

The Circular.

PUBLISHED WEEKLY

BY THE ONEIDA AND WALLINGFORD COMMUNITIES.

VOL. VI.

ONEIDA COMMUNITY, NOVEMBER 1, 1869.

NO. 33.

POST-OFFICE ADDRESS:

THE CIRCULAR, ONEIDA, NEW YORK.

TERMS:

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EGOTISM.

[Home-Talk by J. H. N., June, 1858.]

LET us try to get a clear idea of what we mean by *egotism*. It is evident that we must necessarily and naturally *think* about ourselves more or less; and then the question arises, Is egotism inherent in these thoughts, or is it only to be criticised in the expression of them? The evil lies back of outward manners and expression. It is foolish to imagine that because we do not *say* anything about ourselves, we are therefore free from egotism. We must remember that we are spirits, and that our thoughts are *utterances* in the spirit-world. We think all the time, in the presence of God. Of course there is egotism which is not uttered in word. We must not be satisfied with any such definition of egotism as would pass in the literary public. The exclusion of foolish, disgusting self-reference from conversation, is no cure of the evil, and should not be accepted at all as sufficient action against it. Our dealing with egotism must be with the *spiritual essence* of it. We can have no rule for our conversation, that we should not carry out faithfully in respect to our thoughts. Of course it may not always be proper to say all we think; but so far as egotism is concerned, there is no important distinction between thought and conversation; and the mere *suppression* of egotistical speech is of little value. Egotism in speech will take care of itself, if we get rid of egotism in thought.

We come then to the question, What distinguishes an egotistical spirit from one that is free from egotism? I see a very plain method of running a line between them, and only one method.

Egotism is not simple attention to self; it is *undue* attention, and that is to say, *untruthful* attention to self. It is attention to self, to the neglect of due attention to other beings. The law of God thoroughly displaces egotism, and yet it does not displace attention to self. It demands that we shall "love the

Lord our God with all our hearts, and our neighbor *as ourself*." Attention to self is here recognized, but it is reduced to its true proportion—it is communized; and this distinguishes it from egotism.

The question yet remains, How is it possible to displace egotism? and to this again there is but one answer—By the Spirit of Truth. Egotism is undue attention to self; but who shall say what is due attention in any and every case? No fixed rule can be given. Infinite knowledge, always at its post, is the only power that can accurately determine for us the relations and proportions of self to other beings. It will follow therefore that nothing but the action of the omniscient Spirit of God upon us can make our attention to self truthful. Inspiration is the cure for egotism, and the only cure. It is the connection of our individuality with an omniscient truthful spirit. The Spirit of Truth is the true *solvent* of our individuality. If our egotism can come into connection with the Spirit of Truth, so that it is dissolved and held in solution by that element, then by the action of sympathy with that element, always present in us, we shall have an infallible instinct, that will be as sure as the sense of concord in music, guiding our thoughts and speech accurately, so that every vibration we make in the spiritual sphere will have a communized character.

The Spirit of Truth is a harmonizer of individualities. Ten thousand, or ten million individualities dissolved in that Spirit, will perfectly harmonize with each other. Individuality of itself tends to hardness and centralization, ending in selfishness of the most perfect kind; and individuality penetrated and spiritualized by any of the inferior principalities, in heaven or on earth, i. e., by the world, the flesh, or the devil, which are the other menstruums that men recognize, is individuality still. There is no element that fairly dissolves it but the Spirit of Truth; and that does soften, and hold it in solution.

The theory, so far, is quite simple and plain; but when we come to the practical question, whether egotism—or what is the same thing, selfishness, which creates the discord and competition of the world—will *really* be abolished, I imagine that a general feeling in the world, even in the best and most philosophical part of it, is, that *we could not abolish selfishness if we would, and we would not if we could*—that it is a necessary evil—necessary as being useful, and necessary because we cannot get rid of it. I am inclined to

think that your best philosophers would generally maintain that the world could not get along without selfishness. Even if it is a bad thing, they would say, it is the spring of enterprise; and in that way, an immense blessing to the world. There are many who insist upon it, that sectarianism is not a very bad thing,—that on the whole it is beneficial. So of the strife of politics; and so even of war; some would contend that it would not be best to get rid of these things. It is probable however that when people say they would not get rid of evil if they could, they are persuaded into that position because they think they could not if they would. Let persons be persuaded of the inevitability of a thing, and they will naturally busy themselves to make out that it is useful and good.

We must consider the question, then, whether selfishness is the "necessary means of the greatest good," (as the phrase was in old theological times). The doctrine of the Emmons school, that *sin* is the necessary means of the greatest good, was supposed to have been exploded twenty years ago by Dr. Taylor. But put the matter in a little different shape; drop the word *sin*, which is an abstraction, and adopt the word selfishness, or egotism, and carry the matter back to the downright practical question, whether it is possible in this world to break up egotism and selfishness; and further, whether, if it is possible, it is best; and I imagine that Dr. Taylor and his followers, the best of them, would look grave and ask for time to deliberate.

That is the question we have broached, and it is before the world in due form, with practical experiments accompanying it. It is to be tried whether "sin is the necessary means of the greatest good"—whether it is a useful thing on the one hand, and whether it is an inexpugnable thing on the other.

The question finally amounts to this: *Is the devil indispensable to the well-being of the world?* The devil, spiritually analyzed and defined, is egotism. He is the antagonistic element to the Spirit of Truth. As the Spirit of Truth is the solvent of egotism, so the devil is the *pickle*, so to speak, in which egotism is preserved; and the simple question is, Is the devil's pickle essential to the preservation of mankind? Would not the world get along fully as well if it were to dismiss the devil from all official care and superintendence, and put Christ in his place? The devil and Christ are the sources of the two elements, one of which is the preservative of egotism, and the other its solvent. Christ is the perfect ap-

tagonist of egotism—that is evident from his life and death. He is the exponent of the Spirit of Truth, of which egotism is the opponent. In him attention to the individual is reduced to its true proportion. Can the world, then, accept of Jesus Christ in the place of selfishness, and let his spirit have full sweep in forming the characters and institutions of mankind? Or is it necessary to support the devil in office, though we do not like him? That is an important, practical question, and every man has a vote on it.

Bear in mind that the love of attention to yourself, like every other passion, instead of being impoverished, will be enriched by Christ; and it is easy to see how. Under the fashion of the world, you are excluded from *talking* about yourself. It is assumed that that is egotism, of course. Though you are allowed to *think* about yourself as much as you choose, you are forbidden to manifest your thoughts, or say what is transpiring within you. You are thus debarred from a great field of interesting, and of itself innocent, conversation. But deliver up the kingdom to Christ, so that you come within the reach of his instinct in conversation, and you will have freedom to talk about yourself; and your talk about yourself will be seen to be, not egotism, but inspired attention to yourself, and will harmonize with the thoughts of every one who is inspired. Get your thoughts communized, and you will get your utterance communized, by the same process.

There is nothing pleasanter to good taste, than the free warbling of what in form would be egotistical talk, if you have a spiritual perception that it is a communized spirit that is talking. Paul speaks about himself in a way that the rules of common writing would call egotistical; but you can feel nothing egotistical in what he says. You see clearly that the public interest is concerned in whatever he says about himself.

When we get our thoughts fairly into conjunction with the Spirit of Truth, so that our individuality is combined with the influence of this great solvent, we may talk about ourselves as much as we please—we may say what we think. Our thoughts will be good and comely, whatever may be the subject of them.

We shall find ultimately, that *autobiography* is the most legitimate of all productions; and that when the Spirit of Truth gets full possession of us, we shall talk more about ourselves than anything else. A man can handle the truths in himself and that he is acquainted with by his own experience, a great deal better than he can philosophize about things outside.

THE BRIGHT SIDE OF TROUBLE.

PEOPLE in trouble are sometimes told to draw comfort from such maxims as these: "When things come to the worst they always mend;" "It is the darkest time just before

day," &c. However difficult it may be for persons in hot water to discern any refrigerative properties in these proverbs at the time, there is after all a foundation in them of scientific truth. Paul points at the same apparent paradox in saying "When I am weak, then am I strong;" which is much the same as saying that when a man is pretty well used up by affliction he may be in the most promising condition of happiness.

The explanation of this seeming contradiction is in the fact that our life is two-fold, inward and outward; and that the susceptibilities to trouble or joy in the two departments do not always agree, but may be acted upon differently and tell a different story at the same time. In that case the inward man will rejoice and triumph while the outward man is in trouble. An incident related in the book of Revelation is instructive on this point. It is said that on a certain occasion, there was war in heaven, and the devil and his angels were cast out of heaven *into the earth*. Then follows: "Therefore rejoice, ye heavens, and ye that dwell in them. Woe to the inhabitants of the earth and of the sea! for the devil is come down unto you, having great wrath, because he knoweth that he hath but a short time." Here was occasion for rejoicing and woe respectively, in different places for the same cause. Now heaven and earth form a duality which repeats itself in every man. And the same war that is here recorded may, nay does, occur in the individual, and with like result. A victory in the spirit which casts down evil and gives joy to the heavenly part, is commonly a signal of woe to the earthly. While evil can retain its seat in the central life of the soul, the every-day surface consciousness is left in peace. But when the spirit wakes from its dormancy and expels the rule of selfishness and sin, then look out for storms and earthquakes in the outward. Thus there is ground for the temporary co-existence of joy and pain, arising from the very prevalence of good.

For examples of the truth of this position, note first, the case of Christ, whose spiritual victory in which he said, "Now is the judgment of this world; now shall the prince of this world be cast out"—was followed directly by a period of suffering and crucifixion in which he exclaimed, "My God! my God! why hast thou forsaken me?" The joy of conquest was in him, although enveloped for the moment in a cloud of pain produced by the very fact of his victory.

The concluding point to be observed for the encouragement of persons in trouble, is that this woe and wrath are not lasting. The devil knows that even in the most outward sphere he has but a short time. The spirit will carry the day. Probably the sharper the suffering the quicker the rebound. Christ's three days of darkened anguish brought him to the door of ineffable peace and resurrection.

TRUE LOVE.

THE love that was manifested in Christ, is the true model of that which must exist in the members of his body. But the love of Christ did not depend on receiving a return. Being of God, it was self-sustained. Nor did it look to the present worthiness of its objects: it was contented in itself. He loved us and gave himself for us while we were enemies.

Worldly lovers—those of the novel-bred class—would think it foolish to bestow their love where it would not be reciprocated; and they are constantly fretting and distressed if they do not meet with a full return of affection. But the sons of God can rejoice in love for its own sake: they are happy in having their hearts flow out toward others, whether they meet with a return or not. True love is good in itself, and rejoices in itself. Though we may love without return, we still have the best half of it; for in love as in other things, "it is more blessed to give than to receive."

Our true starting point is, to establish in our hearts that love which, being centered in God, finds rest and contentment in him, and is therefore self-sustaining. It is to be expected, however, that love between the members of Christ's body will at length be mutual, and receive a full return.

But how is this love to be promoted? It cannot be done by constraint, in a legal way. No one can love truly, merely because it is his duty. To a great extent it is not at the disposal of the will. It is the result of attraction, and is, in its very nature, founded on a perception of beauty in its object, and a susceptibility to be impressed by it. They therefore who feel the want of love from others, should not fret and complain, but be content with what they can fairly merit. They should take a just and sober view of their own character, and study to increase their real attractions. We are entitled to just so much love as our intrinsic value and beauty will draw; and in the end we shall gain no more. As it is Christ within us that makes us lovely, our great object should be, to be filled with him. By union with Christ, every individual may draw on the treasures in *his* loveliness, and thereby at length enjoy the affection of others to an extent beyond all that he can conceive.

On the other hand, the will has something to do in the matter. It is voluntary with every one to open his heart to another. We can turn our mind toward others, with a disposition to see Christ in his members. We can put away prejudice and give their attractions full play, and a fair chance to effect a lodgment.

One of the chief hindrances to love, is *evil-thinking*, or a disposition to keep looking at the faults of others. Yet there is a way to overcome this, and to keep up a good feeling toward those who, notwithstanding their faults, are entitled to our love, as members of the same body. When we see faults or things disagreeable in others, we should not stop to look at the bare facts which appear on the outside. We should go back of the faults, and consider their causes. What are the circumstances of the persons we blame? What has been their education, their training, &c.? We should as far as possible enter into their condition, and consider how they

would naturally view things; how they would excuse themselves; and how *we* should act, or how excuse ourselves in their place. If thus, instead of stopping at a bare fact, we would study it as a problem, and allow our intellect to come in and judge our feelings, we should be able to think charitably of a brother whose ways we dislike. And we should thus find, that at bottom he was not malicious nor hateful, but deserving of our love.

In fine, the great principles of the science of love may be summed up, in substance as follows: First, or as the positive part, we must learn to increase our own attractions, and also give a fair chance to the attractions of others; secondly, or as the negative part, we must learn to avoid giving offense, and also not to take offense. True love "THINKETH NO EVIL."

LEARNING NEW TRADES.

A BIBLE Communist, from the very nature of his birthright, is destined to learn to "do all things" that man or woman ought to do, and do them well. If, therefore, one has formed an exclusive attachment toward one profession, trade, or calling, and possesses no attraction for others, nor a disposition to cultivate it, a Community is no place for him. And although no rule or arbitrary system has ever been adopted by the O. C., requiring that its able-bodied members should learn to do good work at a dozen different trades, still a recognized, over-ruling Providence seems to favor a policy of this kind. Regarding the direct influences of Communism as essentially educational, in the broadest sense of that term, the variety of businesses necessarily carried on in a Community family are well calculated to develop and discipline all the faculties of body and mind. To-day, for instance, young H., an industrious expert in the use of edge tools, may be recognized as the managing foreman of a group of carpenters who are at work on the new wing of our dwelling. To-morrow he is found in the basement of the Tontine building, among numerous vats, dyeing silk, or taking his first lessons in that valuable art. As a carpenter, geometry, drawing, &c., were his favorite mental studies; but on learning how to dye well, he will have a new interest in a practical knowledge of chemistry.

In this way, changes not unfrequently occur; and, having freedom to make them, two important objects are gained, namely, a broader education of the members, on the one hand; and on the other, greater perfection in the manufacturing and mechanical arts. The idea, however, may suggest itself to some, that by frequently shifting persons from one business to another, the reverse of the highest attainments in skilled labor, would be the result. But such has not been the fact. Indeed, one object in making these changes is to secure the right man for the right place, which, in ordinary society, could not well be done. We have discovered, moreover, that *fitness* for a situation, and inspiration to fill it wisely, go hand in hand. The predecessor of H. in the dye-room, would in all probability have been nothing more than an ordinary dyer, had he continued in the profession fifty years, not possessing the requisite genius for the art; but in

some other calling, he may prove himself an adept.

Believers, as we are, in the perfect gospel of Jesus Christ, nothing short of a *perfect* standard of execution, in every branch of industry, will satisfy either our tastes, or our principles. To learn a new trade, for the sake of usefulness to society, is almost equivalent to taking a new lease of life. Old habits, by the change, are thrown off, and a fresh inspiration taken in. There are some trades, however, that offer so great a variety of things to be done, that the artisan is constantly challenged to study new methods of doing them, thus bringing into exercise the full power of his inventive skill, which is both pleasurable and improving. Workers in wood or iron—carpenters and machinists—are always learning something new. In dealing with mechanical powers, the almost endless variety of methods of their application, is a continuous source of instruction to the mechanic. Hence he secures the novelty that attaches to the prosecution of new professions and employments. Most of our improved facilities for doing things in the various departments, are the results of rotation in office and of learning new trades.

ATTRACTIVE INDUSTRY.

ONE of the most important conditions of attractive labor is *effectiveness*. Perhaps all have heard the story of the man who was hired at good wages, to pound on a log all day with the back of an axe, and how he threw up the business in disgust, declaring that he would not work like that unless he could see the chips fly. Nothing is better calculated to produce a feeling of disgust and discouragement in business than the conviction that a large outlay of time, effort and pains is going to produce but little result. It is this innate love of efficiency that gives the using of machinery its peculiar charm. Who would consent to run a hand-loom, when he is at liberty to make use of water-power and machinery whereby he can accomplish a hundred times as much with the same labor? It is only in associate or community life that this love of efficiency is fully taken advantage of to render labor attractive.

The irksomeness of monotonous work, as sweeping, setting tables, and cooking, is taken away by the reflection that we are not doing it for the benefit of one person or half a dozen, but for that of a hundred or more. In associate life the labor of every one is elevated from the character of individual self-seeking to that of public and official importance, and every laborer becomes a public officer.

Co-operative industry can increase its efficiency by machinery, as individual labor cannot. A Community can afford the most expensive conveniences; steam in the kitchen, for instance, the value of which cannot be told, for rendering kitchen work attractive. The private family could not make it pay to get an engine and steam-range, but in a Community no better investment could be made. Steam is to have a great agency in bringing in the millennium of attractive industry.

The Union Pacific Railroad Company have commenced the erection of snow fences along the line of their road between Omaha and the Rocky Mountains.

SPEED OF UTTERANCE IN DIFFERENT LANGUAGES.

The understanding of the spoken language in Italian, Spanish, and German, presents great facilities, owing to the correspondence between the pronunciation and the orthography. But perhaps the most difficult of all languages for a foreigner to understand is the English, on account of the complete absence of analogy in the alphabetical representation of its pronunciation, as well as of the rapidity with which it is spoken and its innumerable contractions.

This is humorously illustrated in the following anecdote: In a late trial before the Queen's Bench, Mr. Hawkins, a barrister, had frequently to advert to that description of vehicle called brougham, which he pronounced in two syllables. Lord Campbell, the chief justice, suggested that the word was usually contracted to broom, and that he had better adopt the latter pronunciation, as he would thereby save one syllable and gain so much time. Henceforward Mr. Hawkins called it broom. Shortly after, the pleading turned upon omnibuses; and Lord Campbell frequently used the word omnibus, to which he gave its due length. "I beg your lordship's pardon," retorted Mr. Hawkins, "but if you will call it bus, you will save two syllables, and make it more intelligible to the jury." The learned judge assented to the proposed abbreviation.

Some people think that the French language is spoken faster than the English; this is a great error. Voltaire shrewdly observed, that an Englishman gains every day two hours on a Frenchman in conversation. The truth is, that English is spoken considerably quicker than French. This results from a difference of kind in the pronunciation of these languages.

Pronunciation is composed of two elements, vocal sounds and articulations, represented in writing by vowels and consonants. Vocal sounds admit of duration: quantity is their essence. Vocal articulations, with few exceptions, cannot be prolonged: instantaneity is their essence. When a consonant is placed after a vowel, it generally shortens it. Thus the long syllables, *me, we, fie, no, due, though*, become short by adding consonants to them, *met, web, fib, fit, fig, not, dun, thought*. Now, in English, consonants predominate, and usually form the end of syllables; hence a rapidity of utterance is the unavoidable consequence.

In French, on the contrary, consonants act but a secondary part, and are often silent. The spoken words, in reality, end with vowel sounds, although consonants terminate their written representatives. In the division of the words, consonants seldom terminate syllables; the French word *caricature*, for example, is divided into syllables thus, *ca-ri-ca-tu-re*; its pronunciation, conformably to this division, is necessarily longer than that of the English word, commonly pronounced, according to this other division, *car-ic-a-ture*. The same may be said of every other word in the two languages. The vowels, which contribute so much to lengthen the words, are pronounced full in French, as if every syllable were accented. From these facts there necessarily results a slow and steady enunciation.

As the opinion of a foreigner, however, in regard to the English pronunciation, can have little weight, we beg to quote a few competent authorities: "Such is the vehemence of our accent, that every syllable which follows the accented is not only short, but almost lost in the pronunciation." (Lord Monboddo.) "We incline, in general, to a short pronunciation of our words, and have shortened the quantity of most of those which we borrowed from the Latin." (Hugh Blair.) "Such is the propensity for dispatch that, overlooking the majesty of words composed of many syllables aptly connected, the prevailing taste is to shorten words, so as to make them disagreeable to the ear." (Lord Kames.) "It must be regretted that

contraction subjects our tongue to some of the most hissing, snapping, clashing sounds that ever greeted the ear of a Vandal." (John Walker.) "Our rational conversation is, for the most part, carried on in a series of most extraordinary and rugged abbreviations, a species of short-hand talking." (Bulwer Lytton).
—*Appletons' Journal.*

THE CIRCULAR.

O. C., MONDAY, NOVEMBER 1, 1869.

COMMUNITY JOURNAL.

ONEIDA.

Oct. 27th.—Another installment of winter, accompanied with a snow-storm; and the "Indian Summer" indefinitely postponed.

—Trap-orders received this month to the 30th inst., number 149; giving an aggregate of 3531 doz.

—Our silk-shipper reports that he has filled 350 orders this month, 46 of which were in cases, and the balance in bundles; 50 orders yet remaining to be filled.

—We are blessed with a bountiful supply of apples. Though the yield as a whole is considered moderate, we shall have at least a thousand bushels, after sending forty barrels to Wallingford.

—Potatoes turn out in quite an old-fashioned style this season, giving a yield of two hundred and fifty to three hundred bushels per acre. The size and quality are all that could be desired, with the exception of slight traces of the "rot."

—The season was not propitious for watermelons, at least for early ones, and after August and September had passed without giving us a taste of their succulent sweetness, we naturally gave up all thought of them, and found contentment in the generous supplies we enjoyed of pears and grapes. But the melons were not to be supplanted in that way; and after October had begun to wane, frosts had come, and coal fires were made, they surprised us at the dinner table with such an array of red, pulpy juiciness, that we could hardly believe our senses; handling and tasting, however, dispelled all incredulity, and they were eaten with the zest a rarity only can give.

—Cider-making is going on directly under our office window, and with a long straw we might imbibe the juice directly as it flows from the press. The barrels, and the wooden tunnel with its strainer of straw, look the same as those used by former generations, but most of the other features of old-time cider-making have passed away with us. Instead of the cumbrous mill with its creaking sweep, and "cider-mill-round," a natty, portable machine that may be transported on a wheel-barrow, supplies its place: this, with a belt from the steam-engine to drive it, will reduce apples to pumice with even greater rapidity than the old horse-power method.

—As I entered the spooling-room this morning, I was pleased to see Mrs. T. there. She was seated in front of the "Parting-pin," learning to "part silk." Mrs. T. is well past her threescore years and ten; and has had more than the usual share of infirmity and sorrow. But her graceful step, bright eye, and active intelligent mind have survived it all. There she sat for more than an hour patiently trying again and again to give the parted skein its peculiar twist, and then tie it up in its own double and twisted knot. Occasionally Harriet A., our superintendent, would lean over her chair, and show her how to do it. As I passed out, I stopped to congratulate Mrs. T. "Oh!" said she, her face glowing and her eyes sparkling, "How slow I am—but I shall learn it. How I have prayed and longed to be able to come out here and learn to do something about the silk! This morning I know God inspired and strengthened me—and I came, determined that neither old age nor weakness, nor inaptitude to learn new things, should keep me back. And now I know I shall succeed."

—The "delightful Indian Summer days," which, according to the prophecies of the weather-wise,

should have followed hard upon the early snow of last week, don't come. The snow has fallen thick and fast; the "nipping, eager air," has been all too wintry; the glory of the "autumnal tints" has faded; the skies have glowered and lowered, and still no signs of summer's second-childhood. But we don't care; not we. Indian Summer may bid us a never so long farewell, and we shall make the adieu with praiseworthy cheerfulness. For, thanks to our steam, we have a continuous summer in the house that renders us quite oblivious to the bleak out-o'-doors. Indeed, the trouble is, that our numerous radiators and coils are likely to rival midsummer's heat only too successfully; so we have to use the bounteous supply of heat sparingly, and take a look now and then at our thermometers, in order not to accustom ourselves to an atmosphere that would make us too delicate to enjoy the bracing airs of winter. But to the provident, the outlook is pleasant; for, let winter rage as it may, they have the comforting assurance of being able to cope with it on equal terms—Africa to Siberia.

—A more definite idea may be formed perhaps of the extent of the system required for heating by steam such an institution as the O. C. Mansion, by giving a few statistics. The amount of tubing employed as conductors, coils, radiators, &c., is not less than 7000 feet; this is of various sizes, but will average about 1½ inches in diameter. This will give an aggregate of 329,868 square inches, or 2,291, square feet of heating surface, which is equivalent to 11½ square feet to each individual, of a family of two hundred. This gives each individual what is equivalent to a small stove. The relative cost of this method of heating, compared with the old one of furnaces and stoves, we have not as yet determined; but it can hardly be more, and will very likely be less. As a rule, steam-heating is estimated to save twenty-five per cent. of fuel.

—The barberry-hedge, of which we have about fifty rods on the high-way, is not only the most satisfactory hedge we have produced with all our experimenting, as regards utility, but it is really "a thing of beauty," especially at this season, with its luxuriance of dark green leaves, thickly interspersed with racemes of scarlet berries.

—Our kitchen man (who, by the way, is something of a wag), reports the following criticism of some of the refractory household implements belonging to his department:

REPORT OF A CRITICISM IN THE KITCHEN DEPARTMENT.

The subjects of criticism were the wheelbarrow, coal-basket, hammer, lantern, shavings-basket, fish-tub, and ash-pan.

The wheel-borrow, I suppose, was made to borrow, as its name implies. Since its last criticism it has been generally faithful in respect to the duty of coming home again when it goes out to take an airing; but unfortunately it occasionally goes out on a ride in the morning, without consulting its superiors, which is just the time it ought to be doing its daily chore of getting in the wood and coal. Some allowance ought perhaps to be made on the ground that it is getting old and decrepit. Its memory may be somewhat impaired. Its legs certainly are.

The coal-basket has probably clandestinely eloped with the shavings-basket. I suspect they went to a husking bee. I hope it will never come back again, for it was evidently morally and fundamentally, if not mentally, shattered, and had a spirit of scattation in business. It is replaced by another, marked "kitchen," that I hope has the love of home strongly developed.

The poor forlorn shavings-basket being deserted by its faithless mate, returned after several days absence, only to find its former warm and well-furnished post beside the oven, occupied by an old cheese-box. It is just now an outcast in society, and it is to be hoped that this experience will prove a salutary humiliation.

As for the hammer, I suppose that it has gone off to a butternut-crack, or has dropped into some other out-of-the-way crack. Perhaps it is at this moment rusty-cating under some butternut tree. We prom-

ise to forgive it if it will come home and is not too rusty.

One of the lanterns is evidently a very light, dissipated, and wick-ed character; for it goes out late at night and dissipates its light in every direction; and it is all done to be seen of men. It don't even come home in the morning. Fortunately it is at home now, and I hope it will improve by this criticism.

The fish-tub has probably gone a fishing, and most likely has been drowned, for nothing has been heard from it lately.

As for the ash-pan, we can't complain that it has run away, but rather that it has not run away. It is a bright pan that ought to be above such business as presenting itself in the coal-room full of coal-ashes and ash-urance.

I saw a great many brazen-faced (I would say tin-faced) characters kicking around in the wood-shed last winter, and am sorry to see their unwelcome faces again so early this season.

The above is a condensed report of the meeting, and is respectfully submitted by the

KITCHEN MAN.

—The builders go steadily on with their work, despite the vicissitudes of cold and snow, and they only ask for a very few days of leniency from "the prince of the power of the air" to have all snug for the winter. The masons are climbing up step by step, to lay the final courses on the steam-boiler chimney, that has a towering altitude of sixty feet. The carpenters, masons, slaters and tinnors are so mingled in the strife to give the final blows, that it would seem difficult to keep their different crafts distinct, and the din of their mingled blows at times might easily be mistaken, at a little distance, for the rattle of musketry, and the clash of a more hostile strife. But "peace hath her victories as well as war," and the adverse elements only seem to brighten the ardor of the peaceful combatants for the final assault.

Evening Meeting.—E. H. H.—I feel a growing encouragement to look to Christ for peace and joy. I have been thinking of this passage of Paul's. "To be carnally minded is death, but to be spiritually minded is life and peace." We have mentioned the importance of being spiritually minded several times lately in our discussions. I have felt a desire that we might talk the matter over and get as clear an idea as possible of what it is to be spiritually minded, so that it should seem something simple and attainable to us all, and not a mere cant phrase without meaning or practical use. I do not think it is a mysterious, unattainable state of mind. One view I take of it is this: To be spiritually minded is to seek to discover the mind of God; to seek to know his will, and try to think and feel about things as he does. Now what course do we take when we want to come into fellowship with Mr. Noyes? If we really come into fellowship with his spirit, and think and feel about things as he does, we do not look at his bodily presence; we know that is not the best way to get into fellowship with him; but that the best way is to read his writings and study them, and find out what he thinks and how he feels about things; try to get an impression of his spirit. As we study his character in this way, we get a sense of the integrity and righteousness that govern him; and we realize his loyalty and faithfulness to God. We learn his true character, and are gradually attracted towards him, and learn to love him; and the same things that characterize him begin to influence us. That is, we begin to get into fellowship with him, and with his spirit. It seems to me that the process is much the same, in seeking after God and becoming truly spiritually minded. Instead of trying to find God by looking at the outside things he has made, we study his character. We first get an idea of his perfect integrity, and of the holiness and purity of his character, and then we get an idea of his love and faithfulness. Some of this information is obtained historically through the Bible. Finally we get where we feel the same influence working in our hearts that we find in the historical accounts of him. We learn to feel after his spirit, and to understand his true character. This is what I understand by being

spiritually minded. All of us who have been students know that we can never make any attainment in science without concentrating our attention on the point towards which we are looking, or the subject we are seeking to understand. We find we must convert all our attention and be able to withdraw it from the conflicting influences about us. That is the only way to really make progress in science. It is just so in seeking to find God by feeling after him in our hearts; we find it necessary to be able to withdraw from distracting influences. I wish all our young people would study and think about this matter, and learn to pray by reaching forth the heart after God. I hope they will learn to think that it is not a great and mysterious thing to be spiritually minded. I believe it is the simple, normal state to be in. I am more and more conscious that only in Christ's presence is there fullness of joy.

WALLINGFORD.

—Three hundred pages of *American Socialisms* have been printed.

—We had a grand bee this afternoon for husking; it was not long before a song was called for from all sides. Mr. B. was the man: he sung, "Not for Joe," and "I've been through the fiery furnace." Mr. H. sung "Uncle Ned," to the great amusement of all. G. W. N. then remarked, that we might adjourn to the wood-pile, and there find more active employment.

—W. A. H. related at the breakfast table a ludicrous account of an excursion his class made on the Sound in a small boat. They went out to an island for the purpose of getting botanical specimens. While they were there the wind rose, and in returning most of the company were sick. W. said he would have sold all his specimens for a sixpence.

—The following is an extract from a private letter, written to O. C. by one of our Wallingford girls who is quite an enthusiast on musical topics:

"You have heard of my going to 'Patti's Concert.' It was wonderful; I have no adjectives to describe it. Her voice was not remarkably powerful—but such marvelous flexibility, such compass, it exceeds all imagination. She sang 'Carnival of Venice,' and never have I heard from violin or piano the infinite variations that she warbled forth; chromatics and staccato passages without number, and all with the ease of a little bird. She skipped from octave to octave with the greatest facility, reaching at least the fourth story; there her voice was as clear as a bell, and with one little motion of her head, she glided down as easily as if she had been singing on one note all the time. It was more like a bird than anything else. Carlotta is a short little lady, but very round and plump—black hair and eyes—fair complexion—in manner very bewitching. Her dress was light blue silk, short sleeved, and low in the neck—immensely low—positively startling to a Community girl. Besides she wore an enormous "Grecian bend," and a trail. My! that trail! it was all of six feet long—think of it on that little short woman! She is naturally deformed, and her dress only added to her deformity. But her face was pretty, and a black veil falling from a jaunty little hat set off her beautiful neck and shoulders. No matter about her dress, it was entirely forgotten when she began to sing, and she looked like a sweet fairy."

—Oct. 26th.—The last case of silk machinery arrived from O. C. this morning, and all the machines in the factory, except one cleaner, are now in running order. Five hired girls took their places at the machines to-day, so we can say that work has really begun. The girls did as well as could be expected of beginners, and their superintendent says that one of them was as handy as if she had been in the factory two months. More girls are expected to begin work to-morrow. Mr. B., who left O. C. early this morning, arrived this afternoon, bringing with him, as was expected, two girls (employés) from the W. P. silk works, who are to help instruct the new hands in our factory. The girls thought the factory neat and pleasant; much nicer than they had anticipated.

Evening Meeting.—G.—Mr. T— wrote to me to-

day asking how the "New Pathy" was to take effect in the case of chronic disease, as in the disease of the kidneys or liver-complaint or any other chronic disorder. In looking over the matter as well as I could, it seemed to me that chronic disease of any kind roots back in hardness of the spirit. It may be very insensible and indefinable, but the devil spins a web of that kind over us through our fellowships which interrupts the flow of the currents of life and health, thus leaving an opportunity for the parasites of chronic disease to work in us. You can't hit these chronic diseases as you can acute diseases, so it seems to me that the first thing to be done in such cases is to break up hardness. There is where I should look for my own health. I should look for a criticism from others, or from myself, of my fellowships, that would break up the spirit of hardness and make me receptive to the life of Christ. I don't think that chronic disease can stand that any more than acute diseases can.

N.—You must carry your doctrine of stopping spasmodic action back into the actions of the mind and soul. Now in all these functional diseases where there is a chronic depression of spirits, as it is called, there is a constant, involuntary evil-thinking going on which is just as bad as a cough; and just as properly under the control of the will as a cough. You should search into it, and see if you cannot establish the principle of suppression there: inquire if there is not an internal coughing going on of evil thoughts. If there is, put a stop to it, and get the person afflicted with disease to insist upon it that his mind and thoughts shall submit to God—that God shall rule in them and dictate them, and not the devil. Where there is pain, there the devil is tempting you to evil-thinking; and that is a voluntary thing to be stopped just as you would stop a cough. Paul had a way of instantaneously converting infirmity and pain into a matter of thankfulness. If he could do it, we can do it; and if we fail to do it, it is on the same principle that we give ourselves up to a cough. As Paul said, "the weapons of our warfare are not carnal, but mighty through God to the pulling down of strongholds; casting down imaginations, and every high thing that exalteth itself against the knowledge of God, and bringing into captivity every thought to the obedience of Christ." That is the grace of God. It is the power of God. It is the measure of God's power over our thoughts; and we must make up our minds that evil-thinking is a thing to be controlled—that hypo is spasmodic action. If persons would sweep away the husk of evil-thinking that surrounds their pain, they would find their pain comparatively nothing.

WATT DID IT.

ONE of the CIRCULAR's contributors lately asked the pertinent question, "Who invented the copying-press and copying-ink?" According to the "New American Cyclopedia," the inventor was no less a personage than the famous James Watt, the inventor of the steam engine. The account is as follows:

"Along with Priestly, Darwin, Edgeworth, and other scientific men residing about Birmingham, Watt had for some years belonged to an association called the 'Lunar Society,' the meetings of whose members for social converse were held monthly on the night of the full moon. Either from a suggestion thrown out at one of these gatherings, or (as his son declares) in order to preserve copies of important papers without the necessity of imparting the information to an amanuensis, Watt invented a form of copying-press which proved of great utility to himself and others who employed it." * * * His method, which is substantially the one used at the present time, was patented in 1780. It consisted in placing a dampened sheet of unsized paper upon the manuscript, and passing the two together through a press. The impression being reversed, this transparent paper is used, through which the writing may be read from the back side. Any sort of ink may be employed, thickened with a little sugar."

In another article of the same work we find the following:

"Various methods have been contrived for multiplying copies of manuscripts. Dr. Franklin recommended writing with gummed ink, and applying to

this emery powder, then by the press obtaining an impression upon a pewter-plate, which could be used for printing from." * * * "A method was contrived in 1806 by Mr. Ralph Wedgwood, of obtaining two copies at one writing, by the use of a sheet blackened on both sides with printer's ink, and dried between blotting paper for six weeks. This is placed between a sheet of letter-paper below and one of thin oiled paper above, and the writing is done upon the latter with an agate style. By the pressure of this, marks are produced upon both papers, and those upon the upper sheet being reversed, are to be read through from the opposite side. Patterns and the outlines of drawings are conveniently copied by this method, by placing the original upon the upper sheet, and going over its lines with an agate style. Machines called polygraphs have also been devised, the object of which isto work two or more pens connected together by light wires and joints, so that the motions given to one are communicated alike to the other, and as many copies obtained as there are pens. The latest of these is that of Mr. Nathan Ames, of Saugas, Mass."

MOMENTUM AND VIS VIVA.

By J. J. Skinner, Ph. B., Principal of O. C. School.

TO the mind of a student anxious to comprehend as thoroughly as may be the subjects of his inquiry, the treatment of *momentum* and *vis viva* by the books on physics and mechanics is extremely unsatisfactory. He rises from his study feeling that there is something left unexplained; and failing to find anywhere an adequate answer to his questions, he is fain to conclude that there is some mystery in the case which will never be quite solved. Several text-books, held in high esteem in our schools and colleges, say that the *momentum* of a moving body is its *quantity of motion*, and that it is equal to the mass of the body multiplied by its velocity. For instance, if a body equal to 10 units of mass have a velocity of 10 feet per second, its *momentum* is said to be equal to $10 \times 10 = 100$. But 100 what? Is it 100 feet, or 100 pounds, or 100 of something else? If *momentum* is a *quantity of motion* it certainly cannot be 100 pounds, and it is quite as difficult to say that this body has a *quantity of motion* equal to 100 feet. And here the majority of the books leave us without giving the first idea as to what the unit of the *momentum* is.

In the case of the *vis viva* of a moving body, represented by one-half the mass multiplied by the square of the velocity, an attempt is made to show what its unit is, but nearly all the books fail to point out the essential difference between this unit and the unit of *momentum*. Thus the result is a confusion of ideas, leading to vagueness and error. It is proposed in this article to attempt an explanation, as nearly complete as possible, of the exact meaning and nature of *momentum* and *vis viva*, as deduced from a few simple and fundamental mechanical principles.

Physicists all agree in calling the product obtained by multiplying the mass of a moving body by its velocity the *momentum* of the body; denoted algebraically by *MV*. But there is not the same agreement as to what that product really means. In order to understand what it does represent let us consider its relation to the force required to impart the velocity *V* to the mass *M* originally at rest.

It is a fact familiar to every one, that a body cannot be moved from rest without the application of force, and also that a body already in motion cannot be stopped without the exertion of force. This property of bodies, by virtue of which they resist any change of state, either of rest or motion, is called *inertia*. The common unit of force, with which the intensities of all other mechanical forces, whether producing motion or not, may be compared and measured, is the force capable of producing a pressure of one pound avoirdupois. This unit will be called briefly a pressure of one pound. Now it is clear that if a force equal to one pound pressure act for one second on a certain unit of mass, originally at rest, and impart to the mass a certain unit of velocity, say one foot per second, then a force equal to two pounds pressure will be required to impart the same velocity in the same time to twice the mass; or three pounds pressure will be required to impart the same velocity in the same time to three times the mass; and so on, the number of pounds

pressure being equal to the number of units of mass to which in one second a velocity of one foot per second is imparted. Also, since any force acting on a body produces its own proper effect on the motion of the body, whether any other force act on the body at the same time or not, it is clear that in order to impart to the unit of mass in one second a velocity of two feet per second, by a constant pressure, the intensity of that pressure must be two pounds; or if the velocity given to the unit of mass in one second be three feet per second, the pressure will be three pounds; and so on, the number of pounds pressure being equal to the number of units of velocity given to the unit of mass in one second. If, then, a certain pressure acting for one second on say five units of mass give it a velocity of one foot per second, the intensity of that pressure is five pounds; and the intensity of the pressure which could give to the same five units of mass in the same time a velocity say of six feet per second would be six times five pounds, or thirty pounds. And in general, the number of pounds in a constant pressure which can impart in one second to M units of mass a velocity of V feet per second, is equal to the number of units in the product MV .

These laws may be verified by means of Atwood's machine. But it is to be noticed that the pressure, by these laws, is supposed to be all applied in producing motion of the body through space, none of it being employed in producing compression or extension of the mass; since in the case of gravity, by which the laws are verified, the force is uniformly applied to all the particles of the body, and has no tendency to alter its shape.

If, then, any body having M units of mass, be moving with a velocity of V feet per second, no matter how long it may have been moving, or how intense the force which gave it motion, we know that the same velocity *might* have been given to it in one second by a constant pressure of MV pounds, uniformly distributed through its mass. It may further be proved by Atwood's machine that if a body move from rest by the action of a constant pressure for a certain time, and acquire any velocity, and the impelling pressure then cease to act, the body may be brought to rest again in an equal time by an equal constant pressure in the opposite direction. Therefore, in the case of any mass M moving with the velocity V , since the same velocity could have been imparted in one second by a constant pressure of MV pounds, that velocity may be destroyed and the body brought to rest in just one second, by an equal constant pressure of MV pounds, uniformly applied to its mass, in the direction opposite to its motion.

Let us now consider the value of M . By the standard adopted above, the unit of mass is the amount of matter which, acted on for one second by a pressure of one pound, will acquire a velocity of one foot per second. But this amount of matter is not the same as the amount which weighs a pound. In case of a pound weight falling freely in a vacuum we have a pressure of one pound exerted on the amount of matter which weighs a pound, and the velocity at the end of one second will vary slightly with the latitude of the place, and is usually represented in physical formulæ by the small letter g . But if a pressure of one pound acting for one second on the amount of matter which weighs a pound can give it a velocity of g feet per second, it follows from principles already explained that the same pressure of one pound can produce, in one second, a velocity of one foot per second in the amount of matter weighing g pounds. Hence g pounds of matter is our unit of mass. The number of units of mass, then, in any number of pounds of matter, is equal to the number of pounds divided by g . Or if G be the number of pounds in the weight of a body, and M the number of units of mass, we have $M = \frac{G}{g}$.

If, then, in the expression MV , we substitute this value of M , we have $MV = \frac{GV}{g}$; and the number of units in this expression represents the number of pounds constant pressure, uniformly distributed, by which the velocity V *might* have been imparted in

just one second of time to the mass weighing G pounds, or by which the body *might* be brought to rest in the same time if an equal constant pressure were similarly applied in the direction opposite to its motion. That is exactly what the product $MV = \frac{GV}{g}$, which is the *momentum* of the body, represents. And the *momentum* of the body has properly no other meaning.

The value of g , found by experiment, is approximately $32\frac{1}{2}$ feet. Substituting this value we have $MV = \frac{GV}{32\frac{1}{2}}$. If we say then that a body which contains 10 units of mass, (and whose weight would therefore be $10 \times 32\frac{1}{2}$ pounds = $321\frac{1}{2}$ pounds), and whose velocity is equal to 10 feet per second, has a momentum equal to $10 \times 10 = 100$, we mean that the same velocity *might* have been imparted to the same mass in just one second by a uniformly distributed constant pressure equal to 100 pounds; or that if the body were brought to rest in just one second by a constant pressure similarly applied, but exerted in a direction opposite to its motion, the intensity of that pressure would be equal to 100 pounds. And we do not mean anything else whatsoever.

Let us now consider the *vis viva* of a moving body. It may be shown by means of Atwood's machine that in order to overcome, by a constant pressure, the inertia of a given mass of matter at rest, and cause it to move with a given velocity, a certain definite number of *units of work* must be performed on it. And this is true whether the velocity be imparted in one second or any number of seconds, whether while the mass is moving one foot or any number of feet; the number of *units of work* which must be performed to produce in the mass the given velocity is the same in all cases. By a *unit of work* is meant the exertion of a unit of pressure through a unit of distance, usually taken as a pressure of one pound through a distance of one foot; and the number of units of work, called usually foot-pounds, performed by any force, will be equal to the number of pounds pressure produced, multiplied by the number of feet through which it is exerted. Let us see if we can determine the number of units of work performed on any mass M in imparting to it any velocity V .

It is found by experiment that the velocity acquired by a body, when acted on by a constant force, is proportional to the time during which the force acts. Hence, since a pressure of one pound, acting for one second on one unit of mass, gives it a velocity of one foot per second, the same pressure of one pound acting on the unit of mass for a certain time, say six seconds, will give it a velocity equal to six feet per second. But we know from the laws of uniformly accelerated motion that if the body start from rest, and move by the action of a constant force, the distance passed over in the six seconds is equal to one-half the distance which would have been passed over in the same time with a uniform velocity equal to the final velocity, which is six feet per second. The distance actually passed over by the unit of mass in acquiring the velocity of six feet per second from the action of a constant pressure of one pound, is then equal to eighteen feet. The pressure of one pound has therefore been exerted through a distance of eighteen feet, and the number of units of work performed is eighteen. If the same velocity be imparted to the same unit of mass by a constant pressure of two pounds, the time employed is equal to one-half the time employed before, or three seconds; and the distance passed over is therefore nine feet, and the number of units of work is two multiplied by nine, or eighteen, the same as before. If a pressure of three pounds be used the time is two seconds, and the distance passed over is six feet, and the number of units of work is three multiplied by six, or eighteen again. And in general to impart any velocity V to one unit of mass by a constant pressure, if T be the number of seconds employed, the distance passed over will be $\frac{T \times V}{2}$. But if the pressure be one pound, the number of units in the time is equal to the number of units in the final velocity; or $T = V$. And if the pressure be equal to P pounds we shall have $T = \frac{V}{P}$.

Substituting this value of T we have the distance passed over by the unit of mass, while acquiring any velocity V , by the action of any constant pressure P , equal to $\frac{V^2}{2P}$. But the number of units of work performed by the pressure P will be equal to this distance multiplied by P ; or, if W represent the number of units of work, we shall have $W = \frac{1}{2}V^2$.

This is the number of units of work performed in giving the velocity V to one unit of mass. Evidently, to give the same velocity to twice the mass, twice the work must be performed, or to give the same velocity to M units of mass, M times the work must be performed. The number of units of work, then, which must be performed by any constant pressure, on any mass M , starting from rest, to give it any velocity V , is equal to $\frac{1}{2}MV^2$; and this result is wholly independent of the time employed, the distance passed over, or the intensity of the impelling pressure, and dependent only on the number of units in the mass M and the final velocity V . We must, however, notice that if any work is performed in changing the shape of the mass, it must be in addition to the work represented by $\frac{1}{2}MV^2$.

In order to find the number of units of work performed by any constant pressure while increasing the velocity of a mass M , already having the velocity V , from this velocity to the velocity V' , we have simply to observe that the work required to give the mass the velocity V' if it start from rest, is $\frac{1}{2}MV'^2$, and the work required to give it the velocity V , starting from rest is $\frac{1}{2}MV^2$; hence, the work performed while increasing the velocity from V to V' , is equal to the difference between these results, or $\frac{1}{2}MV'^2 - \frac{1}{2}MV^2 = \frac{1}{2}M(V'^2 - V^2)$.

We may now show that the work performed in giving the mass M , starting from rest, any velocity V , will be equal to $\frac{1}{2}MV^2$, whether the impelling pressure be constant or variable. For if it be variable we may suppose the time divided into very small periods, during each of which the pressure may be regarded as constant. Then, if, V' , V'' , V''' , &c., be the velocities at the end of the first, second, third, &c. instants, we shall have the work performed in the first instant equal to $\frac{1}{2}MV'^2$. That in the second instant will be $\frac{1}{2}M(V''^2 - V'^2)$; that in the third $\frac{1}{2}M(V'''^2 - V''^2)$; and so on. Now the sum of all these elementary quantities of work is the total work performed, which is therefore

$$\frac{1}{2}MV'^2 + \frac{1}{2}M(V''^2 - V'^2) + \frac{1}{2}M(V'''^2 - V''^2) + \dots$$

If V be the final velocity the sum of this series will evidently be $\frac{1}{2}MV^2$ since each of the other positive terms will be cancelled by an equal negative term.

It is therefore a universal principle, that if any mass M be moved from rest, and acquire any velocity V , whether the impelling force be constant or variable, no matter what its intensity, or what the distance through which it act, or what the time employed, the number of units of work performed by the force in giving it that velocity is always the same, and is equal to $\frac{1}{2}MV^2$.

This work has been performed in overcoming the inertia of the mass; and by reason of its inertia the mass M , moving with the velocity V , has the power of performing just the same amount of work while it is coming to rest by the action of an opposing force, as was performed upon it in giving it the velocity V . For if any pressure give a mass any velocity in passing over any distance, and then cease to act, the mass, by reason of its inertia, is able to overcome an equal pressure through an equal distance, before being brought to rest, and thus to perform an equal amount of work.

The product $\frac{1}{2}MV^2$, therefore, represents the number of units of work required to impart the velocity V to the mass M , starting from rest; or the equal number of units of work which the mass M , with the velocity V , can perform before being brought to rest by any force, whether large or small, in whatever time or distance. This product, $\frac{1}{2}MV^2$, is very properly called the *vis viva*, or *living force* of the moving body, since it represents a definite power for performing work, or giving motion to other bodies; which power is exhausted, or may be said to die, at

the instant the body comes to rest. The body can then impart no motion to other bodies at rest except it be first set in motion, or, as it were, brought to life again, by the action of some external power.

It should be remembered that our unit of mass here is the same as in the case of momentum; and thus, if G be the weight of the body, the *vis viva* is equal to $\frac{1}{2}MV^2 = \frac{1}{2}GV^2 = \frac{GV^2}{64}$. If we say then that a body whose mass is 10, (and weight accordingly 321½ pounds), and whose velocity is 10 feet per second, has a *vis viva* equal to $\frac{1}{2} \times 10 \times (10)^2 = 500$, we mean that 500 units of work must have been performed, in order to give it that velocity, starting from rest, or that it will perform 500 units of work before being brought to rest by any force whatever.

The unit of *momentum*, then, is a force of pressure equal to one pound, and the unit of *vis viva* is the work performed in overcoming a pressure of one pound through a distance of one foot. With this understanding there is perfect harmony in all the results. For example, if a body whose mass is 10, moving with a velocity of 10 feet per second, be brought to rest in one second by a constant force, we know that the space passed through will be 5 feet. But the constant force which can bring it to rest in one second, is a pressure equal to its *momentum*, or $10 \times 10 = 100$ pounds. The work which the mass will perform is then $5 \times 100 = 500$ foot-pounds, or units of work; which is equal to its *vis viva*, or $\frac{1}{2} \times 10 \times (10)^2$, as it should be. Or, if the same body fall freely from rest by the action of gravity, the distance it will fall in acquiring the velocity of 10 feet per second will be 1.554 feet. The work performed on it by the force of gravity in giving it that velocity is therefore $321\frac{1}{2} \times 1.554 = 500$ foot-pounds again. And a like harmony may be proved true in any other special case, or may be demonstrated generally.

It should now be observed that the *momentum*, represented by MV pounds, is of no special value for estimating the power of a moving body, or anything else whatsoever with regard to its motion, any more than any other arbitrary force we may choose. For in order that MV pounds shall be a measure of the pressure the body can produce, the body must be supposed to be brought to rest without change of form in just one second of time. Thus the product MV is not a measure of the pressure a moving body is able to produce, or of anything else with regard to it, except under a certain arbitrary condition; the intensity of the pressure a given moving body is able to produce, while coming to rest without change of form, being wholly dependent on the condition of time or distance in which it shall be brought to rest. For if we impose the condition that the mass M , whose velocity is V , shall be so brought to rest by a constant pressure in just four seconds, it is easily shown that the distance passed over before coming to rest will be equal to $2V$. Dividing the *vis viva* of the body, or $\frac{1}{2}MV^2$ by this, we have $\frac{1}{4}MV$ for the number of pounds constant pressure the mass will exert while coming to rest. And this, or any other number of pounds, is just as valuable for measuring anything with regard to the motion of the body, as MV is, if we impose the proper condition as to the time or distance in which it shall act. And we might, of course, have deduced the *momentum*, or the constant pressure required to bring the mass M to rest from the velocity V in one second, in the same way by which we have just obtained $\frac{1}{4}MV$ as the pressure required to bring it to rest in four seconds. For if the mass be brought to rest in one second, by a constant pressure, it will move a distance equal to $\frac{1}{4}V$, and the *vis viva* divided by this gives the intensity of the pressure equal to MV . This simple process would have been sufficient to show precisely the meaning of the product MV ; but there is such a tendency to consider that product as in some way representing a quantity of motion, that it seemed advantageous to establish its exact signification by two independent methods.

The product $\frac{1}{2}MV^2$, rightly understood, is, on the contrary, a valuable and definite measure of the accumulated energy of the moving body, without any arbitrary conditions whatever; and, as before re-

marked, is very appropriately named the *vis viva* of the body. The connection of momentum and *vis viva* with the case of impact may form the subject of a second paper.

SCIENTIFIC.

From time to time, persons are born, whose powers of rapid calculation almost surpass belief. In the year 1839, some of the most distinguished scientific men of France met to test the powers of a Sicilian boy, named Vito Mangramele. The examiners asked him such questions as "What is the cube root of 3,796,416?" and "What is the tenth root of 282,475,249?" The first he answered in half a minute, and the second in three minutes. He was then asked the following by the great astronomer Arago: "What number complies with the following propositions, that if its cube be added to five times its square, and then forty-two times the number, and the number forty be subtracted from the result, the number is equal to 0 or zero?" Arago repeated the question the second time, and just as he was finishing the last word, the boy answered, "The number is five."—*Ulrica Herald*.

In the stereoscopic views one image of the view is superposed on the other and produces the effect of relief. If we tint one of the views with a transparent color, such as cobalt blue, and the other with carmine or lake, we have the combination of these colors in the stereoscope, viz., a purple tint; and so with regard to the colors to produce various shades of green, brown, etc. The colors thus employed produce remarkable effects by their transparency; and to see a view first with one eye in one set of tints, and then with the other in a different set of tints, and then with both eyes to see a third and differently colored picture, is an optical effect as instructive as it is amusing. We, in fact, combine the colors in the eyes instead of the color-cups.

—*Scientific American*.

THE latest deep-sea soundings show that the waters from the polar seas are constantly distributing over the beds of all the oceans. The equatorial waters form a superficial stratum of about two-thirds of a mile; while below that are the polar waters, which at the depth of several miles have a temperature of 39 F., as proved by self-registering thermometers let down to a depth equal to about the height of Mont Blanc. Even at these depths, and with this extreme cold, animal life is found in considerable variety.—*Independent*.

A new disease of the grape, caused by the ravages of a hitherto unknown insect, the *Phylloxera vastatrix*, has created great consternation in the wine-producing districts of France, where it has done an immense amount of damage. This same insect has recently made its appearance in England, and wherever it is found the vines are destroyed. The plants attacked by the insect appear to be sprinkled with fine yellow dust, but which the microscope shows to be myriads of this insect.—*Appletons' Journal*.

THE work on the Mont Cenis tunnel is carried on with increasing spirit and energy. The opening of the great tunnel for the locomotive before July, 1871, is confidently predicted. The Italian minister of public works is hastening the construction of the railway from Susa to Bardonneche, the southern opening of the tunnel; a guaranty, it is understood, being given that the grand opening will be completed and the whole properly walled and strengthened by the time this railway is finished. The French government has given similar pledges as to the northern opening at Modane.

—*Van Nostrand's Magazine*.

PERFECT PRINTING.—It has been doubted whether an absolutely perfect copy of a classical author has ever been printed. A wealthy amateur tried to make a perfect copy of "Os Lucianos," of Camoens, and, with the aid of the accomplished printer, Didot, got up a magnificent edition of it at an enormous expense, which was not to contain a single error. All thought he had succeeded; but when the book was printed, an error was discovered in some

of the copies, by one of the letters of the word *buzituno* being displaced by some accident while working the sheets. The same experiment was made by a famous firm in Glasgow, Scotland. Every precaution was taken to ensure typographical accuracy. Six experienced proof-readers were employed, who devoted many hours to each page; and, when they had done with it, it was posted up in the hall of the University, with a notice offering a reward of fifty pounds to any person who discovered an error. Each page was thus posted for two weeks before it went to press. No error was discovered, but when the work was printed several errors were detected, one of which was in the first line of the first page.

—*Aldine Press*.

From Our Young Folks.
GREEN APPLES.

Pull down the bough, Bob. Is n't this fun?
Now give it a shake, and—there goes one!
Now put your thumb up to the other, and see
If it isn't as mellow as mellow can be!
I know by the stripe
That it must be ripe!
That's one apiece for you and me.
Green, are they? Well, no matter for that.
Sit down on the grass, and we'll have a chat;
And I'll tell you what old Parson Bute
Said last Sunday of unripe fruit.
"Life," says he,
"Is a bountiful tree,
Heavily laden with beautiful fruit.
"For the youth there's love, just streaked with red,
And great joys hanging just over his head;
Happiness, honor and great estate,
For those who patiently work and wait;—
"Blessings," said he,
"Of every degree,
Ripening early, and ripening late.
"Take them in season, pluck and eat,
And the fruit is wholesome, the fruit is sweet;
But, O my friends!—" Here he gave a rap
On his desk, like a regular thunder-clap,
And made such a bang
Old Deacon Lang
Woke up out of his Sunday nap.
"Green fruit," he said, "God would not bless;
But half life's sorrow and bitterness,
Half the evil and ache and crime,
Came from tasting before their time
The fruits Heaven sent."
Then on he went
To his *Fourthly* and *Fifthly*:—was n't it prime?
But, I say Bob! we fellows don't care
So much for a mouthful of apple or pear;
But what we like is the fun of the thing, [bring]
When the fresh winds blow, and the hang-birds
Home grubs, and sing
To their young ones, a-swing
In the basket-nest, tied up by its string.
I like apples in various ways;
They're first-rate roasted before the blaze
Of a winter's fire; and, O my eyes!
Are n't they nice, though, made into pies?
I scarce ever saw
One, cooked or raw,
That was n't good for a boy of my size!
But shake your fruit from the orchard tree,
And the tune of the brook, and the hum of the bee,
And the chipmunks chipping every minute,
And the clear sweet note of the gay little linnet,
And the grass and the flowers,
And the long summer hours,
And the flavor of sun and breeze, are in it.
But this is a hard one! Why did n't we
Leave them another week on the tree?
Is yours as bitter? Give us a bite!
The pulp is tough, and the seeds are white,
And the taste of it puckers
My mouth like a sucker's!
I vow, I believe the old parson was right!
—*J. T. Troubridge*.

ITEMS.

MR. GEO. PEABODY is seriously ill, and his recovery is considered doubtful.

It is thought that the officers of the Cuba, under trial in Wilmington, will be discharged.

It is expected that the public debt statement for the month ending Oct. 31, will show a reduction of \$8,000,000.

EDWARD, LORD DERBY, fourteenth earl of the name, died on Saturday, Oct. 24. He was thrice Premier of England.

THE American Social Science Association commenced its eighth general session, in New York, on Tuesday, October 26th, and closed on the 28th.

GEN. M. C. BARLOW, Marshal for the Southern District of New York, has resigned, and the President has appointed Mr. Samuel R. Harlow as his successor.

GENERAL BUTTERFIELD has resigned his position as assistant United States treasurer in New York, but it is not yet known whether his resignation will be accepted.

ON Friday, the 22d of October, the coast of California was visited by a remarkable tidal wave, supposed to have been caused by a great earthquake in some distant part of the Pacific ocean.

A VEIN of excellent coal has been discovered, extending along the line of the Kansas Pacific Railroad east of Denver. This discovery shows that the workable coal-beds of the Rocky Mountains extend miles eastward into the great plains, and is of the greatest importance both to settlers and to the railway company.

THE "irreconcilables" in France wanted very much to get up an insurrection, and inaugurate revolution in Paris, on the 26th of October, but the precautions of the Government, and the better counsels of the liberals prevailed to prevent disturbance. Victor Hugo wrote a letter from Brussels, on the 12th of October, to M. L. Jourdan, of the *Siecle*, discouraging any violent demonstration. He says, when he recommends an insurrection he will be in it.

THE first practical steps toward the erection of the East River bridge, from New York to Brooklyn, have been taken. The iron caisson for the Brooklyn foundation has been contracted for, and is to cost two hundred thousand dollars. It is estimated that the caisson, with a timber foundation of yellow Georgia pine laid upon it, will weigh eleven thousand tons, and will sink in the bed of the river to a depth of fifty-five feet below high-water mark. The timber sub-structure was the design of the late Mr. Roebling, and is calculated to bear a mass of masonry three hundred feet high with perfect safety.

GENERAL McMAHON, late U. S. Minister to Paraguay, has arrived in Washington. He thinks the present position of Lopez is stronger than heretofore, and that the announcement by the allies that the war was at an end, was simply a pretext for withdrawing the invading troops. Lopez is represented by General McMahon as possessed of fine administrative abilities, and not more cruel in war than the most complaining of the allied generals. The devotion of the people to their chief is without example. They are not only obedient, but always ready to incur any risk or make any sacrifice which may be demanded by him. The men conduct the war without money, make their own cannon and powder, and other hostile appliances, while the women plant and gather the crops.

CONSIDERABLE excitement has been occasioned by the unearthing of a colossal stone statue at Cardiff, about thirteen miles from Syracuse. The image is that of a man, ten feet two and one-half inches in height, but was not intended to stand erect. Opinions were at first divided as to whether it was a petrified giant, or a statue, but it is now generally allowed to be the latter. The interest now turns on its antiquity, some people asserting that it was made within the last three years by a half-crazy Canadian quarryman named Jules Geraud, and that it was secretly buried and is now dug up again for the purpose of a grand swindle. The *Syracuse Journal* of October 28, published a letter from Professor James

Hall, State Geologist, who says there can be but one opinion about it:

I think it is a statue cut in gypsum, and intended to represent a human form of colossal size, in a recumbent position. As to its source or origin, I cannot conjecture. It is worn and discolored by water in a degree that indicates long inhumation, and it was covered by an alluvial deposit of three feet or more in depth. The sculpture is of high order, and very different from those of Central America.

ACCORDING to the analysis of chemists, the relative strength or stimulating power of liquors is as follows: Ten glasses of cider or porter, six glasses of claret, five glasses of burgundy, four glasses of champagne, three glasses of port or sherry, are equivalent to one glass of brandy or three-quarters of a glass of rum.

THE COLLEGE COURANT, published at New Haven, has commenced a series of illustrated biographical articles. The first is a sketch of the new President of Harvard College, C. W. Eliot, with a fine wood-cut, said to be an excellent portrait. Sketches of other distinguished college men, with their portraits, are promised to follow from week to week; also views of colleges, and cuts of new scientific apparatus. The *Courant* makes a speciality of all college news, and is besides taking rank as a successful literary and scientific paper, counting among its contributors many of the ablest college Presidents and Professors in the country.

PUNCH.

The *Independent* gives as "a specimen of a handsome travesty on the proceedings of the British Scientific Association," the following extract from an article in *Exeter Change*, entitled, "On the Alcoholic Compound termed Punch, by John T-and-II, L. L. D., F. R. S.," which is called a "capital imitation of Prof. Tyndall's style:"

"Experiment has proved that the juice of three or four lemons, and three-quarters of a pound of loaf-sugar dissolved in about three pints of boiling water, give saporous waves which strike the palate at such intervals that the thrilling acidity of the lemon-juice and the cloying sweetness of the sugar are no longer distinguishable. We have, in fact, a harmony of saporific notes. The pitch, however, is too low; and to heighten it we infuse in the boiling water the fragrant yellow rind of one lemon. Here we might pause, if the soul of man craved no higher result than lemonade. But to obtain the culminating saporosity of punch we must dash into the bowl at least a pint of rum and nearly the same volume of brandy. The molecules of alcohol, sugar, and citric acid collide, and an entirely new series of vibrations are produced—tremors to which the dullest palate is attuned.

"In punch, then, we have rhythm within rhythm, and all that philosophy can do is to take kindly to its subtle harmonies. It will depend in some measure upon previous habits whether the punch when mixed will be taken in excess or in moderation. It may become a dangerous ally of gravity and bring a sentient being to the gutter. But, on the other hand, it may become the potent inner stimulus of a noble outward life."

SIDNEY SMITH was once looking through the hot-house of a lady who was very proud of her flowers, but used, not very accurately, a profusion of botanical names. "Madam," said he, "have you the *Septennis Psoriasis*?" "No," said she, "I had it last winter, and I gave it to the Archbishop of Canterbury; it came out beautifully in the Spring." [*Septennis Psoriasis* is the medical name for the *itch*.]

"Of what use are forms?" exclaimed a petulant legislator to Dr. Franklin; "you cannot deny that they are often mere empty things!"

"Well, my friend, and so are barrels, but nevertheless they have their uses," quietly replied the doctor.

A WAG seeing a door nearly off its hinges, in which condition it had been for some time, observed that when it had fallen and killed some one, it would probably be hung.

"LOTTIE," said a little visitor, "what makes your kitty so cross?" "Oh, 'cause she's cutting teeth I spect."

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