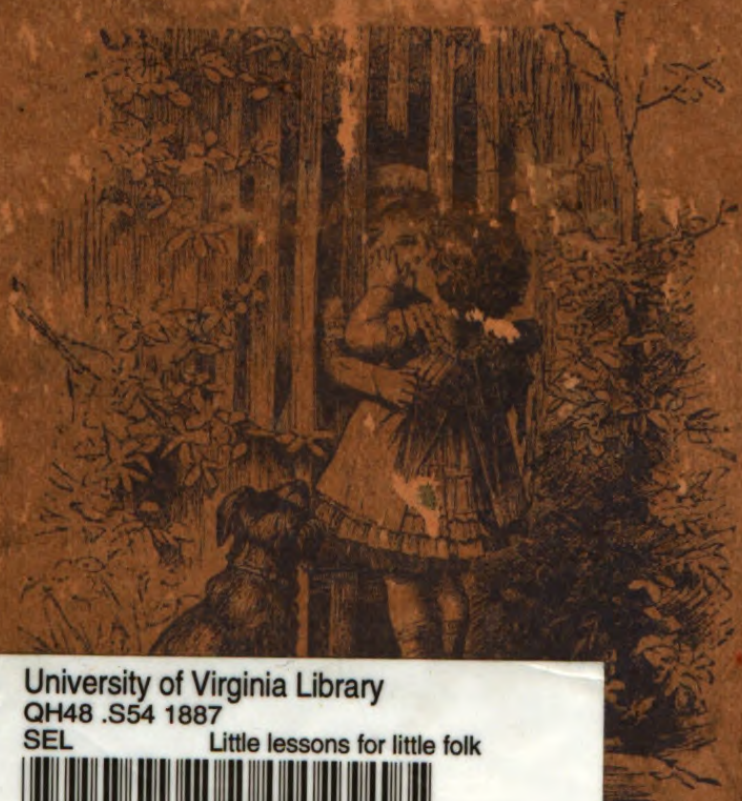
LITTLE LESSONS

FOR

LITTLE FOLKS.

By AUNT ELMINA

Mrs. C. D. Slenker.



NEW YORK:

THE TRUTH SEEKER COMPANY.

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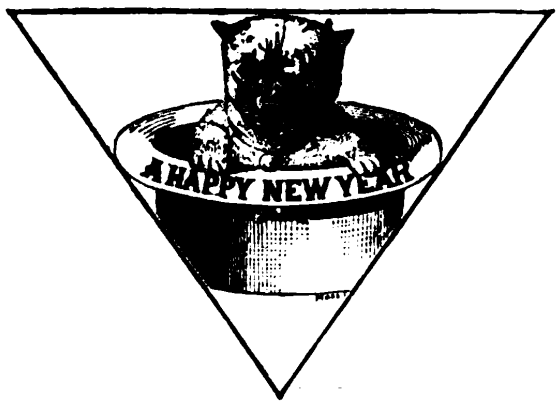

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PREFACE.

DEAR FRIENDS: This little book pretends to no originality. It is like a school-book, which aims to teach the groundwork of facts. It is compiled from reliable sources, and put in plain, simple language so that that all may understand and be benefited.

If the book meets with the encouragement the articles did in serial form, I shall be more than satisfied.

Affectionately,

AUNT ELMINA.

LITTLE LESSONS FOR LITTLE FOLKS.

STARS.

Twinkle, twinkle, little star!
How I wonder what you are,
Up above the world so high,
Like a diamond in the sky!

CHILDREN, did you ever imagine how many stars there are? Did you ever think that there are more of them than there are drops of water in the ocean, or grains of sand on the sea-shore? Look at the sky some cold, clear night in winter, when it is bright with stars, and you will see it sprinkled all over with the sparkling globes of light. Then look through a telescope and you will see still beyond them as many more; and get a larger and more powerful glass and look again, and beyond those

you will see another vast host, and just so it would be could you multiply the power of your vision and look on, on, on without limit, in that vast immensity of the beyond. There is no wall, no stop, no end, but an infinity of stars and of space, endless, eternal, and unthinkable.

And every star we see is a great sun, larger, hotter, and brighter than our own sun.

If one of them should suddenly cool off, we should for thousands of years see it as brightly shining, apparently, as ever, for it is so far off that it would take years, and years, and years for the last of the light which had left it to reach us. So, too, if a new star were to suddenly come into existence at that great distance, it would be years and years before its light would reach us so we would see the star.

The stars look as if they were pretty close together, but that is because they are so very far off. We cannot see the stars move, either, but every one of them is moving faster than a cannon-ball, which takes only three seconds to go a mile. Stars go from five to two hundred miles in a second. One would think all these stars rushing around in space would cause innumerable collisions. Just put fifty girls and boys in a field and let them all run as fast as they can, and each one of them blindfolded—don't you think they would run against one another?

But though the stars seem close together, they are actually millions and millions of miles apart.

It is said that the average distance from star to star is about nine millions of miles.

The distance of our nearest star, Centauri, from the sun is twice nine millions of miles, a distance so great that no mind can conceive it; and should Centauri and the sun begin to fall toward each other, it would take nearly thirty thousand years to bring them together. Therefore, though two stars may, in the vast ages of time, come into collision, there is very little chance of it.

There are several cases where it is supposed two stars have run into each other, as a star has suddenly blazed up with added light just as it would do if another star hit it and the two melted into one.

Planets are not stars. They are dark and cold, and shine only when the sun is shining on them, with the reflected light. The evening star is a planet, and our earth is a planet. Planets do not twinkle as stars do.

It is probable that all the suns, moons, planets, and asteroids are made of the same material as our earth is. But heat and cold make the conditions so different on them that it may be none of them have beings like ourselves upon them.

MONKEYS.

THE monkey belongs to the Mammalia, which is the class of animals that give milk for their young. They are also of the order Quadrumana—that is, having four feet that are like hands.

The word "monkey" generally means not only the true monkey, but the ape and baboon also. The ape has no tail and no cheek-pouches.

All of the monkey tribe can walk upright, but they are not so constituted as to walk well. The head is too much inclined forward, and they walk on the sides of their feet instead of the soles, and the muscles of the legs are not such as enable them to stand upright long at a time. They climb about in trees, and are therefore often spoken of as "our arboreal ancestors."

They have four prehensile feet, which they can use as hands, and some of them have long prehensile tails. "Prehensile" means "adapted to seize or grasp," as we take hold of things with our hands, and as those of us who go barefooted use our toes for

picking up things or for seizing hold with as we climb or wish to make sure footing.

Monkeys are much like men in the organs of the stomach and other parts of the body. They eat fruit, corn, and vegetables principally; and also insects, birds, and birds' eggs. When tamed, they will eat whatever man eats, even to drinking liquor or using tobacco, if they are so taught. They like to live in groups—many of them together—just as we do: this way of living together is called gregarious.

They are much like children—full of curiosity, tricks, and mirthfulness; and are good imitators. They think, reflect, and reason; but more like a child than a fully matured man or woman. They have a sort of chattering talk among themselves—and, indeed, most animals talk in their way. They really talk much more than we think they do, only we cannot interpret their language.

Monkeys have but one or two young ones at a time, and they love them just as human parents love their children. The mother nurses her little ones, and when they sleep she keeps the flies from them. The mothers often go to a stream of water and wash the faces of their babes. Some mother monkeys grieve themselves to death when their baby monkey dies. If the mother dies, the tribe will adopt and take care of the orphans. One monkey took a young kit-

ten and carried it about with her; the kitten one time gave her a scratch, which so surprised her that she examined the kitten's foot, and seeing the claws, she bit them all off.

Monkeys, when tamed, have great affection for their masters, and will fight for them just as a dog would; and, like a dog, they are jealous of love bestowed on other animals. They are very much afraid of snakes, and, indeed, of any animal that is strange to them, fearing it will hurt them.

Monkeys are very human in their diseases. They have aches and pains—ailments just as we do, from consumption to cutting-teeth fevers; and medicines act on them as they do on us.

The male monkey courts the female, and has his special one to love, just as a man does; and sometimes has more than one. Monkeys are brave and cowardly, intelligent and ignorant, kind, fierce, weak, and strong, high-tempered and placid; and, indeed, have all the various shades of disposition and intellect that we have.

It has often been said that no animal but man reasons or uses tools or implements of labor. But monkeys will throw stones at their enemies, and they will use stones to break nuts open with and for other purposes; and they use sticks also. A man named Rengger gave some tame monkeys eggs to eat.

At first they would simply smash them, and thus they lost much of the eggs; but they soon reasoned a better way, and gently hit the egg on some hard substance till it was cracked, and then picked off the shell with their fingers. If they once cut themselves with a sharp tool, they are always careful afterward. They were given lumps of sugar wrapped in bits of paper, and Rengger once wrapped a wasp in the paper and the monkey was stung; so always after that it would, before opening a paper, hold it to its ear to see if there was any wasp in it.

Monkeys will help each other just as people do. When a troop of them go through a thorny brake and get full of briars and burrs, they will take turns and clean each other's fur of every thorn and burr. When one finds a surplus of food, it shares it with others. In Abyssinia, Brehm saw a great troop of baboons crossing a valley, some having already ascended the opposite mountain. Those in the valley were attacked by dogs. The old male monkeys hurried down the rocks with wide-open mouths, and roared so terribly that the dogs ran off. Being again set upon the monkeys, they renewed this defense. In the mean time all had got on the mountain but one young baboon about six months old. It climbed on a rock and cried loudly for help. A large male baboon came down the mountain, slowly went to the

young one, and coaxed and led him off in triumph. The dogs, much astonished at his courage, did not hinder him. Even animals instinctively admire heroism and unselfish helpfulness in others.

The monkey loves oysters, but he is too wise to put his fingers in the shell, so when he sees one lying on the beach with its shell unclosed, he quickly pops a stone in it to hold it open till he digs out the oyster.

The orang-outang will build himself a house out of branches and leaves to protect himself from sun and rain.

A priest owned a pet ape which got loose one day, and, tracking the priest to church, mounted the sounding-board over the pulpit. The preacher commenced his sermon; the ape crawled to the edge of the board, looked at him, and then imitated every gesture in so ludicrous a manner that the whole congregation smiled. The priest, not knowing the reason for this ill-timed mirth, rebuked them earnestly, all of which the ape imitated by gestures till the crowd roared with laughter. A friend finally told the preacher the cause of the mirth, and the ape was removed.

Some monkey tribes have quite a knowlege of surgery. If one is wounded, others hasten to its assistance. One will probe the wound with his fingers to

see how deep it is, and then close it up, while others will chew leaves to stop it with.

When we study the habits and ways of the monkey tribe, we find they are so nearly human that we cannot draw a separating line between them and ourselves as we are in wild and barbarous regions. All animals and insects know far more than we think they do. It is only by study, watchfulness, and keeping full records that we shall finally realize how nearly related are all organized living creatures.

ITEMS ABOUT FISHES.

FISHES form an important article of food, and as far back as you can trace the history of men you find them catching fishes to eat. In remote times fishes were caught by men who lay on rocks and shot them with arrows, or speared them; and even now, where people are only partially civilized, fishes are scooped out with blankets or sheep-skins.

Fishes, not being called animal food, are eaten during Lent and other fasts appointed by the church. It is strange that eating a piece of beef or mutton

can be a sin, while eating a piece of salmon is innocence itself.

Millions and millions of dollars are made by fishing. Fishes are dried, salted, and canned, so we can have them all the year round, in season and out of season.

Royal fishes are the fishes that are called the property of the crown, of a king or queen. The whale and the sturgeon, when thrown on shore or caught near the coast, are called royal fishes. They were considered too precious for other people, just as the swan, which was a royal bird, was too good for any table but the king's.

Fishes are defined, in part, as creatures that live in water and breathe by gills and not by lungs. The eel is a fish, but the whale is not one. In number and kinds fishes exceed all other classes of vertebrate (backboned) animals put together. Even hot springs and the dark pools of caverns have their peculiar kinds of fishes, and some of them we only know as they are thrown up from the bowels of the earth with torrents of water by volcanoes.

Fishes taper at both ends and swell in the middle, and this makes it easy for them to swim through the water. They are very smooth and slippery, too, and this also helps them to move swiftly along. What is called the law of "natural selection" has killed

off the rough, angular, and badly shaped fishes, leaving only the kinds that are best adapted for the life in water. The fishes that swam fastest and moved about easiest would, of course, have the best chances for life by being best able to get away from enemies. There are some exceptions to all rules; so there are some fishes that are globe-shaped, some that are irregular and angular in shape, and some that are "flat as flounders."

There are fishes that have pectoral fins so largely developed that they can fly, or, rather, the fins support them in short flights in the air, as the flying fish and the flying gunnard. The flying fish has the pectoral fins nearly as long as the body, and these are called its wings. This species is abundant in the warmer parts of the Atlantic ocean, and in the Mediterranean sea. There are more than thirty species of flying fishes inhabiting the seas of the warmer parts of the world. They swim in shoals of from a dozen to a hundred or more, and often leave the water all at once, darting in the same direction through the air. They fly about two hundred yards, and then descend into the water and again renew their flight. It is said to be a pretty sight, and perhaps some of you may have seen them.

Sometimes the dolphin chases them, and in its anxiety for a good meal it takes great leaps out of

the water and gains on the flying fishes, which make shorter and shorter flights, till at last the monster has wearied them out and they sink exhausted, while he makes his meal on them.

Sometimes large sea-birds catch them while they are in the air; so they are in danger whether they swim or fly. They can fly only as long as their fins or wings are moist. They generally fly low down near the surface of the water, though they can and do often rise twenty feet above it. They often fall on the decks of ships.

They are good food, and the natives of the South Sea Islands take them by means of small nets attached to light poles. They go for them at night in canoes to the outer edge of a coral reef with a torch-light, which enables them to see the fishes, and perhaps also dazzles and blinds the tiny prey.

The fish called the flying gunnard is remarkable for the great size of its pectoral fins, or wings. The tips of the rays extend considerably beyond the membrane, looking like spines or thorns. It has a long spine, rising like a sharp horn, from the back of the head.

At particuliar times, especially on the approach of rough weather, in the night, numbers of these fishes may be seen by the phosphorescent light which they

emit, which makes their arched passages, in flying, look like streams of fire.

Fishes possess nerves and organs of all the senses, just as we do ourselves, though they are not supposed to feel as acutely or taste as keenly as other animals. A few fishes, living chiefly in the mud or in the water of caverns, have no eyes. But in most fishes the eyes are large, and the vision is very acute. The eyes are covered by the skin, modified in its character: and they have no eye-lids or nictitating membrane—which is the membrane used in winking—and therefore cannot wink their eyes.

Birds, and some animals, have a nictitating membrane, at the inner angle of the eye, which can be drawn across the eye beneath the eye-lid, and this is called the third eye-lid.

Fishes have no external or outward ear.

The mouth is their only organ of apprehension—that is, organ for seizing or taking hold with. Now, you children have two hands and two feet that you can pick up things with, while a poor fish must take hold of everything with its mouth.

Some fishes have no teeth, and some have a great number of teeth as fine as the hairs of a brush. Some have long, sharp teeth, sometimes straight and sometimes crooked; some have teeth so flat and closely set that they resemble a regular and beautiful pavement.

The teeth of all fishes are not on the jaw-bone, as ours are, but are on the *voemer*, or bone extending along the middle of the roof of the mouth; and sometimes they are on the tongue.

Fishes eat vegetable as well as animal food. They are voracious eaters, and seem to spend most of their lives in seeking food.

Many of them eat other kinds of fishes, and some even eat the young of their own kind. Some swallow their prey alive, and other chew it.

Fishes lay eggs. Sometimes the eggs are hatched in the fish and they produce the young alive, but they generally spawn, or lay the eggs in shallow water, by some water-plant, or on sand or gravel.

Very few fishes take any care of their young, though some make nests—perhaps more of them than we know of, as fishes have not been as well studied as land animals have.

When food is plentiful, fishes grow more rapidly, but if food becomes scarce, growth is arrested for a long time.

There are electrical fishes that shock one, like an electrical machine.

Some tropical fishes are poisonous if used for food.

The air-bladder on some fishes yields isinglass, and of that of others artificial pearls are made.

Oil for lamps is obtained from some fishes, and cod liver oil from others.

There is a fish called Father Larsher, which is armed with long spines in the back of the head and along the gill covers. When it is touched it sets out two spurs like a porcupine, and looks terrifying and fearful.

There is a perch, called climbing pearch, that is said to climb up banks and steep places.

"On one occasion Mr. E. L. Leyard met a number of them journeying along a dusty road under a mid-day sun. They are said to form a favorite food of the boatmen of the Ganges, who have been known to keep them alive for five or six days without water, and to find them at the end of that time as lively as when first caught. The typical fish cannot breathe out of water, but the climbing perch can, because above its gills, and in the same cavity with them, lies an organ, composed of a complicated system of thin bony plates, which acts as a lung. Many fishes occur in the fresh waters of the Amazon basin which are amphibious. They all have gills by which they can breath, like other fishes, in the water, but they have also special contrivances for enabling them to respire atmospheric air as well. One of these amphibious fishes, of South America, is in the habit of traveling by night in droves, moving as fast as a man

can walk, its only locomotive organs being the spiny ray of its pectoral fins and its tail. Another, inhabiting the swamps of Carolina, travels by leaps, and always, it has been observed, in the direction of the nearest water. Most of these fishes live in ponds or marshes which are liable to disappear in the dry season, and it is in search of fresh water that they undertake these migrations. There are many parts of the world, however, in which at such seasons this search would be hopeless, and in these places the pond fishes æstivate, that is, bury themselves in the mud at the bottom of the pool, and there lie torpid till the advent of the rainy season sets them free."

FRESH AIR.

WE will take for this lesson one of the most important substances that go to build up our lives—that is, the air, the atmosphere that surrounds our earth like a great ocean, some fifty miles deep. It is composed of oxygen and nitrogen. It is invisible and without smell or taste, and yet it is heavy and elastic, and we know it is a real substance. If the

air were all pumped out of a room we could not live in it, nor would a candle burn in it.

Good, pure air is one of the most essential things in preserving the health. We can live on one meal a day, but we must have fourteen thousand breaths of air every twenty-four hours. And this air should be fresh. We draw it in and it is absorbed in the blood and circulated all through the system; therefore, if there is disease, filth, or miasma in it, we are apt to become sick from these being drawn into our body. The lungs keep most of the oxygen and expel what is called carbonic acid, and so if air is breathed over and over it is foul with the gases the breath is all the time emitting. Whenever you sleep in a close room and breathe the same air over and over all night, you breathe back into your lungs the poisoned and foul air these lungs have thrown away again and again, till your whole blood is tainted with the filth. If two or three of you sleep in the same room, you not only breathe your own cast-off breaths, but breathe those the others have cast off.

Just so if you are shut up in a close room in day-time. If you are in a school-room where there is not good ventilation, or in a church or a theater or any place that is full of people, your system will be tainted by bad air. The out-door air is the best air we have. If we spend a great part of the day out

of doors, we shall be sure we are not breathing foul and unhealthy air. Remember, good air makes good blood, and good blood makes good, sound bodies. All bedrooms should have open windows nearly all the year round. A good screen so placed as to keep the air from blowing directly on the bed will be a preventive from catching cold, and you will sleep better and wake up more refreshed because you have had good, pure air all night. Never cover up your head in bed, for then you will breathe all the air in the bed over and over, and also breathe up all the gas that is coming out of your bodies. Many children get afraid and cover up their heads in bed, but the bad air will hurt you more than all the imaginary bugaboos can possibly do. If you must cover your head, be sure and leave a little place for your nose and mouth to peep out into the clean air. If you could see the dirt and filth floating in foul air, and the germs of disease and death, you could not be hired to take it into your mouths.

Felix L. Oswald—one of the wisest of doctors—says: "Out-door life is a remedy and a preventive of all known diseases of the respiratory organs (the breathing organs). Consumption, except in the last stage of one sort, can be cured by living in the woods on a mountain, and so can asthma and catarrh."

Think of these things, children, and try to breathe

pure out-door air. But do not needlessly expose yourselves to cold, wet, and damp. You must use judgment and moderation in all things. Pure air need not be cold air. To be comfortable is usually best. And yet, on the other hand, you must not be too careful to keep warm and avoid cold and dampness, lest you become tender and delicate and unable to stand nature's changes of temperature.

MATTER AND LIFE.

DID you, children, ever think how large the universe is? How many great worlds, suns, and stars there are, and what may be upon them in the form of plants, animals, and human beings?

The universe is, in all probability, *endless*. You may go north, south, east, or west, through the maze of stars and worlds, and travel billions and billions of years, and look as you go through the most powerful telescopes, and you will still see just as many more globes and stars ahead of you as there were when you started.

The matter of which all these globes are composed is eternal, and, as far as has been discovered,

they are all composed of the same kinds of materials. But each one has its own peculiarities of climate, and probably of atmospheric conditions. The *size* of a world has its influence upon all that lives and grows upon its surface.

It is not likely that on any one of all these worlds there is a single human being like ourselves, or plants or animals resembling those of our earth, because all that live and grow here come from the circumstances around them, are born of this earth; are creatures of the air, earth, water, and sunshine; are evolved or generated from the things around them.

If a man could be born without a head, he would not live. If he were born all head, he would not live. If he has one limb or organ lacking, he is not a whole and perfect man.

If a tree should suddenly become leafless and remain so, it would die, for the leaves are its lungs. Yet some things about all living beings can be changed and improved and made better, and they still live; and some made worse, and they still live. All our lovely roses have come from small, wild roses. Our fine apples, of hundreds of kinds, are improved from the little, sour crab-apple. Darwin tells us all forms of life—all plants, animals, insects, and persons—have come from a little speck of protoplasm.

The word "protoplasm" is formed of two words—*protus*, the first, and *plasm*, the form—and means the first form of living bodies.

Our world is composed of about sixty-four elements, or different kinds of matter.

In a human being there are about eighteen of those elements.

In a human being weighing one hundred and fifty-four pounds there are eighty-eight pounds of water and sixty-six pounds of solid matter.

We are composed of oxygen, hydrogen, nitrogen, chlorine, and fluorine, which are gases; and carbon, phosphorus, sulphur, silicon, potassium, sodium, calcium, lithium, magnesium, iron, manganese, copper, and lead. A great many things, you may think, but there is only a little of each of most of these substances.

Hydrogen, oxygen, nitrogen, and carbon make up the main part of the body.

Nearly all animals are made of the same elements that we are, and like us are only a part of the same world—made from its elements—evolved from remote beginnings, going back to a time when there was no life; that is, no living form on the earth or in the air, on land or in water.

There were only the sixty-four elements from which were evolved forms of life.

Now, you may ask, If there was no life, where did life come from?

Did you ever churn? You know milk is not butter; yet if it is churned, butter will come from the cream.

There is no life in unorganized matter; at least, no sensible life. But the forces and qualities that make life are all there; just as the butter is in the cream, in the cow, or in the grass and corn the cow eats; for a good chemist will make butter from grass or corn without running them through a cow.

Well, we will go back to a time when there were no plants nor animals, and we find four of the elements—carbon, hydrogen, oxygen, and nitrogen—and these four unite when the conditions are favorable, and form a jelly-like substance, which is protoplasm—the first form of life. *Protus*, the first, and *plasm*, form—protoplasm; remember this word, for it is the beginning of you and me, and of all that grows and lives. Protoplasm is our mother and our father, and the old Earth is our grandparent.

Protoplasm needs water, warmth, and free oxygen to form it.

All plants and animals are fed and kept alive by protoplasm. Animals get their protoplasmic food by eating other animals, or by eating plants, and so do we.

Plants manufacture protoplasmic food for themselves from the primary elements (after these elements are combined into water, carbonic acid, and ammonia).

An animal dies; the body decomposes and goes back into elements, and these elements help to form other bodies. You eat pork, beef, mutton, or fowls, and what was the animals' bodies helps to form your bodies. We can never know how many millions of other plants, animals, or human beings help to make us as we are now. Every breath we breathe or mouthful we eat adds something to us, and all the time we are losing bits of us by excretions, by insensible perspiration. If you cry, you lose a part of you in tears. So you see how you acquire and lose the materials of your body all the time.

The first living beings are supposed to have been neither plants nor animals, but something between the two—Protista, which comes from a Greek word meaning "first." A Rhizopod is one of the Protista. But as there is really no line where we can divide plant life from animal life, the first forms—the Protista—may change to one or the other. Probably the first distinctly formed organisms were plants.

This forming of protoplasm of Protista—of plant and animal life from protoplasm, and of protoplasm from the elements—is called *spontaneous generation.*

This big compound word means that life came spontaneously—it generated from the elements. No God was needed to create it.

It does not mean that you, or I, or a chemist, or a physiologist, or even Mother Nature, could mix elements and form a man, a plant, or the smallest *living* thing. We might make protoplasm, but nothing higher. We could place protoplasm where Nature would evolve Protista and the first forms of vegetable and animal life. All must come by slow processes and in regular lines. Nature never jumps. She can no more create a cow or a worm out of protoplasm than you can. She can only form beginnings.

No person can take a cotton ball and make it into a web of muslin by one process, or a piece of wool and make it directly into a pair of trousers. It must be sheared from the sheep, scoured, carded, spun, woven, and made into cloth by steps, by degrees. And before this, the sheep must be reared and ready to shear. So, you see, all things are done by littles.

"LIFE AND HER CHILDREN."

I.

MY dear young friends, I have just finished reading a very interesting book, "Life and her Children," written by Arabella B. Buckley.

I should say that the lady is a Liberal, like one of us, for she does not talk of the wonderful works of "divine power," or see a "godly miracle" in every adaptation of a plant, an insect, or an animal to its surroundings. But she wisely calls all the beautiful varieties of form, and all the peculiarities of each living thing, the manifestations of Life and her work.

She commences by telling us of the variety and quantity of living things life has produced on our earth; how full every spot on land and water, in the ground and in the air, is of living things—of growing trees, plants, grasses, and weeds; of walking, flying, swimming, creeping, and leaping things. Everywhere Life and her Children are found, and all busily at work.

We can take the most powerful miscroscopes, and see millions and millions of infinitesimal plants and tiny creeping things too small to be seen with the

naked eyes. Could we magnify these as many times more, we should find their little bodies covered with still more tiny parasites. A parasite is a plant, animal, or insect that lives on a larger plant, or animal, or insect, by sucking its juice.

Millions of seeds and eggs are produced that never grow or hatch, and yet millions more start into life and are destroyed—are eaten by other forms of life, or are crowded out of space to grow, and starve for want of food.

If we planted fifty grains of corn in a spot six inches square, all the grains might sprout, but only eight or ten would grow to any size, for the rest would be crowded and starved out, and those that were left would be only weaklings unless we thinned them out to one or two.

So life likewise thins out her surplus of plants and animals, in various ways. Some are eaten, some starved, and some destroyed in innumerable other ways, and thus variety is kept up, each living through and by means of another kind or kinds.

You will remember in a former lesson I told you of protoplasm as the first beginning of life; as a jelly-like substance in the water, from which all other forms of life have developed.

Life produces varieties of animals, insects, and plants and trees—of all living, growing things—by a

change of circumstances. A swimming animal may, in a long course of time, become a land-walker, and so may a flying one. A meat-eating animal may come to live on vegetables, and a vegetable-eater may become a meat-devourer. All this depends on which kind of food is most accessible.

Change of food will in time make a change in the form and nature of the eater, and so will all other important changes in condition. It is thus that new varieties of plants and animals are brought into being.

As the change in food and in circumstances produces a change in the plant or animal, the world becomes full of varieties and species, with little shades of difference, just as all apples are evolved from the wild, sour crab-apple.

"LIFE AND HER CHILDREN."

II.

THE first forms of life are found in the sea. They are so small you cannot get a glimpse of them without a magnifying glass.

One of the first of the living forms of life—one of the first "children of life"—is called thread-slime, a tiny speck of gum or jelly-like substance, smaller than a pin's head, with fine grains in it. It floats in the water, and sometimes has a little threadreaching out from it seeking for food. It has no head, mouth, eyes, or limbs; yet it spreads itself over a tiny shell-fish, and sucks the animal out of its shell. It then takes itself off the empty shell, and hunts again for some more food, something else to kill and eat.

This is the one first object of all living things—to find food. The thread slime, without even having a stomach to digest its food, still finds something to eat, absorbs it, and casts away the indigestible shell.

The scientific name of the little thread slime is *Protogenis*. *Proto* means first, and *genis*, kind—first

kind of beings. Then we pass on to what is called finger slime or *Protomœba.* It is a little shapeless mass of jelly, and as it moves lazily along it pokes out some of itself into a sort of finger, and when it touches food it spreads itself over it as the thread slime did, and thus absorbs it.

If you break these slime animals or beings in two, or in several pieces, each piece will go right on living, eating, and growing just as the original one did.

A little higher in the scale of being come the monads. They are found in water where flowers and plants have been soaked, and are called infusoria—something infused into the water. They have a skin, and a tiny opening in one end that serves as a mouth. This is called the beginning of mouths, for it is hardly a real mouth.

These monads have a whip or thread of slime, with which they whip food into their mouths, and it also serves as a kind of oar by which they move themselves along.

There are several kinds of infusoria. They, too, are nothing but bits of slime, and have no shells and nothing to protect themselves with, so they are eaten by the thousands and millions, not only by other animals, but by one another. By and by the slime animals develop into something higher—that is, a

part of them do—and then they begin to build shells around themselves out of lime that is dissolved in the sea-water. The shell is a kind of secretion from the animal, and when it gets too small, new chambers or partitions are added, and so as the animal grows the shell grows also.

I hope you will get the book and see the pictures of these slime animals and their curious and beautiful shells. Though they are so tiny, you can guess at the beauty and variety of the different kinds of shells by judging of them from any collection of shells of larger and more highly developed shell animals.

These minute specks of slime are not only interesting as some of the first beginnings of life, but they are really curious and pretty, and well worth our attention for their own selves.

"LIFE AND HER CHILDREN."

III.

A LITTLE higher up, after the infusoria, we come to sponges. Yes, the sponge is really an animal. It grows in the warm water of a sea or gulf, as in the Mediterranean sea or Gulf of Mexico. There you will find the sponge. It stands up on a rock, or hangs from beneath a ledge of rocks. Some are round, and some branch like trees. They are colored from a bright orange to a dull, dingy brown.

You have all seen the webby net-work of silk fibres. This we call a sponge, but it is really only the skeleton or frame-work of a slime animal, just as your bones are the skeleton of your bodies.

When the sponge is alive, it is filled full of this slime. Every little hole is full of it, and the outside is covered with it. You may call each sponge one animal or a collection of animals, for each bit of it, if torn off, will be alive, just as each bit of the finger-slime is; and the bits of sponge will each put out fingers as they float away from the mother slime or original piece. For the sponge is really only *Amœba*, or finger-slime.

Each sponge is a complete animal, which lives, breathes, eats, grows, and gives off young ones.

Nothing seems to eat the sponge, on account of the tough, indigestible fibres of its skeleton. But it has an enemy in man. About once in three years men visit the places where they grow, and gather all the best and largest of them for the use of mankind.

Small sponges will sometimes fix themselves on shell-fish. A crab was once seen walking about with a sponge upon its back that was many times larger than itself, but so light that the crab did not appear to feel its weight at all.

It would seem as if the little, helpless masses of finger-slime, realizing how defenseless they were against devouring enemies, such as shrimps, fish, water-fleas, and small sea-worms—all of which eat them greedily—finally learned to build for their safety this fibrous skeleton.

It is certain that the most helpless of life's children keep developing onward and upward in their search for food and safety, and thus new and still newer varieties are formed, and branch after branch is added to the great tree of life, which terminates in man as the present apex. Whether there will be a still higher development time only will decide.

"LIFE AND HER CHILDREN."

IV.

AFTER the sponges come a class of animals called lasso-throwers.

You have seen pictures of hunters throwing a coiled rope with a noose in the end around the head of a horse or other wild animal to catch it. Well, the little animals called lasso-throwers grow their own lassoes fast to and out of their bodies, and so have them always at hand.

The pond-hydra is found in ponds, hanging to the under side of duck-weed, or clinging to floating sticks or to stones at the bottom of the pond. It is a quarter of an inch long, and looks like a tube with a circlet of feelers around the end, which it waves in the water. It is simply a tube or sac, with a sucker at one end to hold on with, and a number of jelly arms or tentacles at the other, + The Young.

These arms catch the food and put it in the sac, where it is digested. The hydra feels about with its arms, which are covered with fine jelly hairs, and when the hairs touch a water-flea or small fish or other food, they twist around it and finally draw it into the sac.

The prey struggles at first, but soon becomes powerless, because the harmless, soft-looking tentacles are really full of lassoes all coiled in cells filled with a poisonous liquid. The lassoes are barbed at the base.

Imagine a small worm or fish embraced by a tentacle or arm of the hydra, and the arm covered with lasso-cells. The moment a worm or fish comes in contact with a cell it bursts, and the lasso shoots out and pierces the skin of the victim. Hundreds of these darts are always ready. As fast as one is destroyed another grows. So the hydra is well provided with weapons.

There are many other kinds of lasso-throwers. Some grow in the form of branching trees, and some like bells—jelly bells.

To describe all the wonderful parts of even a tiny jelly bell would take a whole sheet of paper. Yet it looks like only a speck of jelly.

There are large and curious jelly fish that weigh four or five pounds, which, if taken out of the water and dried, weigh only a few grains. They are nearly all water, and yet they are so curiously formed that it would take pages to tell you about them.

The sea anemones are lasso-throwers. They, too, are beautiful, curious, and wonderful animals—some

shaped like flowers, and some like snakes. All have arms and lassoes to catch their food with.

The sea anemone will produce young ones in three ways. It will split in two, or throw out buds, or hatch young from eggs in its own body.

A daisy anemone will throw out three hundred young in a day.

The coral is also a lasso-throwing animal. In the Mediterranean sea the coral begins life as a little jelly body thrown out of the mouth of a white polyp growing out of a red coral branch. It settles on the sea bottom, spreads out its arms, and begins to feed; takes up carbonate of lime from the water, and colors it in some unknown way, and builds its skeleton shell or frame, that we call coral—only into its mouth and stomach it lays no spicules, but leaves them soft and white.

The young ones remain as buds on the old one till it grows into a tree, and finally into rocks and even whole islands—though only the upper part contains the live animals. The skeletons or coral-frames remain below as coral rocks.

I could fill a book about these corals alone, but I only mean to give you the beginnings, so you will have a taste for studying deeper into them from books and papers, and from nature herself.

"LIFE AND HER CHILDREN."

V.

WHEN I was at home I remember that among the few natural curiosities mother had collected together, was one she told me was a Star-fish—though, of course, it was only the empty shell of one of these curious animals.

As I have just been reading about the Star-fish in "Life and Her Children," it carried me back to that old time of the long-ago, and my childhood home.

I presume all you children have seen pictures of Star-fishes, with their five points or rays surrounding a little globe in the center. This globe is called the stomach-bag of the fish.

The arms or rays of the fish are covered on the under side with little thin, transparent tubes, which are the feet of the fish; hundreds of them hang there, and as the fish moves along at the bottom of the water, these little feet are stretched out and bent forward, drawing it along over rocks, hollows, and levels in the bed of the sea.

In the under part of the body of the fish is its

mouth. It crawls along till it finds a small mussel or limpet, and then it passes over it till the mouth is just above it, and then the middle of the body will rise up a little and the feet all around the mouth will close about the mussel and draw it into the opening, where it will stay till the mussel is eaten, and only the empty shell is left; or if it is too large to be sucked in, the Star-fish will apply its lips to it and push out its stomach-bag till it half covers the mussel, and then suck out all the meat from the shell.

It has five eyes—one at the end of each ray or arm. It has a little water-bag at the upper end of each of its hundreds of feet, and is curiously formed in all its parts. Life takes as much pains in making a little Star-fish as she does in making a great whale or a noble man.

Yet all the Star-fish seems to care for is to eat. He devours crabs, shell-fish, garbage, and decaying matter, and is called the scavenger of the sea, as he eats up the filth and makes all clean, just as flies and ants eat the filth about our homes.

The Star-fish is the first walking animal, and therefore is well worthy of being specially noticed. So I hope each one of you will learn all you can about it.

If one of its rays or arms is broken off, another limb will grow in its place. It is pretty well protected from enemies. It has a thick skin covered with

scales, and minute claws like birds' bills mounted on stalks standing round its spines, and these keep continually snapping and picking of small animals and sea-weeds, which would fasten upon it if not thus removed.

Life takes good care of her children, even though she forms them to live off one another.

"LIFE AND HER CHILDREN."

VI.

THIS is the last lesson I shall give you from this interesting and instructive book, but I hope that at least some among you will want to see more of it, for it is a hundred times more interesting when you have all the pictures of these wonderful animals before you as you read about them.

Now for our Sea Cucumber. It is really a species of star-fish, and looks like a bag tied up at one end, with a sort of fringe around the opening. It looks like a soft, satiny sausage, purple, white, or brown, with five delicate stripes down its body. The stripes are the rays. The fringe consists of tentacles, which

keep moving and waving about, feeling for food, and warning it of the approach of danger. The sea cucumber will fill itself with sand, and absorb all the food it finds among the particles, and then throw out the sand again.

It is a soft and seemingly very helpless animal, but if you try to pick it up it will slip out of your hands. It squeezes the water out of its body and slips into the crevice of a rock so closely that you must break the rock to get it out.

It can throw out nearly all its insides and grow them again. "Sir John Dalvell found that a sea cucumber which had lost its tentacles, its throat, its net-work of blood-vessels, its intestines, and its egg-sac, and had literally nothing left but an empty tube, lived, and in three or four months had regrown all the insides of its body."

We think *we* have an advantage over all animals, in almost all ways; but if we study any animal closely, we shall find it our superior in some special way, if not in many ways.

The dog can follow its prey or its master by scent or smell; the ant will tell the young hatched from an egg belonging to its own nest, though the ant never saw the egg or saw the young ant till it was grown; but no fathers or mothers could tell their children if they had never seen them.

If we cut off our finger or our arm it will not grow again; but some worms and thread-slime may be cut in pieces, and each piece will grow a new animal. Spiders will grow new legs, and a snail will even grow a new head.

BOOKS.

BOOKS have always been greatly valued by those who comprehend how useful they are.

Once "books" meant rolls of paper. The first books were all in writing, and whenever a copy of a book was wanted, the person wanting it had to copy it, or get some one to copy it for him. The Romans had many books in rolls, which were highly ornamented, and kept carefully in cedar boxes, so moths and worms could not eat them. The boxes being made round, the library looked singular indeed when filled with these boxed-up books. Some books were made on leaves of lead, and others on leaves of wood covered with wax. Many books were made of parchment, prepared from skins of goats, sheep, and deer. About the year 900 the use of paper for books came in fashion. Even when books

were all written by hand, some libraries nad one thousand books. Just think what a long time it would take to write all the reading that is in a big book. Yet the largest books have been copied hundreds of times by industrious writers. There are a great many houses in the United States that have no books at all in them; and there are homes where there are only the Bible and the almanac. When I used to teach school and board around, I always felt lost when I got into a house where there were no books; it looked so lonesome.

Books are pleasant friends, and when you tire of them you can lay them away. They are called "dumb teachers," because they teach us so much, and yet never speak a word. I can remember when children had very few school-books. A great many little ones came to school who had no books at all. The teacher used to make a letter with pen and ink and sew it on the sleeve of the child, and tell it to learn it by the next day. I can well recall when I used to see children go home with a letter thus sewed fast. Picture-books were a great rarity even when I was a girl. Our reading-books had only now and then a picture in them, and the geography had but a few in it. We had very few primers, and saved them carefully. Now the world is full of books, and pictures are found everywhere, and much

finer ones than they used to have. I hope you all love books and pictures, and love to learn all you can at school and at home.

It is very nice for children to have a writing-book called a diary, and write down something that happens each day. I kept a diary for many years when I was a girl, and once a year I read it all over. It is pleasant to read what we did last year, and two or three years ago. It learns you to read, spell, write, and also to compose—that is, to put your thoughts in good words so that they will be understood. A diary is a book made by yourself and full of your own words.

A little girl sits here by me reading a book. I have a pile of story and picture books that I keep on purpose for little girls and boys to read when they come here. And I always have puzzles and games to amuse them. I like to see children happy. I wish every little girl and boy was happy and good.

CLOVER.

HUMBLE and commonplace as clover is, we all love it for its usefulness and beauty. The botanical scientific name of clover is *Trifolium*, from *tri*, three, and *folium*, leaf—meaning three-leaved. Now and then you find a four-leaved clover, and this is called good luck, and you put it in your shoe. The old saying is that "you will marry the first person you meet" after so doing. Of course this is only a saying, yet a great many have a half-way belief in it.

There are many kinds of clover, but the red clover and white clover are most useful and most common. The red is called *Trifolium Pratense*, and is a native of England and of most parts of Europe, growing in meadows and pastures. It is perennial—that is, it will live more than two years. People in old times thought the clover leaf would keep off witches, and so they wore one as a charm. The leaves generally have a whitish horseshoe mark in the center, and the horseshoe has always been used as a witch charm. You know there are no witches and never were any; but when people believed in them they were just as much afraid as if they really existed.

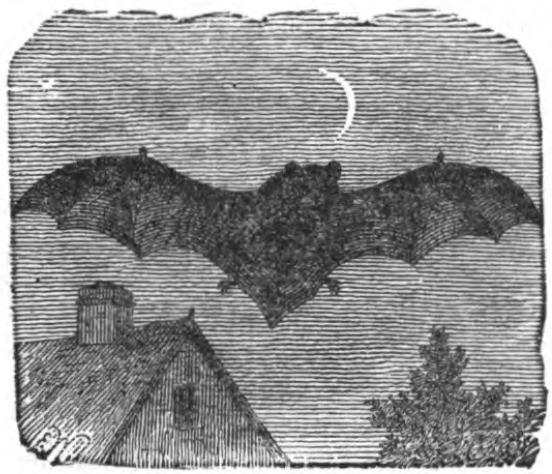
The red clover heads have honey in them, and children like to pull out the corolla and suck the sweet ends of the bloom; and bumble-bees also find the honey, while hive-bees cannot reach it. "As happy as pigs in clover" is an old saying. Who does not enjoy cutting an armful of blossoming red clover and feeding it to a favorite bossie?

The white or Dutch clover is also a native in most parts of Europe and America. Honey-bees delight in it, and white clover honey is the finest honey made. White clover makes good pasturage for stock, too, as it grows thick and short all over the ground, making fresh stems and blossoms all the growing season.

Clover restores old land to fertility, because its leaves gather carbonic acid and ammonia from the atmosphere, and store it up in their roots and stems. I think it will make a pretty ending to this lesson to give you Colonel Ingersoll's beautiful tribute to clover. Declining an invitation to a social dinner, once, he painted this beautiful word-picture:

"I regret that it is impossible for me to be in *clover* with you to-morrow. A wonderful thing is clover. It means honey and cream—that is to say, industry and contentment—that is to say, the happy bees in perfumed fields, and at the cottage gate old 'Boss,' the bountiful, serenely chewing satisfaction's

cud, in that blessed twilight pause that like a benediction falls between all toil and sleep. This clover makes me dream of happy hours—of childhood's rosy cheeks—of dimpled babes—of wholesome, loving wives—of honest men—of springs, and brooks, and violets, and all there is of stainless joy in peaceful human life. A wonderful word is clover! Drop the *c* and you have the happiest of mankind. Take away the *c* and *r* and you have left the only thing that makes a heaven of this dull and barren earth. After all, Bottom was right—'Good hay, sweet hay, hath no fellow.'"



WATER.

I spring from the rock, from the mountain side,
Sparkling, pure, and bright;
And I gather strength as I rapidly glide
From my birthplace into light.

Richness I bear to land and tree,
Beauty to hill and dale;
Beast and bird delight in me,
Drink, and are strong and hale.

Fresh are the flowers that deck my banks,
The sod is greenest there,
And the warbling winged ones sing their thanks,
As they drink of me everywhere.

The traveler on the burning sands,
The wanderer on the sea,
Gasping for water, clasp their hands
And wildly pray for me.

NOW stand watching a pure, crystal stream flow from the spring over to the river near my home. Out from the crevice in the rock, it runs through a little wooden spout and trickles over the cliffs and across the road-bed and loses itself in the grassy, weedy, flowering wilderness of greenness along the river bank below, tracing every step of its way with beautiful growths fresh from nature's own handiwork.

Water! What is it? We see it here, there, and everywhere, but do we ever realize, in all their fullness, its value and its universal blessedness? It is only two gases, only hydrogen and oxygen; two invisible substances chemically united into one and forming a clear, transparent liquid which we call water. And this fluid covers two-thirds of the surface of our earth, and enters into the formation of nearly everything around us, and even of ourselves, as there is in our bodies more water than any other substance. We use water for so many things that one could fill pages and not begin to name them all. We drink it, not only clear, but in the forms of tea and coffee and in numerous other ways. We bathe in it, swim in it, scour and clean our houses with it, run all machinery with it, cook with it, water plants and gardens and yards with it, and float ships, rafts, boats, etc., on it; and some build houses set on posts in it. Thousands make their living by fishing in the water, gathering out of it clams and oysters, and sponges, coral, etc.; and killing whales for their oil and whale-bones, and seals for their skins.

Water freezes when the temperature is below 32 degrees, and boils when it is at 212.

Water is said to be colorless, but it is of a deep ultramarine blue when seen in mass, as in the lakes

and rivers of Alpine countries and in the "deep blue ocean." It is hardly one hundred years since water was called one of the original elements, as people did not then know that water could be reduced into gases which can be weighed and measured and re-united into water again. Rain water, caught after it has rained long enough to wash the impurities out of the atmosphere, is the purest natural water we have, and then come spring water and well water.

Why is the sea water salt? has been asked. Well, we will suppose all the water of a place to run into a pond, some of it running from salt-beds, some from limestone rocks, and some from beds of iron and other ores. The water would carry into the pond some of all of these substances, and while the continual evaporation (drying up) of water would be going on, the salt, lime, iron, etc., would stay in the pond, so each day the pond would become more salty and more metallic. Well, the sea is only a big pond, and in it runs water from all sorts of ores, salt, etc., and thus the sea is not only salt but nauseous with many other substances. And each substance has its uses. Sponges use the silica; shells, coral, and sea weeds, the sulphuric acid; and marine shells and corals use the magnesia. Each uses what it needs of them and the rest remains in the water.

To tell you all the interesting things about this

beautiful and useful substance would take half a lifetime. Only when in extreme pangs for the want of this drink can we really appreciate the value of a glass of water. The poor wounded soldier on the battle-field implores a drink of water as the greatest boon earth can give; the fevered, gasping patient begs for water; and the starving, shipwrecked mariner, with his last cry, shrieks for a cool drink of fresh, pure water. Though all around him roll great waves of the deep blue sea, he well knows it is death to take the tempting fluid that wails and yawns for his dying body—though many, in the dire extremity of anguish, do drink, choosing death rather than the pangs of Tantalus. Tantalus was one of the old heathen gods who was doomed as a punishment to stand in water to his lips, but never so much as taste a drop of the precious, priceless fluid. The poet tells how he,

> Even in the circling floods, refreshment craves,
> And pines with thirst amid a sea of waves—
> Back from his lips the treacherous water flies.

Ages and ages ago the people of Rome believed in a god called Jupiter Pluvius. They picture him as an old man with arms stretched out and wings extended, and long hair and beard, and from these the rain was streaming in one wide sheet of water.

Whenever the Romans wanted rain, they would pray to this god to send it, and they would make presents to him and try to please him so he would send the rain, just as the Christians of to-day beg their God to send rain in a dry season; and I guess the rain came at the call of the Romans precisely as often as it does now at the call of the Christians; don't you think so? This grand old universe is governed by law. When the forces of nature are such as to send rain, it comes, and when they are not so, rain comes not. When the various combinations of clouds, winds, and electrical forces are right for tempests, floods, cyclones, water-spouts, and other aqueous (watery) destructions, they come, and whether we pray for them to forbear or not, it makes no difference. Law is sure, and all that can be done is to study the causes and guard ourselves and our property as well as we can from the effects. Amid all the horrors and desolations caused by water comes the gladdening thought that, in the whole, water is a beautiful and glorious blessing to humanity. So we will love the precious gift, and make the best and the most of it we can.

STONES.

FOR this lesson we will take stones. Probably you think there cannot be much said about a stone. But there are a great many kinds of stones, and some of them have long, hard, scientific names that make them seem very important. There are three classes of stone used for building purposes—siliceous, calcareous, and composite. Granite, sandstone, and slatestone are durable for building stone; calcareous stones are limestone, marble, etc.; composite stones that have neither silica or lime in them are unimportant. Then, there are artificial stones that men make out of burnt clay, called bricks, terra cotta, and cements. Millstones, grindstones, and whetstones are all simple stones, and very useful. Vases, statuary, crocks, etc., are often made of stone, and are called stoneware. Ancient nations used to erect pillars of stone, and carve on them the names of their kings and other things they wished to preserve the memory of. You have all heard of the big monolith or "Needle" that has lately been brought from Egypt and placed in Central Park, New York. It is a big stone nearly seventy feet high,

and is a lasting monument of the labor of men long ago moldered into dust. You have all seen gravestones and monuments in our "cities of the dead" (or graveyards). These are made of marble, and on them are carved the name, age, and date of birth and death of the deceased, and often some record of the principal events of his life, some great and good works he has done. Stones are used also for making good roads; they are hammered up into small bits, and then the travel on them grinds them into dust. Fences are built of stone, and called stone walls. Houses are roofed with slates, and stone floors are laid in many buildings. Long ago, when men were but little advanced in civilization, they used stone for making axes and tools of all kinds, and this was called the Stone Age. In museums you will find the stone implements that our forefathers used to make, and you can find pictures of them in Webster's big dictionary.

The most highly valued of all stones is the diamond. It is one of the hardest of all known substances—though only crystallized gas or carbon—and is generally clear like water. India has long been celebrated for its diamonds, especially those of Golconda; and they are also found in Borneo, Brazil, and other places, and even in our country in Georgia. Some diamonds are worth five hundred thousand

dollars. Only think of a little stone being worth money enough to buy up a town! Diamonds are worn in rings, pins, etc., as ornaments. They are also used for cutting glass; and some savage nations ascribed great medical virtue to water in which a diamond had been dipped, and others think a large diamond keeps luck in the family.

The coal that warms our houses, cooks our food, and runs our engines is only stone, and is made of pure carbon, just as the diamond is. The heat that is stored up in coal is pure sunshine that was gathered long ages ago, little by little, by the trees and plants from which the coal formed. Though coal is an ugly black stone, yet it is really far more useful to us than the bright and glorious diamond.

There are a great many precious stones besides the diamond. There is a stone of yellow jasper in the British Museum that is more than three thousand years old—that is, it is that long since it was made into a signet or seal for a great ruler called Amenophis II., whose name and horse are engraved upon it. There are stones called pearls, cornelians, agates, onyxes, rubies, etc.

Stones may well be said to have sermons in them, for one could talk all day about them and the half would not be told. I read only to-day of some stones called traveling stones. They are found in

Nevada and Australia, and if they are laid on a table two or three feet apart, they will all travel toward a common center, and lie there like eggs in a nest. Probably they are magnetic. You have all seen a loadstone and noticed how it will pick up needles, nails, and bits of iron. But I think I've told you enough about stones for once, and that hereafter the word "stone" will have more meanings for you than it ever had before.

ANIMALS AND VEGETABLES.

CHILDREN, did you ever try to define the difference between an animal and a vegetable? It is easy to tell a cow from a tree, or a man from a potato. But when you take some of the lower forms of life and compare them, you will not find so much difference. You will say an animal moves from place to place, while a vegetable or a plant does not. But there are animals that are rooted fast, and plants that move around. You say animals can feel, and have sensations, and plants cannot. But I have had boxes full of sensitive plants, and when the boxes were jarred,

the plants would shrink and fold up the tender stems and leaves as if hurt, and even the patter of rain upon them would make them droop and look dead. Poison will kill plants just as it will animals, and so will electricity. You say animals have mouths and stomachs, and can eat and digest food. Well, plants have mouths, too, one at the end of every tiny rootlet, and they suck in food with them. Then, there are plants that seize animals and digest them; a certain part of the plant acting like a stomach, even secreting gastric juice just as animals do. The Venus fly-trap and the *Drosera* catch insects and eat them—that is, they absorb and digest them. The insect lights on a leaf, which folds up and holds it till it dies, and then it is digested. A piece of raw meat will be eaten by these plants if it be placed on a sensitive leaf, and if the plant is fed with substances that do not agree with it, it will get sick just as we would. If you put a bit of wood, paper, or iron on the sensitive leaf, it will not be grasped by it, but it is often thrown off just as you would throw these things away if you were told to eat them.

The bladderwort is a water plant, and on its branches are found little hollow sacks or bladders with hairs around the mouth of them. Each bladder has a valve-like lid which opens inward, so that when little animalcules of any kind swim down into

these bladders the lid shuts up, and they are in prison, when the bladder absorbs them—eats them up for its food and the food of the whole plant.

You know that the thought of something you like very much will often make your mouth water, or a bit of something good placed on your tongue will do the same. Well, a bit of meat often makes the gastric juice start from one of these sensitive animal-eating leaves in the same way.

There is a fungus plant found in tan-pits which, when placed under certain conditions, will change into an animal that will move about and eat and digest solid food.

The sensitive leaf of the *Drosera* seems to have nerves just as persons have. Darwin tells us that by pricking a certain point in a leaf with a pin he can paralyze half of it—just as your limbs would be paralyzed if the nerves leading to them were cut or injured.

Plants that grow in the dark always grow toward any light that may be in sight of them. A little plant called *Lathea squamaria* once germinated at the bottom of a mine, and it extended itself 120 feet in its efforts to reach the light at the top. Yet the usual hight of this plant is only six inches. You have noticed that if you leave potatoes in a cellar a few months they will make sprouts several yards

long in trying to reach the door or window, while those in the garden will be but a foot or so in length.

The leaves of a plant are its lungs. Plants breathe from the under side of their leaves. The sap circulates all through the branches of a plant or tree, just as your blood does through the branching veins of your body.

Think about all these facts, and you will see that it is hard to tell where a line can be made to divide plants from animals. It is curious and interesting to know how many things plants do that are done by animals and persons also.

LITTLE LEAVES.

DID you ever think how much there was of real interest to be learned about leaves? You see only a leaf fluttering in the breeze; only a leaf floating down the rippling stream; only a leaf plucked from the baby's grassy grave on yon hill-side. But full of beauty, grace, and loveliness it is. Hold it up to the light and look through it; see the exquisite tracery of veins that cross it in all directions. These veins are full of sap, and this sap answers the same purpose

to leaf and plant that our blood does to us. It keeps it alive, fresh, and vigorous. The leaves of plants and trees are their lungs, by which they breathe, and they are kept clean and fresh by the wind and rain. Each leaf is a little different from each other leaf in the world, just as among a million of little girls and boys you can never find two who look precisely alike. You may not see the difference between two leaves taken from the same tree, but if they were greatly magnified you would see many little differences. Some farmers have a thousand sheep, and while you or I would see very little difference among them, the farmers know the face of every sheep, because they closely mark the little differences.

There are as many kinds of forms of leaves as there are different kinds of trees and plants. The color, too, changes, and the size, just as various nations of people differ in color and form. Some leaves are scattered irregularly over the stems, like those of the potato plant, and some are alternate, one leaf on one side of the stem and one a little higher up on the other side, and so on to the top like a pea vine. Some leaves grow opposite each other in pairs, and some grow around the stem in a whirl. Sometimes the leaf grows out of the ground, which manner of growing is scientifically called radical, from *radix*, root. Plantains grow this way.

The stem of the leaf is called a petiole. When a leaf is all in one piece, like an apple-tree leaf, it is called simple, but when it consists of several blades or leaflets all fastened to a branch, like a locust or rose leaf, it is called compound. Some leaves are net-veined—the veins make a net-work all over the leaf; in some they run parallel, and in others they are forked, as in ferns. Some leaves are nearly round, and are called orbicular, from *orb*. Some are egg-shaped, and called ovate, from *ova*, an egg. Some are lance-shaped—long and narrow; and some cordate—heart-shaped; and some are arrow-shaped, like sorrel, and some linear, like grass.

The edges of the leaves, too, greatly differ. Some are entire—that is, smooth on the edge; and some are dentate, toothed like a saw; and some are spinous and glossy; and others are covered with soft hair or down; while in the wonderful pitcher plant, which grows in India, the mid-vein of the leaf runs out like a tendril six or eight inches, and then swells out into a pitcher which holds half a pint of pure water. It has a leafy lid to keep the water from drying up.

In the autumn the leaves become ripe, and many of them turn to beautiful shades of red, yellow, and orange. It would be a pleasant pastime for you children to collect specimens of all the different

kinds of leaves you can find, and see how many peculiarities you can detect in them.

To learn to look at the wonders of nature with eyes that really see is of great benefit to us all. Then we never feel alone or lonely when there is even a blade of grass for us to look at and study. A single leaf is like a whole book to us.

THE NERVES.

(Facts from Dr. Hollick's "Nerves and the Nervous.")

CHILDREN, did you know each one of you was "a bundle of nerves?" Every part of your body is traversed by little white cords or threads called *nerves*, and these are connected with great masses of nervous matter called the nervous centers, of which the brain and spinal marrow are the principal ones.

The nervous cords convey this nervous sensation to all parts of the body, just as the wires of the telegraph carry electricity from one place to another. You could not move a limb or a finger, nor even open and shut your eyes, if it were not for these nerves.

You see, hear, taste, and smell all by nerves—by nervous power. If you cut off the nerve that leads from the eye to the brain, you could not see at all, for the impressions made upon your sight would not be registered in the brain. Sometimes the nerves of the spinal column are injured, and all the part of the body below the injury seems to be dead to feeling. You may chop off a toe, or the foot, or the whole leg, and not feel it at all. The telegraph wire, the nerve, does not carry the news of the hurt to the brain.

All your thoughts come through your nerves. If you see it rain or snow, your eyes are full of images of the falling drops or fleecy flakes, and the optic or eye nerves carry the impression to the brain and make you think about it.

If you touch fire, the nerves of the fingers carry the pain to the brain, and you *think* about the hurt, and think how careful you will be not to do it again. You may also think it would have been better if you had been formed so that fire would not hurt you. But if you had no nerves, you could not smell pleasant odors, or feel the soft winds, or the loving hands of your mother, or see any of the beautiful things of the world.

The nerves of the stomach tell your brain when

you have eaten or drunk enough. They warn you that if you overeat you will suffer.

A nerve or nervous cord is composed of a number of smaller cords, and each of these is made up of still smaller threads called nerve-fibers, and all these threads form one single cord, as the fibers of a rope make one single rope. Every one of these little fibers is a tube, and is filled with nervous matter—a thin, clear fluid—so that if you look at the tube through a magnifying glass it appears like a rod of glass. These tubes are so small that it takes from twelve thousand to eighteen thousand of them to make an inch in diameter.

If you stick a pin in your finger, it will penetrate one of these nerves, and the nerve will tell the brain, and then you will feel the hurt. If your finger were a great many miles long, it would take quite a while for you to feel the hurt, because the message would have to be carried to the brain before you could feel it, and it would have to pass along all the miles of nerve-cord first.

The nerves of a dead person or animal can be acted upon by certain substances. You can put salt on the legs of a frog that is killed and skinned and ready to cook, and notice how they will draw up and throb and flinch as if hurt; and the same can be done with eels and catfish. Or strike a chicken after

the head is off, and the chicken will jump as if hurt. But neither the salt nor the blow really hurts; for there is no sense of feeling after the head is cut off, because the nerves can no longer send a message to the brain. An electric current sent through a dead body will make it open the eyes and mouth, and move the limbs, and contract the heart.

If you stop the blood from going to the brain one moment, you will drop down as if dead. When one faints, it is because the heart does not send blood enough to the brain and spinal marrow.

Sometimes your foot or arm goes to sleep. It has been under pressure, so that the blood could not circulate in the small vessels that feed the nerves; and so, the nerves not being strong enough to carry a message to the brain, you can pinch or cut the limb while it is asleep, and you will not feel it till the blood gets in full circulation again.

Sometimes too much blood or too rapid circulation through the nervous centers causes sensation, emotion, and thought to be too acute, and this causes congestion of the brain, and delirium.

Impure blood will injure and destroy the nervous system. Breathing bad air or carbonic acid will cause this impurity of blood and injury to the nerves and brain. Good brains need good, pure air. A theater or school-room or lecture-hall needs good

ventilation, because you want your brains to work well in such places. Whenever you study or think, you want pure air, so as to make good, healthy blood.

Your sleeping-rooms must have good air, and you must never sleep with your head covered. If you do, you breathe the air over and over, and each time you breathe it, it gets fuller of carbonic acid and of the gas and insensible perspiration from your bodies. No bed should be made up till it is well shaken and well aired, for it is full of cast-off matter from the body, and this will be absorbed again if we do not clean the bed every day by airing it. All foul matter that we get into our bodies is apt to go into the blood and poison it, and thus injure the brain and the general health. Good food, pure air, and a healthy stomach will produce good brain and a clear mind.

It is good to be out-of-doors in the pure air, to smell the fresh ground and the scent of the woods and the fields and the flowers. Keep close to Nature's heart and you will be happy and wise.

I suppose you think the nerves never get tired. But they do, and must have rest and sleep, or they will wear out. At least, some of them get tired; though the nerves that act on the breathing apparatus never rest, for if we stop breathing we shall

die. The waste and repair of these nerves are equal, and therefore they need no rest. But the brain does need rest from five to nine hours out of twenty-four. You see, the brain is so busy and works so hard! With it you think your every thought. It tells you to make every motion of your hands, feet, eyes, tongue, teeth, or whatever you do. Every one of your thoughts uses up, burns up, a little of the brain matter. What you breathe and eat helps to create more brain matter, but it cannot create more as fast as you use it up, so by and by you grow exhausted and sleepy, and when you are sound asleep your brain rests.

If you dream, your brain is not asleep, and you are not resting it, and your body is not entirely well nor your mind in good condition. When sound asleep you never dream. You often think you dream all night, when in fact you only dream a few moments at a time through the night. You can dream things that would take years to happen, and yet be only dozing three minutes, the brain in dreaming can work so fast. Your dreams are hardly ever good or pleasant, because you do not dream when you are thoroughly well, for then your sleep is sound, but the dreams come of wrong feeling, of pain of mind or body, and consequently are not good dreams.

You need never put any faith in dreams as foretell-

ing the future. They are signs of nothing more than unrest. Your nerves are awake when they need sleep. You can stimulate your brain when it is sleepy, and make it work again, by taking strong tea or coffee or liquor. It will be as bright, active, and wide awake as if well rested. But this wears out and uses it up. It draws too heavily on the future. It is like whipping a tired horse. It puts new life in it for a time, but when it is ready to rest it is over-strained, and the rest will not come for a long, long time. It is better never to overdo if you can help it. A stimulant will do good now and then in an emergency. If you have to go through a great trial in a moment, a drink of tea, coffee, or liquor will give you the power to call upon reserve forces. If you had not strength to swim a river, and was compelled to swim or die, a stimulant that would just take you across would be useful; but is not fully enough, it would be worse than none. For a long, hard pull, you will do better to trust only in nature's own strength. This is why the great teachers are all advising that no alcoholic drink should be use. They say beer, wine, brandy, and all liquors are not food or strength, and we do not need them; that they are poisons, and only produce harm. Strong tea and coffee are the same.

There is so much to learn that we have to keep busy if we want to become wise and intelligent. But

it is such a pleasure to find out new facts that we are never tired of doing so. If we should live ten thousand years we should still find plenty of new things to learn. I hope that you all enjoy every new thought, and try to learn all you can.

The sensory nerve that goes inside the ear is called the auditory nerve, or the nerve of hearing. If it were not for this nerve we would all be deaf, and consequently dumb. Just think of a world where there was no hearing! We should be deprived of all sounds. We could not hear the singing of the birds, the rushing of the winds, the roaring and tumbling of the waves, or the gentle murmur of the breezes in the tree-tops. The sweet voices of those we love, the lowing of the cattle, the sounds of the busy machinery and the noisy world, would not exist for us, but all would seem to be as quiet as the grave. I have heard it said that when one is alone in a cave far under the ground, he almost goes insane at the awful stillness around him.

When people are excited or nervous, they often hear sounds and voices which have never been uttered.

Dying persons are very apt to have the last remnants of vitality concentrated in the special senses, and hence they see and hear in a morbid state, uncontrolled by judgment; so when you hear of a

dying person who sees ghosts or angels, and hears them speak, you must remember it is because of this fact. It is only diseased and dying imagination. It is only a waking dream or vision, and not reality. Sometimes, in cases of great excitement, thousands of people will all see the same illusion at the same time. So you see we cannot really depend on our eyes or ears. We hear things when there is really no sound. But we have to reason and think, and study up the laws of our being, and trust to our judgment.

The optic nerve is one of the most important nerves we have. We could not see at all if it were not for this nerve. It connects the eye with the nervous center, and conveys the impressions made on the eye to the brain, so we become conscious of them. No matter how clear and perfect the eye is, if the optic nerve is destroyed we will be blind.

We do not all see alike. Some persons can see farther than others; some are near-sighted, and some cannot see the difference between certain colors. These last are called color-blind. They see no difference between red and green, or between certain other colors.

You all should be very careful of your eyes. No one knows how terrible it is to be blind until sight is once gone. Those who are born blind do not fully

realize the loss of what they never had, though they know they suffer a great deprivation and miss something precious that others possess. When persons born blind are restored to sight, and they first see things, they do not know any person or thing by simply seeing it. They cannot tell a man from a tree, nor a house from a stone. They cannot tell a big thing from a small one, nor a thing a mile off from one close by them. They reach out for something a long way off just as readily as for something near by. All things look to them like a picture on a flat surface, and they think they can touch one thing as easily as another. They can tell an apple from a cat or basket only by touching it, and they can tell still quicker if they shut their eyes. All the little things about size, distance, color, shape, etc., that we learned when we were small children, they have to learn after sight is given to them.

ON THE SENSE OF SMELL.

CHILDREN, did you ever think why it is that you can smell? We are enabled to do this by the nerves. The nerve of smell is called the *olfactory* nerve. This word is from *olere*, to smell, and *facere*, to make; so it means "to make smell." The nerve makes or causes you to smell. It branches all over the inside of the nose, and into the air passage leading from the nose. In some persons this nerve is more sensitive than in others, and they can smell odors that others cannot. Some diseases will destroy the sense of smell. Many persons cannot taste or smell when they have a hard cold.

Animals are affected by certain smells. In a city a cat will smell catnip if it is steeping, and be so eager for it that it will go into strange houses after it. The smell of valerian will cause great excitement in a cat. Oil of rhodium will attract fish so that they are often caught by it.

Animals can smell things a great way off. The sense of smell seems far more keen in an animal than it is in a person.

The olfactory nerve may be so injured that we can smell but one thing. Everything will have that one smell. If the olfactory nerve is cut through so that there is no connection between its terminal fibers and the brain, there will be no sense of smell at all. It would be unfortunate to have this sense destroyed. We would miss all the sweet smells of garden, field, and woods; of fruits, herbs, and food. We would lose many a warning, too, as we often detect the presence of things that are unhealthful by the bad smell. We get warning of fire by smelling something that is burning.

Sometimes we would like our smell to be less keen. When we are compelled to be in a room with one who smells of tobacco or liquor it is very unpleasant. We should all of us try not to have anything about us the odor of which is disagreeable to others. Everyone has a right to smell clear, pure, wholesome air, so we should, each of us, respect that right by keeping ourselves from bad smells. If we eat any onions and others do not, we must keep our breath from them till the smell is gone. These little things are the graces of life. All children should learn them, and remember that the rights of others are sacred.

HEREDITY AND NATURAL SELECTION.

PERHAPS you children may not understand all this lesson, and I think you will get some ideas from it that will give you a place to start from, in thinking *why* many things are as they are.

The law we call "natural selection" always causes the strongest and best things to live and grow and increase.

If a plant has five hundred seeds, and they all drop down around the root of the mother plant, you know that there will not be soil or room enough for all the five hundred to grow and flourish in so small a place.

Nearly all the seeds may sprout, but some sprouts will be stronger than others and will crowd their roots down into the ground, pushing away all the weaker roots; then the tops of these strong sprouts will push up above the tops of the weak ones and absorb all the sun, moisture, and air, and starve out the weak ones. So, pretty soon, they will all die but the strongest. One by one the weaker ones will

drop, wither, and give up the struggle for existence. This is a good law, because if the whole five hundred seeds made five hundred plants, we should have only weak, sickly, useless vegetation.

The farmer allows only one or two stalks of corn to grow in a hill. If the whole of the corn from one ear was planted and left to grow in one spot, the stalks would crowd and push each other till nearly all would die, and even those which lived would be weak and worthless, because of the crowding and difficulty they would have to get sustenance.

This law is called "natural selection" because nature thus selects and saves the strongest specimens.

If a race of black bears were living near the North Pole, they would mix with the white ones, and they would be all shades and colors; but in a few years all the black and spotted ones would be gone. Not because they are not so strong as the white ones, but because the black ones could be seen plainer on the white snow by enemies. A man going to hunt the bears would see a spotted one or a black one much farther off than he could a white one, and so they would all be killed. This is why bears are all white at the North Pole.

Bugs, moths, butterflies, and all things that live on trees and plants are nearly the color of the plant they live upon. This is because all that are of different

colors are killed off by enemies. Bright-red or scarlet birds are very few, because they are so pretty and so easily seen that they become a mark for a hunter or for their other enemies.

I can mention only a few of these wonderful things, so as to set you to examining and thinking for yourselves. Here is a nice verbena plant. It looks withered and sick, and I begin to search for the reason; and lo! I peep through my spectacles, and find it is crowded full of little green *aphides* or plant lice. All the tender tips of the branches are so full of them that they fairly crowd each other, and every one is sucking the juice out of my poor plant, which has no defense against them. It has no hands to brush them off with, and all it can do is to work faithfully on, trying to make more juice so as to have enough for itself and the parasites. These little aphides are just as green as the plant, so that only by looking closely at them are they to be seen at all. If they had been red, yellow, or sky-blue, I would have seen and killed them long ago.

THE CAMEL.

THE camel is not a pretty animal, but it is a very useful one in some countries. We have camels here only in managerie, just for show. But the camel is used in Asia and Africa to carry burdens and to ride upon. It belongs to the genus *Camelus*, and is of the order *Ruminantia;* that is, cud-chewing. The camel has no horns, and the hoofs are small and situated at the end of the toes, the weight of the animal resting on cushion-like soles behind the hoofs. Only two species of the camel exist. The Arabian camel, or dromedary, is the more useful. It is used in the deserts of Arabia, Persia, Hindostan, Africa, and China. The camel is now nowhere found in a wild or natural state, but is always a patient drudge for man. The flesh of a young camel is as delicate as veal; the milk of a camel is plentiful and nourishing, and when fermented it produces a kind of liquor. The skin is useful, and so is the hair, which is a soft wool, and even the manure is used as fuel and as litter to bed horses.

The camel is called "the ship of the desert." It will carry fifteen hundred pounds. Very little food

is taken along for camels; a few beans, dates, or carob pods is all they receive after marching a whole day. They move slowly but steadily along about two and a half miles an hour.

Some of the fleet dromedaries will carry a man one hundred miles in a day. The gait of a camel is peculiar, and disagreeably jolts a rider who is not accustomed to it, as both feet on the same side are successively raised, so that one side is thrown forward and then the other.

A camel has but one young at a time, and it lives thirty or forty years. A camel will often make a pitiful cry when a heavy load is put on its back; and when it finds it makes no impression on the driver by its sorrowful plaint, it will point its hairy nose upward and howl its wrongs to the skies, and look, oh! so ludicrous, as its upper lip curls back from its teeth and the under lip drops down, and the great mouth opens so wide one can see half a yard down his throat, while out of the cavern thus revealed, comes a series of the most astonishing howls that ever startled the air—howls of such abject misery that one would fancy its heart was breaking, as the tears flow down the elongated cheeks and drop from the end of the nose. But in spite of the protests he makes, he obediently rises at the command of his driver, and, contentedly chewing his cud, is ready for a week's

march. The hump of the camel is a store of fat on which it can live for a long time if deprived of food. After the hump is exhausted by famine, the camel must have three or four months of rest and plenty of food to restore it. The backbone of the camel is as straight as that of the horse or cow, and does not go up in the hump.

It is said that the camel has a fifth stomach composed of hollow spaces, which he fills with water sufficient to supply him for some days. He can cast this water out of each space separately as he needs it. When Arabs are near dying of thirst, they will kill some of the camels of the caravan so as to get the water that is in this stomach. Young, sucking camels have no hump. If a camel is overloaded, he will not rise till part of it is taken off.

Sometimes a camel gets angry and tries to bite its rider by bending its long neck around towards him. The driver would be killed by it if he should alight then, and if he strikes the animal it only add to its fury. All he can do is to be patient, and pet the camel till it is appeased. When fighting one another, camels will nip out pieces of flesh, strike each other with their heads, entwine their necks, wrestle with their forelegs, and act almost human.

The sight and smell of the camel are very acute, and they will discern water at a long distance. Water

is the great need of man and beast when traveling in the desert, and it is a valuable quality in the camel to be able to discern it afar off. Fine camel's-hair is used to make brushes for painters, and also for making shawls. The coarse hair is woven into coarse fabrics.

THE FROG.

THOUGH not a lovely animal, the frog is quite interesting when we learn all about it. It is amphibious; that is, it lives in the water and on the land. It belongs to the genus *Batrachia*. When grown, it has four legs and no tail, and the feet are webbed like those of a goose or duck. It has a large mouth, with small teeth in the upper jaw, and some in the middle of the palate. When a frog is young it is called a tadpole, and has gills like a fish, only they are on the outside of the neck, and look like little fringes. The tadpole has no legs, and has a tail and a horny peak which fall off when it changes into a frog. The hind legs grow first, then the fore legs, then the tail is absorbed, and finally the fish is a frog and hops out of the water. The frog can remain in the water a

long time, but prefers moist places on the land. Frogs have large and pretty eyes, and are better looking than toads. They do not crawl like toads, but jump.

The grunting frog of the West Indies is six or eight inches long, and will jump over a five-foot wall. It makes very good eating. We eat frogs here in Snowville, and find the flesh white, sweet, and very good. Frogs eat insects, bugs, and dead animals that they find in the water. In South Africa a tribe of savages believe frogs fall from the sky, because after a thunder-shower the pools are suddenly filled with them; they had been hidden at the roots of bushes, and when it rained they came out and leaped into the water, thus seeming to have fallen from the clouds.

In the Bible we read of the fabled plague of frogs which the old Jew-god sent on the land of Egypt, because the king (Pharaoh) would not set his slaves free; though this seems unreasonable, since God, we are told, had purposely hardened his heart so that he would not let them go. The frogs, says the fable, came up out of the river, and went into the houses and bed-chambers, and ovens and dough-trays, and covered all the land and all the people. This made the old king promise to let the slaves go, and so the Lord made the frogs all die only those in the river,

and the people had a terrible time gathering up the dead batrachians, and the whole land smelled awfully of the stench they made. But all did not do, for the king broke his promise and did not let the slaves go, as the Lord again hardened his heart. If you want to read this fable (for no child who has been educated rightly will believe that this frog story ever really happened), turn to your Bible in Exodus, chap. viii, and you will find out all about it. In the original Hebrew of this Exodus story, it says "The frog," implying that it was only one frog so big that it covered all the land. One preacher thought that it was one big mother frog that had young ones enough to fill the land. Another said she croaked so loud that she called all the other frogs into Egypt. Rabba, the son of Chanua, said that he himself once saw a frog that, though not so large as this Egyptian frog, was as large as Acra, a village of sixty houses! What a big croaking such a frog could make! All frogs have loud voices, the males croaking the loudest. American frogs croak louder than British ones. There is, in Rio Janeiro, a frog called the Blacksmith, which croaks with a noise like the hammer striking an anvil. In Peru there is one called the Sugar-miller, because it has a grating voice like the sound of a sugar mill. In colder climates frogs bury themselves and sleep away the

winter. Æsop has several pretty fables about frogs —one where a frog wanted to set himself up to be a doctor, and a fox said to him: "How can you be so impudent, you lantern-jawed, pole-phizzed, blotched, spotted-bodied animal, to pretend to cure others?" "Physician, heal thyself," is an old saying. An ox, once, while grazing in a meadow, stepped on a young frog and killed it, and the others told the mother-frog of it when she came home, and informed her that it was the largest creature they ever saw. "Was it so big?" asked the old frog, swelling her speckled body out. "A vast deal bigger than that," said they. "So big?" said the mamma-frog, swelling still more. "Indeed, if you were to burst yourself, you would never be so big," said they. But in her pride she swelled still more, and did burst. This fable means that people should not try to be bigger than they are, or live in too much style because their neighbors are finer than *they* are able to be. Another fable tells that the frogs once wanted a king, and prayed to Jupiter (the name of the god of that land) to send them a king who would teach them morals and honesty. Jupiter laughed at the silly request, and threw them down a log. The splash it made scared them at first, but seeing it did not stir, they drew near it, and finally leaped upon it and grew so familiar with it that they despised it, and prayed

Jupiter to send them another, and this time he sent a stork, who commenced eating them up. Then they prayed a third time for another, or that they might have no king, as at first. But it was now too late, and the stork always eats frogs when he can get them. This fable was to show people that it was better to enjoy the good they had than to ask for things they did not understand the nature of.

THE COW.

Cusha, cow bonnie, let down your milk,
And you shall have a gown of silk;
A gown of silk and a silver tea (bell),
If you'll let down your milk for me.

I THINK these rhymes from Mother Goose must be familiar to you all, yet you will feel the charm of them as you read them over again and think of the quiet, gentle bossy of your own homes. I cannot remember the first cow I ever milked, though I mind well when father would strip them out after me for fear I had not milked them dry. I used always to name my pet cow "Fannie," after dear, good Fannie Wright,

the first Liberal woman I ever learned to know and love, though I never saw her, only having read her writings and seen her picture.

The cow belongs to the *Bovine* genus, and in old times all cows were called oxen. In our oldest histories, away back to the time of Moses, we read of droves of fat oxen, and of milk and cheese.

The ox is used in place of a horse for plowing and hauling, and is also used for beef. In some countries cows are used for the same purpose. But the principal use of cows is for the milk, and the butter and cheese made from it. It is said that a good garden and a good cow will half support a family. The cow is mild, sober, thoughtful looking animal, and she grows very fond of her owner if well fed, well cared for, and kindly used and petted. We seldom see a country view pictured, but one or two fat, sleek, meek-looking cows grace the scene, and in most old-time pictures you would see the milk-maid milking on the wrong side of the cow! Poets love to speak of the cow. Emerson says:

> **The heifer that lows in the upland farm,**
> **Far heard, lows not thine ear to charm.**

But our cow generally foraged for a living through half the year, and I know I was always "charmed" to hear her, on her return home, call as she would

stop at the gate, and give a solitary "Moo," as much as to say, "I'm here ready to be fed and milked;" for it is not a pleasant task to wander off around the country for miles hunting a cow, and often hunting in vain.

In nearly all small villages many of the cows run through the streets, and if they don't come home one must go to look them up. Street cows become very wise in many wondrous ways. They learn to lay down fences, unhook gates, unbutton doors, unlatch latches, and jump high palings. Many of them will even go into a house and eat out of a meal sack if they can find one.

The cow generally has but one calf at a time, though sometimes she has twins, and even triplets. A cow is called old at ten and twelve years, and her milk is not so rich or so plentiful as when she is young; so she is fattened and made into beef. A cow has no upper teeth in front, but she crops the grass, and will mow a swath through rich clover in a short time.

You have all read the parable of the cow that gave a good pail of milk and then kicked it all over. There are many kicking cows, but, generally, if a cow is gently reared and kindly handled, she will never kick unless you hurt or frighten her in milking. In a herd of cows one of them is generally

master, and makes all the rest stand back. I have been really tried when I have gone after the cows, let down the bars, and gathered them all in a bunch, to have the old boss cow get in the gap and stand there, looking back defiantly at the rest, not one of whom dared pass or push by her.

Most of the cows here are fed on corn-fodder during the winter; they hardly know what hay is, and often refuse to eat it, even when half starved. There is a saying, "Offer a thorough-bred Virginia cow hay, and she will laugh in your face; but rattle the husks or shucks, and she knows you to be her friend." The cow seems almost one of the family, and is often the most precious possession of the poor man. The poet Benton writes of the cow in these words:

> But moveth not that wise and ancient cow,
> Who chews her juicy cud so languid now
> Beneath her favorite tree, whose drooping bough
> Lulls all but inward vision fast asleep;
> But still, her tireless tail a pendulum sweep
> Mysterious clock-work guides, and some hid pulley
> Her drowsy cud each moment raises duly.

DOLLS.

ALL little girls are supposed to love dolls, and to want one or more of these little pets for their very own. Boys would love them almost, if not quite, as well as girls do, if it were only customary and fashionable for them to do so. The father's instinct or feeling is probably as strong as that of the mother, by nature, but as we all love most that which we take care of, and have with us the most, the mother, as a general thing, loves a child more strongly and intensely than the father does; and, should it die, misses and grieves for it more.

What is a doll? It is an image of a baby, or a child, or even a grown person. It is so called from the old name *Dorothy*, or from *Idol*. Dolls were quite rare when I was a child. Few poor people could afford to buy them for their children, and so my dolls were usually rag babies; that is, made of cloth, and home-made. We made them ourselves, and perhaps loved them none the less on that account.

The French name of doll is *Poupic;* in German it is *Puppe;* from Latin, *Pupa*, a girl. While little girls, in rich homes in enlightened countries, have costly dolls, dressed in expensive silks and laces,

and adorned sometimes with bracelets and necklaces of real gold, and even diamonds shine resplendent from their ears or breastpins, in the home of the wild Eskimo or African the little girls' dolls are made of wood or bone, which is rudely carved in the shape of a baby; or a simple stick wrapped in a rag does for a doll. I've seen children in our own land have dolls as rude as these. Imagination makes them just as precious as wax dolls would be to their little owners. Just think a thing is nice, and to you it is nice.

Girls will talk to their dolls just as grown people do to real children. If you listen to a group of children when they are together with their dolls, you can generally tell how the mothers talk to their children. One child will say, "Now, you just behave, or I'll break every bone in your body;" or, "I'll skin you alive if you do that again." Another will say, "Mamma is so sorry her little girl has been naughty;" or, "Mamma can't love a bad little girl." Another says, "Get away out from under my feet; I do wish you'd go off out doors and not come back to-day." Now, you can see the mother in each child's talk. Some girls will play visit, and mimic society ways. "Oh, there comes that old gossip, Sal Brown! I do wish she would never darken my doors again;" and when the visitor enters, it will be,

"O my dear Sally! I'm so glad you came to-day. I'm just dying to hear all the news. I'm so confined at home I'd never know a thing that is going on if you didn't tell me." So, you see, playing with dolls is only imitating real mothers with real children.

Girls learn to sew, and cut and fit dresses, too, by playing with dolls. I have taught some of my nieces to become good seamstresses by showing them how big stitches and bad work on their dolls' dresses made the most beautiful material look repulsive and deformed.

Improvements in making dolls are all the time going on. Dolls are made now that are called indestructible; that is, they cannot be destroyed. But it really means they will bear the rough ways of a small child who lets them fall, or uses them as a club to strike with. Of course, children should never strike one another unless they can find no other way of self-defense. To strike or hurt another is very wrong, as it is to hurt anything when it can be avoided.

Dolls are made to wink the eyes, to cry, to walk, to sing, and to creep. All this is done by machinery inside of them, and yet so naturally is it done that it would deceive almost any one into thinking it was a real live baby. Some dolls will say "Papa" and "Mamma" as naturally as can be. Queen Victoria

has blue eyes, and so, since she became queen of England, dolls there usually have blue eyes in compliment to her. In Spain they have black, Spanish eyes. Negro dolls are sometimes made for colored children, though I notice these children prefer white ones, just as the black parents prefer pictures of white people to hang up in their houses. We all like to imitate those we think better and higher than we are, and so the blacks, being an inferior race, look up to and imitate white people.

The different parts of dolls are often made in several different places. One firm follows the trade of making dolls' heads; another the legs and arms; another sews the parts together; another stuffs them; another makes the wigs or hair; another dresses them, and another makes the eyes. One glass manufacturer once received an order for several thousand dollars' worth of glass doll-eyes at one time. How funny this great heap of eyes would look staring at you!

I hope you will all study about dolls, and learn all you can concerning them. No boy who thinks of all the time and money spent in doll-making, and how happy his little sisters and girl-friends are playing with dolls, will ever despise a doll again.

Long, long ago, during the great Rebellion, or the war of one part of our country against the other, Mr.

Slenker was in the army, and I took my two children and went home to my father's. I had a little girl named Lillian. She was four years old, and had never had a real doll. She wanted one very much, and I longed to buy her one; but I had to be very saving of money, and so I put it off and made her rag babies. But at last I determined she should have a cheap doll. But, alas! before I could send to town for one, my little Lillie took the croup and died. To-day I would give a great deal if I could take back the past and have the joy of knowing my dead baby had owned the long-wished-for doll. But none of us can read the future. All we can do is to do the best we can to-day—to make life happy and pleasant for all around us. Parents cannot buy their children all they want, nor is it best they should have all they want. The more rare a pleasure is the more is it usually appreciated or prized.

GRASS.

WALT WHITMAN, the great poet, writes:

A child says, What is grass?
Fetching it to me with full hands;
How could I answer the child? I do not know myself.

But we will learn all we can of this beautiful green covering of the earth, even if we cannot know *all* about it. Grass is so called from a Greek word meaning to gnaw or eat, because so many animals eat grass, gnawing it from the ground. I suppose many of you children will be surprised to learn that bread, sugar, rice, paper, ropes, glass, etc., can all be made from grasses, and so can many other things. The grass you see covering your yards and meadows is one kind of grass. There are more than four thousand different species of grass. Some of them grow in nearly all parts of the world, from the regions of torrid heat to those of perpetual snow, though they are more abundant in the northern temperate zones. Some kinds grow only in swamps and marshes, and some only on the sea shore. Each seems to have its favorite locality where it best loves to grow.

Wheat is grass, and so is our corn and rye. Rice

is also a kind of grass, and there are more people who eat rice than there are who eat wheat flour. Nearly all the people of India and China live mainly on rice. Italy, Spain, and South Carolina all grow rice. South Carolina rice is perhaps the best in the world.

Maize or Indian corn is called the largest fruit of all grasses. Corn is a kind of grass. Sugar-cane is another species of grass. The seed or fruit is not used, but the juice or sap is made into sugar or molasses. It is said to be ripe enough to cut when the rats begin to gnaw it. Where it grows wild it is eaten by all the people, or the juice sucked from it; even the babies love to suck the sweet sap from cane-stalks.

Oats is another grass that is much cultivated. I once thought that only horses and other animals and poultry ate oats, but I learned that Scotch people ate a great deal of oatmeal porridge, and it made them strong and healthy. Of late years oatmeal is very fashionable in this country; a love for the taste of it has to be learned, just as you learn to like sardines, tomatoes, or tobacco; only I hope none of you children will ever learn to like tobacco, or will plant it, or sell it, or touch it in any way save as an *insectia.*

I suppose you may all have eaten rye-bread, and

perhaps drank coffee made of rye browned and ground. The people of Europe eat a great deal of rye-bread.

You can tell grass plants from others by their split sheaths; they are thin, leafy tubes, and the stem is inside of them, and the leaves are like ribbons and run to a point. The stems are hollow and have joints.

Ale and beer are made from the grass called barley, and these are made into whisky, which is a bad use to make of any kind of food.

Straw is stems of grain or grass. All straw hats are made of plaited or braided straw, so they are grass hats. There is a kind of grass grows in jungles called "dale-grass," some of which is fourteen feet high and as thick at the root as a man's finger. Elephants, lions, and tigers hide in it.

There is a grass called "ponic grass," which is fifty feet high, and not as large as a pen-holder. It cannot stand alone, and so climbs up trees. The "giant bamboo" is the tallest of all grasses. It is a species of cane. The bamboo is not valued for food, but the young shoots of some species are cooked and eaten like asparagus. Bamboo is used for hundreds of purposes. It is a native grass plant of India. The frameworks of houses are made there of bamboo, and floors are made of its stems, four

and five inches in diameter, laid close together,and laths of split bamboo about an inch wide are bound down on them by filaments of rattan cane. They make water troughs of bamboo canes, and ladders, bows, arrows, masts of vessels, poles, etc. Out of the blades, or leaves, paper is made, and even cloth is woven of the fibers.

But of all the grasses there is none more beautiful than the tiny blades of green that carpet the earth around our homes. The grass we see every day and trample under foot, how glad we are to see it coming leaf by leaf from the dried and crisp stalks of last year, when early spring wakes it from its winter's rest and sleep. I hope you will love the grass, and try and learn more and more about each of every kind of it.

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