sports and games calling for activity and skill will be helpful mentally.

The time of day at which mental activity is greatest does not correspond absolutely to the time of physical freshness. In the management of factory labor, it is found that the nearer the close of the day, and hence the greater the amount of physical fatigue, the poorer will be the quality of work done and the greater the percentage of accidents, indicating decline of physical powers through progress of the work. In the case of mental action, the process is for a time quite reversed. As the mental work proceeds the quality of the work often improves.

Contrary to many preconceived opinions, tests have shown that the best mental labor is performed in the latter part of the day. Some of these tests, however, may be affected by conditions of temperature, food taking, or other factors that would alter the mental potential. The time of day at which great thinkers have done their work seems to vary widely; so that no general laws can be laid down. Common opinion is that the early morning is the best working period, but here again we may have other factors of mental efficiency, such as coolness, an empty digestive tract or freedom from intrusion.

The individual student should follow no iron-clad rules but should make careful tests to determine, under the circumstances of his own labor, the best time of the

day in which to do this primary thinking. For those living in warm climates, and for all of us in the summer time, the utilization of the early hours of the morning for mental work is to be highly recommended.

Training oneself to think amid a confusion of sights and sounds is highly desirable and necessitated by modern business life, but such a thinking environment rarely equals that of solitude. In the modern corporation the rank and file of clerks and petty officials are now made to work in vast rooms like school children. This is highly to the discredit of the intellectual level of such workers, for it simply means that corporation managers have found out that when they shut them up alone they will idle like bad children when the teacher is not looking. But when a man has proven his ability to do consequential thinking, he is given a private office in which to do it.

If your work requires that you think among disturbances, do what you can to think with this handicap, but do not attempt to carry through your life an unnecessary burden of such disturbances. If you wish to do the best thinking that is in you, have some portion of your day and some arrangement of your office or residence that will give you strict privacy and reasonable quiet.

Such facilities for undisturbed thinking frequently require a radical reorganization of family life. It will be far better to have a place in the home where you can absent yourself from the family circle and devote some portion of your day to hard thinking than to mix your thinking with the social life of your family and spoil both the thinking and the social life.

Mechanical shutting out of the sensations of all the

outer world will sometimes aid in concentrating attention on the internal processes of the mind. Shutting the eyes is sometimes helpful, though if indulged in too freely may induce sleep. Herbert Spencer was in the habit of carrying a pair of ear muffs when out walking so that in case of an idea being suggested to him that he wished to think out, he could clap on the muffs and be free from the disturbance of the noise of the streets.

Many of us have undergone the experience of glimpsing the flash of a good idea only to have it seemingly scared away by the small talk of the company with which we were associated. While some might argue that ideas so easily frightened off are not worth retaining, yet a true knowledge of psychology should show us that even great ideas may not upon their first presentation seem important and may be easily routed by worthless gossip. The more active and vigorous the mind, the finer is the vein of ideas running through it, and the more highly desirable it is to make the external conditions such as to give every opportunity for the development of the slightest suggestion that comes into consciousness.

Edison states that the only sort of recreation he needs is another kind of work, which statement is an expression of the well known principle that the tired mind is more quickly refreshed by diversion of its activity to other fields than by the cessation of its activities. The properly trained and efficient thinker is the one through whose mind there runs a rapid chain of related yet varied ideas; hence, the better trained the thinker the more mental recreation he actually secures from his work.

The process of thought consumes no perceptible amount of matter. The body of the thinker, when care-

fully balanced in a horizontal position, will show an increase of weight in the head due to a greater flow of blood when the brain is actively engaged. But the greater presence of blood in the brain is to establish a certain physical basis for mental action but does not lead to any measurable destruction of tissue or nutrients. Because it consumes practically no nutritive matter and casts off no corresponding physiological wastes, fatigue of the brain is not to be compared with fatigue of the muscles. The external sense organs, notably the eye, may be strained and overworked, but there is little evidence of the overwork of those brain powers that do not involve the use of the external sense organs. Continued mental excitement serving to keep one awake for an abnormally long period, may result in a physical exhaustion from lack of sleep, but even here it is the physical being rather than the mind itself that becomes exhausted.

In the majority of cases of supposed overwork, the expert medical examiner will be able to trace the cause of the mental failure to a physical weakness or abuse. The average scatter-brained individual is awake from fifteen to eighteen hours a day. Therefore, some sort of waking consciousness or "thinking" must endure for this period. The thinker is rare indeed who attempts to apply his mind to constructive labor for longer continuous intervals than the waking periods of the average man. Hence, according to the usual notions of mental overwork one must infer that active thinking is more fatiguing and destructive than the scatter-brained processes than fill the consciousness of the non-thinking individual. On the contrary, the non-thinker is the one who is more likely to suffer from the overwork of his

"nerves" for the reason that his emotional nature is most disturbed by the babble of confusion going on about him.

If the quiet of the sea and mountain and the restful nooks of earth is more wholesome than the din and roar of city traffic, then the processes of reflected thought should be more in harmony with health and longevity than the mental processes which are largely made up of the sensations which fill the minds of the scatter-brained multitude. An examination of the periods of longevity for the various occupations backs up this assumption that the reflective thinking mind is conducive to long life.

THE HUMAN MIND

By HEREWARD CARRINGTON, Ph. D.

IN discussing the anatomy of the nervous system, we mentioned the various parts of the brain—the "areas"—and stated that while the lower brain and spinal cord are responsible for the instinctive reflexes—or "automatic" actions—the *cerebrum,* or higher brain, is the seat of the conscious thinking faculties. The self, the ego, the consciousness, may be said to reside there. It is in some way bound up or associated with this brain substance, and be dependent upon it; certain functions also seem to be directly dependent upon certain areas in the brain; but when we have said this, we have said about all we know; and we are here led into a very great and baffling problem—namely, *the connection of mind and brain;* how the two are connected one with another, or united, as they certainly seem to be? A few words on this matter may enable us to understand it.

The brain as a whole is a material thing—a physical fact. On the contrary, the mind as we know it, is immaterial, non-physical, and of quite a different order of being. This being so, how are the two connected? What link can there possibly be between mind and brain—the material and immaterial? This is one of the oldest problems in philosophy—concerning which numbers of books have been written.

Certain it is that impressions and influences run both ways—from the mind to the body, and from the body to the mind. If you mix poison in the blood, the consci-

ousness is affected; while on the other hand, a man may receive a bad piece of news, and this will make him ill for days or weeks, or perhaps kill him altogether. Again in sensations, impressions appear to travel from the outer world to the thinking self; while in volitions, the impulse runs from the mind outwards, causing a definite action in the bodily muscles.

Thus in sensations, impressions pass from the body to the mind; and in volitions, from the mind to the body.

All this is again exemplified in the case of the emotions. We know that certain emotions—such as fear, anger, pain, etc.—can and do find their expression in the body. On the other hand, impressions to the body can incite these emotions.

The emotions are certainly more intimately connected with the body than any other part of our mental life; the lower animals doubtless experience various emotions, while it can not be said that they reason, or think in the sense that we do. These emotions become finer and more subtle as we rise in the scale of evolution, until we reach man. It is the emotions strictly speaking, and not the mind, which affect the body, and which are in turn affected by it.

We have first of all *pain*—physical pain, which is a sensation; then moral pain, or mental anguish. Opposed to this we have the feeling or sensation of *pleasure*. Both of these may be *either normal or morbid;* and both of them may be explained to a certain extent, by purely physiological processes. We can *remember* pleasures and pains—showing that these states are somehow connected with memory.

Fear is a very primitive emotion, and is either primi-

tive, unconscious, and unreasoned fear, or is fear based upon experience. Fear has a violent reaction upon the body, largely "inhibitory"—preventing the digestion of food, respiration, and even the action of the heart to some extent, while the sweat glands are stimulated, including the well known "cold sweat" typical of this state. The skin also contracts, and the tiny muscles at the roots of the hairs contract, pulling the hair shaft into an upright position. It is because of this that the hair "stands on end" when fear is experienced. Thus it will be seen that this is no figment of the imagination, but that the hair literally "stands on end" at such times.

Anger is another of the primitive emotions, which we share in common with the lower animals, and is associated with combat and the desire to fight. Like all strong emotions it is also inhibitive in action, though stimulating in some ways; and after the first immediate shock to the nervous system, usually stimulates the heart, respiration, etc., to an unusual degree.

The so-called *"tender emotions"*—love, sympathy, etc.—are on the contrary stimulating and not inhibitory in their action, unless extremely powerful and sudden. With these should be classed the *sexual impulse,* which is the expression of a primitive, powerful and universal emotion.

These may be all classed as "simple" emotions, as compared with the "complex" emotions—such as social and moral feelings, the religious and æsthetic sentiments —involving the sense of beauty, etc.

In all these if analyzed, there will be found a complex of primitive emotions, with some higher "overtones" as it were, of which they are the expression.

The emotional life may be either normal or morbid; that is it may become diseased; and many forms of insanity are now thought to be due to disorders of the emotional or affective life. Like all other functional expressions of life, the emotional self is subject to disintegration and decay. With old age the least personal emotions disappear first, while those most closely connected with the ego remain until the last. The desire to live—or the instinct of self preservation—is probably the last to disappear, though that too may vanish with extreme old age, as Metchnikoff has shown, and may be extinguished during earlier periods of life under certain morbid conditions—when for example the subject tries to commit suicide.

At the opposite end of the scale stand the *volitions*—that is the various expressions of the power to *will.* It has been said that the will is that part of us which most intimately expresses the central self, and is that part of us which most directly embodies the real man. Strength of personality is measured to a large extent by the power of will, and it seems at times as though this were the only part of ourselves over which we have direct control. We cannot control our sensations and emotions, and only to a limited degree our thoughts; but our *will* we can control; indeed it seems to be that part of us which does the controlling! Various theories have been advanced by psychologists to explain the will; but for practical purposes and for daily life the above definition is sufficiently accurate.

When we speak of the human *mind,* however, we usually mean the thinking, reasoning conscious self. *Consciousness* is a flow of thought, and constitutes what

we know as the feeling of "self" or "personal identity." When we *reason* about a thing, these thoughts are connected together logically and systematically into a definite chain, by the *association of ideas*. There are certain physiological explanations which have been offered to explain this process—for instance that certain nerve fibers connect certain brain cells or areas; but it must always be remembered that these physiological explanations neglect the main factor, which is the conscious mental state accompanying the brain change; and we are never logically entitled to explain mental states in physical terms—though this is often done.

This is well illustrated to us in the case of *memory*. It is customary to speak of a "memory" as an impression left upon the cells of the brain, in much the same way that the impression is left upon the phonograph cylinder; and that recalling these memories is very similar to replaying the record. This theory is right so far as it goes, but also presents certain difficulties when analyzed —since it also seems to leave out of account the important thing, *viz.* the memory itself, which somehow "accompanies" this change.

Memory consists very largely in two factors, *viz.* interest and association. If one is interested in a thing, one remembers it; we also tend to associate it with other memories, so that when any of these associated memories are recalled, the original memory is likewise recalled, by the simple process of association.

Attention consists partly in focusing the mind upon the subject matter in hand, and partly in the elimination or disregarding of other, interfering factors. Conscious attention may be compared to a searchlight, which can

be switched now in this direction and now in that—illuminating whatever it strikes. We are only enabled to concentrate, however, in this manner by constantly disregarding a multitude of other stimuli sensations, feelings, impressions, etc.—which constantly impinge upon the consciousness, claiming attention.

When we do a thing over and over again, we form a *habit;* and as we all know, while a habit may be easily formed it is hard to break! The reason for this probably is that the first time we perform an action, we cut a new "groove" in the brain as it were, and the second time the nervous impulse travels over the same route, which it finds already cut, making the impression deeper. Every time we perform this action we make this groove a little deeper; and in consequence it becomes that much easier to perform the action again—since the nervous impulse taking the path of least resistance, would naturally tend to travel over this well known road, rather than to construct an entirely new path.

The practical conclusion to be drawn from this is that *it is extremely important to form as many good habits as possible early in life,* since by so doing we make our nervous system our ally instead of our enemy, and it will be *easier* for us to perform the right action than not! Good habits are just as easy to follow as bad ones, when once the nervous system has been trained to carry them out!

There remains one other remarkable faculty of the human mind—which has been said indeed to differentiate it more than anything else from the mind of the animal—and that is the *imagination.* We all have the power of using the imagination constructively and help-

fully, *or* letting it "run riot," as the case may be. Building "air castles in Spain" is all very well for an idle half hour on a hot summer afternoon; but the use to which we should put the imagination is towards helpful, constructive thinking or planning along the lines of our daily life and work, whatever they may be.

Artists, poets, musicians and literary men know full well the scope and power of the imagination; but it is not perhaps sufficiently realized that in all forms of business life in all branches of science, and in our daily life constructive imagination is equally useful and indeed indispensable. It must, however, be checked and controlled by our conscious reason and our will. An example of uncontrolled imagination may be found in our dreams.

Psychology proper is the scientific study of the mind of man; but it must always be remembered that the conscious mind, or "self," is not the *whole* of our personality. It is in fact a small fragment of it. Beneath the "threshold of consciousness" there is the vast *unconscious,* or *sub-conscious* self—in which all our memories, impressions, past thoughts and emotions are stored—together with thousands which have never risen into consciousness at all! The importance of this unconsciousness, the role it occupies and the extent to which it can influence us, either for good or evil, had never been suspected until a comparatively recent date.

Now, however, we know that many of our physical and mental ills—such as hysteria psychæsthenia, morbid fears and emotions, etc.—are due to the abnormal functionings of this subconscious mind, and that these states and conditions can be cured by bringing about a normal

activity of those parts of the subconscious mind which have become, so to say, "diseased." This is one of the triumphs of modern psychology: how this may be accomplished is shown in another place.

THE WILL

By HEREWARD CARRINGTON, Ph. D.

WE have already spoken of the will as being that part of ourselves over which we seem to have the most direct control; but for all that the will in most of us is lamentably weak. Strength of will is strength of character; success, health and happiness all depend very largely upon the latter quality!

Without going into detailed metaphysical and psychological disquisitions as to the nature of the will, its motivation, the question of free will, etc., we may perhaps assume that the chief and most important problem which every reader has in mind is: *How to strengthen the will,* and the exact methods to pursue in order to do this. To this end the following suggestions may be of value:

One very good method is that suggested by Mr. Charles Godfrey Leland. Every night just as you are dropping off to sleep, suggest to yourself that you have strength, power, will and purpose; that the succeeding day will find you stronger; then suggest to yourself that these ideas will take root in your subconscious mind, and "sprout" during the period of sleep. This practice will be found to be very helpful in cases of weak will, and will act as a vitalizing stimulus and energizer.

Will may be impaired or weakened from one of several causes: Hesitation, impulsiveness, inaction, doubt, auto suggestion, over activity, excessive emotion, fatigue, indefinite thinking, etc. These states in turn,

are due to a variety of mental, moral and physical causes, which require rectification before the will can be permanently strengthened.

Ill health and physical weakness are often a great source of irresolution and weakness of will. Energy is required to carry through enterprises, often in the teeth of opposition; and strength and energy are required in order to *will* persistently, in face of this opposition. Even fatigue plays a large part in this will-inertia, while all drugs, poisons, etc., are known to inhibit the will very rapidly. In order to insure a strong, steadfast will, therefore, good health, vim, vitality and bodily energy are fundamental and essential.

Control over the bodily appetites is an excellent method of controlling (hence strengthening) the will; and physical exercises of all sorts are extremely beneficial for this purpose. This is not only by reason of the routine we force ourselves to undergo; but also because the constant motor, nervous impulses which are necessary in such exercises, actually strengthen the brain itself, build it up, and insure its proper functioning and coördination.

Passional influences of all kinds tend to destroy the will, by enfeebling the nervous powers, and engendering a habit of giving way readily to lower desires. The more often they are given way to, the feebler the will is sure to be.

Restlessness and feebleness of mind are factors, preventing the proper focusing and direction of mind and will. Permitting other wills to impose upon us is certainly to be avoided at all costs; the more frequently we allow this to happen, the more easily influenced we

become, and the weaker our will. It has been said that the sign of a strong man is ability to say "No!" and stick to it. Cultivate this power—at first in little things; later in more important ones. The more we allow the will to remain inactive, the feebler it becomes; so we should make it a practice of giving it a little gratuitous exercise every day—if only to keep it in training—so that when the supreme test comes, it will not find us unprepared.

Lack of knowledge, lack of confidence, lack of determination are all the causes and at the same time the effects of a weak will. Exercise will strengthen the will; but we need a strong will to begin exercising. We must break into this "vicious circle" somewhere, and we can only do so by an effort of will, holding ourselves to the task for the first few days, and allowing nothing to deter us, until the habit is once formed. Like all things, exercise of the will is largely a question of habit.

Dr. E. Boyd Barrett, in his work on "Strength of Will," gives the following list of simple exercises which are useful in strengthening the will. (He also advises a daily "introspection," to enable us to examine how far we have progressed in our efforts to strengthen that spiritual faculty).

1. Stand on a chair for five minutes with the arms crossed.

2. Repeat quietly and aloud "I *will* do *this*," keeping time with rhythmic movements of a stick or ruler for five minutes.

3. To hold hands upstretched vertically for five minutes.

4. To walk to and fro in room, touching in turn,

say, a clock on the mantelpiece and a particular pane of glass, for five minutes.

And so on.

The point is these exercises must be done without allowing yourself to become *impatient,* or allowing yourself to think "Why am I wasting my time doing this rubbish?" etc. *Forcing* yourself to do these simple things, and making yourself think *consciously* about them at the time, is a good way to increase your will-power.

The will is in short that part of us which enables us to do unpleasant things, which run counter to the "easiest way," which pushes a man upward rather than downward. This being the case, a man's strength of character may be said to be proportioned to the strength of his will; and thus the will becomes at once the most central and the most important of all our possessions. Cherish it; develop it; for who can say when it may be called upon to make the great decision which shall make or mar your life. If it is well disciplined, strong, supreme, it will enable you to choose aright; but if it is undisciplined, weak and feeble, it will give way under the sudden strain, and your whole life may be wrecked in consequence.

Look upon the will as you would a muscle—as something which can only be strengthened by constant *exercise.* Give it a little exercise every day, and it will sustain you in time of need or crisis!

HOW TO IMPROVE THE MEMORY

By HEREWARD CARRINGTON, Ph. D.

THE memory is that faculty within us which records, preserves, recalls and offers for recognition certain experiences through which we have passed at some time in the past. Much has been written, and much could be said on this important subject, but a few practical rules, and some general advice must suffice for our purposes.

The memory is undoubtedly dependent, in one form or another, upon the physical *brain*, for an injury to the brain can cause complete loss of memory. There are certain "areas" in the brain which record the memory of words, of music, of written characters, etc., and injury to this particular area may blot out this set of memories, leaving all the rest unimpaired. Loss of memory is technically known as amnesia.

Assuming that the brain is normal, in so far as its structure is concerned, the next most important factor is the blood supply. If the blood is not pure and healthy, the memory is at once affected. Perhaps nowhere is a slight indisposition noted more readily than in loss of memory—the inability to recall names, dates, faces, etc. It is astonishing how readily we can forget these upon occasion. As soon as the blood is vitiated for any reason, or toxins find their way into the circulation—alcohol, fatigue poisons, etc.—the memory is impaired.

Fatigue, exhaustion, etc., will also tend to cause loss of memory to a remarkable degree. Even familiar

events can not be recalled. Drugs of all sorts are known to affect the memory very shortly.

Our *diet* affects the memory to an astonishing extent. Perhaps no fact is brought out more strongly, in fasting cases, than the astonishing clearness of the brain, the lucidity of thought, and clearness of memory. This shows us that when the brain is free from poisonous substances, the memory is at once improved. On the contrary in severe illness, the memory is greatly impaired.

Memory is largely the result of two factors—*attention* and *association*. We remember what we *want* to remember, because we pay attention to it. Also, we have other interests of a similar character, and we associate the new memory with these. The more mental impressions we have had in the past, the greater the number are the links of such association, and the greater the chance that these memories will be recalled, when any associated link is stimulated.

Memory is of course also due to repetition. By hearing or saying a thing over and over again, we learn to memorize it. Each succeeding repetition cuts the groove more deeply into the brain, with the result that the memory is more deeply impressed upon us—for the strength of our impressions is no doubt directly proportioned to the depth of these impressions upon the nervous system.

To better the normal memory, therefore, we should first of all pay particular *conscious* attention to what we hear or see; secondly, we must be *interested* in it, and *think about* it (William James went so far as to say that the man with the best memory is he who thinks about it the most); and thirdly, we must *associate* it with other analogous thoughts or impressions, so that

when one of these is recalled, the desired memory is also. Fourthly, we must repeat the thing to be learned if possible.

One very simple, yet very excellent method for strengthening the memory is to repeat the desired name, date or other memory concept aloud several times; or write it out on paper, and then throw the paper away. This has the double purpose of serving to focus the attention of the conscious mind on the name, etc.; and also of bringing into play *two* senses (sight and hearing) instead of only *one*. There is thus a double chance that we will remember the name, date or whatever it is.

If we do not remember a thing, we forget it! The *cause* of our forgetting anything has lately been discovered, in large part. Why is it that we can remember some names and not others? Why is it that a certain event slips our mind, when we thought we should not lose it? The reason is that there are certain unconscious antipathies or "resistance" set up, within us, of which we are quite unaware—which inhibit or prevent the recall of this partcular name, face or event.

This is due to the fact that with that particular memory there exists, in our subconscious mind, some unpleasant recollection—not perhaps directly connected, but associated in some roundabout manner with the person or event we desire to remember.

For example, John Smith may have red hair; we can not recall his address. The reason is that we have at some time in the past had an unpleasant experience with someone with red hair; and the association made in the mind, of which we may have been totally unconscious, forms a formidable "resistance" to the recall,

which requires much breaking down. These unpleasant emotional memories can nearly always be found to exist if a thorough search be made for them.

Most of the "memory systems" upon the market are useless for practical purposes. They require great patience and memory to acquire, and are of doubtful value, when acquired, owing to the fact just pointed out. It is as a rule easier to associate the event to be remembered by a little effort made at the time, than to cumber up the mind with artificial methods of association, which are always liable to fail at the crucial moment.

CONCENTRATION

By HEREWARD CARRINGTON, Ph. D.

IT has been said that "concentration is the secret of success." Certain it is that achievement of distinction in any line of endeavor is not obtained without concentration upon the desired end. If you scatter your forces over a wide area of interest, it is sure that no great advance will be made toward the desired goal. By concentration is meant focusing of all the mental, moral and physical energies upon the chosen aim.

The mind must be very definite and clear as the subject upon which it desires or intends to concentrate. You cannot concentrate successfully upon several things at once, with the hope of obtaining all of them. You may concentrate upon success, health, happiness, wealth, fame, social position—whatever it may be, but when the choice has been made, the energies must be entirely devoted towards that particular end and aim.

Further, you must specify in your mind precisely what is *meant*. For instance, if you choose to concentrate upon success, you must determine *what would be success for you*, and then set about getting it, by taking the next logical step. Thus any great advance in any direction, is made up of a series of short advances—a series of steps, as it were—and these require not only concentration but careful planning and thinking out by the student.

It is hardly necessary to say that physical health is the foundation upon which all development and progress

must rest. Without health there can be no lasting effort, and it has repeatedly been noticed that the mind wanders and fails to concentrate properly when even a slight indisposition is noticed. Here as elsewhere, therefore, physical health is the rock upon which future success is built.

A good method of concentration is one that is coupled with deep breathing exercises. If the breathing be slow and regular and the body relaxed, mental lucidity and concentration are greatly facilitated. Every time you inhale a deep breath, hold firmly in the mind the object or result desired; visualize this as forcibly as possible, by making the mental picture as vivid as you can. One very good way of doing this is to knit the brows and with the eyes closed, try to bring together all the mental energies in the brain, as it were to a focal point low down on the forehead, between the eyes. Hold this for a moment while endowing it with life so to speak, and gaining conscious control of it. Now while holding the mental picture in mind, *will* with all your intensity that you will attain this object and that you will bring to pass what you desire.

The analogy to be borne in mind is that of the magic lantern. Just as you have here, the light, the slide containing the image, and the projected picture on the screen so you have the *will,* which represents the light—the driving force behind; the *mental image,* corresponding to the slide in the image lantern; and the *image* projected into the outer world. Thus in a sense, we actually create realities of our thought images; and recent experiments have been made in an endeavor to photograph these mental images—these "thought forms," with con-

siderable success. This at all events goes to show us that "thoughts are things" in very truth; and that what we hold constantly and consistently in mind will ultimately come to pass, if we only hold them there long enough.

In concentrating you must always hold firmly in the mind the *ideal* you wish to attain. Thus if you wish for health, you must see yourself perfectly well and strong. If you wish for wealth, you must see and feel yourself surrounded by the things you desire, etc. In all this, you must never let a thought of failure enter your mind. You must *feel* success, *will* success, and you will *be* a success! Prof. William James tells us an interesting story of a mountain traveler, who in encountering a giant chasm, halted on the edge before taking the final leap. Now says Professor James, if at the last moment the man hesitates, his footing is insecure, and he probably fails to make the jump with the required strength and skill. "He who hesitates is lost" indeed! If on the contrary he launches himself on the leap with all the strength and surety at his command, he will safely reach the other side, and prevent himself from being dashed to pieces below. In this case the mental attitude of the man makes all the difference between life and death.

It is the same in many affairs of life. We must be sure of our ground; and then go ahead! That is why it is so important to choose an avocation early in life; and once having chosen it, to think constantly about it, constructively and positively.

Everything exists first in the mind. Before it finds visible expression in the outer, material world, it must first of all be formed in the mind of some individual.

The Pyramids of Egypt, the Washington Monument, the Brooklyn Bridge—before any of these were brought into being on the objective plane, they must first of all have existed on the subjective mental plane. So with ourselves, and our own actions and our own life. Before it can express anything definite, we must first of all think it, will it, concentrate upon it. Then it will come to pass!

One very good exercise, for concentration, is to read a page of some difficult book—perhaps science or philosophy—the meaning of which is not quite clear to you. The first time you will not understand it. Read it again! Re-read it over and over again, until its meaning becomes clear. It will in time, no matter how difficult and abstruse it may appear at first sight. This conscious concentration is exceedingly beneficial to the mind, and will train it as nothing else will, to focus itself, and to remain under your guidance and domination.

Failure may be said to be in the majority of cases, due to the *scattering of the forces,* and success due to concentration. You must learn to live *within* yourself, your mind, and not only in the senses. Teach yourself to carry on a continuous train of thought, with the eyes closed. Reason out a thing in this way. Never allow yourself to "day-dream." This is an extremely bad habit of mind, with tends to result in splitting of the personality, psychæsthenis, etc. Gazing out of the window with nothing in mind, is very harmful for this reason. Every moment of the day, you must use your mind *consciously.* It will not wear out! We can not overwork the mind if we use it properly. It is *lack* of use which causes all the trouble!

Never forget that all thoughts must be *deep,* if they are to express themselves convincingly, and impress others similarly. Thoughts which originate on the surface fail to do this. They fall flat, as it were. If, on the other hand, your statements are not only made, but backed up by the force of deep feeling behind them, they will "get over" and convince those to whom you are talking. It is the same with the mental images with regard to yourself. These too must be *deep,* and originate within yourself. If they do this they will bring about that which you desire. And this can only be attained by proper concentration!

MASTERING THE EMOTIONS

By HEREWARD CARRINGTON, Ph. D.

WE have said before that the emotions are the most primitive factors which go to make up the "psychic man," and over them we have the least control. That is undoubtedly true; at the same time there is a certain control which we can exercise over them at times; in fact, it is this ability to do so which constitutes a "self-contained" man, one with "poise," "balance," "equilibrium"; and the ability to curb our emotions constitutes, perhaps, one of the chief distinguishing marks of our civilization.

If we look through books on psychology for hints upon this vital topic, we shall find nothing in any of them regarding this important subject. In very few books is it even mentioned! This shows us the great gulf between academic and practical psychology; between the learning of the class room and that of daily life!

William James has shown us that the emotions depend very largely (he thought entirely) upon the bodily sensations and feelings. Certain it is that these feelings and emotions, which we have, invariably find expression outwardly in the physical form—in the muscles of the face, hands, and body generally; and also in various disturbances throughout the body. The stronger the emotion, the greater these effects are. Powerful emotions—such as rage, hunger, fear, love, etc.—all affect the secretions, the digestion, the respiration, and in fact the func-

tions of the body throughout. The skin is blanched, then flushed with blood; the hair stands erect; the flesh trembles; the muscles give way; the heart nearly stops; the various internal functionings largely cease. These strong emotions find their expression in the countenance—the muscles contorting the face, and giving it the typical expression we are accustomed to associate with the particular emotion experienced.

Thus if we are angry, we clench the hands, the muscles become tense, the jaw tightens, the muscles of the face are contracted—often showing the teeth (the snarling muscles, seen in the lower animals), the brows are knit, etc., etc.

The way to offset a strong emotion of this character is, not to endeavor to overcome it from within, so much as from *without*—by muscular control. Inasmuch as the emotions and feelings depend so much upon the muscular activity, we have only to force this in a particular direction, and the internal emotion will change also. Thus if you are angry, you have only to force the muscles of your face into a smile, and you will find that you can hardly prevent yourself from smiling! The whole internal feeling of the body has changed; you no longer *feel* as you did. Similarly you can alter to a great extent any emotion—by forcing its opposite emotion by means of muscular action. It was this fact which forced Professor James to accept his theory of the emotions—which created such a furore in the scientific world, when first advanced.

Detachment is a great factor in controlling the emotions. If you can learn to separate yourself *from* your emotion, and regard it as a "thing from without," as it

were, you are no longer a slave *to* it, or controlled *by* it. Instead of feeling "*I* am angry"; try to think to yourself; "I have the *feeling* of anger; this feeling is *not myself;* I will rid myself from it"; and by the time you have got thus far, you will probably find that the emotion itself has largely, if not entirely gone—as the result of this analysis.

Relaxation is another invaluable aid. If you notice it, you will find that practically all the strong emotions are coupled with nervous tension. Try to relax the muscles, all over the body, and you will find that the emotion will subside like water running out of a sluice gate, which has suddenly been opened.

Deep breathing is an almost infallible antidote for unpleasant emotions. If when you feel one of these, you will close the eyes, breathe deeply twenty times or more, you will find that the emotion has mostly dissipated itself. You must, however, pay *conscious* attention to the breathing, while it is going on, and not keep "stewing" in the mind all the time, over the emotion experienced!

Many of our emotions may be disregarded, for our present purposes. The so-called "pleasant emotions" we do not *wish* to control; we have few enough of them as it is! Others like fear, are usually sudden and widely separated in our lives—unless they are morbid and excessive, in which case they are pathological, and call for proper treatment. The emotions which we must learn to guard against chiefly, are anger, revenge, hatred, jealousy, meanness, spite, temper and similar feelings.

Jealousy has been called by Bernard Shaw "the most detestable and mischievous of all the passions that enjoy

public credit." We see this played upon and emphasized in nearly every novel and motion picture we see upon the screen. It is merely a relic of the ancient idea of *possession;* and is the exact reverse of those emotions we should seek to cultivate—love, tolerance, sympathy and understanding. Greater poise and self-mastery would prevent this to a very great extent; and it is certain that this passion is manifested chiefly in the more unbalanced, erotic and hysterical of our modern civilization.

The more mean, petty and selfish the emotions, the more strongly should they be fought. If everyone would only bear in mind Shakespeare's adage: "All the world's a stage, and all the men and women merely players," it would help them considerably. Let them think to themselves: "If I saw myself upon the stage, as a character, would I like that person or not! Would I cut a heroic figure, or the reverse?" The pettiness of many of our actions would at once become manifest to us!

Egotism is, of course, the one great fault of humanity. Probably we are all egotists in one form or another. We flatter ourselves! We fancy that the earth would start revolving in the opposite direction—if only we did something, or failed to do so! We are but insignificant creatures, relatively speaking! Look up at the stars; think of the millions of miles of space in the heavens; and then think of suffering humanity, crawling like ants upon the surface of the globe; and the petty little emotions they experience during the few short years of their existence! They pale into their relative insignificance. "It will be all the same in a hundred

years!" Think of that every time you are inclined to overrate your own importance—or are inclined to think that your little feeling or emotion is *really* "important."

As Omar Khayyam sang:—

When you and I behind the Veil are past,
Oh, but the long, long while the World shall last,
Which of our coming and departure heeds
As the Sea's Self should heed a pebble cast.

Yet, while this is true, the good, the unselfish, the heroic actions and feelings of man are destined to last, and actually affect the destiny and evolution of the human race. The self sacrifice, the nobility of character, the courage, the heroism, displayed by many a man and many a woman definitely influence us, and are preserved for us in the song of the minstrel, in the tale of the mother to her children, in the pages of history. All the *noble* emotions of man, in short, live forever; while the mean, the selfish, the weak ones not only die, but destroy their author. Think of this, therefore, when tempted; and determine that, henceforth, you will permit only the highest, the noblest, the finest to manifest through you. In this way, you will become a great man or a great woman; you will likewise influence those about you; and this world's goods—its admiration and successes—will come to you no less than those moral and mental joys which constitute true happiness.

PSYCHO-ANALYSIS

By HEREWARD CARRINGTON, Ph. D.

PSYCHO-ANALYSIS is a term coined by Professor Freud, to designate an analysis of the *psyche,* or self, by means of psychological methods, employed in a novel manner. It had long been suspected that the *unconscious* part of ourselves played a very prominent part in our health and daily lives; Freud proved this to be the case, largely by his study of dreams.

A few words here as to the structure of the mind will be necessary.

The conscious mind is not the only mind we possess. In fact, it is only a small part of it. The mind has been compared to an iceberg, the bulk of which is beneath the surface of the water. Most of our thoughts, emotions, motives, etc., are beneath the "water"—beneath the level or "threshold" of consciousness.

Further, the mind is now known to be a composite thing, made up of innumerable strands, like a rope—composed of numerous fibers. Under normal conditions, these are bound together into one solid whole; but under abnormal conditions, these may become split up, and then separate fragments or portions, or small "selves" are formed; and these take on separate functions of their own. It is just as though separate strands of rope had become detached, and were pulling in opposite directions.

Now, under some emotional shock, the self may be split up in this manner, and separate portions of mind

formed, as it were, which work against one another. These are technically known as "complexes," and consist of groups of thoughts, emotions, impulses, etc., which have become bound up together, forming little groups of themselves, which tend to function separately.

It must not be thought that the formation of these groups of complexes is always morbid. On the contrary, when they are healthy and functioning properly, this is the basis of all our educational processes. But when one of these complexes become diseased, as it were—that is it becomes the focal point of a group of subconscious fears, emotions and thoughts, then this complex causes "trouble." Just in the same way that a physical tumor can press upon a neighboring organ, and prevent its normal functioning, in the same way this "mental tumor" can press upon the mind from beneath as it were; and upset it, and prevent its proper functioning. And in the same way that a physical tumor calls for a drastic operation, in order to remove it; so this mental tumor calls for a mental—surgical operation, which will remove it from the mind.

The way to do this is to discover and uncover it; then to remove it by means of suggestion. When this has been done, the patient is cured—often, too, of a variety of vague fears, or hysterical disorders from which he had suffered before. These unconscious complexes are now thought to be the cause of the majority of our cases of hysteria, psychæsthenia, psychic-epilepsy, phobias or morbid fears, obsessions, and many other abnormal conditions of body and mind resulting therefrom. When the subconscious morbid complex is discovered and removed, the patient is cured.

When a patient is found exhibiting any of these abnormal mental, emotional or functional disorders, it is well to begin treatment at once. Place the patient in an easy chair, in a quiet, semi-darkened room. If possible, set a metronome going, or allow the patient to hear the slow ticking of a large clock—though this is not essential. Tell the patient to close his eyes, breathe deeply and relax. Then ask him to tell you any impressions, pictures or visions which arise before him—his mental vision—*no matter how nonsensical and disconnected these may be.* Pay especial emphasis upon this last point, as the patient will often laugh and refuse to tell what he sees, saying that it is "nonsense," that it "means nothing," etc. He must be induced to describe everything as fully as possible.

When any particular vision has been described, endeavor by questioning to ascertain whether or not this has any particular meaning to the patient, or whether it can be associated, in his mind, with one that has. An example will perhaps make the method of procedure plain.

A young lady of our acquaintance always suffered from a sensation of cold—she was morbidly chilly, even in summer time. An analysis yielded the following facts:

Asked to close her eyes and describe her impressions she stated that she saw large sheets of ice—not a lake of ice, but large blocks of ice. Asked to describe where these were, she said, "In an icehouse." She was then asked if she recognized this icehouse, and she replied that she did. It was one near her home town, where she lived as a little girl. Asked then if she had ever

experienced any shock or fright in this particular icehouse, she *then* remembered that a man had attempted to attack her there when she was about thirteen years old. She had forgotten about this experience years before.

Now, when this recollection was brought to the surface, all was perfectly plain. Her subconscious mind had retained a cluster of morbid, emotional fears about this memory, and a constant sensation of cold had lasted —from the cold which she associated with the icehouse at the time. As soon as this was brought to light, she was practically cured, and a few suggestions sufficed to complete the cure, and remove forever the feeling of "cold," which never again returned.

This example will give the reader an idea of the method employed, and how such morbid manifestations are to be treated. These subconscious thoughts, feelings and emotions often completely upset the proper functioning of certain organs, by inhibiting their functioning; hence we have the manifold and mysterious symptoms of hysteria.

In such cases, therefore, mental methods of treatment are often very essential. The *cause* of the condition should be discovered, if possible; then removed by means of suggestion. The patient will be cured rapidly in consequence.

THE HEALTH CURE FOR WORRY

By Dr. EDWIN F. BOWERS

TODAY is the tomorrow about which we worried so uselessly yesterday. Yet today is here, and the thing about which we fretted the very corners of our souls yesterday never happened—nor is it at all likely to happen. We know that now. But this does not prevent us from seeking a fresh worry, or maybe warming up the old worry, for tomorrow.

Now, if there was any one thing in the universe that worry ever helped, it would be different. If worry created hope, illumined a darkened way, stiffened spiritual backbones, stimulated grit, or animated despair, it might be condoned as a necessary evil—like a sand flea.

But it doesn't—and never will. It is the cinder in the eye, the barnacle on the keel of progress. It hogties humans who might otherwise amble over Life's course in a fairly commendable style. It is that state of mind with which the old lady gave three cheers for herself when she said, "I do feel better. But I always feel bad when I feel better, for I know how much worse I am going to feel."

Yet there is a vast difference between imaginary worry—which is purely a mental figment—and a worried imagination, which is a very real and tangible condition. The first deals with the possibility of Jimmie breaking through the ice and getting himself drowned, or of Mary getting the measles. The other deals with

the fact that on March the 18th the electrocution is to take place, or that "the doctor has given me only four months to live, and what is going to become of the children?"

This latter state is merely a normal mental and spiritual reaction to trouble. It is the logical development of worry into fear or anxiety—an anxiety from which even the most sturdy might be exonerated. In fact, the individual who would not react to such stimuli would be only half-witted.

Then there were those—and almost every family in the land shared in this experience—who have seen a son or relative or dear friend go forth to face the unknown across the seas, and who apprehended, and with excellent cause, that the war would bring to them financial disaster.

To these it were almost sacrilege to have said "Don't worry." It would be so trite, so inept, so impotent.

For that same imagination that "bodies forth the forms of things unseen and gives to airy nothings a local habitation and a name," also paints on the drab canvases of the mind murky horrors, unnamed evils, and a shipwreck of homes and hopes.

Those whose souls have shuddered away from the most desolate of all desolate sounds on earth—the dull thud of clod on coffin—deserve better of us than platitudes. Theirs is a dignification of worry that demands recognition—and help.

And there is help, help and healing balm, for them in Nature, the wise Consoler and Comforter. Under the immensity of the glittering vault of night, by the

ceaseless surge of the restless ocean, under the green arch of the forest glade, on the white desert of the snow-clad field, or prone on the brown bosom of old Mother Earth—recharging the wasted dynamos of Life with her strength-giving magnetism—from all these there comes finally that peace that passeth understanding.

And know also that one can not flee real trouble. One must learn to live with sorrow, bitterness, or loss, or the worry they entail, before one can ever forget them. This does not mean that we must make a fetish of our trouble, dragging it around, as the murderer of old dragged the corpse of his victim. It means looking the sorrow, the shock, or the bereavement frankly in the face, until the stern lineaments soften into benignity, and the repellant features take on a tender smile of an old friend.

Then, also, there is the healing satisfaction of work. To keep busy—in the open air if possible. But, in any event, to occupy mind and body in the task that must be done.

And helpfulness, also. To live a life of service, to give one's self unselfishly to humanity, that the sum total of suffering in the world may be decreased. It all brings its reward in quiet nerves and self-forgetfulness.

Recreation also has its usefulness. The theatre, concert, lecture, book or magazine, cheerful companionship, travel—if one can afford it—sport, amusements of all kinds, the influences of suggestion, and a determined attempt to attain and retain a cheerful mental attitude, all are good.

The "don't worry" class, the ubiquitous individuals who advise us "not to worry," usually because they have nothing to worry about, frequently constitute themselves a veritable pest. For the reasons they advance for curing our worries are well meant but hollow mockeries. Their preachments fail to carry conviction. Their intentions may be all right, but the substance lacks sincerity. I do not mean to say that there may not be some who have not achieved a certain definite solace and ease of mind, and a spiritual calm from the study of "Marcus Aurelius," or some of the modern optimists. But I have yet to meet them.

I do know, however, that many thousands, whose faith is securely founded, derive marvelous consolation and soul repose from the reading of the Bible or from prayer, which, even if they have no other effects or attributes, are the most potent forms of auto-suggestion known to science. This is meant in all sincerity and respect—a tribute from one who has studied all the principal religious literature of the world, and found much of good in most of it.

But the chief cause for worry is weakness—usually of physical origin. The strong, the robust, the exuberantly healthy, rarely worry. A perfect digestion, assimilation and elimination, an organism working in tune with physiology, has a resilient tone that harmonizes not at all with worry.

If the liver is thoroughly alive, if the lungs function actively, burning up the poisonous carbon-dioxide that would otherwise depress body and mind; if the bowels, the skin and the kidneys excrete normally the waste products of the system, worry rarely gains a foothold.

And also there never yet lived philosopher with a raging toothache who remained philosophical. Constant agonizing pain might well test all the patience of old Prudence Patience herself. No amount of cheerful chirping ever yet removed a decomposing pulp from a tooth, filled a root canal, or opened up an abscessed ear.

Wise counsel can not possibly avail with an individual who is victimizing himself with dyspepsia. And dyspepsia is a tangible and potent cause for worry. Those who "stuff" themselves with too much food, or with the wrong kind of food, or with imperfectly masticated food, are manufacturing poisons which will worry them as surely as though they were producing the condition by chemical formula.

Moderation in eating, a limitation of the amount of meat and other proteid which is liable to decomposition in the heat and moisture of the small intestines, and perfectly masticated food will work a physical, as well as a mental, revolution with these individuals.

Frequently an "acid free" diet brings about an improvement that may be noticeable inside of a week, in some forms of dyspepsia culminating in worry—particularly in that form accompanied by fermentation. Oranges, grape-fruit, plums, pears, apples, preserves—even the harmless necessary boarding-house prune—act, in many instances, as veritable "acid factories." Candies, pastries, doughnuts, fried foods, and excessive amounts of starches—which are transformed into sugar during the process of digestion—also contribute toward acidity.

If all acids are eliminated from the diet, and if the system is alkalinized by a teaspoonful of milk of mag-

nesia or baking soda in a glass of hot water three or four times daily, the alkalinity of the blood will be increased, and the acid generated in nerve-irritating excess by a dyspeptic stomach will be neutralized.

The most universal of all the myriad causes of disease is self-poisoning by absorption of toxic products generated in the intestinal canal. The development of these putrefactive alkaloids and their depressing effects upon the organism—particularly upon the nervous system—can not be overestimated. Perhaps some idea of their toxicity may be gained when it is understood that the indol, skatol, indoxyl, and other alkaloids generated by decomposition in the intestine and taken up into the blood are identical with curare—the poison with which the Amazonian Indian tips his darts and arrows, the faintest scratch from which is almost certain death.

The bushman gets his poison by killing an animal, sticking it full of barbs and arrows, like a pin cushion, and letting it rot in the sun. We get ours by gorging upon albuminous food—meat, eggs, cheese, and improper combinations—letting them ferment in us, and then failing to clear out the débris.

The liver, unable to cope with the poisons, which it is its duty to neutralize, throws up the sponge in despair. As a consequence, the tongue becomes coated, the skin pigmented with bile, the eyes yellow and jaundiced, the spleen enlarged, and the nerves a curious and unholy mixture of sluggishness and irritability.

The most studious become inattentive and stupid, lacking power of concentration; the brightest degenerate into somnolent blockheads. Poisoned nerves yell for help—their cries taking the form of insomnia, neuralgia,

neuritis, or that deadliest of all wreckers, neurasthenia.

All these sub-vital states react in their turn upon the original cause, robbing the nerves of the force that should promote the normal digestion of food, as well as stimulate the peristaltic action of the bowels.

And so the grim game proceeds; the poisons depress the organism, the depressed organism produces more and ever more poisons, and these in turn produce more and ever more depression.

The solution of the problem of auto-intoxication is simple enough—if effectually carried out. It consists in prevention and in elimination.

"Prevention" implies the adoption of a diet which shall furnish plenty of "hay"—bulk foods containing little nutritive matter, but much fiber and water. These act as mechanical stimuli to the intestines, and favor in this way the softening and expulsion of their contents. All green vegetables, especially those that grow above the ground, almost all fruits, except persimmons and seed berries, whole wheat, Graham, rye, and bran breads, plenty of butter and rich gravies, buttermilk, or some of the artificial substitutes made with ferments, are most valuable.

Plenty of water—a dozen glasses or more, taken hot or cold, as preferred—should be drunk every day.

Some mild laxative should be used, or a daily flushing of the colon may be practiced until the bowels become educated. After which these may be dropped.

Many of our best authorities believe that nervous diseases and the worries they develop are produced and then aggravated by the drinking of tea and coffee. I have not found this true to any extent.

If tea is freshly made and drunk hot—preferably without cream, as with many the addition of cream seems to produce fermentation—it furnishes a grateful stimulus to the gastric mucous membrane and creates a general feeling of well being. Naturally if one absorbs a dozen or more cups of strong tea every day, the theine contained in this "tea-jag" is going to tremendously overstimulate the nervous system, while the tannin content of the tea is bound to dry up the secretions.

Coffee likewise. A cup of good coffee, especially in the morning, is a veritable life saver to thousands, giving them just the gentle little "kick" that may furnish a stimulus to effort and to digestion that could never be secured in any other way. Personally, I never could see the logic in a doctor's taking away the hot, comforting cup of tea or coffee from a patient, and then giving this patient a two and one-half grain caffeine pill—the same dose of caffeine he would have gotten much more pleasantly in the coffee.

"Everything in moderation." One could expect nothing from a professional "tea taster," or from a woman who drinks her coffee as a drunkard drinks rum —and one habit is quite as nerve wrecking and reprehensible as the other—than that they develop into worrying nervous wrecks.

Women, because of the intimate connection between their functional life and their nervous system, are extremely prone to worry. This condition is intensified during the menopause—when the creative life is burning out.

A determined attempt to find interests that will distract—any activities that will occupy the mind and pre-

vent introspection and self commiseration—will dissipate these imps of unrest and depression until Nature once more brings the barque of health into the quiet water of accomplished purpose.

But if there exists an organic lesion, any pathological or abnormal condition which may constitute a possible source of nerve irritation, by all means seek expert advice and have it corrected.

Hundreds if not thousands of children, are in a fair way to become worrying wrecks, merely because they have been forced to become "mouth breathers." Because of some nasal obstruction, such as a twisted septum (the cartilaginous division in the nose), or enlarged turbinated bones, the nasal canal is occluded. Or adenoid growths may block the passage.

Every mother should closely observe her children for symptoms of these conditions. If found, have them immediately removed. For if they are not removed the child will develop contracted dental arches, and other conditions that will prevent the circulation of lymph. Deprived of this nutritive material, the brain will be starved into sub-normality, and a child who should be keen and alert becomes a dunce.

When your child cries out in his sleep or is subject to distressing restless dreams, look to these or other physical causes for their source. Having found them, see that they are radically removed. The dangers of operation in this era of skill are quite remote—so remote as to be almost negligible. But the dangers of not operating are immediate and progressive. And the little tads rarely "outgrow them."

Needless to say, old John Barleycorn has trained

some of the champion worriers of the world—men and women who can worry more with one hand tied behind their backs than any dozen ordinary worriers can with both hands.

"Booze" is a hollow hope, an evaporated expedient—any kind and every kind. Beer, wine, whiskey, rum, any form of alcoholic drink is, always has been, and always will be a cause for physical and nervous deterioration. Of course any of these could be made perfectly harmless—by leaving out the alcohol. Alcohol is poisonous in any dosage, but more particularly in small doses, constantly repeated—the way the average moderate drinker takes it, for the system gets no opportunity to recover from this poison pricking influence. The nerves have no chance to recover from the cumulative buffetings of booze. Really the only way to drink so that the effects will be relatively harmless, or greatly minimized, is to go into training for drinking. Get into the pink of condition, and then absorb a month's supply in a night. By sweating, purging and flushing, get the stuff out of the system. Then let it alone for another month, and repeat as directed.

Paying too assiduous devotion to My Lady Nicotine is also fraught with evil consequences. Perhaps the chap who is seated on a girder of what will ultimately be the twenty-eighth story of a skyscraper, and who is dexterously rolling his own with one hand while guiding girders with the other can stand it. He gets a supply of oxygen that helps his system burn up the toxins of tobacco.

But the ordinary man who is chained to a desk, or who is otherwise confined, can not oxydize the furfurol,

the aldehydes and the other poisonous products of tobacco so readily, consequently he develops palpitation of the heart, nervous irritability, insomnia, and a worrying disposition. The remedy is obvious.

To cure worry, remove its cause. Put the body into perfect physical condition. Increase the number of red corpuscles in the blood. Protracted warm baths, exercise in the open air, deep breathing, psycho-analysis—in some cases mental suggestion, avoidance of overwork or excessive long continued fatigue, correction of eye strain, foods rich in mineral salts—particularly in phosphorus and phosphates, moving away from the neighborhood of the man who keeps a clarion lunged rooster, or from next door to a girl who is studying grand opera, side stepping baldness, bunions, and anything that hardens the arteries, impairs the digestion, poisons the blood and destroys health—all these thing help wallop worry.

Vitolysing (see Part One), which stimulates the circulation and nutrition of all the cervical and upper dorsal spinal nerves, and all the organs to which these nerves ramify, is also an excellent waylayer, as are all other stretching and relaxing exercises.

So while worry is a red-headed imp in its manifestations, it is yet vulnerable. The only thing necessary in order to eradicate it is to know where it is and how to hit it. The rest takes care of itself.

THINKING FOR RESULTS

By HEREWARD CARRINGTON, Ph. D.

NOW that we have learned something as to the structure and nature of the human mind, we may perhaps turn our attention for a few moments to the practical question: How best to use it? The mind being an *instrument,* a *tool,* which we have to use, how are we going to make the most of it—so as to make our lives as happy and successful as possible?

There are many rules which could be laid down in this connection, but a few brief hints must suffice. The following suggestions, however, if carried out, will no doubt be found useful, as they have proved to be by many thousands of persons in the past.

In order to insure a better future, we should make the most of the present. Tomorrow's joys or sorrows are largely made up of today's efforts, or the reverse. We should not worry about the future so much, but make the most of the present moment instead. For the present makes the future! Most of the things we worry about never come to pass; they exist only in our imagination; and even if they *do* come to pass, they are not nearly so bad as we had anticipated. It is astonishing, to what an extent our lives are made up of vague fears for the future—fear of poverty, of sickness, of death, of a thousand and one things which spoil our lives, and which rarely come to pass as we had anticipated. Away with such fears! Be determined to live the present day to the best of your ability; have faith and confidence in the future; have faith in yourself; and all will be well.

There are three laws, regarding success, which should

be constantly borne in mind; and it may be said that unless they are applied, success will never come. If they are constantly applied and lived up to, however, success can not fail to come. They are the following:

1. *Think definitely of the goal you have in view; make up your mind what you want; then go ahead in your endeavor to get it.*

Unless you know what you *want* in life, it is small wonder that you do not attain it! You must have a clearly defined goal, and stick to it until it is attained. Did you ever see a sculptor at work upon a piece of marble? If you asked him what he was making, he would tell you—a cupid, a nymph, or whatever it might be. He has a clearly defined mental picture of the finished product in mind. And you would be justly astonished if he replied: "I don't know! I'm just chipping away at the marble; something will probably evolve in the end!" Yet that is the way many persons run their lives—with no definite object in view; with no goal in mind; just living from day to day in the hope that something will "turn up"—like Mr. Micawber. Nothing turns up unless you turn it up! You can not want one thing one minute, and another the next, and so on, with any hope of obtaining any of these things. You must fix some definite goal in view—high enough for practical possibilities—and stick to it until that goal is attained. When that has been reached another can be held in view; but you must always be working towards some clearly defined result; and let nothing interfere with your determination to reach it.

2. The second rule to be followed is that *you must make every mental action positive.* This has been de-

fined as follows: "A positive action is an action that you feel when you realize that every force in your entire system is pushed forward, so to speak, and that it is passing through what may be termed an expanding and enlarging state of feeling or consciousness. The positive attitude of mind is also indicated by the feeling of a firm, determined fulness throughout the nervous system."

This positive attitude prevents negative thoughts—doubts, fears, etc., from entering the mind; it gives poise and power to the individual; a sort of reserve strength is felt; you will feel in harmony with yourself and your environment; you will feel that power is going *from* you, instead of influencing you, from without. Positive thoughts spring from deep down within your own personality; they do not originate on the surface, as it were; but from a deep central well within yourself. The deeper the source from within yourself that your thoughts and volitions come from, the deeper they will sink into the minds of others. If they only originate on the surface with you, they will not penetrate beneath the surface with others. If, on the other hand, they spring from a deep well within you, they will reach an equally deep stratum in other individuals. This is the secret of power, which many possess. They make all their thoughts and feelings *deep,* and send them out with force and power.

3. The third rule is that *every thought must be constructive, not destructive;* and by constructive thinking we mean mental action based upon the deep-seated desire to increase, achieve, build, aspire. Keep before you this ideal—to become greater, better, stronger, more in control of circumstances. This is positive thinking.

Do not try to follow the advice of those who would tell you to try and alter circumstances by thought. You can not do it; you can not affect the inorganic outer world in this manner. The way to improve your circumstances is to improve yourself and when you have done this, you will find yourself gravitating into better circumstances, more successful conditions and surroundings; you will find better friends, you will become more competent, and as you do so success will come to you. The way to attract better friends is to make yourself a better friend; be more unselfish, thoughtful, tactful, sympathetic and cheerful. Think of others, and they will think of you. If you shut yourself up in a hard shell, you can not expect others to try to penetrate it. Injustice, tyranny and intolerance no one can tolerate!

You must also bear in mind the undoubted fact that *negative minds never attract that which is helpful to them* under the circumstances, while positive ones do. If you drift, you will meet others who drift also; "like attracts like"; and you will somehow aurite around you failures, those who are "down on their luck," etc. If on the contrary, you begin to assume a positive successful attitude, you will come into contact with those who succeed; things will begin to "come your way," you will begin to gain in popularity and achieve success. The mental attitude is everything; externals will follow.

And this fact should always be borne in mind. In order to achieve riches, it is not necessary at first to possess them. You must begin by feeling "rich inside," as it were; feel that things will come to you; that you will attract them; that they *must* do so; they will obey *your* will. At the same time you can not sit still and just

wish for things to happen. Day dreaming in this manner never brought anybody anything. Accompanying this will must also be strenuous efforts in that direction; you must work to attain your goal; but this work must be cheerful, positive, thoughtful and constructive; and while doing it, you must keep constantly before you the object you have in view and "will" to attain it. There is no doubt whatever that if you consistently do this, and throw your whole "self" into the undertaking, success, and that for which you wish will ultimately be yours. It has been demonstrated in hundreds of cases, and is constantly being demonstrated today.

Always remember that "God helps those who help themselves"; and in order to succeed in any direction, you must work, strive, use your will, energies and imagination—all the powers you possess in fact. You must *feel* your desires through and through, and not only on the surface. Be cheerful; be optimistic. This attitude of mind not only stimulates the bodily functions into greater activity and health, but also actually brings about that which you desire. The pessimist curbs his energies and concentrates his whole attention upon failure; the optimist gives all his thought and power to the attainment of success, and arouses his faculties and forces to the highest point of efficiency. The pessimist waits for better times, and expects to keep on waiting; the optimist goes to work with the best that is at hand now, and proceeds to create better times. Which of these two has the most right to expect ultimate success the more quickly?

Once having chosen a path of action, you should launch yourself upon it with as great force and initia-

tive as possible. There must be no holding back, no hesitation. All forces of this kind tend to hold you back, to prevent the efforts of the mind to progress. If you hold yourself, you will "fall between two stools"; and achieve nothing. Once having chosen a course of action, put all your life, all your energy, all your enthusiasm into that course of action for the time being. Think well before acting; but after acting, act strongly!

Try to live above personalities; above personal things. Most people are too personal in their attitudes; they must learn to "detach themselves," as it were; to see the sin apart from the sinner; to see themselves as they really are; to see and appreciate our own faults and weaknesses—and it may be said that as soon as we can do this, the faults and weaknesses disappear! So long as we are *one with them,* they are part of us; if we can succeed in holding ourselves aloof, as it were, and examining this thought and action of ours, as though someone else had done it, then it is no longer a part of us; and as soon as we can do this, we have cured ourselves of that fault or weakness, as the case may be.

Remember that we must embody our thoughts in our life, and our life in our thoughts. It has been said that "He who would become great must live a great life"; and to a certain extent this is assuredly true. Array yourself in your spiritual strength; know that there is an inexhaustible source of cosmic energy and power upon which you can draw—illimitable, endless, changeless; and that you have only to hold yourself in that attitude of mind and body which permits this to flow into you, to obtain all that you desire. Thus you will find health and happiness and strength and harmony.

Riches will come to you. Love will be yours. Power will arrive. Worthy ambitions will be gratified. But to insure this, you must constantly do your best; strive after perfection and live your noblest. The highest thoughts, impulses and aspirations must be yours; health and strength of body must be cultivated; cheer and optimism and tolerance must prevail. In short, live your life as fully and as well as you can, and success—lasting and brilliant—will assuredly be yours!

CHARACTER MAKING THROUGH GOOD AND BAD HABITS

By HEREWARD CARRINGTON, Ph. D.

"HABIT second nature?" cried the Duke of Wellington. "Habit is ten times nature!"

Even William James has said that we are "a bundle of habits." We get into ruts and grooves, and go on living our lives this way until we die, missing much that is really great and beautiful in life, merely because we are so lazy and indifferent that we do not want to break away from beaten paths, and branch out anew. If we are to form new habits, we must break away from many old ones.

"The first thing necessary in breaking a bad habit is to *want* to break it. Some people don't. They fancy that they would like to stop smoking, or whatever it may be, but in reality the thing that they want to do is the thing that they do. The smoker, for instance, does not really want to stop smoking. He wants to smoke, and that is all there is to it. . . . .

"The second great requirement is to substitute something in place of the habit that you expect to abandon. . . . . The essence of habit breaking consists not so much in the mere negative attitude of refraining from doing the undesirable thing, but rather in the positive attitude of doing something, and so filling one's mind and time with thoughts and activities of the right kind that these very soon establish themselves and re-make one's character."

One of the most important essentials is to *stop worrying*. Whatever your difficulty may be, stop thinking about it! Devote your mind to some more constructive activity. As long as you worry about your habit, you thereby keep your mind on it and make it as hard as possible to break away from it.

You must therefore "get busy." Avoid loafing. Find some useful work, and in it you will find happiness. Remember that "Satan finds some mischief still for idle hands to do"; and it is no doubt true that the work that they really enjoy keeps people out of mischief more than anything else. Moreover, it is no longer "work." I can not too strongly recommend every young man or woman to take up some *hobby* in life, and devote a certain amount of time and interest to it, until it begins to absorb him. No matter what it may be—reading, writing, music, science, even butterfly collecting—so long as it is an intellectual or useful or constructive hobby. You will soon find that you will turn to it with relief; and that many of the so-called "enjoyments" which you formerly liked will begin to seem tame and insipid to you afterwards. A recreation of this sort will prevent many a ruined life; further, it will often lead on the high road to success. Remember always the words of William James:

"Let no youth have any anxiety about the upshot of his education, whatever the line of it may be. If he keep faithfully busy each hour of the working day, he may safely leave the final result to itself. He can with perfect certainty count on waking up some fine morning, to find himself one of the competent ones of his generation, in whatever pursuit he may have singled out. Si-

lently, between all the details of his business, the *power of judging* in all that class of matter will have built itself up within him as a possession that will never pass away. Young people should know this truth in advance. The ignorance of it has probably engendered more discouragement and faint-heartedness in youths embarking on arduous careers than all other causes put together."

To change a bad habit for a good one, therefore, involves a certain alteration within the nature itself. Mere negative denial is not enough. We must *construct* too.

Undoubtedly bad habits do not continue to exist long in a normal, healthy mind, contained in a wholesome, vigorous body. For this reason one of the best interests to have—one of the best "hobbies" to cultivate—is an interest in all athletic pursuits or open air pastimes. If there is any form of sport or outdoor exercise over which you can become enthusiastic, cultivate it for all you are worth. For it will occupy your mind in a wholesome way at the same time that it improves your body. Outdoor life has a certain inspirational and refreshing influence all its own. It is not only healthful, but mentally stimulating and uplifting. It appeals to all our best instincts. No matter what the nature of your habit, the more time that you can spend in the open air the better you will be able to resist it.

Environment and association have much to do with our habits—good or bad.

Example is a great factor, and none but the strongest characters can be expected to grow up without vices when surrounded by them. The majority of us, however, are not thus situated; we are surrounded on all sides by examples of all sorts—good and bad; and we

are free to make our choice—as to which of these most appeals to us, and which line we desire to follow. Once the decision is made, as before said, it must be acted upon immediately. "He who hesitates is lost." If good thoughts and impulses were acted upon at once, we could break away from many of our habits without much difficulty; it is only when we allow ourselves to have "second thoughts" and vacillate, that we are apt to sway back into the old groove again.

Always remember that if a habit is not stopped at the *beginning,* it becomes harder and harder to break, as time goes on. With each repetition, the traces in the nervous system are more indelibly fixed—until after a while it becomes almost impossible to break a bad habit which could have been overcome at the very beginning with hardly any effort at all. It is therefore important to watch ourselves and nip any tendency of the kind in the bud; in this way bad habits are readily cut off at their inception.

ACQUIRING SELF-CONFIDENCE

By HEREWARD CARRINGTON, Ph. D.

SELF-CONFIDENCE is an essential ingredient of success. Without it no man ever achieved anything great in life, for the simple reason that it is an indication that the man is sure of himself and of his facts; and until he is *sure* in this way, he can never convince others, or progress himself.

Mistrust of ourselves—the source of timidity—always springs from lack of confidence in our own strength, and must weaken us by hindering us from giving to our thoughts and their realization the inspiration necessary to exalt them.

It is because of this that physical health and vitality are so important. It has been proved over and over again that physical health gives confidence to a man; and that his confidence in himself increases in direct proportion to his health and strength. The strong man is always calm, self-poised, confident. He knows his own powers; he has tried them, and knows their potentialities. Only the weak, negative type is timorous, for the reason that he lacks that essential ingredient—self-confidence—born of experience and courage.

The loss or weakening of the will-power is the principal cause of attacks of timidity. Excessive self esteem is another cause. This may sound a contradiction, but it is true that the man who considers himself "superior" and refuses to "get in the game" and mix with the world, suffers from a certain timidity and shyness, which is

based upon his own vanity and egotism. Most excessively quiet men are both timid and vain.

Yoritomo-Tashi, the great Japanese philosopher, in writing on this very subject, says: "Timidity is often confounded with reserve. The reserved person is conscious of his worth, and of his resources, which he concentrates, instead of scattering to the four winds. Reserve is a force; timidity, a weakness; and success belongs to the strong. . . . Energy is the highest goal of all things, and the world belongs to the energetic."

Here is a clear recognition of the importance of health and strength, in the attainment of a strong personality and self-confidence.

"Self-confidence or its lack," says Hugh Masters, is really based primarily upon one's consciousness of his own powers or of his deficiencies. . . . It is in large part a realization or consciousness of being able to do. It means faith in oneself, and courage based on that faith. To a large extent, lack of confidence arises from a consciousness that one is not capable of doing the thing or things in mind, or a realization that he can not do them as well as some one else.

"The first thing to do, therefore, is to acquire the ability to do the thing in question, and your confidence in your ability to do it becomes established automatically. If it is a matter of mental work, then proceed with a line of training or study or practice that will enable you to excel. Just as soon as you can do superior work, just as soon as you can do your work better than others are able to do it, your confidence in yourself will be manifested through your own consciousness of what you are capable of doing.

"If it is a matter of physical courage, of self-confidence in your physical relationship to other men, then cultivate your body, your strength, your endurance, until you know that you stand on an equality with them."

This is sound advice, which should be followed.

Self-confidence depends to a very great extent also upon the *carriage of the body.* If you keep your chest high, your lungs full of air, and your head well back, you can not possibly feel "hang-dog," in the same way that you would if you went about with a sunken chest, head down, and rounded shoulders. Our general feeling of self-assurance depends to a very great extent upon the body; and this question of self-confidence in turn depends very largely upon the *feeling* self, coupled with a strong will.

Clothes play a part in this feeling which can not be overlooked. Ordinarily, one can not feel the same degree of confidence and dignity and self respect in rags that one would in a well groomed suit or evening dress. To a certain extent, it is true that "clothes make the man." Even a dirty collar, soiled finger nails or unbrushed hair may have the effect of disturbing one's equilibrium to the extent that one can not feel one's best, or assume the same degree of self-poise and self-confidence one could when clothed at one's best.

Read the chapter devoted to the cultivation of personal magnetism, and follow the directions therein laid down relative to the use of the hands, eyes, body, the use of the voice, etc., and you will find these of great use in the cultivation of self-confidence. In fact, these two are largely inter-related, and as your self-confidence in-

creases, your fund of magnetism will be found to increase, and *vice versa.*

Develop the spirit of self-reliance, not so much by affirmations, as by the more practical and effective character-building school of doing things. And also by learning to stand on your own legs. When you have an idea of doing something from which your first impulse is to shrink, then go ahead and *do* it with as little thought as possible about the courage you show in doing it. Forget that it takes nerve. Simply do it! You have heard of the theory of "learning by doing." This is a plan of character-building by doing. Cultivate your courage by establishing a life policy of going through with everything you start, by carrying out your projects, until you have established in your own mind the fact that you *can* do things. And when you have actually realized that, through proving it to yourself, the element of confidence in yourself and in your ability to do things will develop naturally.

Probably the most subtle and penetrating analysis of lack of self-confidence and timidity ever written is that of Yoritomo-Tashi, already quoted, who said:

"The timid person . . . . . is cognizant of his own worth, but it is very rare that this conviction inspires him with a wish to correct his defect (of timidity). . . . He thinks the opinions of others are very unjust; but he suffers less from this than one would imagine. There is a special kind of pride which causes him to congratulate himself on the amiable way he bears this lack of appreciation. The "ego" of the timid man becomes a god whose altar is his heart. It is there he takes refuge in hours of humiliation; and this creed is the

source of the self-love which causes him to have an exaggerated opinion of his own worth, and to depreciate that of others. . . .

"The timid also feign gentleness, and they are obsequiously polite; they do not know how to make objections nor to banter, and so they give their approval to everything without exercising any judgment. . . . They live a life like a rabbit, and everything which disturbs them, whether under the guise of pleasure or of grief, frightens them. . . . This mistaken virtue, called timidity, soon degenerates into open antipathy toward everybody who offends them."

The way to prevent and cure timidity then, is the same as the cultivation of self-confidence. As the one increases, the other vanishes. Build up the bodily health, by means of exercise, careful diet, a plentiful supply of water, deep breathing exercises; strengthen the mind by work; cultivate the will by a series of exercises; and cultivate a certain social side to your nature—thus familiarizing yourself with all shades and classes of society—and your self-confidence will increase by leaps and bounds; and as it does so all feeling of fear, of hesitation and of timidity will vanish like the mist before the strong rays of the morning sun, which sends its shafts of light athwart the fields and meadows, rising in its power and splendor.

PERSONAL MAGNETISM

By HEREWARD CARRINGTON, Ph. D.

SUCCESS in life depends very largely upon personal magnetism. No doubt everyone has observed the fact that certain men and women possess this power to an astonishing degree; it is not necessary for them to say anything to manifest it. They may only step into the elevator, and everyone around them feels this magnetic force—exuding as it were from them. All great men and women possess this magnetic quality to a large extent; and it is owing to this fact that their success is largely due. Napoleon possessed it to an unusual degree; and all great leaders have been similarly endowed.

Personal magnetism is but a name given to the universal force manifested in human life. It is that power which attracts what we want; holds people under our sway, and enables us to forge ahead and obtain what we want. Some people possess this quality to an astonishing degree; but there can be no doubt that we all possess it to some extent. and that it can be cultivated in all of us by practice.

Here as elsewhere, *physical health* is the foundation and pre-requisite upon which personal magnetism depends. In practically all cases, vitality and energy are required, to develop this power; Roosevelt was a living example of this. Physical exercise will generate it more, perhaps, than anything else; and it is certain that without health and vitality, no high degree of personal magnetism can be obtained. All measures should be adopted,

therefore, to strengthen the body and the mind; to improve its strength and health; to control the mind, and build up and strengthen the will. The various practical chapters devoted to psychological training should be studied in this connection.

Deep breathing exercises are very essential. Without full lung capacity, no great degree of personal magnetism is possible. Throw out the chest, take a few deep breaths, and you will find that your self-confidence is already increased many fold. If now as you inhale, you think to yourself: "I have strength"; "I have power"; etc., you will find that you actually acquire this power to an astonishing degree in a relatively short space of time.

A good *speaking voice* is essential. To obtain this, reading and speaking aloud should be practiced. Endeavor to make the voice deeper, if a man—as a rich, resonant voice at once carries with it the idea of power, and others will tend to follow instinctively. Speak clearly; articulate carefully, do not hurry your speech, and speak with depth of feeling. Pay *attention* to what you say, and see that your listener is paying attention before you speak. Have a "smile in your voice." Make it pleasant, while at the same time maintain its firmness. Nothing so influences a woman as a man's voice; in fact, it has been said that a woman can resist a man's looks, his riches, his manner, but she can not resist his voice! From this we see the importance of cultivating a good speaking voice. And to cultivate this there is no better exercise than reading and reciting aloud every day alone, in front of a mirror, so that you can observe your actions, and check those which are superlative.

Regarding the *movements of the hands* while talking, a few remarks must suffice. Make these as few as possible. Wild gesticulations may be all right for a religious revival; but they are not effective in daily conversation; they only make the speaker ridiculous, and fail to convince. A slight gesture, just at the conclusion of a sentence, or when making a point emphatic, may be all right; in fact, it is sometimes very useful here; but above all, avoid the use of the hands on any and every occasion. Remember that all downward passes with the hands are "sleep" passes, in hypnotism; and all upward passes are "waking" passes. Therefore, your hands should move in a downward direction, when they move at all, since this tends to influence the person to whom you are speaking in the right manner.

The *eyes* are very important factors, in the cultivation of personal magnetism. It has been said that a stream of vital magnetism issues from the eyes, when the will is used intently; and experiments seem to prove this. You must train your eyes so that they can look at any object for a considerable length of time without becoming tired or without blinking. To do this, you must look with relaxed eyes, without strain; for if you strain them, you will cause the eyes to water, to appear weak, and they will at once lose all their power. A very good practice is to look at a small object, such as a black dot on a piece of paper, for some time; then move the head round in a circular motion, keeping the eyes fixed all the time on the dot. Another good plan is to look at your own reflection in the mirror. Take up your position in front of a looking glass at a distance of about fifteen inches, and gaze steadily into your own eyes,

taking care not to blink or allow your gaze to be distracted for a moment, while so doing. Now, *will* intently, while you are looking into your own eyes, that a certain thing shall come to pass. This will give you an idea of your own appearance during the process; will tell you what to avoid; and will prove excellent practice for developing magnetism in your look, and in your eyes.

The *use of the eyes* is another matter. Always remember that the eyes have a certain subtle fascination; even a horse or a dog will look you in the eyes when you speak to him. Therefore, look directly into the eyes of the person to whom you are speaking when you wish to influence him and make a point; on the contrary, look away when anyone is speaking *to* you, and trying to influence *you*. A good plan is to look away until the very end of the remark, and then suddenly turn to your conversationalist, and look him directly in the eye, as you begin your own sentence.

Remember that a quick, short remark will usually have the effect of drawing the eyes of the other person to your face. Many salesmen know this, and will wait for the psychological moment; then just as they are about to make their point, will make a short, snappy remark, which will draw the eyes of the other person; then before these can be withdrawn, the point is made with all the emphasis possible. An emphatic downward gesture of the hands at this moment may be useful in aiding the general suggestion.

Always remember that *suggestion* is a great factor, in personal magnetism. It has been said that if any man were to get up on the street corner, and repeat emphatically enough and often enough that two and two

make five, that he would find a certain number of people who would believe him! While this may be an exaggeration, it is certainly true that a deep, sincere manner of stating things goes a long way towards getting them accepted as true. Conviction brings conviction. Repetition is also essential. Saying a thing over and over again will force its acceptance, even when the first time seemed to awaken no response. This is the secret of advertising. The first time the advertisement is seen, it fails to "reach" us; but the second and third times, it gets into our consciousness; and after many times, we begin to feel that we actually must have that thing! It is the same with verbal suggestions. Tell a man a thing once, and it may make no impression; but to keep on telling him that thing, perhaps in different words, and he will ultimately agree with you that he *does* really want it after all!

Back of all these external expressions—the eye, the gestures, etc.—must lie the power of the will. This is the driving force which gives your commands power and forces their acceptance. Telepathy, or the influence of mind upon mind without direct sensory channels of connection, is now pretty thoroughly accepted by the scientific world; and it is this power which is largely used in personal magnetism. Use your mind to influence the person to whom you are talking or thinking about; use your will power; focus and direct it. There is nothing "wrong" in so doing, since we all do it unconsciously every day; and further, life is a battle, in which the strongest wins. You have a right to exercise all your powers to the unmost, provided you are using them in the right manner, and not for evil purposes.

Two factors should perhaps be insisted upon in this connection. They are, *first,* the importance of drinking large quantities of *pure water,* in order to increase the amount of personal magnetism one generates. Water seems to have the effect of imparting this; and the human organism revives and responds to water in much the same way that a plant does.

The *second* factor is that *too much food* will effectually prevent the accumulation of vital magnetism. The body will be poisoned, and the necessary magnetism will not be generated. Mr. Leroy Berrier says in this connection: "From observed experiments, I am convinced that the person who desires to unlock a wealth of latent magnetic power must not only abstain from overeating but eat very moderately and take a fast now and then. . . . My foods are of the proper qualities; I consume a sufficient amount properly to sustain me, both mentally and physically, and leave a surplus which takes the form of personal magnetism—a surplus store of personal magnetism which I can unlock through love, enthusiasm, concentration, absolute trust, punctuality, order and application. This gives me mastery of self and conditions."

HOW SUCCESS IS MASTERED

By HEREWARD CARRINGTON, Ph. D.

WE speak of success being "achieved." That is just what it is—*i. e.*, gained, arrived at, mastered. It results from certain *causes*. Success does not happen. It is a result. It results from your own attitude and method of life.

We must always remember that rarely or never in life do things "just happen." They happen because we *make* them do so. The law of cause and effect is operative here as elsewhere. In fact, in no department of life is this obvious truism more amply borne out than in the attainment of success.

We must be sure as to what we *mean* by success, however. What would be success to one person would not be success to another. The usual idea of "success" is that represented by money—the amassing of a large fortune; we call such a man a "successful man." And so he is. But many other men and women have other ideas as to what would constitute success for them; *that* would be their success. It might be to win the love of a particular person; or to make some great discovery; or to achieve some great name in the world, etc. This would be success for them. Success, therefore, varies with the individual; so that we must say that success, broadly speaking, is the ability to bring about that which we desire. The objects of success may vary; the methods never.

Let us assume that you have made up your mind as to the kind of success you wish to achieve (and let it be said vou will never attain success until you *have* done

this). You must then set about attaining it! Certainly, some people will be more successful than others in this world; but within reasonable limits, it may be said with complete conviction that *you can make sure of success.*

First of all you must have *bodily health,* energy, vitality, life. Unless there is a certain driving nervous force behind your actions, you will not reach a high degree of success. This can be cultivated by a simple, hygienic life, and by taking daily exercises, and following the methods of life laid down in this system.

You must then take into account your *ability,* natural and acquired. If you have inherited talents, so much the better; if you have had the advantage of a good education, good again; but never forget that many great men—such as Lincoln—made themselves, and had none of these advantages to start with. They had large quantities of that third most important ingredient—*Character.*

Character consists of a variety of compounding elements—will power, persistence, integrity, industry, punctuality, self-confidence, ambition and enthusiasm. All of these are needed, in order to attain great success. If you lack enthusiasm for your work, you will not succeed; if your will is weak, or you lack the necessary persistence, or self-confidence, or are always late and not "on the job"—any of these faults may spoil your chance of success, which would otherwise have been achieved. Most of these are purely a question of *habit;* and these habits can readily be acquired, with a little patience and the exercise of a certain amount of will power—as explained in the section devoted to "Habits."

Your personality may be said to consist of good pres-

ence, address, appearance, appropriate voice and speech, dignity, cheerfulness and magnetism. Again, these are all more or less essential to the attainment of ultimate progress in life. Self-study and frank self-analysis will often reveal hidden faults of character, which call for eradication, before further progress can be made. We must learn to regard the body and mind as a delicate, inter-acting mechanism—just as a motor car is a mechanism; and if any part of it is out of order, it must be repaired before progress can be made. A man is as weak as his weakest link; and this applies to the mind no less than to the body. A little judicious work in self-examination, and effort will not be wasted; it will, in fact, repay you more than anything else you could possibly do, in proportion to the effort made.

Consider also your qualifications under the heading of "Generalship," in which may be listed Management, Judgment and Business Insight. These are partly instinctive and partly cultivated talents. But there is no doubt that a certain tendency or talent—which we had thought to be purely instinctive—can be cultivated by a little work and effort. Those portions of the brain utilized in that particular line of work seem to be stimulated into greater activity, in consequence of the added effort. Thus if you wish greater financial success, there is no doubt that those faculties of the mind which constitute this, and upon which success in this line depends, can be brought into greater activity and prominence by the continued thinking along these lines. Any faculty can be similarly cultivated; we only have to use an organ or a power practically and constructively, in order to increase its strength and dominance.

Always remember that you must make the most of all your opportunities and never let one slip by. "Grasp opportunity by the forelock," is an old saying—and a very true one! If you have made up your mind in a certain direction, act at once upon your choice without procrastination. Remember that "fortune favors the bold," and it is perhaps better to fail once in several trials, than not to try at all. "Faint heart ne'er won fair lady!"

Learn to know the value of money, without becoming a slave to it. Learn the value of time; such a book as Arnold Bennett's "How to Live on Twenty-Four Hours a Day," would prove most useful and illuminating to many persons. Keep your resolutions fixed; never let them "float"; at the same time, do not become so set in your views that they can not be changed. If you do, you are liable to become prejudiced and obstinate—and many people mistake obstinacy for will power; when, as a matter of fact, it is the very opposite.

Time is equally available to all; your life depends upon the use you make of it. Thinking is that which builds success. Your earning capacity rests with *you;* and depends upon the amount of actual work you do "above the eyes." It has been pointed out that a man, from his nose downward, may be worth thirty dollars a week; but from his nose upwards, he may make a million a year! It all depends upon how you use your "gray matter." And remember there is no "royal road" to success! It usually means *work,* and plenty of it. But there is no reason why the young man or woman of today who realizes this and determines to achieve success, should not do so in great measure in consequence.