THE STORY OF A LIVING TEMPLE

by

FREDERICK M ROSSITER
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The Story of a Living Temple

A Study of the Human Body

BY

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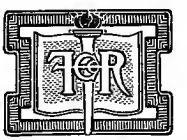

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TO
HENRY AND MARGARET.

PREFACE

This book was suggested by experience both in teaching and in professional work. Its plain object, bare of figures of speech, is to arouse in the young a deeper interest in the study of the human body. As a physician called to see both young and old, I have long been convinced that "people are destroyed for lack of knowledge." They lack a practical knowledge of the physical basis of health and happiness and morality. As a teacher I have found that when presented as here outlined, the study of the human body becomes not only interesting, but fascinating. The young mind can easily be led to regard the human building as a masterpiece of creation, a beautiful structure, worthy of the most profound admiration. In addition to this, every young person who once comes to a clear perception of the true relation of body to mind and mind to body, must ever after hold his health as sacred as his character.

It is my desire to help you who read these words, and everybody else to think of the body as a rare and wonderful building, to lead you to study it and to see the vital relations between your care of it and your whole success in life.

To regard the body as a temple is not vital, but to see the bearing of practical physiology and hygiene upon yourself as an individual is of the greatest importance.

Although the analogy has been followed throughout the book, special care has been taken to adhere to scientific truth in every particular as well as to omit no important fact of physiology or hygiene.

Since the name of Mary Henry Rossiter appears upon the title page as joint author, it is necessary to state in order to explain the later use of the singular pronoun, that the conception, the plan, and the first writing of the manuscript were entirely my own. When the book was finished the critic and editor took it in hand. Her work was so thorough and she infused so much of her own personality and enthusiasm into the undertaking that it became in part her own. The

last chapter was her suggestion and was entirely written by her except the description of the face.

I am also greatly indebted to Professor Winfield S. Hall, Ph. D., M. D., Professor of Physiology, Northwestern University Medical School, Chicago, for carefully reading the manuscript, and for many valuable suggestions.

F. M. R.

Evanston, Ill., June, 1902.

Health is simply nature's music,
Sweet diapason without flaw,
Chorus of happiness eternal,
Full harmony of life with law.

M. H. R.

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THE STORY OF A LIVING TEMPLE

[I.]

Your Body a Temple.

This is the story of a building. It is the most wonderful building ever built. The best part of the story is that every word is true. The strangest part is that the building is alive.

Perhaps you have seen a house or a church being moved on rollers from one place to another. The building I shall tell you about does not need rollers or wheels to move it. It can go wherever the person who lives in it wishes it to go. It can do this because it is alive.

Would you like to see this building, or one of these buildings, for there are just as

many such buildings as there are people in the world?

Just look into the looking glass. Or look at your father, your mother, your brothers and sisters. Yes, every human being is a building, a live building, a building that can move and see and talk, a building that is full of strange and beautiful and mysterious rooms.

This building, the body, is not a house. It is a far grander and more important building than that. It is grander even than a church. It is a temple.

A temple is a special place where God is to be worshipped.

The most famous temple of olden times was Solomon's temple. Solomon's temple was built of gold and silver and precious stones, of cedar and fir and other costly woods. An army of men spent seven years in building it. It is still celebrated as the most perfect structure ever erected by human hands. But far more beautiful, far more delicate, far more curious in workmanship are the walls, the doors, the windows, the pillars, all the living and marvelous parts of

every human body temple. Although it takes a lifetime to build the temple of the body it may at every stage be perfect and complete.

Solomon's temple is considered a wonder because "there was neither hammer nor ax nor any tool of iron heard in the house while it was in building." But the temple of your body is a thousand times more wonderful than that. Think how you grow, from a little baby that can not walk or talk or help itself, to be a strong, active boy or girl and by and by to be a man like your father or a woman taller than your mother.

There are no hammers heard in building you. Growing, the human temple is building. God is the Architect and Builder that builds you from a baby to a man. You are the Architect's assistant. If you wish to grow into a fine, strong man or woman you must help the Architect. Even the divine Architect can not carry out His plan for a perfect temple unless you work with Him.

Men were told long ago that the body is a temple. Paul said to the people of Corinth,

"Know ye not that ye are the temple of God, and that the Spirit of God dwelleth in you? If any man defile the temple of God, him shall God destroy; for the temple of God is holy, which temple ye are."

As you look into a temple or a church from the doorway, is it the thought that God is in the temple or the church that fills you with awe? As you step inside, is it the feeling that you have entered the presence of God that makes you walk on tip toe and speak in whispers?

Listen.

God is in the church because you are in it. You brought Him there when you entered it and when you depart you will take Him away. You can not shut God into the church and leave Him there. He has chosen your body as His temple and so long as you live He lives within you.

The man who swears or smokes in a church is profaning his body, not the church. He is defiling the living human temple, not a cold, dead pile of stone. He defiles the temple just the same whether he smokes in a church or in a barn.

Your Body a Temple

What does it mean to defile the temple of the body? To defile is to make dirty or unclean. You defile the outside of your body when you daub it with mud or filth. You defile the inside of your body when you eat things or drink things or do things that make you sick or weak.

One of the Kings of Israel, after King Solomon, was a wicked man and defiled the temple. Because of this a terrible disease came upon him and he had it all his life. Whenever you and whenever I defile the sacred temple of the body, disease and weakness and sometimes death are sure to come upon us. But if we remember that our bodies are temples and if we do our best to treat them as temples, we shall have health and strength, and our bodies will grow more and more beautiful and perfect.

[II.]

The Wonders of the Temple.

People often travel thousands of miles to visit a cathedral or some magnificent building of stone or marble. If Solomon's temple were still standing everybody that heard of it would wish to see it. If you could not see it you would read about it.

But this wondrous temple of the body, this temple that was built by God himself at the very beginning of the world, this temple that has stood the storms and changes of thousands of years, that is still as beautiful and complete as when it first left the great Architect's hands,—nobody thinks very much about.

We are shocked when men break into a church and rob the altars or the treasury. We think such men are worse than common thieves. They are as bad as bad can be. But every day we see men robbing their

bodies of health, the most sacred treasure of the temple, and yet we do not call them thieves. Why is this? It is surely a greater crime to steal from the living temple things that can never be replaced than it is to rob vaults of gold and silver.

We do not think enough about our bodies. We do not know how wonderful they are. The few great men who have studied them have been deeply influenced by what they learned. The psalmist exclaimed, "I will praise Thee; for I am fearfully and wonderfully made; marvelous are Thy works, and that my soul knoweth right well."

No one can study the body without feeling as David felt.

We almost worship the mind that could invent a steam engine. We are never tired of watching a big locomotive, its giant wheels, its fierce headlight, its great black throbbing body. But within your own body is a more wonderful engine than any made by man. It is your heart. If you put your ear over another person's heart you can hear it beating, beating. Sometimes you can hear your own heart beating. Swiftly, steadily,

quietly, this perfect little engine is working every moment to keep you alive and well. It never stops. Ever since you were born it has been running without ceasing. The heart is an engine that does its work without coal or steam. It is only one of a million machines invented long ago by the great Creator. It is only one of a thousand wonders in the living temple of the body.

Just think, with your eye you can look at once from a star, millions of miles away, to a marble in your hand. No telescope can be so quickly adjusted as that. With your ear you can hear a cannon shot twenty miles distant and with the same ear you can hear a pin strike the floor at your side. You think the phonograph a great invention, but what are the rough metallic sounds it can make to the songs and shouts and merry laughter of your own voice.

If once you become interested in this story, this true story of a living temple, a building that can move and see and talk, that is full of strange and mysterious rooms, those other stories that you may have read, stories that

are neither true nor good, will seem very dull and common place.

If once you become interested in this story, when you throw a ball or ride a wheel you will think how it is that you *can* throw the ball or ride the wheel. You will study the machinery that gives you the power to run and jump. When you ask your mother to "feel your muscle" you will be able to tell her all about that muscle, what it is made of, how it works, how you make it grow and how you keep it strong.

If a house is building in your neighborhood you like to watch the workmen putting up the frame, filling in the walls, making partitions and finally finishing the windows and painting the outside. Houses, however, are not built in your neighborhood every day. But from the very moment you read these words, if you will, until you are a grown man or woman, you can watch nature building your body temple. You can learn about the frame, the living walls, the curious partitions, the windows, the doors, and a hundred other parts more interesting and more beautiful than those of any other building.

You can watch nature and you can help. Indeed, whether you wish to or not and whether you know it or not you are either helping or hindering all the time. Every mouthful you eat, every breath you draw, every movement you make, every thought you think, every feeling you have, is either building or tearing down the living temple.

The more you know about this temple, the more you can help. The more you learn about it the better you will understand how the very smallest habits have their influence in building it. You will understand how habits may be formed and how other habits may be changed so as to make the temple grow more beautiful.

Before you have studied the body long you will not need any one to tell you that the living temple in which you live is the greatest work of God. You will see that the divine Architect has a perfect plan for a perfect temple, and that it depends upon you whether this plan is carried out or not.

[III.]

The Outside of the Temple.

The first thing we see when we look at one of these body temples is its color. We do not often think that this is the first thing we see, because most of the people we know have a color like our own. But if we happen to meet a negro, an Indian, a Chinaman, his color is the first thing we notice.

The color of the body, whether it be black or white, dark or fair, clear or muddy, depends upon the skin.

The walls of other temples are made of stone or marble. But the wall of the body is this living wall of skin. Just the story of the skin alone is stranger and more fascinating than a fairy tale.

Notice that the skin fits the body like a garment—no, much better than a garment. It is not kind to nature to say your skin fits like clothes. There never lived a tailor who

could make clothes fit as well as the skin does. Is there a gap here and there between your skin and your body? Does your skin feel tight in one place and loose in another? Can you feel your skin at all in the way that you feel clothes?

No, of course not. This is because nature and not a dressmaker made your skin and because nature intended in the beginning that the skin should take the place of clothes.

The first men and women did not wear clothes. The skin was their only garment. The natives of many very warm countries to-day wear only a band of cloth or of woven grass about the waist. Such people almost always have a beautiful and healthy skin. Everybody would be healthier if his skin were not covered, if the sun could shine directly upon it, and if the pure, fresh air were not shut away from it. The skin of your face always looks better and can endure more exposure than that of any other part of the body. This is because it is not covered.

The skin is not only a more beautiful garment than any man could make, but it is also a more durable one.

Did you ever wonder why the skin on your feet was not worn out after you had run barefooted all summer? Why, on the contrary, it was thicker and tougher than when you took off your shoes in the spring? The shoes you had worn all winter were thin and there were holes in them.

Clothes wear out, but the skin does not. This is because the skin is alive. It is growing all the time and replacing what is worn away. If one part of the skin is used more than another part it becomes thicker and harder.

It was considered remarkable that while the children of Israel were wandering in the wilderness forty years, during all this time their clothes did not wear out, not even their shoes. Moses called their attention to this. He said, "Your clothes are not waxen old upon you, and thy shoe is not waxen old upon thy foot." Nobody, however, calls our attention to the fact that the skin does not wear out.

Although we live to be seventy or eighty years old or even one hundred, we wear the same skin that God gave us when we were

babies. That is, in one way it is the same skin, and in another way it is a new skin. It has the same color and general appearance and we have never changed it as we change a garment. But nature has been changing it all the time through all the years. While we have been asleep, even while we have been awake and working, nature has been mending the worn out places and making them new.

Rub your hand over your cheek, or over the skin on your arm. How soft and smooth it is, almost like velvet. Pick up a little skin between your fingers. You notice that it stretches like rubber. It is elastic. As soon as you let go it springs back. When you crook your finger or shut your hand or bend your arm the skin does not crack or break. When you straighten your finger or open your hand the skin does not fall into folds or creases. The skin of the hand is really a glove. It does not crack or break or form in creases because it is a living glove and not made of the dead skin of some other animal.

Look at the skin through a magnifying glass, as a botany glass or a sun glass. You will see that it is covered all over with very

dry or oily scales. These scales, many millions in number, have finished their work in the body and are now dead and ready to be carried away.

Once I saw a little girl who had a disease of the skin that almost covered her body. Her skin scaled off so badly that during twenty-four hours she could gather a large handful of the dead scales. One reason why you should take a bath every day, whether you feel like it or not, is to help clear off these scales.

The skin in general is about one-eighth of an inch thick. On the palms of the hands and on the back it is thicker. Like most garments it is made of two layers, the outside and the lining. The outside skin is very thin and can be separated from the deeper layer. When you fall down and as you say "rub the skin off" it is merely the outside layer that you rub off. It is not so easy to rub off the true skin.

You know how a blister feels. The skin is puffed up and tight. If you prick the blister the skin falls down in a thick wrinkle. This thick wrinkle is the outside skin and has

no feeling. Its life is gone. But if you take the dead skin off, you find at once that the place under it is red and smarts. This second part is the second layer and is called the true skin. The blister was made by water which collected between the true skin, which is called the dermis, and the outside skin, which is called the epidermis.

Now look at the true skin through your magnifying glass. Do you see those many, many little mounds or hillocks? They are called papillæ. On some parts of the body you can see them even through the outside skin. Examine the palm of your hand. You will notice a large number of little ridges, that make a beautiful pattern. These little ridges are formed by the same tiny mounds that you see through the magnifying glass.

Each mound or hillock contains an artery, a vein and nerves. It may also contain touch cells. All the arteries and veins together make a vast network of blood vessels. All the nerves together make a telegraph system in which even the smallest nerve is a live wire. By and by I shall tell you more about the blood vessels and their business of feeding

the body and about the nerves that carry messages back and forth from the brain.

There are so many, many wonderful things to explain that we must take them one at a time and the simplest and most important first. Before we go any further you must understand what I mean when I talk about the cells.

[IV.]

How the Wall of the Temple can be a Living Wall.

Our houses are made of brick, or stone, or wood. Every piece of brick or stone or wood is composed of tiny separate bodies. In the wood these tiny bodies are called cells. But in the wood from which houses are built the cells are not alive. They are dead. The tree is made up of living cells. That is why it grows. Stones and bricks do not grow for they have no cells. The human temple, unlike all other buildings, can grow because it is composed of living cells. In fact, the whole marvelous and complex human body that contains millions and millions of living cells, so small that it takes from two hundred and fifty to three hundred in a row to make one inch, all grew from just one living cell.

Years ago people thought that these little bodies that compose the living temple were

sacs and so they called them "cells" which means sacs. But now we know that the cell is a great deal more than a sac. It is a living bit of something called protoplasm, a living body that breathes, and eats, and moves, and grows, and gives off other cells and dies. Its life is just as real as your life is, and your life and health depend upon the happy working together of all these millions and millions of separate lives.

In every organ of the body the cells are different in form, have a different work to do, and are called by different names. The cells of the skin are called epithelial cells.

You have probably been in a crowd waiting to get through a gate or into a building, so you know how it feels to be pushed forward all the time by people coming up behind you. The epithelial cells, or the cells of the skin, are constantly dividing and multiplying in number, and as the number grows from behind or within, the upper or outer cells are pushed forward nearer the surface to make room for the new ones.

The outer layer of the skin, the epidermis, has no blood vessels, but its millions of hun-

gry little cells are fed by blood vessels in the mounds.

The epidermis does contain, however, some very small cells, called color cells. The true skin of the negro is just like yours or mine. All the coloring matter that makes him look different from us is in the outer layer. Hence, you see, a difference or a beauty that is only skin deep does not amount to much.

Deep in the true skin among the fat cells are many little tubes or pipes all coiled close like a spiral spring. These little pipes pass up, like a corkscrew, through the true skin and through the epidermis. The very least little tiny tip of the tube comes out on the surface of the skin in an opening called a pore. The pipes are called sweat ducts or tubes and the coil is called a sweat gland.

Farmers, in many localities, dig ditches in their corn or wheat fields to carry off the waste water. Your house, perhaps, is fitted with pipes for the same purpose. In the same way the little pipes in the skin are put there to carry off the waste.

In the palm of the hand there are more than twenty-five hundred pores in one square

inch of skin. In the entire skin there are more than two million five hundred thousand pores.

Just think of that! If every one of those two million five hundred thousand pores were an eye what a vast deal you could see!

If the two million five hundred thousand sweat ducts or tubes were all connected into one straight tube they would make a pipe more than seven miles long.

Surrounding each little coil among the fat cells are many little blood vessels. The coil takes water and waste matter out of the blood and forces it up through the little pipes and places it on the skin. We call this liquid, sweat. Every day in a full grown man or woman these little pipes carry from three to six pints of water and waste matter and leave it on the surface of the body. The sweat evaporates or passes off in vapor and thus cools the skin.

If the skin is not kept clean the pores become filled with dirt, the sweat can not flow out and so is carried back again into the blood. But the sweat is now poison and if carried on in the blood will soon make one

sick. This is another reason why it is necessary to take a bath every day, to wash off the sweat and to keep the pores open so that the poisons can get out.

Once some people who were getting ready for a great celebration took a little boy and tried to make him look like an angel. They covered him all over, next to his skin, with gold leaf, and stood him on a pedestal. They did not intend to hurt him, but by putting the gold leaf all over his body they stopped the pores of the skin so that the sweat glands could not carry off the waste and the little boy died the next day.

When one has a fever the pores are closed. This is why your mother gives you a "sweat" when you take a bad cold. She wishes to help nature open the pores and let the poisons out.

In winter you are interested in watching the thermometer go down to zero, in summer, to see it climbing up. If you ever thought about it you probably said to yourself, "What a wonderful instrument the thermometer is." Your skin, however, registers the changes in the temperature far more

quickly and correctly than the most delicately adjusted thermometer. The skin takes account of every little variation in the atmosphere around you and opens or closes its pores accordingly. In summer it helps you to keep cool and protects you from the heat, in winter it helps you to keep warm and protects you from the cold.

[V.]

Touch Cells and Living Wires.

In playing tag, when you are touched, you run. How do you know you have been touched? Can your clothes feel? Can your skin feel through your clothes? Do you think that the garment of your body, the outside wall of the living temple, or in other words, your skin, can feel?

When you prick your finger is it the skin that suffers pain? When you put your hand on a piece of ice you say it is cold. If you are in the dark and touch something, you can tell without seeing it whether it is smooth or rough, square or round. Is it your skin that knows all this?—No, it is you, inside the body, controlling it, as the telegraph operator, in his office, controls a whole system of wires from that one center. Let us see how this is.

In those little mounds of the skin, the papil-

læ, there are some very small bodies called touch cells. From one end of each touch cell starts a fine slender thread called a nerve, which is like a telegraph wire and goes to the brain, as the telegraph wire goes to the operator's office. The brain is your office. Every tiny touch cell is in direct and constant connection with the brain. Some of the touch cells tell us about cold, others about heat, others about pain. Some are made especially to tell us whenever anything touches the skin.

For thousands of years people did without a telegraph system. Nobody had invented it. One country had to wait a long, long time to hear from another. There were some tribes of savages so far away from every body else that nothing was known about them until after they had lived and died and disappeared from the earth.

But it was God and not man who put the telegraph system into your body. He did not have to wait thousands of years to think of it and then to work it out. In the very beginning He planned the body so that every man and woman and child might have a per-

fect system of communication from the brain to the tips of the toes, to every muscle, to every bone, to every cell.

Without this system of communication the living temple would soon be destroyed. If you struck your hand against the stove and there were nothing to tell you it was hot, your hand might be severely burned before you knew it. But the Architect has provided for this. He has put a live wire into every touch cell. When you touch the stove, quick as a flash the warning of danger goes to the brain and before you can think comes back the order, "Jerk your hand away."

Sometimes people put the operator to sleep by giving him poison, and then he can not help them. This is another part of the story.

The touch cells are more numerous in the lips, the ends of the fingers, the tip of the tongue, the cheeks, the eyelids, and the palms of the hands, than in other parts of the skin, because we touch more often with those parts. But there are a few of these temple guards scattered throughout the skin, standing on duty, we might say, in case that region of the body needs them.

In blind people the sense of touch is very keen. If a man can not see, the little touch bodies must act for eyes. I once saw a blind boy playing ball. He would toss the ball into the air, then listen for it, and catch it every time. Both touch and hearing helped him, because he had no sight.

The touch cells in the mouth and in the tube leading from it to the stomach keep us from eating food that is too hot and from drinking fluids that would scald us.

[VI.]

How to Keep the Wall Beautiful.

Let us count up now and see how many things the skin does:

1. It clothes the body.

2. More than any other one thing it makes the body look beautiful or ugly.

3. It helps to keep the body warm in cold weather.

4. It helps to keep the body cool in warm weather.

5. It sweats, and by sweating carries poisons out of the body.

6. It breathes through its pores.

7. It takes in food through its pores.

8. By means of it we learn about cold, heat, pain, roughness, smoothness, and other feelings.

So you see the living wall of the living temple is a great deal more interesting and important than the magnificent dead wall of

Solomon's temple or any other rare and costly building.

If you wish to have a beautiful skin that can do the things it was made to do you must keep it clean and healthy. With all the poisons that are pouring out of it and all the scales that are scaling off, you can not possibly keep your body clean unless you bathe it every day.

If you did not wear clothes, this would not be necessary for the air and the sunshine would bathe it for you. Your hands and face that you do wash every day, and sometimes many times a day, do not need the washing so much as the rest of your body that is covered by clothes. The clothes shut out the air and sunshine and so the poisons and the scales collect on the skin and dry and harden and stop up the pores until you have a very unclean feeling. And you *are* even more unclean than you feel. After a while the inside of your body becomes unclean too, and it takes a long course of sweating and scrubbing and careful living to make you clean.

You know how happy and well you feel after you have had a good bath and put on

clean clothes. If you take a bath every day your clothes will keep clean a great deal longer and you will feel better and happier all the time instead of just once or twice a week.

Washing the skin, however, is not the only thing necessary to keep it healthy and clean. It is quite as necessary to eat pure food and to drink pure water. It is important also to breathe out-door air and to exercise regularly.

It is natural for people to like to do the things that make the body healthy. If the Architect's plan had been followed throughout the ages, men would always have chosen those foods and drinks, those pleasures and recreations and occupations that would have kept the living temple beautiful and pure and perfect. Even yet, almost all children have natural tastes. They prefer simple true foods to mixed and made dishes. Nine children out of ten would rather have oranges than candy. They would rather go in swimming than go to dancing school. They would rather play out doors than bend over books in a dark house.

If you wish the wall of your temple, as well

as every other part of it, to be strong and beautiful and perfect, you must go back to the Architect's plan and follow it.

The marvelous walls of the living temple are covered with a soft finish, the hair. You have only to look at a bald headed man to realize how much beauty the hair adds to the body.

The hair is also a protection, especially to the head, where it grows so thickly. If the hair of the head is not cut it becomes very long and may be coarse. But on the rest of the body where the hairs are more scattered, it is very short and soft.

There are about two hundred and fifty thousand hairs in an average head of hair. Each hair has a root, a shaft or stem, and a tip. The root fits into a tiny bag in the true skin, called a follicle. Food is brought to the root of the hair by a little blood vessel at the bottom of the follicle. Each hair follicle is surrounded by small nerve fibres.

Every hair is made of cells, just as are all other parts of the body. The new cells grow in the root of the hair. They push the older cells up and out into the stem or shaft and on

toward the tip. So the hair grows longer every day. The tip is the oldest part of the hair.

If you look at a hair through the microscope you see that the outside cells are placed like the shingles on a roof, or like the leaves of a pineapple. They overlap away from the root toward the tip.

Now put the finest needle you can find, under the microscope and look at it. You will see the difference between God's handiwork and man's.

A straight hair is smooth and round. A curly hair is flat in many places and twisted. Real curly hair can be made only by nature. Your hair can not be coaxed to curl by wetting and combing. Each little hair obeys its Creator and grows round or flat as it has been taught.

In the center of the hair stem is a little canal filled with air. The color of the hair depends upon the coloring matter stored away in the cells that surround this canal. When the cells stop making coloring matter the hair turns white and there is more air in the shaft.

By the side of each hair in the skin is a little gland for making oil. Sometimes there are two oil glands to one hair. The oil gland makes oil from the blood and pours it out on the hair. The oil spreads in a thin layer over the skin, keeping it soft and cool. If this oil is all washed off by soap the skin sometimes itches and feels dry.

The hair may be kept healthy and beautiful by brushing it often and by dipping the fingers into cold water and then rubbing the scalp briskly.

The finger nails and the toe nails are another ornament to the living wall of the body. The nails are hardened and thickened skin. They protect and complete the ends of the fingers and toes. Without finger nails you could not do much fine work.

The nail grows about one inch in thirty-two weeks. If the nails of a man seventy years old had never been cut they would be nearly eight feet long.

When one is sick the nails grow more slowly and are marked by ridges. When one is sick nature has no energy to waste on

the decorations of the temple. She must put all her work on the necessary parts. That is why the hair sometimes comes out after a fever. Nature could not spare any food to the hair cells and they were starved.

[VII.]

The Pathway of Taste.

Did you ever see a church spire building? If you watched the carpenters you noticed that they made a rough framework or scaffolding to stand on while working. Every little while they raised the scaffolding so that they could reach higher. When the spire was done they took the scaffolding away. Then you could see the beauty of the church. The scaffolding had hidden it and made it look untidy.

You have also seen carpenters make a path of boards on which to carry brick and mortar and other materials. The scaffolding, the temporary paths, the hammers, the nails are all necessary to the work of human builders. But the divine Builder of the living temple needs none of these. Silently, without confusion, without scaffolding, the temple of the living body grows from one cell to be a man.

Instead of wood and stone and brick, the materials used for the living temple are food and water, air and sunshine.

Food and water are taken into the body through the mouth, over the first part of the pathway of taste.

The pathway of taste begins on the tongue. It is not a temporary, but a permanent pathway and is planned and built with more than human skill.

Perhaps you have noticed that everything you put into your mouth has some kind of a taste. We say that certain things are "tasteless" because they are neither sweet nor sour, agreeable nor disagreeable. But everything intended by nature as a food, and everything that you might easily suppose to be a food has a taste of its own when coming into contact with the tongue.

Everything that men were intended to eat has a good taste, a good smell and is also pleasing to look at. Everything that men were not intended to eat and that might have been mistaken for food, originally had a taste, a smell or a look that would prevent one from eating it. This was the divine

Architect's plan for keeping things out of the body that would hinder or destroy the work of building.

If you put something into your mouth and it tastes bitter or disagreeable you spit it out. Sometimes you can not eat certain foods because they do not look attractive. You say they are not appetizing. Sometimes just the smell of a thing will make the eating of it impossible. So, you see, all natural food is protected by three important senses, the sense of taste, the sense of smell, the sense of sight.

Suppose we study this pathway of taste and learn how the great Builder has planned it, so that nothing shall pass into the stomach without being tasted.

First, get a looking glass, and holding it up in front of your mouth, look at your tongue. Do you see those little red mounds scattered all over it? Some of them are very small, some are of medium size and back of these are eight or ten very distinct ones arranged in the form of a wedge. It is by means of these mounds that you are able to taste.

The mounds project above the surface of the tongue and are round. On the sides of each are peculiar little bodies that form a perfect circle around each mound. Under the microscope these round bodies look like a leaf bud or like an onion that has been cut through the middle. They are called taste buds because it is in them that the power to taste is located.

Everything you put into your mouth touches the taste buds first, and the taste buds tell you whether it is sweet or sour, bitter or pleasant, agreeable or disagreeable. The taste buds that give the best taste of sweet flavors are on the tip of the tongue, those that give the best taste of sour flavors are on the sides of the tongue, and bitter things are best tasted by the taste buds on the back of the tongue. Many flavors that we think we taste are recognized wholly by the sense of smell.

I said that the pathway of taste begins on the tongue in the taste buds. But, just as I told you about the skin, that it is not the skin that feels, but you, in your office in the brain, so it is not the taste buds that taste,

but you, again, in your office in the brain. Another live wire of the great telegraph line, the nervous system, goes from the brain to the tongue and connects with the taste buds, so as to tell you at once when anything enters the mouth. It is for you to say whether the morsel that is on your tongue shall be swallowed or not.

A food that has no taste or flavor does not do the body much good. If the carpenters dawdle about their work the building does not go up very fast. It depends upon what the taste buds tell you about the food whether you set the stomach and other digestive forces at work briskly and steadily or not.

If people had never abused the taste buds they would always tell you the truth. But it is a long, long time since the taste buds were quite natural.

You can make a terrible coward of a little dog, by whipping him. People have whipped the taste buds by striking them with stinging things like mustard, pepper, spices, vinegar, until often they can not tell the truth about the morsels of food that touch them.

Some taste buds have been whipped so often and so hard by these fiery things that they no longer have the power to detect the delicate flavors of natural foods.

If you use your jack-knife to sharpen nails or to whittle stones it soon becomes dull. In the same way you can dull the taste buds by using them on tobacco, beer, whisky, tea and coffee—things that are not foods at all and that will surely blunt the taste buds and the brain so that by and by they will be of no more use than a worn out jack-knife.

When you think that there are no taste buds anywhere else in the body except in the mouth, not even in the tube leading from the mouth to the stomach, nor in the stomach, does it not seem very foolish to eat things that simply please the taste buds for an instant and then pass on where they can no longer be tasted but where they are bound to do great damage to the body? It is more than foolish, it is wrong, if you look upon your body as a temple sacred to the divine Creator.

I have seen little folks as well as grown folks swallowing food that they liked, as fast

as they could, so that they could eat more. This is not only greedy, selfish, and impolite but it is also very silly. It is even more silly than it is greedy or selfish or impolite. Why? Because if you eat food fast you do not get the full benefit of the taste. If you wish to know the true pleasure of eating you must keep every mouthful in your mouth so long as you can taste it at all.

Nature, in putting all the taste buds in the mouth, intended to give you the pleasure of tasting food during the entire time it remained in the mouth and nature intended all foods to remain in the mouth long enough to be thoroughly chewed and mixed with a fluid called saliva so that they could be digested properly. To carry out this plan of nature you must chew every mouthful carefully. It is only when the taste is quite gone that it is ready to be swallowed. You miss a great deal of pleasure and do your body untold harm by eating too fast and by swallowing food that has not been ground fine between the teeth.

Did you ever think what a very great number of natural and simple and delicious flav-

ors or tastes there are? You can tell every fruit you know from any other fruit by its taste alone, without either seeing or smelling it. Apples, oranges, pears, plums, strawberries, raspberries, bananas, blackberries, and many, many other fruits have each a different and distinct flavor. The same is true of nuts, and grains, and vegetables. It is a much better plan to preserve these simple and delicate flavors than to destroy them or to hide them by stronger ones that are not natural. If you put hot spices and high seasoning on food you not only hide and injure the natural flavor, but you also weaken the power of the taste buds to taste.

[VIII.]

The Pathway of Smell.

The nose is the smelling room of the body. It is more than a room,—it is in reality a wonderful little house. It is three stories high, and is made up of many curious rooms and winding stairs. Two doors, the nostrils, admit the air laden with odors to the waiting room or vestibule. Most of the air passes back through the hall on the first floor, some of it goes up stairs to the second floor and visits the various chambers, but the odors one and all make haste to reach the rooms on the third floor. In the walls of these upper rooms are thousands of delicate hair like projections ready to be touched.

These projections are like electric buttons in a house or a hotel. You touch the button in your room at a hotel and after a while there is a tap at the door. The bell boy has brought you a pitcher of water. The very

gentlest touch of an odor on one of these hairs or "smell bodies" in the smell chamber of the nose, rings a bell in your office in the brain and tells you that a rose is waiting to be enjoyed or that you are in a disagreeable or a dangerous air. As at the hotel you ring once for hot water, twice for drinking water, three times for something else, so the little smell bodies, which are called olfactory cells, send different messages to the brain for different odors.

The next time you go out doors see how many different things you can smell. Then see how many more smells you can think of that you like. One thing that makes the spring of the year so delightful to everybody is the wonderful sweetness of the odors. The new grass springing up, the leaf of the tree, even the earth, has a pleasant smell. How it refreshes us to go into a clover field or an orchard in bloom and to breathe and breathe and breathe!

Every fragrant odor is healthful or full of health. It makes us breathe more deeply and thus brings more life into the blood, more vigor to the brain.

Bad odors have just the opposite effect. They warn us of danger in the air and keep us from breathing gases and fumes that would poison us. How often in passing a factory or some other place where there is a bad smell you hold your nose shut to keep out the odor. At the same time you are keeping out bad air.

You can not smell any one odor very long at a time. If you do not heed the warning of a bad smell soon the warning will no longer be given. If you bury your nose in a fragrant bouquet or hold it close to the top of a bottle of perfume almost at once you cease to smell anything at all. If you keep smelling and smelling of some sweet flower your very eagerness destroys your pleasure. The odor can not be constantly smelled. In three minutes or in a shorter time it will be gone. This is because the power of the smell cells is limited. You have been trying to make them work too hard. They are so built that they can not overdo. If you wait a few moments and let them rest they will go to work again and you can again smell the flower, the perfume, the gas.

In this the smell cells are like the taste buds. After one has been eating for half an hour the food does not taste as it did at first. The taste buds as well as the smell cells become tired and need rest. The first mouthful has the keenest taste. The first whiff of an odor has the keenest smell.

Just as the taste buds in the mouth stand, like sentinels, at the beginning of the food passage to see that nothing dangerous enters, so the smell cells stand, like sentinels, at the beginning of the breathing passage, guarding all the air we breathe.

The air often carries other enemies besides bad odors. Just inside the doors of the nose, in the nostrils, are several little stiff hairs, that are placed there to keep out these enemies. They keep out flies and other insects as well as the dust. If dust or dirt or insect passes these guards it is caught by the moist walls of the nose.

In many places, especially in some large cities the air is so full of dust that it forces its way past these sentinels through the nose into the throat and lungs where it often causes disease.

If the air is very cold or very hot the front doors of the nose are partly closed by certain little muscles whose duty it is to keep watch and not let in any more cold air or hot air than it is safe to breathe. When these little muscles are holding the door shut it makes our noses look thin and "pinched." Notice this on a cold frosty morning. It is not Jack Frost that is pinching your nose but the little muscles in the tip of your nose that are shutting the doors to keep out Jack Frost.

The cold air that these muscles do let in goes up and down stairs in the smelling house, all around through the many rooms and is gradually warmed by touching the warm walls of the nose until it is ready to pass on into the lungs.

Smell and Taste are good friends and work together. One helps the other. But smell helps taste more than taste helps smell.

Sometimes you get up in the morning to find that you have a cold in the head. You try to breathe through your nose but can not. You can not smell. You sit down to breakfast but you can not eat. The food does not taste good. You push back your plate and

give up trying to eat. This is just what smell and taste were working for. Your cold will disappear sooner if you do not eat much, so they make eating uncomfortable and disagreeable. Every part of the body is all the time helping every other part to keep the living temple growing healthy and strong and beautiful.

When I was a boy and lived in the country I often had to go to town and sometimes did not get home until after dark. In the summer when the grapes began to ripen there was such a fragrance from the vineyards filling the air that I could tell just where I was, however dark it might be.

Since I have grown to be a man I have known some people whose lives were so fragrant with health and happiness and kindness that every body who came near them felt, even without seeing it, the sweet, refreshing influence that went out from them. The divine Architect who made the vineyards, the sweet smelling orchards, the living human temple, planned that every life, not alone of flower and fruit, but of human being also, should give forth fragrance. If we labor

with Him to build this temple of our body and of our life as He has planned it, then the ripened fruit, the finished work, will have the true fragrance of love and goodness.

D

[IX.]

The Windows of the Temple.

Did you ever visit one of the great churches or cathedrals in New York, Chicago, Boston, or possibly in London or Paris? If so, you remember the beautiful stained glass windows, of many, many colors, through which the light fell softly. Some of these windows cost thousands of dollars and are famous all over the world. There is one window in the cathedral of Notre Dame in Paris that is made of tiny pieces of the most costly colored glass and is hundreds of years old. It is called the Rose window, and nobody ever goes to Paris from the United States without making a special effort to see it. There is also in Paris a chapel called La Sainte Chapelle, the walls of which are almost entirely made of windows, rare and beautiful windows that are the wonder of all who look at them.

But the richest and most skillful builder in the world could not make a window half so beautiful, or half so useful, as one of the windows of the living human temple.

You know, of course, that the windows of your body are the eyes.

Perhaps you have sometimes wondered why you can never go up behind a fly so quietly, so carefully, that it will not see you and fly away. The fly has only two eyes, like yourself. That is, it seems to have only two eyes, but the eyes of the fly are not made like ours. The fly's eye has four thousand window panes through which it can look. That makes eight thousand window panes for the fly and two for you. Each one of these window panes is called a lens or facet.

The bee has even more windows to look through than the fly. The bee has six or seven thousand eyes in the sides of its head besides one great big triple power eye in its forehead. Some ants have twenty-four hundred eyes. The dragon fly has about twenty-four thousand, and the butterfly thirty-five thousand six hundred. Men have actually counted twenty-four thousand lenses in the

dragon fly and thirty-five thousand six hundred and fifty in the butterfly. They are able to count them by placing them under the microscope and thus making them look hundreds of times larger.

Did you ever think how very, very big, like a terrible giant, you must seem to the fly when it looks at you through its eight thousand windows? Although it can fly, it needs all these eyes to help it to escape from the cruel hands of many a boy or girl.

No two eyes are just alike, not even your own. Probably your two eyes have the same color, but this is not necessarily the case. I knew a man who had one brown eye while the other was half gray and half blue.

Look at the eyes of the different members of your family—see how they differ. Just among your own acquaintances you will notice astonishing variety.

There is a marked difference in the eyes of different races. It is easy to point out the eyes of a Chinaman or a Japanese.

The eyebrows are both useful and ornamental. Like the cornice, to a window, they give expression to the eye and to the face.

The cornice prevents water and dirt from running into the window. The stiff hairs of the eyebrow prevent the sweat from running into the eye by turning it toward the nose or down the sides of the face. They also keep out dirt and dust.

The eyelids are the heavy outside curtains of the windows. You have seen handsome curtains made of brocade and lined with silk. Your eyelids are made of two layers of skin that touch each other loosely like the brocade and the silk lining. The outside layer is like the rest of the outside skin of the body, but the inside layer, that corresponds to the soft silk, is a wet skin called mucous membrane. The mucous membrane lines the entire inside of the body. This wet lining of the curtain keeps the eye moist and prevents any rubbing of its very delicate coats.

The eye lashes are the fringe of the eyelids. They too protect the eyes from dust and dirt and from small insects.

They are also a protection against too much light. If you are looking at an object in too strong a light this fringe of lashes falls more closely in front of the eye so that you

must look through its shade to see. Sometimes when the sun shines on the snow or you try to look at some brilliant light you can hardly see at all. Both curtain and fringe are shielding you.

The eyelashes, like the taste buds and the smell bodies, are sentinels. They stand at the entrance of the eye, to give warning of danger and to keep out enemies. If anything touches one of these little hairs, quick as a wink the eye is shut.

The windows of your house probably move up and down on pulleys. In some old-fashioned houses the windows still have to be pushed up and down and are held at certain points by a catch. You never heard of windows, made by men, that could move up and down and sidewise, at every angle and in the direction of a circle without any visible machinery. The windows of the human temple can do this.

Suppose we prove it.

Hold your right arm out straight in front of you. Fix your eyes upon your thumb. Now make a small circle with your arm, keeping your eyes fixed upon your thumb, but

without moving your head. You can not feel your eye moving, can you? But it does move all the time. It follows every change in the position of your thumb and has itself described a perfect circle in the brain,—that is if your thumb described a perfect circle.

Each eye is moved by six little muscles that are behind the eyes and can not be seen.

Back of the heavy outside curtain of the window, the eyelid, is the window itself, the eyeball. It is called the ball of the eye because it is almost round. The eyeball rests upon a soft cushion of fat which protects it from jars and blows. When a person has been sick a long time the fat disappears, just as the fat does under the skin, and so the eyes look "sunken."

Boys and girls will sometimes spend half an hour at a time watching a doll that can nod its head or take off its cap. If you will watch the eyes of one of your playmates or of your kitten or your dog, you will see things more remarkable than any toy.

Have one of your friends stand facing a window and look into his eye. You see, of course, as you always can, the white of the

eye and the round center. But look more closely. If you notice carefully you will observe that the very front of the eyeball is a transparent part as clear as glass. This is the window pane and is called the cornea. Back of the cornea in the very center of the eye is a round black circle. This round black circle is a hole. It is a hole to let in the light. It is called the pupil of the eye. Now watch the pupil of your friend's eye. Ask him to shut his eye a moment. Look quickly when he opens it. Do you see that as he opens his eye the pupil gets smaller and smaller while after he has stood in the light a few seconds it is a very tiny point? Now ask him to turn around with his back to the light. The pupil grows larger at once. If you could see your own eye now that you are facing the light you would notice that your pupils have grown smaller.

The pupil or the real window of the eye grows larger or smaller to let in or keep out the light as you need it. It does this by means of a round muscle that runs around the edge of it. When this muscle contracts or tightens, like a purse string, it makes the

hole smaller and when it loosens or expands it makes the hole larger. When a bright light strikes the eye the pupil instantly becomes very small. But in the dark the pupil is large. This is the reason the eyes of a cat are always so bright in the dark. The pupil then is almost as large as the eye.

If the pupil of the eye did not contract in a bright light, too much light would enter and the eye would be injured.

You have noticed perhaps that your mother is careful to keep the baby's eyes out of the light. This is because the baby's eyes are weak and the little round muscle has not yet learned to do its work quickly. If a bright light should enter the baby's eyes it might hurt the little one's sight for life. It is a bad practice to try to look at the sun.

Now look at your friend's eye again. You see back of the clear part called the cornea, and around the black hole called the pupil, a colored circle. This colored circle is directly in front of and covers the round muscle that forms a ring around the pupil. The colored circle is a layer of color cells and corresponds to the delicate inside curtain of a window

whether it be of lace or fine silk. It is called the iris, which means rainbow. The pupil of your friend's eye is black. But no two persons have exactly the same colored iris. The color cells are different in each person. It is the color cells that give the color to the eye, that make it brown or blue, gray or black, sometimes green and in a very few cases white.

If you could look through the hole in the eye, the pupil, you would see exactly opposite the entrance, a small round body about one third of an inch in diameter, and as clear and transparent as a glass crystal. This is the crystalline lens through which the light passes to reach the sight nerve. In front of the crystalline lens is a small room filled with water. Behind it is a larger room also filled with a perfectly clear fluid. So you see, in the middle of the eye, from the window pane back to the sight nerve the path for the light is as clear as glass.

The white of the eye and the window pane or cornea are kept clean and moist by water from a little fountain called the tear gland. The tear gland is in the upper and outer part

of the eye socket, just outside the eyeball. It is about the size of an almond. A dozen little pipes carry the water in this fountain to the edge of the upper eyelid. From there it spreads in a very thin layer over the front of the eye, keeping it always moist and washing off the dust. If coal dust, or dirt, or a speck of hard matter gets into the eye, the delicate covering of the eyeball or the inside lining of the eyelid is irritated. The irritation causes more pressure to be put on the fountain and in a few minutes floods of tears are pouring through the tubes. The tears do their best to wash out the speck and often succeed. They flow toward the nose, so, if anything gets into your eye, be sure to help the tears by rubbing your eyelids, very gently, toward and not away from the nose. When the tears are very abundant they run down the tear duct into the nose. This is the reason people blow the nose and use the handkerchief when they are crying.

The eyeball is dressed in three very beautiful coats. The outer coat, or the sclerotic coat, gives shape to the eye because it is hard. The second coat or the coat next to this is

called the choroid coat. The color of this coat is a rich, dark purple and its principal use is to keep all the parts of the eyeball supplied with blood. The inner or third coat is one of the most marvelous parts of the entire body. It is so thin and so delicate that one can hardly touch it without tearing it all apart. Yet, although it is so very thin, it is made up of ten layers.

This inner coat, the retina, is the expanded end of the nerve of sight, or the optic nerve. If you think of an umbrella turned inside out you will get some idea of the shape of the retina. The umbrella part would represent the expanded end of the optic nerve while the umbrella handle would stand for the nerve trunk passing back to the brain. The nerve trunk is made up of about one million little white threads or nerves, each going from the inner coat of the eye back to the brain.

[X.]

A Living Camera.

The eye is a camera. It is smaller than the smallest pocket camera, but it has an endless number of films and takes thousands of pictures every day. It is self-adjusting, self-repairing and though the picture is life sized, the image is very small. It works instantaneously. It is not for sale. Millions of dollars could not buy one. It has never been improved by additions or changes. It was invented in the beginning by the great Maker of every perfect gift. It was given to you, perfect and complete, when your life was given, that you might take pictures of everything you saw, so long as you lived. You did not even have to learn how to use it or to provide plates and films and washes. Everything about it was complete and is kept complete and in good repair by the Giver. All that He asks is that you try to prevent your

eyes from taking any but beautiful and useful pictures.

You may think you understand all about taking and developing pictures with a kodak or camera. But there is at least one thing about even the simplest process that you can not explain. After you have everything ready, the slide in, the object posed, your watch in hand, and after you have snapped the camera, you can not explain how it was that letting in the light for just one instant printed a picture on the plate.

In the same way, no one can exactly explain how light falling on the sight nerve can make a picture in the brain. But I wish you to understand it as well as any can, and this is the way of it.

Suppose your finger touches my hand. The nerves of touch send a message to the brain. Now, seeing is touching at a distance. Hearing is another kind of touching at a distance. You know that if you fan the air you set it in motion. You can feel the waves of motion. The shining of light also sets waves in motion—waves of light. If these waves of light pass over that clear path through the

pupil of the eye, through the room full of water, through the crystalline lens and the transparent fluid back of it, and if these waves of light strike the retina, or the expanded end of the sight nerve, then in some mysterious way, no one knows just how, the picture brought by the waves of light is carried on over the sight nerve to the brain, where, in the back part of the brain, it is left as a negative, a picture that can never be destroyed. After that you can see this picture even when your eyes are closed.

Sometimes the sight nerve takes pictures of things that we afterwards wish we had not seen. All the pictures of a lifetime are kept stored away in the back part of the brain. Sometimes we call this part of the brain a picture gallery. Sometimes, too, we say that the pictures are hung on memory's wall.

It is a grand thing for a man when he is old, to have pleasing pictures hung in the art gallery of his brain.

It is impossible to keep out every disagreeable sight, but one can cultivate the habit of looking at beautiful things.

When you see an animal that is hurt, if you

regard it with pity, and try to help it, the picture left in your brain will not be so dark as if you had turned away in horror or had made the animal suffer more. So if you see a drunken man in the gutter, or people fighting, the picture will be better if you are sorry rather than amused.

The divine Maker of your camera, the eye, intended it to have only beautiful pictures to photograph. Everything that God has made is beautiful. The hills, the valleys, the brooks, the flowers, the trees, the fields, the birds, the animals, the sky, the clouds, the moon, the stars,—all these are God's views for your camera. They are free. Your eye is taking snap shots of them all the time whether you are thinking about it or not. And the pictures your eyes are making are having a constant influence on your whole mind and character.

Some things you see are so new and startling that you feel the effect of them at once. But the most lasting images are the daily sights of ordinary life. That is why it is important to be surrounded by beautiful things,

to look at God's views every day and many times a day.

Everything made by man is a copy of God's work. That is the reason there is so little that is really beautiful in large cities. The works of God are hidden by the imitations of men. Even the sky is so clouded with smoke and dust that it does not look like God's sky. People who have lived a long time in cities often forget about the truly beautiful things in the world.

There is one great difference between the eye and any other window. The eye is changed by the things it looks at. Perhaps it is better to say that the eye is changed by what you think about, and what you think about depends very much upon what you look at. The windows of a house may stare at wickedness a hundred years and that will not make them any different. But the windows of the living temple can not do this. If you look at things that are not good for your temper, that arouse bad feelings of any kind, if you form the habit of looking at such things, not only your mind and your char-

acter will be injured, but even your eyes will change. They will grow ugly, cruel and hateful. On the other hand, if you cultivate the habit of looking at things that are beautiful and pure and true your eyes will show this. They show your thoughts, whatever they are.

Suppose you were to wear a dark shield over your eye for a year or two. You would probably become blind. The sight nerve would be injured and the sight nerve can not be repaired. Taking the shield off would do no good. But if a cataract or a sort of thick film should grow over your eye, it might remain there for years and you would not become blind. If the cataract were removed you could see again. So if you blind your eyes to beautiful things, by and by you will not be able to see the things that are beautiful. Your eyes will be blind. But if through no fault of your own you have been prevented from seeing the good and the true, even for many years, if the obstacles are at last removed, you can see the good and the true as well as any one,—perhaps even better than

some who have been looking at them all their life.

It is harder to take care of the living windows than of the windows of a house. All that the windows of the house need to keep them in good condition is to be washed often. The eyes need more than this. The water from the fountain of the tear gland is all the time washing the living windows. But this alone will not keep them bright. In order to have bright eyes and good eyesight the entire body must be kept healthy. Poor food, the wrong kind of food, or the lack of food, will dim the vision, for the eye is nourished by the blood and the blood can not carry wholesome nourishment unless it is made of wholesome food.

When your are sick your eyes become weak. It is dangerous to use them then, or at any time when they smart or ache. This is the reason why, if you have the measles or the scarlet fever or any other disease, the doctor and your mother are so very particular that you must not read until you are quite well again and strong.

When you are reading, the light should fall over your left shoulder upon the page and never into your face or from the front on the book. It injures the eyes to read in the dusk or by a dim light. When changing from day light to lamp light, or from any one kind of light to another, be sure to rest the eyes a few moments either by closing them or by looking away from the book.

At any time, if you are doing close work, you should rest the eyes frequently, by looking off, over the fields, down the street, always at something far away.

It is a very harmful practice to read lying down. It is not natural. It strains the eye. It is injurious to read while walking, riding in a carriage or on a train. If your body is in motion it is impossible to hold a book at just the same distance from the eye every instant. Every time the page moves, the muscles in the eyeball have to move also, to adjust themselves, and this tires the eye.

One good way to rest tired eyes, or to relieve the eyes if they smart is to lay over them a soft cloth wrung out of very hot water and then to change this for a cold one.

You could keep this up for half an hour, changing from hot to cold every five minutes. It always soothes and strengthens the eyes to bathe them gently in cold water.

If, when you read, the letters blurr or run together you should consult a physician at once.

[XI.]

The Pathway of Sound

The pathway of sound is the path that a sound travels after it is made until it reaches your office in the brain. Every sound starts waves of motion in the air just as light does. These waves of motion go in all directions, so that if two people are exactly opposite each other when the sound is made, both can hear the sound. If a tree falls in the forest where there is no one to hear, it starts waves of motion just the same as if you and I and a hundred others were listening.

Perhaps you think you hear with that queer looking, crinkled, trumpet shaped object that is fastened to the side of your head and that you call your ear. But you do not. You could hear if that part were taken off altogether. But you would not look very handsome.

The part of the ear that you can see is called the external or outside ear. But the name external ear includes not only the trumpet shaped part which is made on purpose to catch the waves of sound but also the tube, or the hole that you see when you look closely.

You never hear the whole of any sound. You hear just so much of it as is carried by the waves of motion that are caught by the flaring part of the ear, this outside part that is called the trumpet or auricle. The tube of the external ear collects the waves of sound and carries them back to the internal ear.

No two ears are just alike. You have noticed that some people have large ears and some have small. Perhaps you have seen ears that stood out from the head very awkwardly, or that looked as if they had been glued to the side of the head. If you have never studied the ear, possibly you think the Architect of the temple might have made a prettier one, without all those crooks and ridges and turns and hollows. But every one of the crooks and ridges and turns and hollows serves a wise purpose. And when you

understand about it every part of the ear becomes beautiful. The ear alone is a masterpiece of building.

The ear is shaped differently in different animals. Birds have no external ear. The frog has none. In some snakes the ear is not well developed. "Deaf as an adder" is a common expression.

Most animals can move their ears toward a sound. It is said that in South America when the wild horses travel they have sentinels to warn the herd of the approach of an enemy. The sentinel in front travels with its ears always forward, the two at the sides with their ears turned out and the one at the rear with its ears turned back.

Men can not move their ears very much. But by practice one can train them to move a little.

The tube of the external ear, or the hearing canal, is nearly an inch and a half long and is slightly crooked. In the outer third of it, near the opening into the trumpet, are some little glands that pour out a very bitter wax. The wax is to prevent insects from entering the ear, and to keep the canal moist.

The inner end of the hearing canal is closed by a very thin skin that is drawn tightly across it, making a drum head. If you strike a drum it vibrates and makes a noise. If waves of sound strike the ear drum it vibrates and sends the sound on toward the brain.

A drum made by men can give only one kind of sound. It may beat loud or soft but has only one pitch. The drum of the ear, the living drum, is acted upon by a very delicate little muscle. When a sound that is pitched high touches the ear drum the muscle shortens and draws the drum tighter. When the sound is low this muscle lengthens and loosens the drum head. So it is changing all the time to give different sounds.

On the other side of the ear drum, opposite the tube or the hearing canal is the middle ear. This is a very peculiar little room. In it are three small bones. One is shaped like a mallet and is called the malleus. Another is like an anvil and is called the incus. The third is like a stirrup or the step of a saddle and is called the stapes. These three bones are all fastened together in a chain. The mallet or hammer-bone is fastened to the

drum head. The anvil bone is between the other two. The stirrup bone fits into a little window that opens into the hall or vestibule of the inner ear.

The queer little room, the middle ear, is not a closed room. From it a long, dark passage leads down hill toward the throat. If you could follow it to the end and should fall off you would run great danger of being swallowed. This dark passage is the Eustachian tube. It admits the air to the middle ear.

Now try an experiment. Hold your nose with your finger, close your mouth and then try to blow your nose. Did you have a strange feeling in your ear? That is because you forced air through this passage into the middle ear from the throat and the drum head was crowded outward. Now swallow. The strange feeling disappears. By swallowing you open the tube and the air which was forced into the ear drum is allowed to escape.

Ear ache is caused by inflammation of the middle ear. The ear is so tender that such inflammation causes terrible pain. Sometimes the ear drum is pressed on so hard that

a hole is forced through it and there is a discharge from the ear.

The internal ear consists of a whispering gallery, and so many secret passages, mysterious rooms and dark stairways that I could not describe it to you unless I could sit down beside you with a model of it and spend hours in explaining it. There are, however, a few things that I can tell you about on paper.

The internal ear, the part that receives sound, that gives so many of our most pleasing feelings, is carefully hidden away inside the bones that form the skull. All of the delicate and important organs of the body are protected by bony walls.

The whispering gallery of the internal ear is filled with water so that the sounds will vibrate better.

There is a curious shell in this part of the ear. It is called the cochlea. Outside, this shell, or cochlea, looks like a snail shell. It makes two and one half turns from one end to the other. Inside of it are two stairways. One of them leads toward the small end. The other begins at the small end and goes down to the base. Between these staircases

is a very small passage which contains the smallest musical instrument in the world. All of these winding ways are filled with fluid. Fluid increases the clearness of sound. You know that when you are riding in a boat you can hear voices and shouts much farther than you can on land.

The musical instrument in the inner ear is called the organ of Corti, after the man who discovered it. It is so small that it can not be seen by the eye. But the microscope has revealed many wonderful things about this living instrument.

The organ of Corti is shaped like a harp. It has two series of pillars with broad bases. The pillars are united at the top so that a row of arches is formed. There are nine thousand of these pillars. They are pillars of cells, musical cells. There are about fifteen thousand other cells, hair cells, working with them to make each sound more perfect.

This wonderful harp of thousands of strings can play any kind of music. All the melodies of the world have been tried on its strings. The harp of the ear, like the camera of the eye, is a fitting instrument to be placed

in the marvelous human temple. Upon it are heard the thunders of an August storm, the softest breathings of a flute, the faintest hum of a bee.

Each little cell in the organ of Corti is in touch with the very delicate end of a nerve fibre. All the nerve fibres come together into one bundle, the hearing nerve. The hearing nerve carries the sounds into the brain where they are analyzed and understood. The ear is built to receive the sound, but it does not understand it.

Suppose now we trace the journey of a sound over this pathway. A church bell is ringing a mile away. Every time the clapper strikes the side of the bell it starts waves of sound, or vibrations, into the air. The waves of sound travel at the rate of one thousand and ninety feet a second. They never stop, but go on and on throughout all space.

When you throw a stone into the water the circles it starts go on and on until the waves are so small you can not see them. But they are still going on and on. If you were in the middle of the ocean and should drop a pebble over the side of the ship the circles it started

would go on and on across the ocean, growing larger and larger, until they struck the shore.

Every sound that is made sets in motion the ocean of air that surrounds the earth. If the waves of sound touch your ear drum you hear. But the waves go on whether you hear or not.

Low sounds produce long, slow waves. A sound that causes sixteen waves a second can be heard, but the ordinary ear does not respond to fewer waves than that. The very highest sound we can hear sets up nearly fifty thousand vibrations a second. A trained ear can hear far higher sounds than one that is untaught.

Meanwhile the church bell is ringing a mile away. The sound waves are coming at the rate of nearly a quarter of a mile a second. If your ear trumpet catches some of these sound waves it passes them on into the tube of the hearing canal. They have entered the path into the temple. At the end of the hearing canal they touch the membrane of the ear drum. They break upon it as the waves break on the shore. It begins to vibrate with

the tones of the bell. The ear drum tightens. The sound waves make it shake all over. Then they pass on into the queer little room where the three bones are, and all the little bones begin to vibrate, to tremble with motion. The sound goes on over the stirrup, through the window, into the fluid of the whispering gallery. It moves quickly, quickly, up and down the winding stairs of the shell. It sets up waves in the water in the shell. These carry the sound to the wonderful harp and it plays upon the strings among the pillars. It touches the sensitive ends of the nerves of sound and they too begin to vibrate. They carry the sound of the ringing bell to you, in your office in the brain, and you listen and listen. By and by you have a pleasant memory to store away. Years after, if you will, you can recall the sound of that church bell, through the memory you have stored away, although the bell may have long since ceased to ring, although you may be in a distant land.

Strike the key of a piano and hold your finger on the key. Now strike another key and remove your finger at once. In the first

case, you notice, the vibration continues. In the second, it ceases. If you strike several keys and hold them down no one sound is distinct. All the sounds run together. When you remove your finger from the key a little cushion called a damper inside the piano falls against the wire that has been struck and stops the vibration.

The same thing happens in the ear. There is a small projection on the hammer bone in the middle ear which presses against the ear drum as soon as a sound wave strikes it. This stops the vibration. If this were not so the sounds we hear would run together. This would cause the greatest confusion in the brain.

More and more as you study the temple of the body you see that every detail of its workmanship has been carefully planned by the all-wise Architect.

The ear is the entrance through which a caravan of sounds is constantly travelling to you. You may have in this caravan about what you choose. The sounds of birds, of the wind in the trees, of the brook in the meadow, all the sounds of nature will

bring you wealth and happiness. Noble truths, loving words, good songs, true music, are other sounds that make harmony in every living temple. Discords, whether in speech or music, empty sounds that have no value, counterfeits of true words and music are bad investments for any boy or girl. They bring neither wealth nor health nor happiness. On the contrary, they take away wealth and health and happiness.

You must not forget that this wonderful instrument I have been describing, the ear, is a living instrument and is a part of the living temple of the body. The Architect has made it so that it usually takes care of itself. The bitter wax that is poured into the hearing canal to keep out insects gradually dries to make room for fresh wax. The old wax dries in the form of whitish scales. These drift out of the ear, being helped along by the motion of the jaw.

You do not have to do anything to keep the ear canal clean. When you are well it keeps itself clean. It should never be bored out with the corner of a towel, a handkerchief, or with ear spoons, hair pins, toothpicks

or pins. The man who said, "You must not put into the ear anything smaller than your elbow," was as sensible as he was witty.

If a bug or an insect gets past the bitter wax and crawls into your ear, have a little warm sweet oil dropped in to drown him.

Never put cold water or anything cold into the ear. Before diving into water plug the ear canal with cotton. But be sure to take it out again afterwards.

Do not blow your nose when you have a cold. If you do you may make your ear ache by setting up an inflammation of the middle ear.

It is cruel and dangerous to box the ears. People have been made deaf for life by a blow on the ear.

If a person hears better when he is looking and expects to be spoken to, than when he is not paying attention there is probably something the matter with his hearing.

The ears should be protected from sharp winds and from driving snow or sleet.

[XII.]

The Entrances of the Temple.

Have you noticed how many ways of entering the temple I have told you about? First there was the way of touch, through the skin, by means of the nerves that end in the skin. Then there was the way of taste, over the taste buds in the mouth, by means of the nerves of taste that end in the taste buds. Then there was the way of smell, through the nose, by means of the nerves that end in the nose. Then there was the way of sight, through the eyes, by means of the wonderful optic nerve. And last, there was the way of hearing, through the ear, by means of the hearing nerve that carries waves of sound.

That makes five ways of entering the temple.

These five ways of entering the temple of the body are called senses,—the sense of touch, the sense of taste, the sense of smell,

the sense of sight, the sense of hearing. These are all the ways and the only ways in which the temple can be entered.

The doors of Solomon's temple and of many other temples, churches and cathedrals are justly famous for their marvelous workmanship. You have seen that any one of the entrances of the human temple,—the skin, the ear, the eye—is more remarkable and shows more skilful workmanship than any masterpiece of man. But even the rare perfection of the eye or ear, the artistic genius displayed in its building, the wonderful way in which it is made so that it does perfectly and smoothly its own particular work,—all this ceases to astonish us when we understand what the great Architect has made us able to do by means of these senses.

Here again comes in the difference between the human temple and all others. A stone temple is not expected to do anything. It can not move, or change itself or mend itself. It can neither destroy nor complete the work of the builder. It makes very little difference in its beauty or value what comes

into it or what takes place within its walls. As it was built it must remain.

But this living temple of yours and mine was planned with just one thing in view—that in it and with it we might live and grow. Our life can not be separated from the life of the temple. If anything comes into it that ought not to come into it, that injures or destroys any part of it we ourselves are injured with it or destroyed. If the temple grows, we grow. If it dies, we die. If the body is healthy and strong, we are healthy and strong. If it is diseased and weak, we are diseased and weak. So you see it makes all the difference in the world what comes into it and what takes place within its walls. For as it was built it can not remain.

That is, you can not remain a baby. You must grow to be some kind of a man or woman. The five senses were given you that you might use them in building this man or woman.

Animals also have the same five special senses. Some animals can see better than men. Some can hear better. Some can

smell better. In some the sense of touch is more sensitive. But animals can not use their senses as men can.

Animals have all the ways that lead to the brain. They have nerve and brain cells and some intelligence. But they have not the mind of man. They have not been chosen by God as His temple, His sacred dwelling place. God uses their bodies in a different way, for a different purpose.

The hawk flying high over a meadow can see a mouse running across the field. A man could not do this. But man can invent a telescope through which he can study the geography of the moon two hundred and fifty thousand miles away. His mind has helped his sense of sight.

So, while the dog can smell farther than we can, he does not enjoy the fragrance of the rose, the perfume of the hyacinth. Neither does he like to hear beautiful music.

The senses, then, these five ways to the brain, are the means by which impressions, information, news, warnings, all kinds of messages concerning the work and the condition of the temple, concerning also the out-

side world, are constantly carried to the brain.

Everything you know you learn through the senses. You can see farther than you can hear. You can hear farther than you can smell. You can touch farther than you can taste.

Over the pathway of touch are carried into the temple warnings of danger, news of whatever is touching the skin, messages from the air and the sun.

Over the pathway of taste are carried information and warnings concerning food and water. Over the first part of this pathway passes the material for building the solid parts of the temple.

Over the pathway of smell are carried into the temple, warnings of danger, news of all sorts of odors, good and bad, of fragrant incense and rare perfume. Over the first part of this pathway also passes the great volume of air that is necessary to the life of every human being.

Over the pathway of hearing are carried sounds. Sounds are servants of the mind. They are messengers that bear instruction,

warning, counsel, news, information, encouragement, inspiration. If you can not hear, you are very much hindered in building the body. You miss also many of the greatest pleasures.

Over the pathway of sight are carried the rarest and finest materials that enter the temple. They are used in building the secret thoughts of the heart, in fashioning memories, in painting portraits, in coloring landscapes, in beautifying the walls of the wondrous gallery of the mind.

When you think about this, when you get ever so faint an idea of all that the senses may be to you in helping you build the body temple, you understand how important it is to have every pathway in good repair.

The skin must be kept clean and pure. The pores must be free to open and shut. The body must be bathed all over every day and dressed in such a way as to aid and protect instead of to hinder and obstruct the skin. The taste buds must not be overloaded with food, or goaded by the prick and sting of stimulants, or taught to pass things that are not wholesome.

The pathway through the nose must be kept clean not only that the odors of flowers and fruits may reach the brain but also to admit the air without which all the work of the temple would stop at once.

The pathway of sound must be carefully guarded that warnings of danger may not go unheeded, that words of life and health may freely enter the temple and reach the brain, that no harm may come to that exquisite instrument, the harp of the ear. You must do all you can to keep out every sound that would profane the temple. None but true and good music should be heard in this sacred place.

The pathway of sight—that luminous pathway! What one of us would look at any evil thing knowing that forever afterward the picture of it would remain, a blot upon the walls of memory, marring the beauty of the fairest chamber in the temple?

[XIII.]

Your Sanctum Sanctorum.

It seems strange to think of a telegraph office in the temple. It is strange to think of telegraph wires running all through the temple, everywhere, so close to each other that you could not see through them, going to every window and every door as well as to every part of the walls, the roof and the floor.

This would be a strange thing to have in a marble temple that stands empty and silent all day long. But the living temple of the human body, this temple that is building, and wearing out and repairing itself all the time, the temple in which every bit of material is alive and moving, that is filled with messengers and workers going to and fro, the temple in which you live and that could not be built without you, must have some quick and perfect means of keeping in touch with every

part. So, in the temple of the body there is a telegraph system having its central office in the brain.

Perhaps you think that a telephone service would be better than a telegraph system to have in a building. But a telephone service could not send messages quick enough for the needs of the body temple.

I have already told you about some of the main wires that go to the brain. I have told you about five pairs, those that go from the skin to the brain, those that go from the taste buds to the brain, those that go from the nose, those that go from the ear, and those that go from the eye. These main wires are called nerve trunks. There are twelve pairs of nerve trunks in all that go to and from the brain. You have heard about five pairs. Most of the other nerve trunks are connected with the different muscles of the body to tell you when to move those parts.

Besides these twelve main wires or nerves there is the spinal cord which is a continuation of the brain and goes into the backbone. There are also thirty-one pairs of nerves or wires that branch off from the spinal cord and

go to all parts of the body. This makes forty-three pairs of nerves which in turn give off many hundreds of branches; altogether there are more than five hundred main wires that carry messages back and forth between the brain and every part of the living temple.

You could not live without the brain. Here the Architect sits and directs the work. You are there, too, in your office, helping or hindering him. If you work with Him, and all the workers and laborers and messengers of the body also work with Him, the body grows daily more and more beautiful, more and more perfect. If you work against Him, and if workers, or laborers, or messengers are slow, lazy, or stupid, then even the divine Architect can not prevent the temple from being injured, defiled, it may be, ruined. It is the brain of man that places him high above all other animals. The liver of the dog or the horse is just as remarkable and just as perfect in structure as the liver of a man. So is the stomach. So are the lungs. So is the heart. But the brain of the dog or the horse, of any and every other animal, is far less com-

plex and from our standpoint, far less perfect than that of man.

There are many, many things about the brain that nobody can explain. You understand why this is so when you think that no one has ever seen the brain at work. No one ever can see the brain at work. It is only when the mind has gone out of the brain that the brain can be examined. But this is just what we should all like to see—the brain at work, or rather the mind at work in the brain.

You know that there is a mind at work in your brain just as you know that your mother is at work in the house. You know it by what the mind or your mother does. You may not have seen your mother for half a day but you know she is there at work because the parlor is swept and dusted, the dining-room table set, the dinner prepared. So you know that the mind is busy in your brain because the work of your body is going on.

The men who have studied the brain and the body have found out just what parts of it have charge of certain work. They have found out that you think with the top and

front parts of the brain, that you move the muscles with a wedge shaped part on the sides and that you feel glad or sorry, angry or pleased, with the back and lower part. They have found out that you move the right side of the body with the left side of the brain and the left side of the body with the right side of the brain. They have found out very many wonderful things, but there are very many others that are just as mysterious to-day as they were when people first began to study the brain.

The mind, what it is and how it works, is the Architect's secret. He will never reveal it. So long as he keeps it, it will never be possible for any human being to make a doll or an imitation man that is alive.

Even a young child would be amused if you should ask him if he could think with his feet. You know by instinct that you think with your head, or with something that is in your head. This something in your head, with which you think, is the brain.

The substance of the brain is very soft and easily crushed. It is surrounded and protected by a wall of bone, called the skull. You

all know the shape of a skull. Inside the skull the brain is surrounded by water. It rests upon a cushion of water.

So important is the brain that it has six coverings. First, is the hair. This is a very great protection. Football players who expect to be hurt let the hair grow long so that their heads will be better protected against blows. When the hair is long and thick it is hard to cut the scalp. Thick hair keeps out the cold and prevents the brain from getting chilled. The hair is also a protection against heat.

The second covering of the brain is the scalp. The scalp is a part of the skin. It is tougher and thicker than the skin of the rest of the body and contains more hairs and more oil glands to the square inch. The third covering is the skull, the bony wall around the brain. The bones of the skull are very hard and very smooth. The part of the skull that forms a bowl to hold the brain is called the cranium. The cranium and the face bones make the whole skull. Each bone of the cranium consists of two plates with a layer of soft bone between. Like the double wall

of a house with padding between, this makes a stronger protection. Inside this double wall of bony plates are three other coverings called coats. The outer one of these three coats helps to keep the brain in shape. The second coat gives it room in which to move. The third coat supplies it with blood. Between these coats are thin layers of water, completely surrounding the brain. The brain as a whole and every cell of the brain is surrounded by water. This is a protection against the constant jar of walking and a great protection against the occasional shock of a fall or a blow.

If you take off the shell of a walnut, very carefully, so as not to break the kernel, the outside of the walnut meat will give you a rough idea of the appearance of the outside of the brain. The outside of the brain like the outside of the walnut meat is folded in ridges and hollows. The hollows get deeper and the ridges more crooked as you grow older. The outer layer of the brain becomes thicker as the mind develops.

The largest part of the brain is called the "big brain" or cerebrum. There is a smaller

part called the cerebellum, or little brain. There are two other parts of the brain. They have long Latin names but the names are not hard to remember when you know what they mean. One is medulla oblongata and means oblong marrow. You have seen the marrow of a chicken bone or a soup bone. The oblong marrow is something like that but it is only an inch and a half long. It is the enlarged end of the spinal cord as it enters the head. It comes out of the top of the backbone. If the medulla oblongata is hurt instant death takes place.

The other long Latin name is pons Varolii. Pons means bridge. Varolii is taken from the name of the man who described the bridge. The brain bridge or pons Varolii connects the two halves of the little brain or cerebellum.

Of course you have not forgotten all this time, that I have been describing the central office of your telegraph system and also the headquarters of every worker and every messenger in the temple. But the brain is different from other public offices. It is very, very beautiful. It is full of winding passages. It has many strange rooms covered with lace-

like fringe and curious tapestries. It is the most secret and mysterious of all the wonderful rooms of the temple. Somewhere among its hidden chambers, no one knows just where, for no one but the Architect and you, has ever entered it, is your sanctum sanctorum, your sacred place, your own private, secret room, where you live from babyhood to manhood, through old age, so long as you have need of the body temple.

It is the life that you live in your sanctum sanctorum that makes you different from all other animals. This is the inmost life. Your friends the birds may sing sweeter songs than any man. Your dog may run faster and smell farther than you can. Many a four footed beast has a body, an eye, an ear, a brain, as complete and perfect as your own, but neither bird nor dog nor any other animal can live the inmost life. The human animal is the only one that has a sanctum sanctorum.

It is the sanctum sanctorum, the holy sanctuary of the brain, that makes your body a temple. Without this sacred place you would be no higher, no more responsible than

any other creature. You would be simply an animal like your dog.

You do not blame your dog if he breaks a window or kills your bird. He does not know any better. But you know better than to break a window or kill a bird. Your conscience, that is a part of you, in your sanctum sanctorum, tells you better.

The power that you have in your sanctum sanctorum makes you responsible. The telegraph operator of a busy railway office bears great responsibility. He must keep his brain clear and pay strict attention that there be no delays or wrecks. It is a terrible crime for a telegraph operator to risk the lives of hundreds of people by confusing his brain or neglecting his work.

It is a greater crime for you to profane and injure or destroy the noblest work of God, the sacred temple of the body, by any wilful violation of physical law.

[XIV.]

The Brain Workers.

By this time, I hope, you have got the true idea of a living temple. And you think of this living temple not as a cold, dark place, empty and still, but as warm and light and full of busy workers that go about their duties with marvelous skill and perfect harmony.

All the work of the body is done by cells. The cells that do the work of the brain are called nerve cells or neurons. There are about three billion nerve cells in the brain and spinal cord.

Three billion separate, active bodies in a space no larger than a melon!

Perhaps you have not a very clear idea of how many a billion is. A billion is a thousand million. There are only seventy-five million people in the whole United States. And in the whole world from the north pole to the

south pole and from New York away around the earth to New York again, in all Europe, Asia, Africa, Australia, North and South America, and the islands of the ocean there are only one billion five hundred million people. But there are three billion distinct and separate cells in your brain and nerve centers alone, to say nothing of the rest of your body. And these three billion distinct and separate cells are not at all crowded for room. They are not even obliged to touch each other.

Some of the nerve cells are so small that it would take three thousand of them, placed end to end in a straight line to extend one inch. Others are larger, so that two hundred and fifty, end to end, would make one inch.

Look at your baby sister's head. Let me tell you that that baby's head and every other baby's head contains just as many brain cells as yours or mine or any other grown person's. Every brain cell you will ever have to work with was in your head when you were born. No amount of study can manufacture brain cells.

Many things, however, will injure brain cells. Cigarettes will do it as well as any-

thing. If you wish to weaken thousands and millions of the busy little cell workers in your brain, just smoke or chew tobacco, or drink whisky.

There is no surer way to impair the mind and brain, to make oneself weak and useless, than to harm the faithful little laborers that are always working day and night to keep the living temple growing.

Do you wonder how it can be that a little baby one day old can have as many brain cells as you have, when your head is so much larger? The reason is that brain cells, just like boys and girls, grow larger as they grow older. Like boys and girls, too, they grow larger and stronger by exercise. Some brain cells can grow to be ten thousand times as large as they were at first. And still they do not burst the skull. And still there is plenty of room for them in the brain and they need not touch any other cell unless their work requires it.

If you could look into the brain and watch the little cell workers you would see a queer sight, for these tiny nerve bodies are very

curious in shape and also behave most surprisingly.

Some of the brain workers look like spiders with many legs. These are called spider cells. Others look like old fashioned kites with long tails. Others look like turnips, having a large body, a bushy top and a long central root. Some are star shaped, some are three cornered, some are very irregular. Some nerve cells have so many branches that they make one think of a luxuriant tree.

Imagine spiders, and kites, and turnips, and stars, and triangles and branches of trees all in your head together and working as hard as they can carrying messages back and forth between your sanctum sanctorum and every part of the temple!

But that is not the most interesting part of it. Every cell works under water! It is separated from every other cell of the brain by a delicate film of fluid and rests on a cushion of fluid. So it is perfectly true to say that you do your thinking under water.

You can see, then, that the little brain workers are taking a bath all the time, while

they are working and when they are resting. The same layer of water that is always bathing them, also brings them food, which has been taken from the blood.

The little brain cells, like other workers, have arms and legs. Some have two, some have three, some have more. These arms and legs project in all directions. They have branches like trees and form what are called dendrites. When the cell has a message to deliver the branches reach out and touch the branches of some other cell.

The brain worker has a tail as well as arms and legs. The tail of the brain cell or its axis-cylinder is a very delicate white silvery thread that reaches from the cell body into the substance of the brain, or sometimes down, down, far down, into the spinal cord. Some of the tails are very long. Others are very short.

The silvery threads or tails of the brain cells are nerve fibres. Each cell has one of these fine, single threads that connects it with the thicker cord of a nerve trunk. These are the tiny telegraph wires that carry messages from one cell to another.

Imagine your dog's tail being a telegraph wire as well as a tail! If you pull the dog's tail he will bark at you. That is because a message went up his tail to his brain. So if you touch the silvery thread of a nerve cell, a message is sent to your sanctum sanctorum.

Each thread, or tail, or nerve fibre is covered by a layer of fat. This prevents messages from jumping across from one nerve to another. If messages were to jump from one nerve to another the brain would be in constant confusion, and much worse confusion than is caused in a business office by the crossing of telephone wires.

The little brain workers wear gray coats. If you study them through the microscope you see that their arms and legs are very rough and appear as if they were tied in knots. Altogether the little brain workers are very queer looking and queer acting objects.

Most of the brain workers live and work in the outer surface of the brain which is called the cortex. Cortex means bark. So the brain workers live in the bark of the brain.

The cortex, or bark, or layer of gray cells, varies from one-eighth to a quarter of an inch in thickness. This is called the gray matter of the brain. The white matter of the brain is inside this layer of gray matter and is made up of millions and millions of the little white nerve fibres of the gray cells. Where the gray matter dips down into the hollows, those hollows like the hollows of the walnut meat, it may be thicker than on the ridges. If the gray matter could be flattened out smooth like a table cloth it would cover four square feet. Hence, you see, you have actually four square feet of thinking surface.

The more perfectly the brain is developed the thicker the gray matter becomes. The more you use them the larger and stronger and faster the cells grow. The more different things you study and the more thoroughly you learn one thing the more cells are set to work and exercised. Every new thing you think or say or do calls a new band of brain workers into service.

[XV.]

What the Brain Workers Do.

When men are building a church or a temple or any big building, if they do not like the workmen they dismiss them and hire others. You can not do that with the workers in your body. If the workers in your living temple do not do their work well it is your fault, not theirs. If you injure them or destroy them you can not have others to take their places. There are no others that could do their work. Each cell of the body has its own place and its own work. It can do just the one thing it was made to do and nothing else. If it is injured or dies its work is left undone. Its fellow workers will do what they can to carry the extra burden but they can not fill the lost cell's place.

The nerve cells control all the other cells in the body. They are the head officers of the temple's working force. Most of them

are stationed in the grand central office, the brain. Large numbers, however, are placed in the spinal cord, and in other centers throughout the body. Every little and unimportant part of the temple has its tiny telegraph office and its faithful operators. Each nerve cell is an operator and controls one wire, that white silvery thread. Some of the wires are short, not even leaving the brain. Others are several inches, it may be a foot or two or three feet long.

These wires are different from other telegraph wires. The same wire that carries a message to the brain can not bring the answer back. One tiny telegraph office receives the message and another answers it. The nerve-cell officers, these living officers that are also hard workers, reach out their arms and touch each other. In this way they exchange messages.

The grand central office, the brain, is divided into many different compartments or centers. Each center attends to certain work. One group of nerve cells stores away all the messages received through the eye. Another takes messages from the ear. Each of the

five senses reports to a special part of the brain. Every movement of the body is ordered from a center called the motor center.

No other telegraph office can equal this in variety or rapidity of work. The largest and busiest office of the Western Union's whole system does not do as much business in a year as your brain does in a day. Thousands and thousands of different messages may be coming and going in your brain at once. Every message that comes in is classified instantly and put into its proper pigeon hole. If it needs an immediate answer, it is answered. If not, it stays in the pigeon hole until you call for it.

If you could at any given moment see all that is going on in this marvelous office while you are doing some simple thing, you would be astonished. For instance, suppose you are playing the piano. Think now of all the different bands of brain cells that are working as hard as they can to help you. There are the sight nerves. They are carrying into the brain, over the great optic pathway, exact pictures of the musical notes. The group of cells in the back of the brain that receives

these pictures, communicates with another group of cells that classifies the notes. This group of cells in the front of the brain decides what keys on the piano correspond to the written notes. The office of this group then calls up the motor center and asks to have orders sent to certain muscles to make certain fingers touch certain keys. The striking of your fingers on the keys makes a sound. This sound enters the ears and is carried by the nerves of hearing to the hearing center. The hearing center, like the optic center, reports the sound to the intellectual center in the front of the brain. The intellectual center decides whether the sound was correct or not and sends new orders accordingly. And all this happens in one second, while you are playing just one note. Imagine the activity of a great musician's brain while he is playing a Beethoven symphony!

You see, then, that all the little brain workers work together and all the different nerve centers work together in perfect harmony. But they do not work independently. They work under you as the other cells in the body work under them. They obey your orders

as the other cells obey theirs. You do not, however, have to keep repeating the same order to the same cell.

You know yourself that after you have done a thing once it is easier to do it again. It is just so with the little workers of the body. They form habits very quickly. If you tell the nerve cells, once, to make your finger play the wrong note, it will be easier for them the second time to play the wrong note than the right one. Every time they play the wrong note it will be still easier. If you do not correct the mistake at once and make the nerve cells form the habit of playing the right note, by and by it will be almost impossible. Your finger will always play that one note wrong.

I knew a boy who used to squint "just for fun." He trained certain cells to make him squint whenever he ordered it. After a while they made him squint whether he ordered it or not. They had formed a habit that he could not break.

The little baby's brain is like a big forest on the frontier. It is hard to get messages back and forth. The brain workers are all un-

skilled. The centers of speech can make only one sound, a cry. The centers of motion, the motor centers, have not learned one thing about their work. To speak the first word is like forcing a new path through the forest. But the second word follows in the track of the first and soon there is a beaten road.

It is the same way with the baby's first step. How many times he falls before his nerve cells of motion have learned their work.

When the baby is trying to walk he does not think of anything else. He puts his whole mind on this one thing. By and by his motor nerve cells are trained. They have learned their work. They have formed the habit of walking. He walks now without thinking about it. We say that he walks "automatically" or like a machine.

You never think of your feet, or the muscles of your legs, or your motor nerve cells, when you are walking, do you? That is, you do not ordinarily think of them. You can walk and walk and pay no attention to your little brain workers. You can walk and walk and be thinking all the time of some-

thing else,—of the book you are reading or the fun you are planning.

But there are times when you can not do this. Suppose, for example, you are visiting in the country and go out for a walk in the meadow. Your nerve cells of sight are busy taking pictures. Your nerve cells of hearing are storing away sounds. Your nerve cells of smell are registering odors. Your nerve cells of touch are putting into their pigeon holes the gentle messages of the breeze, perhaps the prick of a thorn or the sting of a nettle. Your nerve cells of motion are making you walk.

You, however, are unconscious of walking. Your nerve cells of motion take you where they please. You are giving your whole attention to the beautiful pictures, the sweet sounds, the fragrant odors, the balmy touch of the breeze. You become more and more absorbed in the woods, the clouds, the flowers, the singing of the brook, the call of the bird, the tinkling of a cow bell far away, the fragrant odors, the balmy freshness of the air.

Suddenly your nerve cells of hearing are

startled by a strange sound. You look up and your nerve cells of sight tell you that a furious bull is rushing straight at you. You gaze at no more landscapes, hear no more songs, smell no more odors. Your nerves of sight, of hearing, of smell stop their work at once. Your whole attention is instantly transferred to your motor center. Every nerve cell of motion you have ever used for covering ground at this moment hears from you, gets a message from your sanctum sanctorum. You do not move automatically now. You do not walk now without thinking about it. You do not walk at all. You run. You do not run unconsciously. You do not now let your nerve cells of motion take you where they please. Your whole mind is bent on having them take you over the fence and that as speedily as a few millions of very much excited nerve cells can.

Do you get over the fence? That depends upon how well you have trained the motor cells.

By this time I suppose you would be much disappointed if I did not tell you something strange about every part of the body temple.

Let us play that you did get over the fence and are sitting on the grass on the other side. While your motor cells are resting I will tell you something strange about them. These tiny motor cells, that are among the busiest workers of the brain, are also perfect little electric batteries. Yes, each one of the motor nerve cells is an electrical battery that generates nerve force or nerve electricity. The nerve electricity is stored in the cells while you are sleeping or resting. It is ready to use at a moment's notice. When you wish to use a certain muscle the cell sets the nerve electricity free and it passes out over a nerve fibre at the rate of one hundred and forty feet a second. When it reaches a muscle fibre the electrical current causes a little explosion. It is an explosion of the food stored in the muscle. The explosion makes the muscle work. The muscle contracts. It is the work of muscles to contract and to relax.

If the nerve fibre going to a certain muscle be cut or destroyed the muscle can not move, no matter how strong and perfect it may be. The wires are down between it and the central office. The command to move can not reach

it. No message can get from it to the brain.

I could tell you just as strange things about many others of the little brain workers. Perhaps I will, sometime. You can also study them out for yourself if you wish.

[XVI.]

How the Brain Workers Are Trained.

Although the little brain workers are only nerve cells it depends entirely upon how you train them whether the living temple of your body will be beautiful or not.

Your baby sister, who can neither walk nor talk, who lies on the bed and kicks and coos, does not seem to be doing much. But she may be busier than you. All her little energies are already hard at work trying to teach the young nerve cells their duties. Every time she makes a new motion or a new sound new bands of nerve cells have been called to action. You can see that she makes steadier motions and plainer sounds every day. As I said before, the nerve cells, like other laborers, learn their work by practicing.

The nerve cells, however, can not think. They can not tell themselves what to do in the first place. But they can and do remem-

ber what you tell them. Sometimes they remember better than you wish they did.

This places the whole responsibility upon you. The nerve cells will remember just what you teach them. But when a nerve cell has once learned its work, a change takes place in that nerve cell's body, so that it can not learn anything new. It must keep at work in the way you have taught it, if it works at all. If you have taught the nerve cell to do something that you wish to stop doing, the only way you can proceed is to let that nerve cell alone and arouse a new one that has never done anything. You must not give any more orders at all to the old nerve cell, but must train the new one to do the work right. The old nerve cell will keep on doing its work wrong, without being told, for a while, but usually by and by it will become discouraged and waste away. You would better have wasted nerve cells in your brain than those that are working wrong. But if you train them right in the first place they will not only work right but they will also live and grow stronger and do their work better and better.

The little brain workers of the living temple not only do the one work they learn, and that alone, but in doing this work they also make pathways in the brain. The first message that comes into or goes out of any part of the brain has to make its own path. But the next similar message finds it easier to go the same way. Thus paths are formed in the substance of the brain. By and by these paths become so smooth and so deeply worn that it is almost impossible for a message to go any other way. It is easy to follow a rut.

This explains a great many things. It explains not only walking and running but other common habits. Did you ever notice that you almost always make the same motions in dressing or undressing, and in the same order? You put on your right shoe first or your left shoe first. You wash your face and comb your hair either before or after putting on your dress or coat. If anything happens to make you do the opposite way, you notice it. Otherwise you think of something else while you are dressing. Your nerve cells are doing their work without special orders from you. They are following

their habit. If anything stops them, they wait for orders. When you have to give a special order, you notice it.

The drunkard has cut deep pathways of habit in his brain. His nerve cells of smell and taste have so long called for messages to be sent along the pathway of yielding that they can not go any other way. If his mind, in the sanctum sanctorum, should send out a "No" when the nerve cells are clamoring "Yes," that "No" would have to force its way against great obstacles. But the pathway of "Yes" is all made. That is the reason so few drunkards really reform.

The pathways the nerve cells make in your brain by the time you are twenty-five years old determine, to a large extent, your character. They determine what kind of a man or a woman you will be. They determine what kind of a living temple your life will build.

The younger you are the easier it is to make these pathways what you wish. The first habits you form have the greatest influence on your life. If you wish to enjoy music when you are a man you must learn to enjoy it when you are a boy. If you wish

to use good language when you are grown you must train your nerve cells correctly when you are a child.

If you wish to be able to say "No" to temptations brought by the senses you must make a pathway for "No," in your brain. You must do this now. You can not wait. For whether you know it or not you are making a pathway for "Yes" or for "No" every moment of your life. You can not say "I will begin the path tomorrow and I will make it right." By this very thought you are making a pathway for putting things off.

Do you know why it is that some of your playmates can remember things better than you can? It is because their nerve cells are better trained.

Photographers in taking a picture are careful to get a good exposure. If the picture does not have a good exposure it is indistinct. It is the same way with the pictures taken by the living camera, the eye. If the pictures are not well made they fade.

One boy may look at a word several times and forget it immediately. Another looks at it once and remembers it. The first boy

looked at it carelessly. He did not give it a good exposure. The picture made in his brain was dim and soon faded. But the second boy turned his whole mind to the word. He looked at it closely. The picture made in his brain was distinct and clear, and did not fade. When he wanted it again, he had it.

So, you see, it does not make so much difference today, whether you learn your lessons or not, whether you form good habits or not, whether you look at good pictures and good words, whether you listen to true sounds or false, whether you say "Yes" or whether you say "No"—it does not make so much difference today, that is, the difference does not show so much today as it will tomorrow, or a week from now, or years from now, when you are a man.

By and by when the pathways of the brain are fixed, you will be glad you have taught the little cells true and skilful work.

By and by when you shut your eyes and tell the sight cells to show you pictures of your childhood and youth, when they bring back your old home, your mother's face, the garden where you used to play, the school

house and your desk by the window, if they show you only pleasant pictures of merry, loving and peaceful scenes, happy are you.

By and by when you lean back in your arm chair and tell your hearing cells to whisper the memories they have stored away, happy are you if they report kind words, true voices, tender melodies.

For the little nerve workers of the brain have stored away in their secret cells the memory of every thing you have seen or heard, tasted or smelled, touched or thought, every thing you have studied or learned or done since the first day of your life.

But they have not stored away the things you have not thought or seen or heard or studied. If you do not learn to read, to write, to spell, to draw, to play musical instruments, to use tools, to throw a ball straight, to sew neatly and swiftly, if you do not look at good pictures and hear good music, if you do not learn self control and a love of truth, if you do not occupy the nerve cells of your brain with these things when you are young, when you are old it will be too late. The nerve cells have not been idle all these years. You have

been training them one way or another. If you have not been teaching them good habits you have been teaching them bad habits. They have stored away bad memories. They have made bad pathways in your brain.

"You can not teach an old dog new tricks."

The nerve cells, like other workers, must exercise, or they can not grow. If you do not use them they waste away. After a while they may lose their ability to work. The mole has lived so long underground where it does not need eyes, that it has become almost blind. The fishes in the mammoth cave where there is no light are said to be blind. If you do uot use your muscles they get weaker and weaker until they are good for nothing. So with the brain cells. You must set them to work when they are young and strong. You must call into action as many different groups of workers as you wish to have ready to serve you through the years of manhood and old age.

Nerve cells, also, become tired. When a nerve cell is tired, it lops, like a tired human being. It loses its shape, grows smaller, draws in its arms and legs and refuses to

communicate with other cells. It acts like any other tired laborer. If you give it stimulants, it rouses itself and goes to work again for a little while but afterward it is more tired than ever.

The little brain workers are trained by you. The habits they form show what you are. They show what your thoughts and desires have been in the past and what they are now. They reveal your character.

[XVII.]

The Sympathetic Workers.

You have seen how the little brain cells work together, each in its own place. All the cells of the body work together just as faithfully, each in its own place. If one group of workers is sick all the other groups suffer with it. They not only suffer with it, but they try to help it, just as you try to help your brothers and sisters by doing their work when they are ill.

There is one class of workers in the temple whose chief business it is to be sympathetic, to help other workers do their work, to help you, especially when you are asleep or tired, to keep the work of the living building going smoothly. These workers are called the sympathetic nerves.

Two sympathetic nerve cords start in the neck and go down, one on each side of the back bone. The two sympathetic nerve

cords in passing down the back bone have twenty-four stopping stations. The stopping stations are called ganglia. They are sympathetic ganglia. You remember the spinal cord, that main wire of the temple's telegraph system that runs down from the brain inside the back bone or spine? The spinal cord and the sympathetic cords make three nerve cords down the middle of the back, two outside and one inside the back bone. The sympathetic nerve cords outside the back bone are connected with the spinal cord inside by little arms or feelers,—nerve fibers that reach in from each stopping place or ganglion. Other nerve fibers or feelers reach out to other ganglia or sympathetic stopping places in the heart, the lungs, the liver, the kidneys and the intestines.

The Architect of the temple has put these little sympathetic workers or ganglia into the body so that the little brain workers will not have so much to do, so that much of the work of the building can be carried on without direct orders from you. There are so many different things to be done all the time and some of the work is so difficult and so deli-

cate that if we had to attend to every little detail the beautiful temple would soon be in ruins.

The sympathetic workers have indeed a wonderful part in the body building. They preside over the circulation of the blood and the digestion of food. They help to make the heart beat. They fill the lungs with air. All the work of the body that is done without orders from the central office is done through them. Through them God works while we are asleep.

There are sympathetic nerves in all the blood vessels. It is their business to regulate the supply of blood to any part. They do this by making the blood vessels larger or smaller. Thus they let in or keep out the blood.

When cold first touches the skin the sympathetic workers contract the blood vessels and the blood is driven out. But it rushes back at once. When heat first touches the skin the sympathetic workers relax the blood vessels and more blood rushes to the skin.

You can try this and see. Hold a piece of ice to your cheek. It turns white at once.

The sympathetic nerves have contracted the blood vessels The blood has left the skin. As soon as you remove the ice the skin becomes red. The sympathetic nerves have relaxed the blood vessels and the blood has come back,—even more blood than was there before.

When you put your hand into hot water, it gets red because the sympathetic workers have sent more blood to that part.

Behind the stomach is a very large group of sympathetic nerves, some coming from and some going to all the organs of the body. This group is called the solar plexus or abdominal brain. When the great brain in the head is asleep the solar plexus or abdominal brain and all the little sympathetic workers are wide awake and busy, giving directions and keeping up their work under the direction of the Architect himself.

If you have been hit by a stone and lose your senses, as we say, it is only the brain workers that stop their work. The nerves of sight, of hearing, of touch and taste and smell, the motor nerves also, are stunned and cease to act. But the little sympathetic

workers are not disturbed. They keep straight on steadily and faithfully, making your heart beat, filling your lungs with air, moving the blood, digesting food.

In house building, after you have decided upon the plan and materials and after you have signed the contract with the architect your work is done. So in body building, after you have chosen certain food, after you have put it into your mouth, chewed it and given the order to swallow it you have no more control over it. Now the sympathetic nerves take charge. They cause the food to be swallowed. They make the gastric juice flow out. They move the stomach and the intestines. They direct the entire process of digestion until the food is made into blood and built into the body.

But although the little sympathetic nerves work independently of the brain, yet they are greatly influenced by it. They are truly and intensely sympathetic. Every little cell is affected by your state of mind. If you feel well and happy, active and hopeful, the sympathetic nerves work briskly and vigorously. If you are sick and worried, discontented and

fretful the sympathetic workers feel it and are burdened. They work more slowly and their work is not so well done. The stomach becomes discouraged, the liver grows lazy, the heart beats faintly, the appetite is poor, and sleep is unrefreshing.

You can make the little sympathetic workers feel so bad that they can hardly work at all. If you think you are going to be sick and keep thinking about it you may confuse and upset the sympathetic nerves so that their work is hindered until you *are* sick. But if you make up your mind to resist bad feelings and are bent upon keeping well and strong, the sympathetic workers will help you bravely and you may keep off an illness altogether. It pays to be kind to your sympathetic nerves.

[XVIII.]

How to Take Care of the Nerve Workers

In building the temple of the body everything depends upon keeping the little workers healthy,—all the little workers and especially the brain cells.

You know that if the officers of any working company are disabled there is confusion and the work is hindered or stopped. The nerve cells are the officers of the temple's working force. They control every muscle and every organ. If a nerve is cut, or if any muscle or any organ is separated from its controlling nerve center, the muscle or the organ will stop working and by and by will waste away. If the nerve cells are not well fed and exercised, if they do not have the rest they need, they become tired and irritable. So it is very, very important in the building and manning of the temple to take the proper care of all the officers.

The nerve workers must have the very best and most wholesome food. They spend more energy than any other cell workers. This energy is liberated from food and drink, air and sunlight. If you do not give the nerve workers nourishing food they can not get much energy. If you over feed them they are just as badly served. They become lazy and stupid and refuse to work. So you see there is a close connection between what you eat and what you are. Even your thoughts depend very much upon the food and drink you choose.

The best foods out of which to make energy for the little brain workers are simple foods like grains, fruits, and nuts. The best drink is water.

You must also breathe pure air for the busy little brain cells. Every time you expand your lungs and take in a deep breath you are bringing new life and vigor to all the millions and millions of faithful body workers.

If you do not eat good food, if you eat hastily or over eat, if you breathe impure air and drink impure water you are treating the nerve workers shamefully. You are

starving them and yet expecting them to work. You are covering them with clouds and fog and yet expecting them to go straight on, briskly, as if the atmosphere were clear. They can not work in a heavy fog any better than you could.

You would not think of giving poison to the workers on a building. But the majority of people are feeding poisons to the little brain workers all the time.

Tobacco is the most common poison that is given to the brain cells. It is forced upon them. They do not want it. They fight against it. They recognize it as a deadly enemy. But more and more the boys and men of our country are compelling them to take it.

The poison of tobacco acts like any other poison,—it destroys and kills. It attacks the little motor nerves and makes them stagger. If you smoke you can not write with so steady a hand as if you did not. It stunts the growth. It sometimes weakens the great optic nerve and dims the eyesight. It injures the cells that store away pictures and impressions so that the memory is im-

paired. It keeps the little brain workers awake and disturbs the sleep.

Another poison to the nerves is alcohol. It is given in beer, fermented wine, whisky and brandy. It makes the brain cells smaller, shortens their arms and legs and makes them stiff and hard. After a while it destroys their power to act. Then they are useless. Thus it weakens the judgment, lessens the power of self-control, deceives the mind, and ruins the beautiful living temple.

Alcohol is a subtle poison. It weakens the nerves, but it pleases them. It makes them depend upon it and ask for more. After a while they crave it. A habit has been formed. A pathway of yielding has been broken through the forest. It is no longer possible to say "No."

Many a man has lost millions of dollars because his little brain workers were so poisoned by alcohol that they could not help him in business transactions.

Many a man has wrecked trainloads of people and sent scores and hundreds to a terrible death because his little brain workers were so poisoned by alcohol that they could

not help him run the engine or send the right messages over the wires.

Many a man has brought disease and death upon himself because his little brain workers were so maddened by alcohol that they gave him up to the most frightful suffering.

Tobacco and alcohol are thieves and murderers. They must be kept out of the temple absolutely. Then they can get no influence and do no harm among the brain and body workers.

Like all other workers, the brain workers need rest. Every thought, every movement, every command, tires some nerve cell and causes waste in its body. If this waste is not repaired the cell is weakened and does poor work.

During sleep is the best time for repairing the waste in brain cells. Then the brain workers are not on duty. The sympathetic workers are in control and the brain cells are supposed to be resting. They are supposed to be resting and at the same time building up their strength and energy for the next day's work. If the sleep is sound and healthful they are doing this. But if you go to bed

excited or if you eat just before retiring your sleep is not sound and healthful and the brain cells can not get the necessary rest.

Children and young people need more sleep than older persons for their brain cells and all the other little cells are not only working and wasting, but growing also in size and power. Nothing is so necessary to the health and strength of the nerves as sleep. Without sleep the brain cells can not repair the waste in their bodies. They can not make new energy. They become exhausted and can not work. When they can not work, you can not work. When they are tired, you are tired. You can not move rapidly. Your thoughts come slowly. You can not remember. You are cross and impatient.

When you have had a sound and sweet sleep you feel ready to undertake a big day's work. Your nerve cells are rested. They have filled themselves with energy and are eager to spend it. Things that looked impossible the night before seem easy now. You are happy and pleasant and brimming over with life and spirits.

But the brain cells need work as well as

rest. Working makes them strong. As they spend their energy they call for more. That gives you an appetite. The better the brain cells work the better all the other cells of the body work. The better all the little cell workers of the body work the more beautiful and complete becomes the living temple.

The more the brain cells practice their work the better they can do it. The better they do it the more gracefully you can move, the more perfectly and eloquently you can speak, the better and more nobly you can think, the better and more perfect you are.

If you take care of the little brain workers, if you give them proper food, sufficient rest, and do not poison them or keep them awake when they ought to be asleep, there is no danger that you will make them work too hard. It is their nature to work hard. They can not work too hard. But they may work too long at one thing.

For this reason when you have been studying hard it is better to go out doors and run and play or chop wood than to sit in the window and read a story. If you read the

story, you are keeping the same nerve cells at work that helped you study. But if you work out doors the tired workers can rest, while fresh cells have a chance to use their energy. A change of work is the best kind of rest for the brain cells.

If the builders of a house quarrel among themselves the work does not prosper. So you, the builder of a living temple, must be in harmony with the divine Master Builder or the work can not prosper. The more perfectly you bring your mind to be in harmony with Him the more perfect and beautiful the finished product of your life will be.

A mind in harmony with God is free from worry, from fear, from anger.

Nothing hurts the brain cells more than worry. You have known a lamb to be worried almost to death by dogs or wolves. You can worry the brain cells until they are injured beyond repair. Worry hinders digestion, interferes with the action of the heart, prevents sleep, and makes life miserable.

Fear is akin to worry and like it brings only harm to the brain and body workers. "Per-

fect love casteth out fear." If you are in harmony with God these enemies of health can not enter the temple.

Anger, like alcohol, makes the brain cells drunk. Sometimes it kills them. I knew a woman who became so angry at another woman that she burst a blood vessel in her brain and fell to the floor, a senseless heap. Four days afterward she died.

If you are in harmony with the Master Builder you have faith in Him. You have love and hope and faith to inspire the little brain workers instead of anger, fear, and worry to discourage them. Faith, love, and hope make the brain cells work better. They stimulate you and lead you to do your very best for all the workers of the temple.

[XIX.]

The Living Fountain.

You have all read stories of magic fountains. Sometimes they are in a fairy palace. Again they are hidden in a wood. Sometimes they are carved with strange devices, or set with precious stones, or made in the form of a flower or an animal. Sometimes an elf, a sprite, or a genius visits the fountain and may be seen there. But these are all mere stories and we know that not one of them is true.

There is, however, a real and very wonderful fountain in the temple of the body. It is called the heart. Unless you know about it or examine it closely it is not remarkable to look at, being nothing but a hollow muscle shaped like a pear or a cone, and shut up in a little bag. But the work this fountain does and the use it serves in the living temple more than makes up for its plain outside appearance.

The heart is about the size of one's fist. I do not mean that everybody's heart is about the size of your fist, but that everybody's heart is the size of his own fist. The little baby, then, has a very tiny heart, but the big tall man with a massive fist has a heart to correspond.

You can not see this living fountain, but you can hear the music of it by putting your ear to another person's chest. The small end of the heart, the apex, points to the left side of the chest wall between the fifth and sixth ribs. So you can hear it, as I said. You can also feel it by pressing your fingers over it on the chest. Sometimes it beats so strongly that you can see the motion of it.

When you are well the heart beat can always be felt, seen and heard. The water is never turned off from the living fountain. But although the swift and steady stream of life is always flowing through the heart both day and night, yet this little living, working fountain manages to get about fifteen hours rest in every twenty-four. Every part of the living temple must have rest.

The large end or base of the heart points

upward to the right and is under the breast bone. Like the brain, the eye, and the ear, this precious part of the living temple is especially protected by bony walls. All the pipes that carry the stream of life into and out of the fountain enter or leave the heart at the large end or base.

The bag that encloses the heart is called the pericardium. The name is taken from the Latin *cardium*, meaning the heart, and *peri*, meaning around. In this little bag is a kind of water or fluid that keeps the outside of the heart moist and prevents it from rubbing against the bag. The fluid oils the heart and makes it run smoothly. Sometimes this fluid dries up and then every heart beat causes great pain.

The living fountain is a double fountain. There is no connection between the right side and the left side. It is almost the same as if there were one heart on the right side of the chest and another on the left.

Each side of the heart or fountain contains two rooms or basins, one above the other. The upper basin or room is at the large end of the heart and is called the auricle. The

lower room or basin is called the ventricle. This makes four rooms or basins in every heart.

The stream of life in passing through the heart, enters, slowly, the right upper auricle or basin until from six to ten tablespoonfuls or from three to five ounces have passed in. There is a trap door made of three little valves in the floor of this room. It is called the valve with three flaps or the tricuspid valve. When the right auricle has taken in about three ounces of blood, the trap door flies open and the blood drops into the lower room or right ventricle. As this room fills up the trap door floats on top of the blood. When the right ventricle is full the trap door is closed. It is a self closing door.

When the lower room on the right side is full and the trap door is closing, the muscle walls of the room begin to contract and to squeeze the blood out into a large pipe, called the pulmonary artery. They can not squeeze it back through the trap door into the upper room for the trap door can not open that way. It is fastened on the under side of the wall of the heart by many little cords that

hold it firmly in place when it is shut. When these little flesh doors get out of order and fail to close there is terrible disturbance throughout the temple.

The blood is forced through the pulmonary pipe or artery into the lungs. When it enters the lungs it has a dark purple color. In the lungs the purple color is changed to a beautiful bright red. Then the blood is carried back to the heart by four different pipes called pulmonary veins.

But it does not go back to the right side of the heart. The beautiful red blood flows into the fountain through the upper room on the left side of the heart, the left auricle. The purple blood and the red blood are absolutely separate in the heart. There is another trap door on this side of the heart. It is called the mitral valve. Through this the blood is forced into the lower left room or basin which is called the left ventricle.

The walls of the left side of the fountain are very much thicker than the walls of the right side, for the left side has to force the blood all over the body, while the right side has to force it only through the lungs.

The left ventricle squeezes the blood with great force into the largest tube or artery connected with the fountain, the aorta. The aorta and its branches carry the stream of life to every part of the living temple.

All this happens far more quickly than I can tell it. Just the squeezing of the blood through the heart and the short rest afterwards take only eight tenths of a second.

The living fountain is kept running by the little nerve workers. Most of them are sympathetic workers. They send the stream of life flowing through it all the time, steadily, silently, without will or thought of yours. When you are asleep your heart is beating just the same as if you were awake, only more slowly. You do not give orders to make it beat more slowly, but the sympathetic workers do.

The walls and basins of the fountain and the crimson stream that is flowing through it are all alive with temple workers. They are not fairies or mischievous elves, but steady and faithful little workers, living cells that work together doing their part in the constant building of the living temple.

They obey the nerve workers—the sympathetic workers and the little brain workers. You never know that you have a heart until something happens to you. If you are knocked down and lose your senses, as I said before, the sympathetic workers keep the stream of life flowing, the trap doors opening, the muscle walls contracting and relaxing. If you hear good news, or bad news, if you get angry or have a joyful surprise the little brain workers send special messages to the heart to make it work faster or more slowly.

This is probably the reason that in olden times the people thought the mind was in the heart. Now we know that the mind is in the sanctum sanctorum, that it is there and not in the heart, that we think and feel, that we love and hate, that we know courage, fear, or pain.

The living fountain of the temple is the dwelling place not only of millions of busy workers, but also of a great and wonderful Genius—the Power of God. This power appears in every part of the body. It is the power of God that gives life to every little cell, and makes it able to work. It is God

by His power that has given you life, and mind and the beautiful living temple to build for Him. Without this power your heart could not beat once. You could not draw one breath.

Sometimes when you look at the living fountain of the temple you think it is a fountain. At other times it seems like an engine. Again it takes in your mind the form of a pump. What magic fountain of a fairy tale is so strange and wonderful as that? As a pump the heart is a force pump. The ventricles pump out the blood into the two large arteries, a partial vacuum is made in the auricles and the blood rushes in from the six large veins to fill it.

As an engine the heart is a simple but marvelous machine. Without steam, without coal, without wheel or cylinder, it runs day and night, year in and year out, seventy, eighty, it may be a hundred years. It beats on the average seventy two times a minute. Every time it beats it forces more than six ounces of blood into the blood vessels. At seventy two beats a minute, in one hour it has

completed at least four thousand three hundred and twenty beats; in twenty-four hours, one hundred and three thousand six hundred and eighty. Each one of these heart beats has lifted at least six ounces of blood. That makes six hundred and twenty two thousand six hundred and eighty ounces, or thirty eight thousand eight hundred and eighty pounds. Think of it! Almost twenty tons of blood lifted the same as one foot high every twenty four hours—and by a little engine no bigger than your fist.

This fountain, or engine, or pump, the heart, never stops for repairs. The great Builder has made it so that it is constantly renewing itself without hindering the work of the temple. But, being a living fountain, or engine, or pump, it can not work without rest. The great Builder had planned for this as only a divine Builder could. The heart rests about five tenths of a second at a time after it has forced the blood into the aorta, before the next contraction. In twenty four hours this five tenths of a second every eight tenths, amounts to fifteen hours. So the

heart does nine hours of high tension work a day. This is God's division of time into work and rest. Nine hours of high tension work is about the maximum for living tissue.

[XX.]

The Stream of Life.

Every little cell worker in the temple is dependent for life upon the stream that flows through the living fountain. We call this stream the blood. We usually think of it simply as a thick, red, rather unpleasant fluid, that we do not like to look at. We say that the sight of blood makes us sick. This is because the blood is not intended to be seen. Flowing, inside the body in the arteries and veins, it means health and life. Flowing, outside the body, through a wound, it means sickness and death.

If we could see the blood flowing inside the body through all the arteries and veins, if we could understand what it does for the temple and every little worker in it, we should no longer shrink from the sight of a few drops. We should recognize that it is indeed the stream of life and that every little blood

corpuscle has on board a tiny cargo of the Life of God and is bearing it swiftly to a waiting port.

The stream of life flows through every part of the living temple except the outside wall of the skin, the epidermis, the window pane of the eye, the cornea, the nails and the hair. These parts are nourished by a fluid called lymph.

If anything happens to prevent the blood corpuscles from reaching any part with their cargo of life that part will decay and die in less than two days. The health of every cell depends upon the freedom with which the blood flows to it. The more perfect the freedom the more perfect the health.

The weight of the blood is about one thirteenth of the weight of the body. A boy or girl weighing sixty-five pounds has five pounds of blood. A man or woman weighing one hundred and thirty pounds has ten pounds of blood.

One fourth of the blood is in the heart, the great blood vessels and the lungs. One fourth is in the liver. One fourth is in the

muscles. One fourth is in the skin and other parts.

According to the great Architect's plan the blood is so divided among all the parts of the body that each has enough to do its work perfectly. But there is never enough blood in the stream at any one time to fill every part full.

When the workers of any part are busy more blood is needed in that part than when they are resting. If you are chopping wood your muscle workers need more blood than your nerve workers. After you have eaten a hearty meal the little workers that digest food need more blood than the brain cells. They need so much more blood that you ought never to study at once after eating. If you do, both the brain workers and the workers that digest food will be clamoring for blood at the same time. Since both can not be fully satisfied at once the blood will be delayed, as you would be delayed if your mother and father were both calling you at the same time from opposite directions. You can not think the best and clearest thoughts

while the first part of the work of digestion is going on.

The stream of life, examined closely, is in reality very beautiful. If you look at a drop of blood through the microscope you will see this.

Notice first those tiny little moving columns made of round, biscuit shaped bodies. They are forming in rows with their sides together. These are the red blood corpuscles. They are called corpuscles from the Latin *corpus*, meaning body and an ending meaning little.

The corpuscles or little bodies do not look very red when seen under the microscope. They appear to be rather of a pale straw color. They are so small that if three thousand two hundred were placed edge to edge they would make only one inch, and if twelve thousand eight hundred were placed on top of each other the pile would be only one inch high. In a cubic space one twenty-fifth of an inch on each side there are five millions of these little bodies. Each one of these little red corpuscles is hollowed out on each side like a saucer and has a thickened rim.

The red cells contain a coloring matter called haemoglobin, which gives color to the blood. In the lungs this coloring matter unites with the oxygen, or air food, and turns the blood from purple to bright red.

While looking at the blood through the microscope, you will see, now and then, a large blood cell. This is a white corpuscle. The white corpuscles are not nearly so numerous as the red, there being only one white cell to seven hundred red ones. But the white blood cells have an important work.

We might call the white corpuscles traveling policemen on the stream of life, for they are ever looking out to see that no enemy invades. If a germ gets into the blood the white corpuscles fall upon it and destroy it.

When you sprain your ankle, or run a sliver into your finger, the part begins at once to swell and to pain you. The pain is caused by the cry of the nerves for help. The swelling is caused by the rushing in of the blood to repair the injury. The white corpuscles troop in by thousands to destroy the germs and to protect the part. The red corpuscles troop in by millions, bringing food and water

to the broken down cells—doing their utmost to restore them. So it is when any part of the body is hurt or diseased. It is the mission of the blood to build up and to heal.

The stream of life contains many other little bodies the duties of which are not so well understood.

About eighty per cent of the blood is fluid. This fluid is called blood plasma.

When the skin is cut or scratched the blood flows out fast at first and is a bright red. In a few minutes it becomes thicker, flows more slowly and is darker in color. Soon the flow stops altogether. The blood has formed what we call a clot. A clot of blood is one of nature's devices for stopping bleeding. When a large blood vessel is cut the blood sometimes flows until one bleeds to death.

The stream of life that flows from the living fountain of the temple carries the little corpuscles with their cargo of life to every cell worker in the body. In this cargo are oxygen, food, and sunlight. The oxygen is taken on board in the lungs. It is taken from the air and the air must be fresh and pure. So it is absolutely necessary to the health of

every one of the billions and billions of cell workers that pure, fresh air be found in the lungs. If it is not there the little corpuscles must go on without it,—or without enough, for they could not move at all without a little. If they can not take pure air to the little cell workers, the cell workers pine and droop like a stifled plant, and grow weak and cross like boys and girls that are shut up in the house. Oxygen is a necessary part of the cargo. The first thing the new born baby does is to breathe. The last thing a dying person does is to breathe. Each breath carries oxygen into the lungs where the blood is waiting for it.

The little cell workers breathe the oxygen as we breathe air. It refreshes them and makes them work better. They also use it in burning the waste matter that collects in each cell. When you wish to start a fire you open the dampers and let in the air. It is the oxygen in the air that helps to burn the wood; so it is the oxygen in the body that helps to burn the waste.

Food is another important part of the cargo. The working cells get hungry and

need to eat just as do people who are working hard. The blood is made of food. If the food is pure and wholesome the blood will be pure and wholesome. If the food is poor and not nourishing the little cells are starved and grow pale and lifeless.

Sunlight is a luxury. It is a part of the cargo that in some subtle way that we can not understand is carried by the little corpuscles to every cell. The temple workers can exist without it for a while, but their work is slow and lifeless. Children as well as plants need the sunlight. They must have it if they are to grow and thrive. The more sunlight the blood vessels carry to every dark corner of the temple the more briskly and skillfully the little workers perform their tasks and the more and more beautiful the temple grows.

The stream of life must also have pure, fresh water to carry to all the little cells. They could live longer without food than without water. When you get thirsty please remember that all the little workers in the body, those billions and billions of faithful little cells, are each and every one crying for

a drink. So you must drink and drink pure, fresh water for the thirsty little cells until your own thirst is all gone. Then you will know that their thirst too is satisfied.

Nothing is more important in building the living temple of the body than to keep the stream of life pure and sweet, and to keep the twenty-two billion little red blood cells supplied with pure and wholesome food. When the blood is loaded with poisons or useless things, or over loaded even with wholesome food, it flows more slowly and all the little workers of the body are delayed and hindered. If the blood carries poisons to the cells instead of food, if it carries impure air instead of oxygen and sunlight, if it carries alcohol and other harmful drinks instead of pure, fresh water, the little cells are poisoned instead of nourished. They become weak and cross, diseased and helpless. Sometimes they die. So you see how important it is to eat the best food and to drink the best drink, to breathe fresh air and to stay out in the sunshine so as to keep the workers of the temple fat and happy, active and healthy.

Whatever you do affects them. If you are

happy the blood flows more freely and the little workers get their supplies more promptly. Faith and hope relax the blood vessels and the little corpuscles are borne along faster toward their ports. Fear poisons the blood and weakens the heart. The blood can not move properly and the body is chilled. Grief also slows the stream of life and influences every little worker.

When the stream of life is pure and sweet it is easy to be good and very hard to be unhappy

[XXI.]

The Course of the Stream.

It is astonishing to think that all the wonderful things we have been describing, the pathway of touch, of taste, of smell, of sight, of hearing, the living camera, the musical instrument, the great telegraph system, the vast number of little workers in the brain and other parts of the body, the living fountain and the stream of life with its billions of tiny vessels, can all be in one small body, are, in fact, and must be, in every perfect human body. And yet we have only begun to tell of all the marvels of the temple.

The stream of life in its course through the body reaches every part of the temple except, as I have said, the very outside wall. The pipes that carry the blood away from the heart are called arteries. They are so called because the physician who named them long ago supposed that they contained air. At the time when Christ was a little boy the wis-

est physicians did not know as much about the blood as you do now. They thought not only that the arteries contained air instead of blood, but that the air in the arteries was a spirit. They knew nothing at all about the movement of the blood, or as we call it, the circulation. The strange ideas they held were taught until late in the sixteenth century. In the year 1616 an English physician, Dr. John Harvey, made the great discovery that the blood flows or circulates from the arteries into the veins and back, and that the arteries hold red blood and the veins a darker fluid.

The largest artery in the body is the aorta. It begins at the large end of the heart and passes downward back of the heart through the entire length of the trunk in front of the back bone and behind all the important organs. All along its way it gives off branches to the heart, the lungs, the brain, the arms, the stomach, the liver, the spleen, the intestines, the kidneys, the legs, and the muscles.

The stream of life, then, freighted with oxygen, food and water, starts from the liv-

ing fountain, the heart, through the opening into the aorta. It is forced out of the left ventricle at the rate of fifteen inches a second. If the aorta is cut instant death results. When any artery is cut the blood spurts from the end nearest the heart. To stop the bleeding, place your finger just above the spurting tube and press down firmly.

Each spurt of the artery represents one beat of the heart. Feeling the pulse is feeling the heart beat. You can feel the pulse or the heart beat better in the wrist or the temple than anywhere else because the artery there is near the surface.

The tube or wall of the artery has three thicknesses or layers. The middle one is made of muscle. When the muscle contracts the artery becomes smaller and so less blood flows through it.

Altogether there are nearly a thousand arteries in the body.

As the branching arteries pass away from the aorta they also divide into branches. The more branches they give off the smaller and smaller they become, until at last they are as fine as hairs and the little corpuscles have to

pass through in single file. Now they are called capillaries, from the Latin *capillus*, meaning hair.

The capillaries are very delicate and very short. The capillaries of a frog's foot with the blood passing through them may be seen through the microscope. It is a very beautiful sight.

In the lungs the capillaries are so numerous that if they could all be arranged in a straight tube it would reach from Chicago to London. The capillaries of the entire body if placed in a straight line would probably extend many thousands of miles.

The capillaries can hold much more blood than the large arteries or blood vessels, and being so much smaller the blood flows through them much more slowly. By the time it reaches the capillaries the stream that started in the aorta at the rate of fifteen inches a second has slowed down to about one inch in twenty seconds. That is not exactly slow, as we think of speed, but it is slow for the blood.

This gives the little corpuscles time to put off their cargoes of oxygen, food and

light. In the capillaries the blood exchanges oxygen for waste matter and poisons. Each little cell worker takes its share of oxygen and gets rid of the waste and poison caused by its work.

Parting with the oxygen turns the blood from the beautiful bright red to a darker, almost purple color. The red blood is called arterial blood because it is carried by the arteries. The darker blood is called venous blood because it is carried by the veins.

The stream of life flows back to the heart through another set of tubes called veins. The veins are much more numerous than the arteries. They are larger and increase in size as they near the heart. They do not contract so much or so quickly as the arteries, for their walls have less muscle.

The veins collect the blood from the capillaries. They carry it, now loaded with waste matter and poisons instead of food, back to the heart for a fresh cargo.

The veins from the legs and all the organs of the abdomen unite in one large vein, called the inferior vena cava, which empties the blood into the right auricle of the heart.

The veins from the head, the neck, the arms, and the chest unite in another large vein, called the superior vena cava, which also empties into the right auricle.

The veins from the stomach, the spleen, the pancreas and the intestines, all unite in one large vein called the portal vein, which goes to the liver. Everything that we eat and drink excepting fat must be carried through the portal vein to the liver before it can enter the body.

All the veins carry venous blood except the four large veins passing from the lungs to the left heart. These carry arterial blood. All the arteries carry arterial blood except the large artery passing from the right heart to the lungs. This carries venous blood.

Thus, you see, the living fountain and the stream of life make another system of communication between all parts of the living temple, a slower system than the telegraph system, as fluid communication always is, but just as perfect and just as useful. From the heart throughout the body, and back to the heart in an endless course, without pause or haste, flows the stream of life, a healing

stream, bearing the life of God to every little temple worker.

There is still a third system of communication in the body. Between each cell and each little capillary a clear fluid flows. It is called the lymph. It also, as well as the blood, travèls in little hair-like tubes, called the lymphatics. The lymphatic tubes, like the veins, increase in size as they near the heart. All the tubes together make the lymphatic system, which closely resembles the venous system.

In the intestines the lymph canals are called lacteals. They carry fats and oils from the intestines into a larger pipe or canal called the thoracic duct and this empties into a large vein under the left collar bone. There the lymph mixes with the blood and is carried at once to the heart and thence to the lungs where it is partly purified.

The lymph is a very important fluid. It makes about one fourth of the weight of the body. It is therefore more abundant than the blood, which makes only one thirteenth of the weight.

The lymph acts as an agent between the

cells and the capillaries. That is, no blood vessel runs directly to a cell. The blood vessels drop their cargo into the lymph and the cells pick it up as it floats along. This is easy to do for each little cell is bathed in lymph all the time. It drinks from the lymph and receives from it also food and oxygen. From the lymph it gains power to breathe and to work.

Each little cell worker of the body works alone. It is shut in to itself by a liquid wall. Alone it eats and drinks and breathes and moves and uses up food and air. Alone it works and rests. Its tiny body throws off waste matter just as our bodies do. This waste matter is cast into the lymph and carried away to the blood by the lymphatic tubes. So it is plain to be seen that the little cell workers could not get along without the lymph.

Each little blood cell lives about six weeks. At the end of that time it shrivels and dies and a new cell takes its place. We do not know how long the other little workers of the body live. We know that the brain cells, although changing and renewing themselves

all the time, in some mysterious way preserve their identity, or personality, or individuality, just as we do through all the changes of our life.

All the way along the stream of life and the lymphatic canals, are little telegraph stations connected with the brain. Every artery and every vein is controlled by nerves. The little nerve workers regulate the supply of blood to each part. When you begin to chop wood they send more blood to the muscles. When you study they send more blood to the brain. They regulate the flow of blood by causing the muscles of the arteries to contract and relax. When they contract, the blood supply is diminished. When they relax it is increased. When they contract the heart works harder and more slowly. When they relax it works more easily and more rapidly.

When something happens to make you blush the little nerve workers send messages to the arteries in the face to let more blood in. So the arteries relax, the blood rushes in and makes your face red.

The use of alcohol paralyzes the nerves

going to the blood vessels and they all relax. This is why drinking intoxicants makes the nose and the face red. When a man has used alcohol for years the blood vessels are permanently relaxed or dilated and become diseased.

When the blood vessels in the skin are dilated, much heat is given off. The skin feels warm because it is full of blood, but the rest of the body is being robbed to give this warmth. Thus the use of alcohol deceives a man by making him think he is warm all over when it is only the outside of his body that is warm while the inside is being chilled to the point of danger.

Tight clothing squeezes the veins and arteries and prevents the stream from flowing freely. The blood becomes clogged, poison and waste accumulate and foods decay. It is dangerous to hinder the stream of life.

[XXII.]

Antechambers.

We have followed the course of the stream of life from the living fountain to every part of the human temple and back to the fountain. We have seen how it carried food and water, sunlight and oxygen to every little living worker. We have seen how it gathered waste and poisons and brought them back to the right side of the heart. We know that the blood must now be purified before it can start out again on its mission of health. In order to be purified it must meet the air. It meets the air in the lungs, or breathing rooms.

Without this meeting of the air and the blood the life of the temple would end at once. All the little workers would soon be dead. The beautiful temple would grow cold and dark and still. Hence the great Builder has so arranged it that the air and the

blood can not fail to meet. When the stream of life, purple and dark with poisons, flows from the right ventricle through the pulmonary artery into the lungs it always finds the air waiting in the little breathing rooms.

No one can stop breathing by an effort of will. You may breathe more or less deeply, you may breathe good or bad air, but breathe you must. You can not possibly hold your breath to the point of danger. Nature compels you to keep the way open into the breathing rooms.

To meet the blood the air must pass through a hall, a vestibule, a music room, and a corridor. On this journey it first enters the nose.

The nose not only adds expression to the face, but it is the receiving room of whatever we breathe. It is also the smelling room. If the little smell workers notice anything bad about the air they warn us of it.

As it enters the nose the air first brushes past those stiff little hairy sentinels that stand at the outside door to keep out insects and to catch dust. It then finds itself in the outer hall of the smelling house. This is the soft,

fleshy end of the nose that we see on the face. Back of the outer hall, inside the bony part of the outside nose, is a room called the vestibule. It is the vestibule to the lungs.

Inside the face, back of the vestibule, are two large rooms called nasal chambers. The nasal chambers run back about three inches and then open into the throat or pharynx. They are very silent and mysterious, as is the fashion of antechambers. The same bony partition called the septum, that separates the nostrils and the vestibule also divides the nasal chambers into two rooms. In each of these rooms are some peculiar little bones that are rolled up like a scroll. They are covered by that wet, smooth, red skin, called mucous membrane, that lines the whole body.

As the air passes through these little rooms it is warmed and prepared for the lungs. The dust that may have escaped the sentinels sticks to the wet skin, or mucous membrane, and so is kept out of the lungs.

When you have a cold the mucous membrane is swollen so that you can hardly breathe through the nose. Then you must

not blow your nose, for if you do it will make the cold worse.

The proper way for air to enter the lungs is through these antechambers. They were planned by the Architect on purpose to conduct the air to the little breathing rooms where it is wanted. If the air goes around through the mouth where it is not wanted, it makes all sorts of trouble. It makes the throat dry and sore and causes disease. If you form the habit of breathing through the mouth it spoils the expression of the face. Mouth breathers are likely to have consumption. A wise man once said: "Shut your mouth and save your life."

Snoring is caused by breathing through the mouth while sleeping.

When the air has entered the antechambers in the proper way and has become warmed it passes on through the pharynx, on downward through a queer little door, into the music room or larynx. The larynx is often called the voice box because it is here that vocal sounds are made.

The walls of the music room are walls of cartilage, a substance almost as hard as bone.

The queer little door is just back of the tongue and is tongue shaped. It is made of flesh and moves on a hinge. If the tongue is pressed down the tip of it can be seen through the mouth. It is called the epiglottis. When you are breathing, the epiglottis is open, but when you begin to swallow food or water it closes quickly to keep the food out of the larynx. When you "swallow the wrong way" the food has been quicker than the door. Then the little workers make you cough, to get the food back where it belongs. The epiglottis is open only to the air. To everything else it is a closed door.

You can feel the walls of the larynx by placing your fingers on the front of your neck. The cartilage moves when you swallow. This part of the larynx is called "Adam's Apple." In some men it is very prominent.

In the music room or larynx are two very delicate thin white pearly bands or cords, the vocal cords, by means of which we talk or sing. The vocal cords are so placed that as the air comes out of the lungs it passes over them and makes them tremble or vi-

brate, thus causing a sound. But before they can vibrate they must be drawn tight like a violin string. If they are very tight the sound will be high. If they are loose the sound will be low.

Little muscles act upon the vocal cords to make them tight or to loosen them, to separate them or to bring them together, so as to fit every slight change in sound you wish to make.

You remember that wonderful little instrument in the ear called the organ of Corti, that tiny harp of thousands of strings upon which is played for you all the music of the world. That is the instrument in the living temple to which you listen. The vocal cords are the instrument in the living temple that you use, upon which you play, to express your thoughts and feelings, your wishes and needs, your inmost life.

To use this instrument it is not enough that the air in coming back from the lungs passes over the edge of the vocal cords. You must will that there be music. The Master Architect has built you a beautiful reed-

organ. The chest walls and a part called the diaphragm are the bellows. They pump the air into a pipe called the wind pipe and across the vocal cords. The walls of the throat or pharynx and the walls of the nasal chambers are the sounding board. The mouth, the teeth, the tongue, the lips, serve as different stops to vary tones. The Builder has forgotten none of the details. He has made the beautiful reed-organ different in every one of the untold millions of living temples built by Him since the world began. He has made the vocal cords shorter or longer, or has varied them in breadth, thickness or density. He has varied the shape of the sounding board, of the pipes, and the stops. He has given you this organ to be used by you alone. It is not like a piano that any one may drum on. But it is like the piano in this, that however sweet its tone, however perfect its mechanism, it can not make music without a player. You are the sole player of your temple organ.

The human voice is a part of the mystery of life. It is one of the most precious posses-

sions of the living temple. It can be trained to utter the sweetest and most musical sounds in nature.

The voice is used in speech or song. Speech may be music as well as song. That depends upon you. Your words and the tones of your voice show your thoughts. If you have angry thoughts you will speak angry words that will make others angry. If you have kind thoughts they will be expressed in word and tone. "A soft answer turneth away wrath but grievous words stir up anger."

Speech is one of God's best gifts to man. It is given to him alone. No other animal can speak. A man who can not use his voice in speech is greatly disabled in his work in life. How long it takes the deaf and dumb to learn to communicate with others! How lonely you would be in your sanctum sanctorum if you could not talk to any one of all you think and feel!

In speech not only are the vocal cords used, but the tongue, the cheeks, and the lips are necessary. Hearing is also necessary to

plain and correct speech, as children learn to talk by imitating the sounds they hear.

There is nothing that varies more in different people than the voice. The voice of an old friend will be recognized when everything else about him is changed.

In a certain sense the voice is born in the living temple. The quality of the vocal cords, the size and shape of the pharynx, the shape of the walls of the pharynx and larynx, the size and shape of the mouth, the tongue, the teeth—all these are determined in the great workshop of nature. Now and then there is built into the walls of some living temple a voice organ so rare, so powerful, so sweet, that all who hear it are enchanted. If the owner of such a voice organ has a soul and a mind to correspond, his influence over the hearts of men is almost boundless.

But even the ordinary vocal organ may be trained to give only harmonious and musical tones. You must try to speak every word distinctly, to pronounce it correctly, plainly, softly. You must study the voice as you would the piano or the violin. You must

think none but pure and beautiful thoughts if you would express these only to yourself and others.

It is just as true of the voice as of all other parts of the living temple,—to keep it strong and perfect the whole body must be in health. The voice is particularly injured by the use of alcohol and tobacco, also foods containing much fat. Vinegar makes the voice harsh.

The voice is injured by using it in damp or badly ventilated rooms. It is also injured by improper breathing.

If you take cold you are hoarse because the vocal cords are thickened and so filled with blood that they can not vibrate.

To have a voice that is clear and fresh, eat plenty of fruit, take a cold sponge bath every morning, breathe fresh air and sleep from eight to ten hours every night.

[XXIII.]

The Breathing Rooms.

All is silent in the music room when the air passes through it on its way to the breathing rooms. The vocal cords are made to vibrate only to the air that is coming back.

Having passed through the outer hall, the vestibule, the nasal chambers, the pharynx, the larynx or music room, the air enters a large corridor or tube, called the trachea. The common name of the trachea is the wind-pipe. It is through the wind-pipe that the air comes rushing across the vocal cords to make them tremble and produce sound.

The trachea or wind-pipe is round, and stiff, about four and one half inches long, and is built of rings of cartilage, nearly twenty in number. It runs downward and divides behind the breast bone into two tubes called the bronchi. One of the bronchi goes to the right lung, and the other to the left.

At the end of the corridor or trachea, part of the air then turns to the right and part to the left. The bronchi divide and subdivide into bronchial tubes, down which the air passes until it is lost in a network of narrowing corridors, that grow smaller and smaller, smaller than knitting needles, smaller than sewing needles, finally again like the branching arteries, as small as hairs. These are the capillaries. But the capillaries of the lungs are larger than those of the arteries. The air at last reaches the cells, the tiny little air cells or sacs or rooms where the mystery of breathing takes place.

The breathing rooms are inside a larger room called the chest. The chest in turn is one of two rooms that make up the trunk. The trunk is all of the body except the head, the arms, and the legs. The lower room is called the abdomen. Besides the breathing room or lungs, the chest contains the living fountain, the heart.

You have probably seen the lungs of a dead fowl. They are vulgarly called the "lights." The lungs are pink, smooth, and

soft to the touch. They will float in water, because they contain air.

The breathing rooms and the living fountain are shut in and protected by a bony wall. The bony wall is formed by the breast bone and the collar bone in front, by twelve pairs of flat, curving bones called the ribs, that extend in front, on the sides, and behind, and by the back bone and the shoulder blades. All the bony walls are padded outside and between by many muscles that also help to protect these vital parts of the living temple.

There is the closest relation between the heart and the breathing rooms. The living fountain is placed directly between the two lungs. Every time that you take a deep breath the lungs expand in front of the fountain so as almost to cover it. The upper part of each lung, like the lower end of the heart, is pointed, and is also called the apex. The apex of the lung reaches up into the neck above the collar bone. The lower part of the lung, like the upper part of the heart, is broad and is also called the base. The base of the lung rests upon a muscle called the dia-

phragm. The diaphragm is the partition between the chest or thorax and the abdomen.

There is a constant double communication between the living fountain and the breathing rooms. Seventy-two times a minute the purple and poisoned stream of life flows through the trap door, through the lower right basin of the fountain, through the pulmonary artery, into the millions of tiny cells that make a vast network of meeting places for the blood and the air. Not seventy-two times a minute, but every instant the red and purple stream is flowing back from the breathing rooms into the fountain.

To get an idea of the shape of the breathing rooms, just for one moment imagine that tree in your front yard to be a pair of lungs. The trunk is the wind-pipe or trachea. The two largest branches are the bronchi. The smaller branches, the twigs and the stems, are the bronchial tubes and the narrowing corridors that lead to the air cells in the leaves. Now cut the tree off even with the ground, and stand it on end in the air with the very top leaves just touching the ground. You have a pair of lungs that could take a deep

breath. Think of a larynx as large as all space, a wind-pipe as large as the trunk of an oak, and millions of air cells as large as the oak leaves!

But although the little breathing rooms of the lungs are not as large as oak leaves, they are more numerous than the leaves of an oak. In a normal pair of lungs there are about seven hundred and twenty-five million air cells. If these were all spread out on a flat surface, they would cover a lot fifty feet long and forty feet wide. This is your breathing surface.

The capillaries of the lungs are the final passages through which the stream of life flows to seek the air. There are millions of capillaries in the lungs. They wind among the little air tubes and twine about the air cells or sacs as a vine winds and twines among the branches and leaves of the oak. The walls of the little breathing rooms and of these tiny capillaries are thinner than the walls of soap bubbles. Hence, it is the slightest film that separates the air and the blood.

It is here that the mystery of breathing

takes place. It is here that the air and the blood intermingle. It is here that is breathed the breath of life. It is here that the poisons, the wastes, the impurities brought by the stream from all parts of the temple are exchanged for oxygen and sunlight. It is here that the blood is purified. It is here that the little red corpuscles unload their debris and take on a fresh cargo. It is here that the color of the blood is changed from purple to bright red. From here, from the little breathing rooms, the stream of life, renewed and pure, is ever starting on its sacred mission of health and healing.

We can follow the path of the blood to the capillary. We can follow the path of the air to the air cell. We can tell how much oxygen is taken into the blood and how much carbon dioxide is given off. But there we stop. The secret power by which life is breathed into matter, by which air and sunlight, food and water are made into blood, by which the blood and the breath possess healing and building, and life-giving power—this is another of the divine Architect's secrets.

All the walls of the antechambers and of the breathing rooms, except the walls of the little air cells and of the tiniest tubes into which they open, are hung with that wet and soft red lining, mucous membrane. In the lungs this lining is covered with little living workmen, curious cells that stand out in rows from the walls at any angle and are busy working night and day. On the top of each little mucous membrane worker's head are several fine, microscopic hairs called cilia, that are constantly waving toward the larynx. They work all the time, fanning dust and particles of dirt out of the lung into the throat. They never by any mistake fan backward, but keep the air moving toward the music room. If you have ever seen bees fanning air into a hive you will understand this. If the air tubes of a frog are taken out and a speck of white paper is put on the lower part of the mucous membrane, it will travel over the cilia toward the larynx fast enough to be seen.

The breathing rooms are moving rooms. They are free to move on all sides except at

one place called the root of the lung, where they are fastened to the back bone. The root of the lung is made up of air tubes, arteries, veins, nerves, and lymphatics, all of which go to the lung or lead away from it, carrying food, water, and messages just as they do to and from every other part of the temple.

If you put your hand on your chest, you can feel the motion of the breathing rooms. They move up and down about eighteen times a minute. Each rise and fall of the chest indicates one breath. You breathe then, ordinarily, about eighteen times a minute. The movement of breathing is produced by the action of nearly a hundred muscles.

The diaphragm, the muscle which forms the partition between the two large rooms of the trunk, is the most important muscle used in breathing. It is dome-shaped on the upper side, and curved on the under side. The diaphragm makes a movable floor to the chest and a movable roof to the abdomen. To draw the outside air into the breathing rooms this muscle contracts and the dome is

flattened. This makes the chest room larger. The lungs, resting upon the diaphragm, follow it when it moves down. The lungs expand and tend to make a vacuum. The air rushes in to fill the vacuum. This causes the rising motion of the chest. It is called breathing in, or inspiration. The movement is helped by twenty two pairs of little muscles between the ribs called intercostal muscles.

To expel the air from the lungs, the diaphragm relaxes and the muscle returns to the dome shape again. The lungs are elastic like a rubber bag, and so they return to their normal position and the air is forced out. This is expiration or breathing out.

When you sing or talk the air should be forced out by the diaphragm and the muscles of the abdomen. Some people try to sing or to talk by using the little muscles in the music room. But these little muscles are not large enough or strong enough to do the work, and so the people using them become very tired and sometimes even sick. It is a bad practice thus to abuse the muscles of the larynx, as well as to neglect the large strong muscles that were especially made to

force out the air. If you will notice a calf bawling or a dog barking, you will see its sides moving and the muscles of its belly contracting in the proper manner. The calf or the dog never tries to use the muscles of its larynx in producing sound.

The strength of the voice, whether it be loud or soft, depends upon the strength of the abdominal muscles.

All the air in the lungs is not changed every time you breath in and out. Normally you breathe into the lung at one time about thirty cubic inches of air. This is called the tidal air. It comes and goes without special effort. If you take a deep, long breath, if you try to see how much air you can possibly breathe in, you will take in a hundred cubic inches more. This extra hundred cubic inches is called the complemental air.

When just the ordinary work of the living temple is going on you do not need this extra air. But suppose some sudden danger arises, as in the case of that furious bull that charged you when you were walking in the meadow. Then, if you could not breathe more than thirty cubic inches of air at once, the little

blood vessels could not begin to supply the muscle workers with food and water fast enough to make your legs go at the top of their speed. So the Builder of the living temple has left space in the breathing rooms for just such emergencies.

Normally you breathe out about thirty cubic inches of tidal air. If you make an effort, you can breathe out about one hundred cubic inches more. This is the supplemental air.

Besides the tidal air, the complemental air, and the supplemental air, there is the air that always remains in the lungs. No matter what you do, you can not force all the air out of the little air cells. About one hundred cubic inches constantly resides in the breathing rooms. This is called the residual air. Without the residual air there could be no more life in the human temple.

[XXIV.]

The Breath of Life.

There is one great mystery everywhere, in every part of the living temple. It is just the mystery of Life.

We can trace the course of the arteries and veins, explain the composition of the blood, make a map of the brain, show the action of the muscles, describe the life of every little cell, but we can not tell what that life is.

The life that works and moves in matter, that makes it something more than form, that gives it energy and power, has never yet been seen or heard or touched. It is the divine, eternal mystery.

From the earliest ages men have tried to solve this mystery. The question, What is Life? has rung down the centuries. The only human answer is the restless echo, What is Life?

The mystery of Life is the mystery of God.

The divine Word says: "I am the Life." "In Him we live and move and have our being." "In whose hand is the soul of every living thing, and the breath of all mankind." "He giveth to all, life and breath, and all things." "And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life, and man became a living soul."

This defines and bounds the mystery. We know that God is Life and the giver of life—but what that Life is and all that it may be is still as far above and beyond us as the understanding of God himself.

If, however, we would be Godlike we must study God. If we would live we must study Life.

In the living temple we have the Life of God in His own image. If we study the temple, if we learn its mysteries, if we keep it holy, we may hope that sometime our Father in Heaven will take us by the hand, lead us behind the curtain of Life and show us His face.

In making man, the divine Architect "breathed into his nostrils the breath of life."

This breath of life is as great a secret as the sanctum sanctorum.

Breathing is not the breath of life, but to live we must breathe. Air is not the breath of life, but to breathe we must have air.

Every living thing in order to live must breathe the air. The tree breathes the air through its leaves. The leaves are in a sense the lungs of the tree. Insects breathe the air through tiny openings in their bodies. Frogs breathe the air partly through the skin. Fishes breathe the air by taking oxygen out of the water as it passes over their gills. Men breathe the air through the air cells in the lungs.

There is no mystery about the air as a necessity to breath.

The air, too, is one element of life that no one can keep to himself or corner. It can not be collected into a storehouse and sold at a high price. It is free to every living creature. "Free as the air" is the highest superlative of free.

Air is a food. It is just as truly a food as bread. Men have lived for weeks without food, some have lived seven days without

water, but no one can live five minutes without air.

When the air enters the body it contains twenty-one parts of oxygen and seventy-nine parts of nitrogen. When it is breathed out it contains sixteen parts of oxygen, seventy-nine parts of nitrogen and five parts of carbon dioxide.

Oxygen, nitrogen, and carbon dioxide are gases. You have seen what becomes of oxygen in the body. Nitrogen, in some forms, is a terrible explosive, but in the form in which the great Creator has placed it in the air it enters the lungs and passes out again without the least danger to the body. Carbon dioxide is a gas—a waste matter—produced by the burning of food and tissue.

When the air is breathed out of the body it also contains moisture. If you breathe on a looking glass you will see this. When you breathe out doors on a frosty morning the breath "steams" because the moisture is condensed into a visible vapor.

Air once breathed is not fit to breathe again. It is full of poison. If you do breathe it again you will poison all the little

body workers. That is why you feel sleepy and have a headache when you stay in a close room, where the air is breathed over and over. The little nerve workers are dull from the poison. They are trying to tell you by the headache that you must go out doors and get them some fresh air, or open the windows and let it come in.

People who live in poorly ventilated houses can not be healthy. They lack energy and ambition and after a while become sick and diseased.

No one should ever sleep in a bed-room with closed windows and doors. At night, while you sleep, the sympathetic workers and many other little workers are very, very busy clearing up after the day's work, repairing broken tissue, replacing worn out cells, carrying away the rubbish and making everything ready for another day's activity. If you sleep in a close room, instead of supplying them with oxygen and other food they must have for this work, you are giving them poison that will make them slow and stupid. If you wake up in the morning tired and cross it is because the little workers you have been

misusing are tired and exhausted. By lowering the window several inches, even an inch or two in winter, you can avoid much of this and provide your faithful temple workers with the pure, fresh air they need. Air may be cold and yet not fresh.

Every day the doors and windows of your house should be opened to change the air throughout. Especially should the doors and windows of sleeping rooms be opened. The bed clothes and the pillows should all be taken from the bed and thoroughly aired. Nearly one-third of our time is spent in bed, so it is of the greatest importance to have the bed and the bed-room fresh and sweet.

Not only should every room in the house be supplied with fresh air and sunlight, but the cellar, also, should be aired regularly. No decaying vegetables should be left to manufacture poisons, and all the drains should be examined often.

Every time a grown man breathes he poisons nearly a barrelful of air. So every person in a room needs three thousand cubic feet of air an hour. When you come from out doors into a closed room where there

are people, you often notice a bad odor in the room. That bad odor is caused by waste matters cast out of the lungs and is a warning to your nerve workers that the air is poisoned and ought not to be breathed again.

Once, a hundred years ago, some natives of India captured one hundred and forty-six British men and women and made them all prisoners. All of these people were put into one little room in the ground. The room had only one small window. The night was hot and sultry. All could not get to this one window for fresh air and the little opening was too small to supply so many lungs. In the morning one hundred and twenty-three of the number were dead.

Cold air is better for the lungs than warm air. How refreshing is the cold air of a frosty morning! Warm air is weakening. The air that we breathe indoors should not be warmer than sixty-five or seventy degrees.

Outdoor air is far better for the lungs than the air of any house. The great ocean of air outside is always in motion and so is fresh and pure. In the house it becomes foul, like

the water in a stagnant pool. It needs the wind and the breeze and the sun to keep it wholesome. It can not purify itself. Not many people die suddenly from bad air, but thousands are dying slowly because of living and sleeping in poorly ventilated and overheated rooms. Air and sunlight are God's free gifts. They are the finest materials of the living temple. If we debase the air and refuse the sunlight, we alone are to blame if the temple does not grow fair and stately, if the little workers are poisoned and die, if the beautiful building of the body becomes a ruin and falls to pieces.

It is a crime against the Builder of the body to crush in the little breathing rooms and destroy the shape of the chest by wearing tight clothing. The Architect left the lungs free on purpose. You could not crush in your head or your hips by a corset. They do not need any more room at one time than another. But the breathing rooms do. If you force in the ribs against the lungs and leave the little air cells no room to expand, you are coming in brutally to hinder the meeting

of the air and the blood. You are taking your own life just so surely if not so swiftly as if you tied a halter around your neck.

Nothing helps more than a fine pair of lungs in making the work of the living temple move briskly and well. To strengthen the lungs you must exercise them. Cold bathing is one good exercise. It makes you breathe more deeply and faster. Dash some cold water on your chest and see. When you breathe faster the blood flows more rapidly into the lungs and so is more rapidly supplied with oxygen and purified.

Another good way to strengthen the lungs is to take breathing exercises. While you are working or walking always breathe as deeply as you can. Stop now and then and make a point of it. Take a deep, long breath, hold it, and then force it out slowly. Do this a number of times at once and several time daily.

Never sit or stand with the shoulders bent forward. Never lean over a desk or a book. Keep the chin up, the chest up and forward and the shoulders back.

In going from a warm room into the cold

air be sure to breathe through the nose. If you feel cold at any time take several deep breaths. This will warm you.

To take a deep breath and to hold it will help you to bear pain. A long deep breath will sometimes stop the hiccoughs.

[XXV.]

A Living Canal.

This living temple that can walk and see and breathe, that needs a telegraph system and other strange arrangements,—for a temple, needs also a canal. This temple, too, that may be no larger than a baby and is never larger than a man, and that yet contains thousands of miles of living tubing, arteries, capillaries, veins and lymphatics, has room also for a living canal, the alimentary or food canal.

The teacher of a geography class once asked, "What is the most important canal in the United States." A little boy answered, "The alimentary canal." This is literally true. More than this, the alimentary canal is the most important canal in the world.

Food and water are just as necessary in the building of the body as are oxygen and sunlight. Food and water are the coarse and

heavy materials, as air and sunlight are the fine and light materials of the living temple. The food canal, then, down which are carried food and water to all the little living workers in the temple of the body, is far more important than the most useful and remarkable canal described in your geography.

However, the journey of food down the alimentary canal is not in the least like the journey of a boat through the Suez canal or the Erie canal. For in the living, growing temple not only are the canal workers alive, but the canal itself is a living canal, all the stopping stations are living stations, all the machinery is living machinery, and all these, —canal workers, canal, stopping stations and machinery, are working together to turn the food into living material out of which the temple may be built. They are working, also, under the personal direction of the Master Builder, who has all nature at his command to furnish workers and appliances. Hence we may look for surprising things in the journey of food down the living canal, in the changing of our food into suitable food for the little body workers.

This is what digestion is—simply the turning of food into suitable material for body building. Food must enter the blood before it can be carried to the living cells. A grain of wheat, an apple, a piece of bread can not enter the blood. As a grain of wheat, an apple or a piece of bread it can not enter the body. Food that is in the mouth or stomach is still outside the body. Before it can enter the body and become a part of it, it must go through certain changes. It must become a liquid that can pass through the walls of the food canal into the blood or the lymph. If it fails to do this, if it fails to pass through the walls of the food canal into the blood, it never enters the body, it never becomes food, it does you no more good than if you held it in your closed hand. So you see the alimentary canal is not only the most important canal in the world, but it is also the most extraordinary.

In a grown person the alimentary canal is about thirty feet long. In any person it is about ten times the length of the trunk. In flesh eating animals it is much shorter.

There are many stopping stations along

the canal where the necessary changes take place in the food. Each part of the canal and each stopping station has a special name and a special business. There is first, the mouth or entrance, second the pharynx, third, a long, round passage called the gullet or oesophagus, fourth, a large waiting station called the stomach, fifth, a canal proper, a very winding and curved canal about twenty feet long called the small intestine, sixth, a junction, shaped like a sac or pouch, called the caecum, seventh, a large canal about six feet long passing up and around the coiled canal, and called the large intestine or colon, eighth, the final part or rectum closed by a muscle at the anus. Two smaller canals empty into the colon near the stomach. One comes from the liver and the other comes from the pancreas.

The alimentary canal runs back of the antechambers, the breathing room and the living fountain, down through both main rooms of the trunk, the chest and the abdomen. With its large stopping station, the stomach, and its coiling and winding parts, it takes up most of the space in the abdomen. It makes a

complete passage way through the body. It is lined throughout its entire length by mucous membrane or as it is sometimes called, the internal skin. By looking at the lips you can see where the external skin ends and the internal skin or mucous membrane begins.

Every entrance to the temple is protected by guards. The large entrance to the living canal is protected by a double row, the teeth. These are under your control. If you shut your lips and teeth nothing can enter your mouth. It is hard work to force a man to open his mouth. You may eat or refuse to eat. The old saying applies, "You can lead a horse to water but you can not make him drink." So it is left for you to choose the materials for the living temple.

The teeth not only open and shut to let in food or to keep it out, but it is their chief business to bite and grind and chew all the solid food that comes into the mouth. They assist in the first process of digestion, which is called mastication.

The first teeth of a child are neither so strong nor so numerous as the second teeth. During the first few years of life the alimen-

tary canal is not expected to carry very heavy foods and so it is provided with temporary teeth. They are called milk teeth and are twenty in number. The first milk teeth begin to appear after the baby is six months old. They are not very firmly rooted in the jaw and by the time one is six or seven years old they have been replaced by permanent teeth.

The teeth, also, are living and growing parts of the living temple. Each permanent tooth, as it grows and grows, pushes the milk tooth up so that it is loosened and finally drops out. When a milk tooth drops out, if you examine the gum carefully, you will see a beautiful pearly sprout coming up in its place.

The Builder of the living temple did not put the very hardest material to be found in the body, the enamel, into the teeth, simply for ornament. He made the teeth hard and strong, purposely, to chew the food, for it is very important that all food should be soft and fine before it leaves the mouth. He made special teeth to do different things. The four front teeth in each jaw are the bit-

ing teeth or incisors. Next to these on each side is a sharp pointed tooth for tearing the food. This is the canine tooth, so called from the Latin word for dog. Next are two chewing teeth on each side called the bicuspids. Then come the grinders, or molars, three on each side, making sixteen teeth in each jaw, thirty-two in all.

It is the business of the teeth to grind everything to pieces that comes between them. Mastication is necessary for the food and necessary for the teeth. The teeth must bite and grind and chew or they will decay. As well as any other body workers they need exercise to keep them strong. If you eat none but soft foods, or if you hurry foods through the mouth, the teeth will grow weak for want of work. On the other hand they were not intended to be used in cracking nuts, cutting wires, or biting threads.

The chewing surface of the tooth is called the crown. This is the part that is covered by enamel. The second part or neck is under the gum. The third part, or root, is tightly fastened into the jaw bone. A tiny nerve

and a little blood vessel run into the root of each tooth.

If the teeth are damaged or broken the food enters the canal in bad shape. If one tooth only is gone, the food can not be evenly chewed. If the teeth are not kept clean, little particles of food collect between them, ferment and form an acid that destroys the enamel and makes the teeth decay. If the tiny nerve of the tooth becomes exposed to the air and to germs you have the toothache. One reason the toothache is so much worse than many other pains is that you can not do much to relieve it. If the little nerve cries out, "There is a hole or a germ down here," you can not send a message to jerk the tooth away. You must wait for a dentist to stop the hole or remove the germs. But the little nerve worker keeps crying out as it was made to do, until that part of the temple is repaired.

The appearance of your teeth is a very good indication of the sort of a person you are. If the front gate of a man's yard is broken and dirty it is more than likely that the man himself is lazy and a sloven.

If you make it a practice to clean the teeth with a tooth brush after each meal you will soon be very uncomfortable if you do not do this. Certain little nerve workers have formed a habit that will be a great help to you always. Cleansing the teeth regularly keeps the mouth sweet, the teeth white and sound, and saves you a great deal of pain and trouble. The age of a horse can be told by its teeth. If your teeth decay early it shows that you are growing old before your time.

The outer entrance to the living canal, the mouth, is a beautiful pink entrance. It has a pink, arched roof, the hard palate. It has pink walls, the cheeks. At the farthest end, opposite the teeth, is a soft pink curtain, the soft palate. When you are breathing, this curtain hangs down, but when you swallow, it is drawn up to close the back door of the nose so that nothing can pass that way. The mouth has a pink floor, covered by a thick pink cushion, the tongue.

The tongue is a queer cushion. It can move forward and back, up and down and sidewise. It can do this because it is made

of many little muscles. The back part of it is called the root or base and is pulled down by muscles and fastened to the throat. You send orders to move the tongue over a certain pair of nerve wires that connect it with the brain. The muscles of the tongue and of the lips are the last muscles of the body to come completely under the control of the will.

When you are eating, the tongue is very busy rolling the food about, putting it between the proper teeth to be crushed, and keeping it from getting between the teeth, or from between the cheeks and the teeth. It helps to separate from the food any very hard particle, as a cherry pit, a bone or a stone, and to move it toward the lips. Without the tongue the food could not be chewed.

A baby makes a little suction pump with its tongue and the cheek muscle and so is able to nurse.

The tongue aids in speaking. Without the tongue you could not talk. The tongue has been called "an unruly evil," the member of the body that "no man can tame." It

takes some of us a life time to learn to keep our tongues from saying things we do not wish to say.

If the pen is mightier than the sword, the tongue is mightier than the pen. Many a life has been ruined by an unkind word. Many a life has been saved by a word of help. To use the tongue in evil speaking, in telling untruths, in speaking unclean words is to defile the beautiful living temple. A tongue that will do such things as this will not hesitate to assist in eating and swallowing things that will also defile the temple.

You remember that the first part of the pathway of taste is over the tongue. The inside of the mouth is covered with curious little workers that are all helping in the great work of choosing and preparing materials for the temple. The taste buds or papillae on top of the tongue are helping you to decide upon everything that comes into the mouth, whether to keep it as good material or to throw it away as harmful or useless. If the papillae do not tell you the truth about the foods it is because you have trained them badly.

In different parts of the mouth are several very important groups of workers that help in the first and second processes of digestion. They are called salivary glands. They are called salivary glands because they make a fluid called saliva.

A gland is a collection of cells banded together to do a certain work. There are two kinds of glands, secreting glands, and excreting glands. Secreting glands take out of the blood substances needed elsewhere. Excreting glands take out of the blood substances that are of no further use and throw them out of the body. The sweat glands do this.

The salivary glands take from the blood the materials to make saliva. The saliva is poured upon all solid food that enters the mouth, to prepare it for the stomach. This is the second process of digestion and is called insalivation.

There are six groups of saliva workers. They work in pairs. The two largest groups, called the parotid glands, are placed in front of the ears, one on each side of the mouth. Every time the lower jaw moves it squeezes

the little workers in the parotid glands and they pour saliva into a tiny tube that empties into the mouth near the second upper molar tooth. The next two groups, the submaxillary glands, are under the lower jaw, and the third two, the sublingual glands, are under the tip of the tongue. The saliva made by the submaxillary glands and the sublingual glands is not so strong as the saliva from the parotid glands. It is useful chiefly in keeping the food and the mouth moist. Besides these larger companies of saliva makers, there are scattered all over the walls of the mouth, many other very small groups of glands, that also make a fluid to moisten the mucous membrane and to keep it smooth and slippery. When these little workers have too much to do and get tired out and dull the mouth becomes dry and you feel uncomfortable.

The saliva makers are among the most important of all the canal workers. Without saliva the food can not be prepared properly to go on its journey. As the food is chewed the saliva mixes with it and makes it wet. If it is chewed long enough it too becomes fluid.

It is intended to become fluid before it is swallowed. The taste buds are placed on the tongue purposely, to make it a pleasure to hold the food in the mouth until it is all ground fine by the teeth, so that not even one little lump can be found.

If food is swallowed hastily, without proper mastication, the saliva makers do not have time to pour out the saliva and change the starch in the food to sugar. But the starch must be changed to sugar before it can enter the body. If the saliva makers are prevented from doing their work, the other canal workers have extra burdens thrust upon them, burdens for which they are not fitted. It is very easy for the saliva makers to turn starch into sugar, but it is a hard matter for the little workers farther down the canal.

Chewing gum is not only an unpleasant habit, but also a harmful one. By chewing gum you compel the saliva makers to work when they should be resting and preparing for the next meal. You are wasting saliva and making it thin so that it can not act so readily upon starch.

If you could take a trip down the living

canal you would have surprising experiences. Being swallowed is one.

Swallowing is a very difficult process and yet we all swallow many times a day and never think anything about it, or have the least idea that it requires the harmonious action of nearly sixty muscles.

Just for a moment we will suppose that you *can* be swallowed. We must imagine that you are in the mouth, that you have been rolled around by the tongue, chewed by the teeth and covered with saliva by the little gland workers. When you say "All ready" the tip of the tongue tosses you quickly against the roof of the mouth and pushes you back toward the throat. At the same time the root of the tongue is drawn up higher, the soft cushion or palate is raised and shuts the door into the nose, and the epiglottis closes down over the door into the music room, so as to keep you from falling into the wind-pipe. By this time you have reached the base of the tongue and are lifted high upon its curving root. The soft palate or cushion closes behind you and you are off. You could not go back now any more than

you can turn back when you are coasting down a steep hill and have been "started" from the top. Down you slide, swiftly, over the epiglottis, into the pharynx.

You have heard of the pharynx before. The air passes through it on its way to the lungs. Compared with other rooms in the temple the pharynx is large. It has seven doors, two from the nose, one from each ear, one from the larynx, one from the mouth, and one from the stomach.

Usually food and drink make straight for the opening that leads to the stomach. Sometimes, however, the epiglottis is not quick enough and a crumb of bread or a drop of water falls into the wind-pipe through the larynx. Then you cough.

But we will not suppose accidents. You are to make a straight trip. You land next in the gullet or oesophagus. This is a round narrow tube about nine inches long and as large around as your finger. The food does not drop through this tube but is helped along by muscles.

This is a queer way to get into a canal—through a curtain and a room with seven

doors. But we are here at last, at the real beginning of the living canal.

In the wall of this part of the food canal, the gullet, are two thin layers of muscle. One layer is in the form of rings that encircle the passage from one end to the other. As the food passes through the gullet these rings of muscle contract behind it so that it can not return. The other layer of muscle runs down the tube and makes wave like contractions toward the stomach, squeezing the food forward.

Since you can not go back, perhaps you would like to make haste through this strange part of the living canal. But no, you can not make haste. The muscles of the gullet always work just so fast and no faster. Slowly and regularly the walls open before you and close behind you and push you on until you reach the opening into that large stopping station, the stomach.

When you get back from this trip drink a glass of water and time yourself while you swallow. You will now understand why you can not do this faster. You will also understand how a horse or a cow can drink from a

stream,—actually drink up hill without the least trouble. The ring-like muscles of the oesophagus contract behind the water and keep it from running backward. With practice you could learn to stand on your head and swallow in that position. Your trip down the oesophagus took about seven seconds. If you were to make a journey the entire length of the living canal it would take you anywhere from twelve to twenty-four hours. It would all depend on how you were treated by the little canal workers.

The process of swallowing is called deglutition.

[XXVI.]

Where Building Materials Are Mixed.

It is a simple matter to quarry stone, to make brick, to mix mortar. But to turn bread and butter, potatoes, apples, and all the other foods we eat into living materials for the body is one of the strangest and most complex of all the strange and mysterious processes that are constantly going on in the living temple.

We have followed three stages of this process, mastication, insalivation, deglutition, or chewing, mixing with saliva, and swallowing. The next stage is digestion and takes place in the stomach or the large stopping station of the living canal, and in the long narrow part of the canal called the small intestine.

The stomach is simply an enlargement of the food canal. At one time in every life this enlargement is very slight. Then the stomach is almost straight. The stomach of a

new born baby hangs with the small end down and holds about five sixths of an ounce or two tablespoonfuls. As the living temple builds, the stomach changes its shape and position until in the full grown man it lies almost crosswise in the lower room of the trunk, partly under the diaphragm, and partly under the liver.

The stomach is a canal station, a waiting room, or a hollow muscle bag, as you please. It has two gates or openings. The upper gate is at the large end and leads from the oesophagus, that part of the canal down which you came flying in seven seconds. It is called the cardiac opening. The lower gate is at the small end and is called the pylorus, from two Greek words meaning both guard and gate. The pylorus opens outward toward the intestines. Both these little doors are made of muscular bands that open and shut like a puckering string.

The wall of the stopping station is quite as remarkable as the wall of other parts of the living canal. It is a moving wall. It grows larger and smaller and churns everything inside of it. It does this by means of

three layers of muscle. The outside layer contracts the long way of the stomach, the middle layer the short way, and the inside layer obliquely.

The wall is lined with mucous membrane that hangs in folds or stretches out as the muscles contract or expand.

In the mucous membrane are many millions of very peculiar little workers. Like the saliva makers they manufacture a fluid to be used in digestion. Like saliva makers, also, they work in groups called glands. But the groups are very, very small, so small that millions of them can stand without crowding, on the walls of this little room. Some of these glands are called peptic glands, and others pyloric glands. The fluid they make is called the gastric juice. If they all work together they can turn out from ten to twenty pints a day.

Under the mucous membrane are thousands of tiny blood vessels that furnish blood to the little gland workers out of which they take whatever they need to make the gastric juice.

There are not very many telegraph offices

along the living canal. The stomach is controlled by the sympathetic workers rather than by the brain cells. Hence this part of the living temple may get into a very bad condition before you know anything about it. You are expected to keep it in good repair by attending faithfully to what goes into it through the entrance, where the little workers are under your personal direction.

A hundred years ago people did not know very much about digestion. Today, because of the patient labor of many physicians, we have learned some of its mysteries, but not all.

In 1822, a man named Alexis St. Martin, who was one of a hunting party in Northern Michigan, was accidentally shot in the stomach. The wound never healed entirely but left a small opening, a sort of window, covered by a curtain of mucous membrane. By pushing aside this curtain St. Martin's physician, Dr. Beaumont, watched for the first time in human history the process of digestion going on in a living man. As the result of this accident and of Dr. Beaumont's observations we know what happens to the

raw materials for the human temple when they reach this part of the living canal.

As soon as the door from the oesophagus opens and a mouthful of food drops through, the mucous membrane that lines the stomach turns very red. Soon little drops of gastric juice pour out from the walls and then the walls begin to move. All the little workers have gone to work to digest the food. The little gland workers are pouring out their fluids and the little muscle workers behind the mucous membrane are rocking and churning the food back and forth.

This movement is called peristalsis. It lasts as long as any food remains in the stomach. It squeezes the food and forces it from the upper gate toward the lower gate and back again. This finishes the process begun in the mouth, of breaking up the food, and continues the process of mixing it with the digestive fluids.

But the teeth can break up the food better than the stomach. If the food is hurried through the mouth without proper chewing the stomach is overworked.

The glands in the stomach do not make

saliva. They make gastric juice. But the gastric juice does not act upon starch, or sugar, or fats. If the starch in foods comes into the stomach mixed with saliva it has already begun to be digested, and the process lasts about thirty minutes longer. If it has not been mixed with saliva the stomach can not do anything with it and the process of digestion stops until the cells of the stomach make gastric juice, a period of about thirty minutes.

As the food is churned back and forth by the muscle workers the little particles of food are thrown against the walls where they are drenched through and through by the gastric juice.

The gastric juice acts upon flesh building foods, such as oats, wheat, bread, corn, barley, beans, peas, lentils, milk, eggs, nuts, and meat. It does not digest them entirely. It does not turn them completely into living materials. But it gets them ready for the final change beyond the pylorus in the intestine.

After a while the bread and butter, the eggs, the potatoes, and other foods that come

into the stomach as separate particles are all mixed together into a thick paste or fluid called chyme.

It is the business of the little gland workers and the little muscle workers in the walls of the stomach, to turn food into chyme. The little gate keepers of the lower gate, the pylorus, know just one thing. They know it is their duty to let the chyme pass and nothing else. If a coarse lump of food comes down and tries to get through they give it a push and send it back again to be broken up. If it keeps on coming down and pressing against the gate the little gate keepers sometimes become very cross. They may open the gate to get rid of it or they may shut it so tight and become so very irritable that all the little workers in the stomach are thrown into confusion. Then they all join with some very strong muscle workers in making the cause of the trouble go back the same way it came. This we call vomiting. Sometimes it is the very best thing that can happen to a person.

Sometimes, too, if anything startling takes place, if a glassful of ice water, perhaps,

comes suddenly plunging into the stomach, the little gate keepers may be so astonished that they will open the gate wide and leave it open until the stomach is almost emptied. This is one bad effect of drinking ice water.

The little gate keepers are always ready to open the gate for the chyme. But they make it pass a little at a time so as not to overburden the canal workers beyond.

The little gland workers and the little muscle workers of the stopping station work from four to six hours after each meal. But they are not intended to work all the time. They need periods of rest. When the food has all gone out of the stomach the walls relax, the mucous membrane hangs in folds and the gland workers stop pouring out the gastric juice.

If you eat oftener than three times a day these little workers have no time to rest. If you eat between meals you make them overwork so that when the meal time comes and you send down food they are too tired to digest it.

Like any other good workers they get used to working at regular times and prepare

accordingly. If you send food down when they are not expecting it, the gastric juice may not be ready and the food must wait for the glands to make it.

You can not keep this part of the living canal clean, as you can the teeth and the mouth, by washing and scrubbing it. It will keep itself clean and in good order if you send into it none but clean, pure foods and if you do not over load it so that it can not take care of the foods.

[XXVII.]

Winking Valves and Living Pumps.

You are keeping in mind, I hope, that the food you have eaten is not yet in the body. It has passed through four parts of the living canal,—the mouth, the pharynx, the oesophagus, and the stomach. It has passed through four stages of the change from food to living building materials,—chewing, moistening with saliva, swallowing, mixing and digestion in the stomach. In the fluid paste form, chyme, it has been squeezed through the pylorus into the longest part of the living canal, the small intestine.

The small intestine is a round muscular tube about twenty feet long. It is coiled so closely that it does not take much space. It occupies the middle of the lower room of the trunk,—the room called the abdomen. It is lined with mucous membrane like the rest of the canal and has a muscular layer

inside like the muscular layer of the oesophagus. The first twelve inches of the small intestine is called the duodenum from the Latin word for twelve. It is in the duodenum and the small intestines that the work of turning food into building material is completed.

Two very important digestive fluids are poured through little pipes into the duodenum. One is pancreatic juice, from a gland called the pancreas or sweet bread. The other is bile from the liver. The pancreatic juice helps to digest starch, flesh making foods and fats. The bile joins with other juices in making soap out of fats.

There are many little gland workers in the intestine. They manufacture fluids called intestinal juices. The intestinal juices act upon all foods.

The saliva makers are very particular. Their digestive fluids will touch nothing but starch.

The gastric juice makers are more obliging. But none of the fluids they make will act upon starch, fat or sugar.

The little juice makers of the duodenum and the small intestine, however, are very

accommodating. They make a fluid that will digest any food.

If the food has been hurried through the mouth, unchewed and unmixed with saliva, if it has been washed through the stomach by ice water or has failed to be acted upon by the gastric juice, no matter whether it be starch, sugar, or fat the intestinal juices go to work on it at once. If it can be digested, they digest it.

Cane sugar and candy have come all the way from the mouth just as they entered it. Neither the saliva nor the gastric juice would have anything to do with them. It is because they are compelled to remain in the stomach so long, unchanged, that they make so much mischief. But when they pass the pylorus they begin to receive some attention.

The mucous membrane of the duodenum and the small intestine is smooth and slippery as elsewhere but also irregular. It is wrinkled closely in tiny folds but the folds of the intestine do not smooth out like the folds of the stomach when the canal expands. Instead they become sharper. They are stationary folds. They make the food move

more slowly, as it is intended to do in this part of the canal.

The folds of the intestine are called winking valves or valvulae conniventes. They are circular and run almost around the canal. They are most numerous in the duodenum and the upper end of the small intestine. Altogether they number between eight and nine hundred. If the inner lining of the small intestine were stretched out on a flat surface it would make a strip three inches wide and seventy feet long. This shows again the wonderful economy of the Master Builder in using space.

If you examine the little winking folds through a magnifying glass they will seem to be covered by small fine hairs that make them look like velvet. These small, fine hairs are called villi. Each one is a villus and is about one-twelfth of an inch high. Although so small, each villus contains two arteries, one or two veins, a tiny muscle, and a wee little milk white canal called a lacteal, from the Latin word for milk.

Away down in this secret part of the living temple are hidden more than ten million of

these villi, each covered and filled with busy little workers, living cells that have a curious and remarkable work.

When the little muscle of a villus contracts it turns the villus into a pump, a suction pump! The muscle contracts whenever food comes into the intestine. So every day, after each meal you have eaten, after the food has passed out of the stomach, there are ten million pumps at work inside you, in the living canal, pumping liquid food from the intestine into the blood. But they work so silently and so smoothly that you never have the least idea of their existence.

This part of the canal is full of wonders. Between the villi and between the winking valves fifty millions of hungry little mouths as well as ten million living pumps are sucking up food from the food canal and passing it on into the blood and into the little milk canals or lacteals.

This is the fifth stage of the journey of food and is called absorption, from a Latin word meaning to suck up. You have seen water or ink soak into a carpet. You have seen a dry sponge take up or absorb a panful

of water. In just the same way the inner lining of the small intestine soaks up or absorbs building material from the living canal.

Absorption begins in the mouth, continues in the stomach, but takes place chiefly in the small intestine.

From the mouth to the intestine the food has been tumbled about. It has had a rough journey. But after it passes that little lock gate, the pylorus, it has smooth sailing.

Up to this point the different foods have traveled together. We might say they have come thus far along the bread and butter route, for wholesome bread and good butter, or fat, represent a complete and perfect food. But now the foods separate. The bread goes one way and the butter another. Most of the fats in the food take the butter route. All the starch and wheat and other foods take the bread route.

If the food should stop here in the small intestine, it would still be outside the body. It would do you no more good than if you had put it into your pocket instead of your mouth. If the food should stop here all the little workers of the body would be starved.

So you see it is very important that foods be so chosen and prepared that when they pass through the pylorus they will take one of these two routes and so reach the inside of the living temple. All the foods that do not take one or the other of these two routes pass on down the colon and out of the canal.

When food enters the intestine it makes the muscles of the walls contract. These muscles are of two kinds, long and round. Their double contraction gives to the intestine a worm-like motion that is called peristalsis. This contracting movement is like that of the oesophagus and forces the food forward. But in the intestines the food can not go so fast because those nine hundred winking valves or folds check its progress. They were placed there on purpose to make it go slowly so that the ten million little pumps and the fifty millions of little mouths can suck it up. They take out of the moving mass all the food that has been digested.

Each of the ten million little pumps is a living pump. It is covered outside with living cells. These living cell workers have different duties. When the muscle workers

begin to draw up the fluid each little cell selects a certain kind of food. Some of the cells collect a drop of fat, others pick out a bit of digested wheat. The muscle workers and the little cell workers work together to send the fats into the milk canal or lacteal and all the other foods into the blood vessels. So in the villi the bread and the butter bid each other good by and go different ways into the living temple.

How these little cells know their work so well, how some of them know that they must reject everything but fat, how others know that they must take up the wheat, how every little cell works all its lifetime without one mistake—only the Mind that made them all, that trained them all, that guards their life, could reveal.

If you and I did our work as faithfully as these little cells, if we yielded ourselves to the divine Power within us, to be taught as they are, there would be no such thing as sin or disease.

From the villi the butter or fat passes into the lacteals. These are special canals for carrying fatty foods. They are very small

and hair like and have a white, milky appearance. They carry the fat to a large reservoir called the receptaculum chyli, that stands in front of the back bone and just behind the lower border of the stomach. From this reservoir it is carried by means of a straight tube upward through the lower and upper trunk rooms into a large vein, where it joins the blood. It then passes quickly to the right upper room of the heart where it meets the bread and they journey on together again to the lungs.

From the villi the bit of wheat follows the bread route through a vein which becomes larger and larger until it finally reaches a very large organ called the liver. After passing through the liver the bit of wheat enters another large vein which carries it to the right upper room of the heart where it meets the fat and they journey on together again to the lungs.

As the food passes through the intestinal wall it is changed in some mysterious way. Here again is another of the Builder's secrets. The food now becomes a part of the stream of life. It is carried by the blood to every

cell in the body, to all the little living workers, to be used by them as living material.

This last stage in the journey of food is called assimilation. This big word means simply the making of the food into a part of yourself. How it is done no man can explain. The wisest person that ever lived can not follow this process, or any other, beyond the cell. We are all stopped by the mystery of life.

At the marriage feast of Cana, Christ turned water into wine. This was heralded far and wide. But the turning of wheat and corn, milk and butter, fruits and nuts, into blood, and the building of blood into living beings that move and see and hear, is a far more wonderful change than the turning of water into wine. This change, however, is so common that we do not notice it. It is going on all about us and in ourselves every day and hour and moment. It is the constant revelation of God and Life and Power in us.

It is this that makes even the simplest things we do important. It is our business

to furnish the choicest foods to be made into us, to be changed into our bodies.

But we must not bring too much even of the best materials. If we over eat, we burden the living canal and crowd it so that all the food can not be pumped up by the villi and sucked up by the little mouths, and so, much is left to pass on without entering the temple. This is not only a waste of food, but a waste of energy. It makes all the little canal workers spend their time and strength for nothing, getting food ready that can not be used.

If the builder of a beautiful house should pile up tons of costly stone that he could not use you would think him foolish and extravagant. But that would be a small thing compared to the needless waste of these wonderful living materials prepared by God himself for the living temple of the body.

[XXVIII.]

The Inner Door.

You have often seen beautiful houses or churches with a large outside door leading into a hall and then an inside door, perhaps two or more doors, opening into the room or the church beyond. The mouth is the outside door of the living temple, and the inside door through which most of the materials for building the body must pass, is the liver.

Not everything that enters the temple must pass through the liver, for there are those five wonderful entrances, the senses, that I am sure you have not forgotten. But the great bulk of the coarser building materials, the materials found in food and drink, must not only be carried through the mouth and down the food canal but must also go through the inner door, the liver, where the food and building inspectors are waiting for

them. About sixty per cent of the fats do not go this way but are taken up from the intestine by the lacteals and carried to the heart by way of the lymphatics. All other foods must pass through the liver.

The inner door of the temple is on the right side, under the ribs, just below that partition between the two trunk rooms, the diaphragm. Instead of panels this door has lobes. It has two large lobes and three small ones. The larger of the two large lobes is on the right side. The smaller reaches over to the left and covers the small end of the stomach.

The color of the inner door is reddish brown. It has a smooth finish. In a full grown man it weighs about three and a half pounds.

A baby's liver takes up almost half of its lower trunk room, or abdomen.

The fat, smooth part of an oyster is almost all liver. It is the business of livers to destroy poisons, so the oyster needs a large liver to take care of them. When you eat an oyster you are eating a body full of poisons.

The liver is not a door like the door of a

house. It is not a door as the epiglottis or the pylorus is a door. It does not open or shut or lead to a room. It is a door simply in the sense that foods must pass through it to enter the body.

The liver is not only a door but is is also a gland. It is the largest gland in the body. You remember that a gland is a collection of cells banded together to do a certain work. The work of the liver cells is to discover and destroy poisons, and to put the final touches on the building materials of the temple. So you must think of the liver as a curious door, not shaped like a door, not opening or shutting like a door, but like a door admitting certain things to the living temple and barring others out.

You must think of it also as a living door, a door and a gland, a living part of the living temple and like all other parts, having its share of the millions and millions of living cell workers.

The cells of the liver do their work in little groups called lobules. The lobules are about one twenty-fifth of an inch across. They are separated by thin partitions.

The little lobule workers are called hepatic cells, or liver cells. They are among the busiest of the temple workers. They know just what to do and how to do it. There is no more important work than theirs and it keeps them on duty night and day.

We have followed the course of the food material through the outside door of the temple, the mouth, down the living canal into the stopping station, through the pylorus into the intestine. We have seen how it is then sucked up by the winking valves and the living pumps. It is now collected by small veins that bear it swiftly to a large vein, the portal vein, by which it is carried to the inner door.

The portal vein is so called from the Latin word for gate. The blood that passes through the portal vein is always richly loaded with food.

As it enters the liver, the blood, with its load of living materials, is quickly scattered among all the little liver workers, by means of blood vessels called interlobular veins. It soaks down between the cells toward the center of the lobule. As it trickles between

the little hepatic cells or building inspectors, these watchful workers seize upon all foods and examine them to see whether they are good materials for the temple or not. They separate the good materials from the bad. The good food is collected by a little vein in the center of the lobule and sent out of the liver through three large hepatic veins that carry it to that very large vein, the inferior vena cava, that empties into the right side of the heart. The poisons and other harmful substances are collected into small spaces and forced on out of the liver through tiny channels called bile canals.

Bile is a yellowish green fluid that is separated or secreted from the blood by the liver cells and poured through the bile canals into the duodenum at the same time that food comes through the pylorus. Bile is made by the little workers to aid in the process of digestion. Between meals most of the bile is stored up in a special little reservoir under the inner door, called the gall bladder. About one quart of bile is made each day.

The poisons and other harmful substances that come with the bile through the bile

canals, pass on down the small intestine, through the large part of the living canal called the colon, and out of the body.

The liver workers do not immediately send on all of the good materials. Some of the food brought by the portal vein is stored away in the gland as liver starch or liver sugar. The liver is a store house as well as a door. There the wise little liver workers are constantly laying up supplies for a rainy day. They prepare reserves of food not only for the liver but also for the muscles and other parts of the body. Food enough is stored away in the temple to keep you several weeks even though you should not eat at all during that time.

Liver sugar is called glycogen. The glycogen stored in the muscles is ready for immediate use. It is a kind of muscle gunpowder. If you wish to move a certain muscle, you send a message to it through the motor center in your brain. The nerve electrical impulse passing into the muscle serves as a spark to the food gunpowder and it goes off in a series of tiny explosions that furnish the power to obey your wish.

The liver is not only a door and a store house but it is also a divining cup.

In olden times certain royal cups called divining cups were supposed to have the power of detecting poisons. A king who had a divining cup thought he could tell, by pouring into it the wine he was about to drink, whether the wine was poisoned or not. But the divining cups made by men do not really possess this power. Many a king has been poisoned to death by wine that had been tested by the divining cup.

The liver, however, is a true divining cup. It never fails. No matter how subtle a poison may be it can not deceive the liver. The little cell workers in this wonderful organ are on the alert for every substance that could injure or destroy the sacred temple.

You may have been willing to defile your body. You may have sent into the living canal foods and drinks that you knew would do you harm. But when any such food or drink arrives at this curious inner door that is alive with food inspectors, it is stopped at once. The liver workers attack it as an enemy. They do their best to keep it out

of the temple, to change it so it will not be so poisonous, to break it up into something less dangerous.

But the liver cells are not always able to keep out of the body the poisons you send to them. They are usually very greatly overworked. Almost everybody sends more material into the temple than is needed. Almost everybody sends in bad material in one form or another, often without knowing it. Therefore the little liver workers have so much to do that they can not always examine everything brought to the door, and many poisons in this way escape and get into the body.

Not only this, but the food inspectors become tired and discouraged and can not do their work properly. If you over eat and keep on over eating, if you eat poisons or bad food, however ignorantly, the liver cells become more and more tired, more and more discouraged, and their work falls behind until they give up entirely. Then it is that some terrible disease that has been watching and waiting for just this opportunity seizes the little workers of the temple and spreads destruction and ruin through all its beautiful

parts. For all the other body workers are very dependent upon the food and building inspectors in the liver. If their work stops, everything stops. If poisons escape them and enter the temple they poison the cells and make you sick.

Eating much candy and sugar makes the liver cells groan under burdens. They become so clogged with blood that they can not work. The poisons crowd past them into the body and you have the headache and possibly the side ache as a result. You have drugged and stupefied your faithful little temple builders.

If you eat or over eat simply for pleasure, because things taste good, you are stealing strength and health from your temple workers. This is just as bad as any other kind of stealing.

It is your business as assistant architect to help the building and food inspectors by keeping poisons out of the body so far as possible, and by providing sound materials and healthful foods.

Alcohol is one of the worst poisons with which the liver cells have to deal. It smoth-

ers them with blood and robs them of oxygen, so that their work is greatly hindered. Alcohol causes many incurable diseases of the liver.

You can help the little liver workers by drinking water freely every day, also by drinking fruit juices and eating fruits.

The liver workers themselves are not nourished by the blood brought to the liver by the portal vein. The cashier of a bank does not pay himself from the money that passes through his hands. He must be paid by the appointed person just as the bookkeeper or the night watchman is paid. So the liver cells can not take their own food and building materials from the blood that goes through the liver to the body workers but are supplied by a special artery, the hepatic artery. This is a large artery. It brings quantities of oxygen to be used by the liver workers in destroying poisons.

The liver workers are also aided by a very mysterious group of workers called the spleen. The spleen is a gland without an outlet. It is under the ribs to the left of the stomach and is richly supplied with blood.

There are both gland workers and muscle workers in the spleen. The gland workers make blood and the muscle workers contract the spleen once a minute to help in forcing the blood from the portal vein into the liver.

In destroying poisons the liver makes ashes. All the work of the temple makes either ashes or wastes. These are collected and thrown out by little ash carriers scattered through the body. Ash carriers are found in the skin, the lungs, the kidneys and the large intestine. It is very important that the ashes be emptied every day. You know that if the ashes from a fire in a stove or furnace are not attended to, the fire burns lower and lower and finally goes out. If all the ashes and wastes were retained in the body for one day only, the fires of life would be smothered out.

[XXIX.]

The Muscle Workers.

No doubt you already feel quite well acquainted with the muscle workers. You know that by moving the muscles you move your arms and legs. You know that muscles contract and relax to move the stomach, the eyes, the heart. By considering a moment, you can think of a great many things the muscles do. It is by means of the muscles that every movement of the body is made. By means of the muscles you are able to laugh and shout and breathe and sing. By means of the muscles the living temple can be moved at will from place to place.

The carpenters, in building a house, can not make more than one part at a time. If a man were to try to build a human body he would probably begin with the bones. He would first make the separate bones and then join them together. Next he would put in

some of the muscles, then an artery, a vein, or a nerve, then more muscles. But you and I know that even in this bungling, haphazard fashion he could never make a real human body. It would be the poorest kind of an imitation.

The divine Builder of the living temple, however, makes all the parts perfect and complete at once. The bones, the muscles, the arteries, the nerves, of a little baby's body, are just as perfect in form as those of a well developed athlete. The baby grows as a young plant grows. Today it is perfect, tomorrow it is perfect, every day, if the plan of nature is not hindered, although it may pass from youth to age and change in form and size and strength, it is still perfect and complete.

The baby is born with more than six hundred muscles. He will have no more than this when he is a tall, strong man. Each muscle is named either for its shape, its location, or for what it does.

The muscles are so arranged and placed that they make the body look graceful and beautiful. When a muscle has lost its power

to move we say that part of the body is paralyzed.

The lean part of meat is muscle. When you eat lean beef you are eating the muscles of some cow or ox, commonly the muscles used in walking or running.

Muscle is the fleshy part of the body. Dead muscle is red, but living muscle is almost transparent, for some light will shine through it. The light of the x-ray is so penetrating that when using it you can not even see the muscles. The x-ray shows only denser tissues like the bones.

You can learn a great deal about the little muscle workers by examining a piece of the leg muscle of a beef or mutton. The muscle should previously be boiled several hours.

You will see in the first place that the muscle is made up of many little bundles. These bundles are called fasciculi from a Latin word meaning "little bundle." Each bundle or fasciculus is separate and distinct from the other.

Now, by using two needles, you will be able to find and separate many little strands in each bundle. These are called muscle

fibres. A muscle fibre or cell is about one inch long and is five hundred times longer than it is thick. The muscle fibres are made up of many delicate muscle threads or fibrillae.

There are two kinds of muscle fibres or workers, voluntary and involuntary. The voluntary muscles are the willing muscles. They do what you tell them to do. After you have told them to do a certain thing over and over many times, they may learn to do it so well that they will surprise you some day by making the usual motion without a special command. Sucking the thumb and biting the finger nails are habits that are formed by training the muscles. Walking is another habit learned in this way.

If you look through the microscope at some of these voluntary workers, or willing muscle cells, you will see that each fibre is striped. It looks as if one flat layer were piled on another, layer after layer, the whole length of the cell. The muscle is thicker along the dark stripe and so the light does not pass through it so easily. This gives the effect of dark and light stripes. All the vol-

untary muscles, or muscles controlled by the will, are striped. They are called the straited muscles.

At one end of each muscle, sometimes at both ends, is a white, round or flat cord called a tendon by which the muscle is fastened to the bone. The largest tendon in the body is just above the heel, and is called the tendon of Achilles, from the old story about the Greek hero Achilles. This tendon attaches the leg muscle to the heel bone. When the muscles contract, the heel is raised.

The longest muscle in the body is the sartorius or tailor muscle in the thigh. It is used in crossing the legs. The smallest muscle with a name is the stapedius, only one eighth of an inch long. It is in the middle ear and acts upon the stapes or stirrup ear bone. When this tiny muscle is injured the hearing is greatly disturbed.

The muscles are so arranged about the joints that when they move the body they act as levers. Every time you bend or straighten your arm, stand on your toes, lie down or get up the muscles act as levers.

The muscle workers do all their work by

contracting and relaxing. When a muscle contracts it swells and shortens. The ends are drawn closer together and the muscle becomes hard. The shortest, thickest muscle can lift the heaviest load. The longest muscle can carry a load the farthest distance. A short muscle with a long tendon is the best combination to make quick movements.

The Creator has given the horse, the deer, and many other animals muscles that can make better speed than human muscles. But he has given to man a mind capable of inventing a machine that can carry him sixty miles an hour.

There are thousands of little working cells in every muscle. They move together in perfect harmony. They do this by means of nerves. One main wire of the living telegraph system runs to each muscle. This divides and subdivides into smaller and smaller branches until every little worker receives its tiny wire. When the order to contract is sent to the muscle from the central office in the brain, the order reaches every cell at the same time and at the same time every cell responds.

When the captain of a company of soldiers gives the order "Forward march" one hundred left feet are supposed to start together. But they never do start exactly together. Some one is sure to be a second or two behind the rest. Not so, however, with the muscle workers. Millions of them act together on the instant.

Most of the movements of the body require the united action of many muscles. When you stand still, for instance, certain muscles keep the leg straight at the ankle, others prevent the knee from bending, others hold the body upright on the thigh bones, and certain very powerful muscles keep the back straight. If the muscles of the body should give way, the temple would fall into a heap of ruins. The bones could not be put together without muscles any more than lumber could be made into a house without nails. The muscles not only serve as nails to keep the bones in place, but they also protect them as warm and beautiful cushions. The inside of the living wall of the human temple is padded in very many places with this rich, strong covering.

The muscle workers are generously supplied with blood. An artery as well as a nerve goes to every muscle. Like the nerve, the artery divides into thousands of branches so that every muscle worker is reached by one or more blood vessels of the stream of life. Here as everywhere throughout the body that watery fluid, the lymph, acts as a middle man between the cell and the blood vessel. The lymph takes oxygen and food from the blood and gives it to the muscle cell. It also takes waste and ashes from the cell and gives them to the blood.

When the muscle workers are contracting they need more oxygen. Hence the great Architect has so arranged the arteries in the muscles that when any muscle contracts, more red blood enters that muscle. At the same time the veins in the muscle are so pressed upon that the venous blood is forced forward toward the heart.

Food is kept stored in the muscle cells. When the muscle contracts, this food is changed into energy and heat. Eighty per cent. of all the heat produced in the body is

made by the muscles. This is one reason that when you have a fever you feel like being quiet. Nature makes the muscle workers keep still so that the fever will not be increased.

You remember that the willing or voluntary muscle workers, that do what you tell them to do, are striped or striated. The involuntary muscle workers, that act without your will or knowledge, are not striated.

The involuntary muscle workers do what the great Builder has made them to do. They obey only Him. This is why their work is so skilful and perfect.

The muscle workers of the heart and the stomach are involuntary. Involuntary muscles are found all through the food canal, in all the blood vessels, and in the lymph channels. The involuntary workers are under the immediate control of the sympathetic nerve workers. They pay no attention to you,—whether you are asleep or awake, active or quiet, but silently and faithfully carry out the orders of the Master Architect, given through the nerves as arranged in the begin-

ning. This work concerns life itself. It is too important and too complex to be entrusted to the human will.

These muscle workers move much more slowly than the voluntary workers. But they do not rest when we rest. They are always at the call of the little nerve officers.

You can see some of the work of the muscle fibres by the goose flesh that sometimes comes on your arms when you go suddenly into the cold. There are more than a million involuntary muscles in the skin. When the nerve workers in the living wall are chilled by the sudden cold they send a message to a special office in the brain, the office of the fire tender. They say, "It is cold. Take the blood out of the skin or the heat will be wasted." Instantly the fire tender sends a message to every one of the millions of involuntary muscles in the living wall,—"Contract." As the muscular fibres contract, the papillae in the inner wall, or true skin, are drawn together. This makes the little pimples of goose flesh.

You notice also that the skin turns blue. As the muscles contract, all the blood except

a little venous blood is forced back from the cold wall, out of the skin, and the heat is kept within the building.

The diaphragm is a very important involuntary muscle. By holding your breath you can keep this muscle still for a minute or a minute and a half, but no longer. At the end of this time you are obliged to breathe. You can not help it. The nerve workers that control the diaphragm will not let you hold your breath longer than is good for you. They will not let you cease to breathe.

If you wish to have six hundred strong, healthy, well developed muscles, you must give the little muscle workers plenty of exercise.

The baby takes exercise by kicking, twisting, creeping, waving its hands. It exercises its lungs by crying. A healthy baby is never quiet unless it is asleep. Its muscles, being more active, grow faster and develop more rapidly than at any later time in life.

A muscle that is exercised becomes stronger and firmer each day. When you have been sick in bed a long time the muscles are wasted and lose their strength. If your

arm should be tied to your side a few weeks it would become so weak you could not raise it.

The blacksmith who uses a heavy hammer day after day develops an arm that is almost as hard as iron. The farmer who plows, pitches hay, lifts wheat and corn, has strong muscles. Boys and girls who run and shout, climb trees, chop wood, do housework, have strong muscles. The city boy who habitually rides in the street car or in a carriage is pale and lifeless and has thin legs. His muscles are soft and flabby.

Housework, running errands, making gardens, working with tools, rowing and swimming are all healthful exercises to keep the muscle workers in good condition.

Nothing pleases the muscle workers more or does them more good than to have you swim. Swimming is especially good for the muscles of the legs, the arms, the back, and the neck. It keeps the back straight and will correct round shoulders.

But even exercise may be over-done or done improperly. It is necessary to the health of the muscle workers not only that

you give them exercise, but that you give it in moderation, and that you divide it among them all. If you give one set of workers daily exercise and neglect another set the one will grow strong and the other weak and the body will lose its graceful shape. The one group of workers will be worn out and the others rusted out. Mr. Gladstone observed that the horses daily traveling a certain road to London died much sooner than those traveling other roads. This road was level while the others had ups and downs. Mr. Gladstone concluded that the horses traveling the level road wore out so soon because they used too constantly the same sets of muscles.

If the muscles are to be strong and healthy it is also necessary to provide the muscle workers with wholesome food. The best foods to use in building muscle are wheat, oatmeal, corn, beans, peas, lentils, nuts, milk, fruits, and vegetables. The sugar found in sweet fruits is a good tonic to give the muscle workers.

But you must not overload the muscle workers with food and building materials.

If you eat large quantities of food and then do not exercise enough you become fat. Fat weakens the muscles. If you weigh two hundred and twenty-five pounds when you ought to weigh one hundred and twenty five you are carrying around, night and day, an unnecessary burden of one hundred pounds. All the body workers must help bear this burden. The little workers of the lungs and the heart are especially overworked. So you become short of breath and have a weak heart. If you do not eat too much you can keep the surplus fats burned up by wholesome exercise that will at the same time strengthen the muscles.

Very large muscles are a hindrance. They require so much blood and food that other parts of the body are exhausted.

Sunlight is another essential to the health of the muscle workers. The sun is the great power in nature that gives strength and vigor to every living thing. The millions of muscle workers hidden away in the living temple must have their share. If you stay in the house, perhaps for fear of being tanned, you can not have strong and active muscles. The

Indian who spends his time in the open air and sunshine has a brown skin and fine, firm muscles.

The muscle workers depend upon the nerve workers. If you can work a long time without being tired, it shows that you have both strong nerves and strong muscles. Under great mental excitement people often do muscular feats that are impossible under ordinary conditions. For instance during a fire bedridden patients have climbed down fire escapes to save their lives and men have carried women twice as heavy as themselves to a place of safety. This is possible because of the great nerve power that can be put into a muscle.

[XXX.]

The Living Framework of the Temple.

When you see the frame of a house going up you can tell by the size of it just how large the building is to be. But by looking at a baby you can not form the least idea as to the size of a man it will make. This is because the baby's framework grows, while that of the house does not. A frame of timber can not grow, but a frame of bones is a living frame and grows in size and strength like all other parts of the living temple. It takes twenty-five years for the living framework to reach its full size.

The framework of the body is called the skeleton. It is made by two hundred and forty-three distinct bones. These bones are alive. They are filled with little living workers that keep building and renewing them from inside.

The bones not only support the body and

give it strength, but they help also to divide the living temple into rooms.

The bare skeleton of the body is not a pretty sight. It was not intended to be seen, but to be covered with muscle, flesh and skin as the frame of a house is covered by brick, plaster and paint.

Dead bones soon become dry and brittle, but there is not one dry bone in a living body.

The timbers and joints of a house are fastened together by nails, iron and braces. The house is built to stay just so. Here is another of the marvelous contrasts between divine and human building. In the living temple only a few of the bones are fastened together. Most of them are so arranged as to give a freedom and grace of motion that would be the wonder of architecture were it not so common that we seldom think about it.

Who would imagine, to see a child running and tumbling, or to see an acrobat rolling himself into a ball,—who would imagine that this limber and lively person had two hundred and forty three separate bones inside his body! It is because the Master Builder

himself planned the bones and so arranged and placed them that all move in harmony, without friction, that this wonderful framework adapts itself to every need of the body workers.

The part of the skeleton that forms the framework of the head is called the skull or cranium. There are eight flat bones in the skull. They are so united that they make a large room or cavity. This is the room occupied by the brain. The sanctum sanctorum and all the delicate centers where the sensitive little brain cells work, are protected and surrounded by the strong, firm walls made by these eight flat bones.

In the baby these bones are not yet perfectly formed and united. They could be moved by the fingers, but this would not be safe for the baby. The soft spot on top of a baby's head is part of the space left for these bones to fill. It is called the fontanelle or little fountain. After a few months the bone has grown in and filled this space and the soft spot has disappeared. By the time a child is seven or eight years old the bones of the skull are firmly united.

In the bottom of the skull are many openings for the passage of blood vessels and the many pairs of brain nerves.

In the face and the nose there are fourteen odd shaped or irregular bones. They help to give shape to the face. The muscles that move the face and the lower jaw are attached to them.

You remember those three small bones in the ear, the hammer, the anvil, and the stirrup. That makes six more bones in the head.

Now I will tell you something queer. Your teeth are bones. They are the hardest bones in the body. So you have thirty-two bones in your mouth.

One of the most interesting bones in the body is the back bone or spine. But the back bone is not as it sounds, just one bone. It is made of twenty-four peculiarly shaped little bones called vertebrae. The singular of vertebrae is vertebra. The word comes from the Latin word meaning "to turn."

Each little vertebra has a large round hole in the middle. The vertebrae, close together but with little cushion rings of cartilage or gristle between each two, are all strung, like

large beads, on that great trunk line of the nervous system, the spinal cord. They make a strong, perfect, closed canal for the spinal cord, that protects it completely and yet that can bend in any direction. The vertebrae and the spinal cord form the spinal column.

The spinal column rests upon the sacrum, or sacred bone, a wedge shaped bone between the hip bones. Below the sacrum is a little chain of bones called the coccyx or cuckoo bone.

The skull rests upon the first vertebra, which is called the atlas. The atlas rests upon the second vertebra or the axis, in such a way that it rotates or turns freely in all directions.

The spinal column is curved. The curve contributes very much to the beauty and grace of the body. It also helps to prevent the brain from being jarred by your walking and jumping. Jarring is further prevented by the little cushions of cartilage between the vertebrae and between all the bones from head to feet.

When you bend back and forth, up and down, and sidewise you never feel even the

presence of those twenty-four vertebrae in your spine. They do not grate on each other in turning. No matter how sharp an angle you make the little cushions protect the edges of the bones.

The framework of the upper trunk room, the chest, is formed chiefly by twelve pairs of flat curved bones called the ribs. The ribs start from the back bone, being attached to the vertebrae, and pass around the body after the manner of hoops around a barrel. In front of the chest ten pairs of the ribs are united to a bone called the sternum or breast bone. The two lower pairs of ribs are short and are loose at the front end. They are called floating ribs. The framework of the shoulder is formed by the union of two bones, the collar bone or clavicle, and the shoulder blade or scapula. The clavicle and the scapula hold the arm in place and unite it with the trunk.

The bone in the arm, above the elbow, is the humerus. There are two bones in the forearm or the part of the arm below the elbow. They are the radius and the ulna. Eight bones in the wrist, carpal bones, five in

the palm of the hand, metacarpal bones, and fourteen in the thumb and fingers, called phalanges, finish this end of the framework.

Two very large, irregular bones called the hip bones, or innominate bones, form the body basin or pelvis. The hip bones are broad and protect delicate organs just as the skull and the ribs do. They also help to support the weight of the entire trunk.

On the outer side of the hip bone is a round, cup-like hollow, called the acetabulum, in which rotates the round head of the thigh bone or femur.

The longest bone in the body is the large bone in the leg, above the knee, the femur. Below the knee there are two leg bones, the tibia and the fibula. At the knee in front is the knee cap or patella. In the foot are seven ankle or tarsal bones, five longer bones, one for each toe, the metatarsal bones, and fourteen bones in the five toes, the phalanges.

The bones are the hardest parts of the living temple. The outer surface of the bone is much harder and more solid than the inner portions and ends. In the shaft or long part of the long bones is a canal fitted with a soft

substance called marrow. The marrow is made up of fat and blood vessels and is filled with very important and busy little workers. The ends of the long bones, where they join with other bones, are large and smooth and porous. If they were as solid as the shaft they would be very heavy.

In the bones of the face are many hollow places or cavities filled with air. One of these in the frontal or forehead bone communicates with the nasal chambers. Another, under the eye, called the antrum of Highmore and about the size of a hickory nut also communicates with the nasal chambers. Back of the throat are one large air cavity and many smaller ones that act as a sounding board to the voice. If these bones were all solid the head would be heavily weighted.

When you have a cold in the head or an attack of catarrh all these air cavities are likely to become affected. If the inflammation extends into them it is no wonder your head feels big and "all stopped up."

The places where the bones are fastened together are called joints. Some joints are

very firm, as the joints in the head bones. The joints of the elbow and the knee are called hinge joints because they act like hinges. The arm and the leg swing on them as a door upon its hinges. The shoulder joint and the hip joint are called ball joints because almost a complete circle can be made in them by the humerus or the femur.

The ends of the bones are protected by a thick, smooth substance called cartilage or gristle. The cartilage also serves as a cushion for the joint, protecting it from injury.

The joints are held together by bands called ligaments. These ligaments completely surround the larger joints, so that nothing can enter. Inside the ligaments there is a joint water or fluid that oils the joint and keeps it smooth. If the joint water dries up, the joint becomes very sore and stiff.

If you wrench your foot and tear the ligaments loose the injury is called a sprain.

It is hard to imagine living cell workers in the bones. But they are there, many millions of them, the same active, tireless, busy

little bodies that fill every part of the living temple.

They have many things to do, these little bone workers. Not only do they build the framework of the temple, but they are also the most important blood workers in the body. Yes, in the marrow of every bone are countless living cells at work turning food and drink into blood for the stream of life.

So the bones not only form the framework of the living temple, not only give shape to the body and protect all its delicate parts, not only join each other in making moveable joints and unite with the muscles in moving the body where you will, not only serve with the muscles in acting as levers to lift the body and to help you in all your physical work, but they also shelter innumerable companies of little blood makers that are hidden away in their safe hollows, unseen by any save the Master Builder, working with Him to keep the stream of life steadily flowing through the living fountain and into every part of the living temple.

There are two kinds of material in the bones, organic matter and mineral matter.

How the little cell workers turn food and drink into these hard substances, how they send a grain of salt here and a bit of wheat there and change them both into bone and blood, is one of the secrets that make every part of the living temple an infinite mystery.

The bones of a young child have more organic than mineral matter. For this reason young bones are flexible and do not easily break. It is very seldom that a baby's bones are broken by falling. There is so much cartilage in the baby's bones that they rebound almost like a rubber ball.

The bones of the old are very brittle and easily break because the organic matter has been carried away by the blood, leaving the mineral matter alone. The mineral matter alone does not give the bones much strength. If an old person's bones are broken they heal very slowly. The stream of life flows sluggishly and the little workers too are growing feeble. But in a child's body, bones that are broken knit together in a very short time and presently are as good as new.

Because the bones of children are so soft

and yielding it is of the utmost importance to keep them from being bent and deformed by bad positions or improper clothing. If a baby is urged to walk too early, its legs, not being strong enough to support its body, become bent and we say the baby is "bow legged."

If you sit on a seat so high that your feet do not rest on the floor, your thigh bones may become crooked, or your back bone may be bent to one side or the other.

Sitting at a desk that is too high, so that the elbows must rest upon it, will make the spine crooked.

The habit of standing on one foot will curve the spine. So will the habit of resting the weight on one leg while playing the violin.

Sitting much in a rocking chair, or reading with the head bent over, will in time cause "round shoulders." All these deformities are hard to correct.

If you wish the framework of your body to grow strong and shapely, you must be sure always to sit straight, to stand with the

weight of the body resting on the front part of the foot, with the hips back, the chest lifted and the head erect.

You must also be sure that your clothes do not press any bones out of place. The bones may be deformed by tight clothing. Garments fitting very closely at the waist crowd the ribs inward, press on the blood vessels in the skin, and stifle millions of the body workers. Squeezing the feet into tight shoes injures the bones of the foot and destroys its beauty.

To keep the framework of the living temple strong and graceful you must do the same things for the little bone cells that you do for all the other workers—eat wholesome food, bathe frequently, exercise out doors, stay in the sunlight, breathe fresh air, take plenty of sleep.

Potatoes and all the cereals are rich in the food elements necessary to build the bones. The acids of fruits are also important. Children fed on a poor diet grow very slowly and their bones are often deformed for life.

[XXXI.]

The Bread of Life.

I have told you the story of the living temple. I have not told you all the story, for no man yet knows all there is to know about the body. I have not even told you all that I and other students have learned, but surely I have told enough to make you love and honor the human body, the living temple, above all other created things. I hope I have told you enough to make you think of your own body as very wonderful and sacred. Unless you do so think of it, you can not make it grow and keep it strong and fair and beautiful.

It is a new idea that just such simple things as fresh air and sunlight, exercise, and wholesome food and sleep, make a better elixir of life than any sought or dreamed of by the alchemists of old. But you and I who have read this story of the body, can see as plainly

as plain can be that all we have to do in building the living temple, to make it beautiful and perfect, is to take good care of the little workers, the living cells. If we give them plenty of the right materials, if we do not starve them, or overwork them, or deprive them of rest, they will build us a temple in which we can live, and work and grow, in which we can love and worship, and be happy, without pain or worry or disease, so long as we remain on earth.

But we must give them the right materials. We must take care of the little workers. Unless we do so, they are helpless. This is our part of the work of building as laid down in the Architect's design.

In the plan of nature all these materials are free,—the air is free, sunlight is free, exercise is free, food and water are free, rest is free.

Not only is the air free, but you are compelled to breathe it. You may choose whether the air be good or bad, but you can not choose whether or not to breathe. Nature has put within you a desire for pure, fresh air. She has put within you a dislike to foul air, bad odors, poisonous gases. If

you give generously to the little workers of this free and pure fresh air, you are doing one thing very important to the beauty of the temple.

You are not compelled to give the little workers plenty of sunlight, or to help them by taking wholesome exercise, but nature is always urging you to do both, and nothing is more necessary to make the temple strong and to keep the little builders happy.

You are almost compelled to give the little workers food and drink. You must do this, if you are to live. It would be very hard for a man to starve himself to death. You never heard of anybody who killed himself by refusing to drink.

When you are hungry you may know that the little workers are calling for food. Hunger is the great cry that they join in sending up to you. The cry of hunger does not come from the stomach alone, but from all the little workers throughout the body. If every one of those billions and billions of crying cells had a voice, what a noise they would make!

You are compelled to let the little workers rest. Whether you like it or not, you are

obliged to sleep. You could not keep awake all the time. When you are asleep some of the little workers rest. Others are busier than when you are awake. But nature has arranged it so that all the little cells, even the busiest workers of the living fountain, have their periods for rest that can not be disturbed.

You may, however, prevent them from getting all the rest they need. And you may break and spoil their rest in many ways. But you will not do this when once you understand the body.

The day work and the night work in the temple are very different. During the day the brain workers are on duty. You are thinking and talking. You are seeing and hearing, tasting, touching, and smelling. You are eating and drinking, walking and running, making a hundred different movements. By every movement, every word spoken, every thought, every feeling, you are using energy, tearing down tissue, causing waste in the body. Thinking produces a more rapid waste than any other kind of work.

During the night, that is, if you sleep at night, as nature intended, the sympathetic workers are on duty. The brain cells are resting. Millions of little temple carpenters are building up the tissues torn down in the daytime. Millions more are carrying away the waste and rubbish left by the day workers. The food you have eaten during the day is being made into building material and carried to every part of the body. It is stored away or used by the little workers. In the morning you feel hungry because very many of the body cells have built all the food they had into living timbers, and now are crying for more.

You feel rested because, although you were not taking in food during the night, you were taking in oxygen and storing it away. You were breathing in more oxygen than the night workers needed, and so in the morning the day workers find it all ready, and are eager to use it.

Boys and girls and young people need more sleep and more food than full-grown men and women because they are not only

thinking and working, but growing also. Whether you grow tall and strong and healthy, depends a great deal more than you have the least idea, upon what you eat and how much sleep you get. You have seen little babies that did not have the right kind of food lose their rosy cheeks and grow thinner and thinner until they died. You can not grow without food.

Grown people do not get so hungry as children. They do not need so much food, for they are not growing. They need to eat simply to keep the body in good repair, to furnish the little workers with materials for building up wasted and worn-out tissues, and to store away oxygen and energy for their regular amount of thinking and working.

Old people naturally eat still less. In their bodies the work of repair is very slow. If they overeat, they make the little cells work for nothing, preparing material that can not be used.

While Jesus was preaching his famous sermon on the mount, he asked, speaking to the fathers in his audience, "What man is

there of you, whom if his son ask bread will he give him a stone?" And every father must have answered to himself, "No, of course we would not give him a stone."

People do not mean to give the little workers stones when they ask for bread, but they often do, nevertheless.

The word "bread" is used to mean foods in general, because bread contains all the materials that build up the body, that nourish the cells, that are used by them in repairing waste and freeing energy, that keep the fires burning in every part of the living temple.

The Bread of Life is the food that will do all these things in the most perfect way.

The old Hebrew philosopher, Job, declared, "As for the earth, out of it cometh bread." We read, in the Psalms, "He causeth the grass to grow for the cattle and herb for the service of man: that he may bring forth food out of the earth." So we see that the earth is the source of food.

The plants and the animals, as well as man, get their food from the earth. The rose bush takes up food from the soil, through its

roots, and breathes in oxygen from the air through its leaves. The cow eats grass and clover from the meadow, drinks water from the brook, breathes the same free air that we do, and in her body the grass, the water, and the air are turned into bone and blood and muscle. You and I eat grains and vegetables and fruits, drink water, and breathe air, and in our bodies also these raw materials are turned into bone and blood and muscle.

It seems to us a marvel that iron and wood and other materials can be taken from the earth, and so changed that out of them are fashioned strings and keys and all the delicate parts of a beautiful piano.

It seems a marvel that out of simple gold and silver, gems and metals,—crude materials from the earth, can be made a watch, a Corliss engine, a telescope or a microscope.

If these are marvels, what shall we call the silent, unseen changing of food and drink, of wheat and corn and fruits and nuts, into living cells, into bone and blood and muscle, into working and thinking men and women?

The little builders of the temple ask for

bread. If they are to work this marvelous change of food into people, they must have bread. If they are to make people strong and healthy, if they are to make the temple perfect, they must have the Bread of Life.

[XXXII.]

Good Building Materials.

The foods that make good building materials for the living temple are divided into two great classes—nitrogenous foods and carbonaceous foods.

Nitrogenous foods are foods containing nitrogen. Nitrogen is one of the things the body builders must have. There is nitrogen in the air, as well as in the soil.

Nature first puts the nitrogen into plants, and after you have eaten the plants the little workers take out the nitrogen and build it into flesh and muscle.

Nitrogen makes you grow. It is used especially in building up broken-down parts of the temple. Worn-out brain cells, wasted muscle cells, bone cells and heart cells that need mending, are all repaired and restored by nitrogenous foods. These are found in

wheat, barley, oats, corn, potatoes, peas, beans, lentils, meats, and all kinds of nuts.

Milk is a nitrogenous or flesh-building food. It contains all the elements of a perfect food. It is the only food that a baby less than a year old needs. All young animals live upon milk until they are old enough to find their own foods. Milk is a good food for most children, and is used largely by grown people. It contains a food element called albumen, sugar of milk, fat or cream, and some mineral matter.

Eggs are also flesh-building foods. Birds and chickens growing in the egg live on the meat in the egg, until they are hatched. If eggs are fresh, they are very wholesome and nourishing. The white of the egg is pure albumen. The yolk contains fat, sulphur, and nitrogen.

A great many people think that the flesh of fish and of certain animals, as the cow, the sheep, the fowl, makes the best nitrogenous or flesh-building food. Others who have studied the matter believe differently.

Animals live on food grown from the soil, just as man does. It is true that their flesh

does contain nitrogen and other food elements, but these are badly mixed in with the poisons and rubbish that are to be found in any living body. There are little breathing, moving, working cells in the cow's body or the chicken's body just as there are in yours, and they throw off poisons and waste matter like any other cells. It is not pleasant to think of eating these little workers, even if they are dead.

All meat contains a poison called uric acid, and many other substances that harm the body, especially the growing bodies of boys and girls.

Meat is very often diseased. Whether diseased or not, if eaten in large quantities year after year, it is sure to make mischief in the body. It brings on disease of the lungs, the stomach, the liver, the kidneys, and is often the cause of rheumatism.

Children do not know very much about stomach trouble and indigestion. Their little workers are young and active, and can dispose even of food that is not the best. But if the little workers are abused day after day and year after year, by and by they be-

come discouraged and sick. Then you have dyspepsia. When the little canal workers are sick, all the other workers are likely to be sick, too, for they depend upon the canal workers for food. Then you feel so bad and generally miserable that you go to the physicians for help.

About the first thing the physician does is to say that you must stop eating the foods that have hurt the little workers. He puts you on a special diet, and gives you a "diet list," as it is called, of the foods you may eat.

If you had never departed from the original diet list given to man, it is not at all likely that you would have come to this unhappy pass. It is recorded in Genesis: "And God said, Behold I have given you every herb bearing seed which is upon the face of all the earth, and every tree, in the which is the fruit of a tree yielding seed; to you it shall be for meat."

So the first food list of the first men and women was made out entirely from herb-bearing seeds, grains and vegetables, and the fruit of trees yielding seeds, fruits and nuts.

The animals also originally lived on these

foods. There was no such thing upon the earth as killing for the sake of food.

Plants are the natural food-makers. No life need be taken to obtain food from them. In fact, it is the life in them that provides food. Life makes them grow from seed to plant, from plant to fruit, from fruit to seed. Life so abounds in the whole plant world that there is food enough for all, for plants and animals and men. It is living food, of the purest quality.

In making every pound of food manufactured by plants, from two hundred to three hundred pounds of water are used. The water is sucked in from the soil by the little roots, and lifted into the leaves and branches. Sunshine and air are also used, so that when we eat plant foods we are taking into our bodies stored-up sunlight, oxygen, nitrogen, and pure, distilled water.

No man could put these things into food. No man could invent or make a food. The manufacturing power is in the life in the plant, and no man knows the secret of life.

There is abounding life in grains and nuts and fruits even when they are cooked. These

foods contain no poisons. Meat is a second-hand food, at the very best. The wheat, the corn, the vegetables, the albumen, the nitrogen, the fat, that you eat in meat had all been obtained by the animal from plants. As second-hand clothes and second-hand furniture are neither so clean nor so durable as clothes and furniture fresh from the makers, so with second-hand foods.

Carbonaceous foods are the foods that contain fuel to be used in the body, to keep it warm. "Carbonaceous" means "containing carbon." It is the carbon that burns in coal and wood. It is the carbon that burns in food.

Carbonaceous foods contain starch, sugar or fat. Most of these are furnished by the vegetable kingdom.

Starch is found in rice, potatoes, wheat, oats, rye, barley, corn, tapioca, in many nuts, particularly the chestnut, and in many vegetables. Potatoes and rice are used more than any other starchy foods.

There is a natural sugar called grape sugar, in all fruits. Some fruits contain more of this sugar than others. The starch of grains

is changed by thorough cooking into a kind of sugar called malt sugar. Sugar is also found in honey, in milk, in sugar-cane, and in sugar beets.

The best quality of sugar is furnished by fruits and fruit juices. When fruit sugar is oxidized in the body it gives energy to the muscles. So fruits act as a muscle tonic. But fruits do not produce as much heat and energy as starchy foods or fats, hence they are the most refreshing foods in hot weather or at any time if you have a fever.

Fats are found in all nuts, in corn, oats, wheat, in ripe olives, in milk, butter, eggs, and meat. The burning of fats in the body produces more heat and energy than the use of any other food.

Wheat, oats, and corn are the most nourishing of all the grains. Corn and oats contain considerable fat. We say that a horse "feels his oats," after he has had a good meal of these heat- and energy-producing little grains. The burning of the carbon in the oats makes him feel like running and jumping to expend the energy set free.

One of the duties of the little workers is

to keep the temperature of the body at 98.6 degrees, winter and summer, whether you live in the cold north or in the hot countries of the equator. In cold weather a great deal of heat is all the time being given off from the skin and the lungs as heat is given off from a warm stove or a hot-water coil. If we did not wear warm clothes in the winter, the loss of heat would be so great that most of us would perish.

For this reason we need to eat more in winter than in summer. We need more heat-producing foods, like starch and fat. These do not especially build up the wasted cells, but they give off much heat and set free much energy, so that we are kept warm and active.

The little cell workers can not live without water. When they want a drink of water they cry for it, just as they cry for food. The cry of the little cells for water is thirst. How uncomfortable they can make you feel if you do not give them water when they ask for it!

The suffering caused by unsatisfied thirst is very severe. The little workers cry and cry, until, if they can not get water, they give

up and die. After a few days without water, every cell in the body would be dead. Your life would be gone.

About two thirds of the body is water. The skin is, in fact, a closed water-bag. If you weigh one hundred pounds, sixty-six and two-thirds pounds of that weight is water. So if you were dried you would weigh only thirty-three and one-third pounds.

A man needs about four pints of water a day. Most people do not drink nearly this amount. The inside of the body needs to be bathed more than the outside. Every little cell in the liver, the brain, the muscles, ought to be bathed and kept clean all the time.

The best time to drink is about half way between meals, and a short time before meals.

Water is the best and most refreshing drink there is. No other fluid can quench the thirst. It is the water in all drinks that satisfies the thirst.

These are the foods that the body needs to make it grow and to keep it healthy and strong. The same great Power that designed and built the living temple planned

and prepared also the building materials, the golden grain, the rich brown nuts, the many-colored and beautiful fruits, that supply every need of every part of the Master Builder's masterpiece.

[XXXIII.]

Apples of Gold and Nuts of Silver.

Grains and vegetables may be called the solid timbers of the living temple. Fruits and nuts are the gold and silver in pillar, wall, and fret-work. They are the most exquisite and delicate of all foods.

The great Architect is an artist as well as a builder. Every food intended to be used in building the beautiful living temple, is itself, in its natural state, beautiful and fair to see. Examine a kernel of wheat or corn, and notice the fineness and daintiness of it. Think of the rosy apple, the yellow pear, the purple plum, the downy peach, the transparent grape—every one of all the different kinds of fruit has a color and a shape of its own, and every one is beautiful.

Not only this, but every fruit has a different flavor or taste. It would be hard to find a person who did not like some kind of fruit.

When you are sick and have lost your appetite, fruit is often the only thing you can eat. Nature makes you crave the food that will be best for the little workers, to restore their health and give you an appetite.

Every season has its own peculiar fruits. From June to June one delicious variety follows another. When the strawberry comes, we think it has the finest flavor possible. But soon there are raspberries, blackberries, cherries, early apples, each and all pleasing different tastes. When cherries are gone there are blueberries, huckleberries, plums, a little later, peaches, apples, grapes, watermelons. All through the autumn many varieties of apples, grapes, and peaches ripen and are harvested. The apples last all winter, and there is no better fruit. Grapes also are in the market at every season. From December to April we get the best oranges, lemons, and bananas. Bananas, too, last all the year round. Dates, figs, and prunes are so prepared that we can have them at any time. Cranberries are on hand for Thanksgiving, Christmas, and New Year's Day. What a feast of fruits!

Most fruits are nearly all water. The water of each fruit has a distinctive flavor and color. The juice of fruit is the purest and most refreshing water to be found. It has been distilled by the wonderful Power that is at work in all living things.

Besides water, fruits contain acid and sugar. Even the sweetest fruit has some acid. Some oranges are very acid.

A fruit may be both sweet and acid. The sweetness is due to the presence of grape or fruit sugar. When a fruit is ripe it usually contains more sugar than acid.

Adding sugar to fruit juice does not change the acid. You may put sugar into lemon juice until it makes a syrup, but the acid is there just the same.

You have seen people clean brass and other metals with acids. The acids of fruits are used by the little workers to cleanse the mouth, the stomach, and the intestines. They kill the germs that have found their way to the living canal. They cool the blood, and help the kidneys to throw poisons out of the body. They also help the liver cells to do their work. The acids in fruit are a very

important part of the body's building material.

The sugar in fruits helps to keep the body warm. It is used as fuel, and when it is burned it liberates energy.

Some fruits are very nourishing. The banana is one of the most nourishing. When baked, the banana is very digestible. This fruit contains albumen, starch, sugar, and acid.

Figs and dates are very nourishing. They contain a large per cent. of sugar.

The best grapes also contain much nutriment. A pound of fine grapes yields as much albumen as an egg.

Apples are among the best of fruits. Strawberries contain some iron, which is good for the blood. Ripe olives furnish oil or fat, and are wholesome.

When fruits are green they contain starch and are bitter to the taste. It is very dangerous to eat them. As the fruit ripens under the action of the sun, the starch is changed into sugar. When all the starch has been changed, the fruit is ripe. Then it is sweet instead of bitter.

Some fruits, like bananas, oranges, and apples, will continue to ripen after they have been picked. But they are more wholesome when they ripen on the tree.

The first canned fruit was put up by nature. The best housekeeper that ever lived can not approach Mother Nature in the matter of canning fruit. Every ripe apple, or plum, or peach, or grape, or cherry, is a perfect little can of fruit, closed and sealed, air-tight and water-proof. Each can is labeled by its form and color. What a beautiful storehouse every orchard is!

You must be sure to give the little workers fruits. But you ought never to eat fruits and meats at the same meal, or fruits, eggs, and vegetables, or acid fruits and milk. It is better to make an entire meal of fruits or to eat fruits combined with grains.

Green fruits and over-ripe fruits are dangerous, and should be avoided.

A great many people think that fruits are not a good food. They like them, they say, but can not digest them. This is because, first, so much cane sugar is used with fruit. The cane sugar makes the fruit juice ferment

or sour, and then it causes trouble. Second, fruit is usually eaten at the close of the meal, after meat, potatoes, eggs, milk, and many other things. If fruits are eaten alone, or with bread and cereals, no food is more digestible.

Nuts are not so showy and handsome as fruits, but they contain more nutriment. They are very rich in fat or oil, and also furnish albumen or flesh-building food. Some nuts afford considerable starch.

The most wholesome nuts are sweet almonds, pecans, peanuts, English walnuts, filberts, Brazil nuts, and cocoanuts. Hickory-nuts, butter-nuts, hazlenuts, beechnuts, black walnuts, are all rich and nourishing foods to those who are able to digest them.

Nuts, even more than fruits, are generally regarded as indigestible. They are not looked upon as foods, in the sense that potatoes and grains are foods, but are considered a luxury, a dessert, to be eaten sparingly at the close of a meal, or between meals, or as refreshments just before bedtime.

No hearty food is digestible eaten in that way. If nuts are taken with the regular

meal, if they are eaten slowly and very carefully chewed, they will agree with the majority of people. But every little particle should be crushed between the teeth. In fact, the nut should be chewed until it is a milky paste.

It is true that some people can not eat nuts in any form. Then they should not try. It is worse than useless to send the little workers even the very best materials, if you know they can not use them.

Some nuts require a special preparation before they are digestible. The peanut is very hard to digest if eaten raw, also the chestnut. The peanut is most digestible when it has been boiled several hours. Roasted peanuts are not very digestible. Chestnuts are more wholesome if they are boiled or roasted. Nut candies are not digestible.

So far as food elements are concerned, nuts belong in the same class of building materials as meats.

[XXXIV.]

Poor Building Materials.

People have never paid much attention to the kind and the quality of the food they ate. There are not very many who know or care about the little workers in their body, and what they need. So the great world of men and women fills the living canal with all sorts of stuff that is not food, as well as with foods that are not the best, and that do not make good building materials because they are not well-prepared.

You, however, have learned to love the little workers, and to understand how important it is to give them the right materials to work with, and the right foods to keep them in health.

One very bad thing that almost everybody does is to overload the body builders with one or two kinds of food, while failing to give them other things they need, as if a building

contractor should send his carpenters loads and loads more brick than they required, and did not send them half enough lumber.

In order to build the living temple as you wish to build it, so that it will grow fair and strong and reach perfection, you must put into it all the food elements, in the right proportions, enough of each but not too much of any.

In natural foods all these elements are found in proportions that are easily adjusted. Grains, vegetables, fruits, nuts, milk, cream, butter, and eggs furnish a complete list from which to choose. Grains and milk contain all the different elements in good proportions. Fruits, grains, and nuts make a perfect combination. Grains with peas, or beans, or lentils, grains and nuts with vegetables, grain with vegetables and milk or eggs, are other good selections.

It is better not to eat a great variety of food at one meal. You never see brick, plaster, and shingles all loaded together on one wagon. Choose a good combination of two or three foods, and have the variety at different meals.

Certain foods become indigestible if eaten with certain other foods, as most fruits with coarse vegetables, acid fruits with milk or sugar, meat with fruits, except cranberries—they seem to be an exception.

Fruits that are made very sweet with cane sugar do not harmonize with the sugar or with anything else.

Simple foods, prepared in a simple, natural manner, are better than fancy or made dishes. The carpenters could not very well use for siding a house, boards that were smeared all over with tar or varnish. So the body builders can not easily use foods that are covered with mustard, or catsup, or oil. All such substances as pepper, pepper sauce, mustard, catsup, spices, horse-radish, and ginger, not only destroy the natural flavor of food, but greatly hinder and disturb the little workers. They are very poor materials from which to make living cells. In fact, they are not materials, for they have no food value, and afford no nourishment. They also spoil the good material in other foods.

Cakes, pies, puddings, and other rich foods are poor building materials. In them sugar,

butter, eggs, milk, fruits, spices, acids, nuts, are combined without the least regard to their effect upon the body. In fact, people often eat these things when they know they will suffer in consequence. If one begins when he is a child to choose only simple, wholesome and natural foods, he will always prefer them to artificial dishes. It shows a perverted taste to like cookies and pie better than sweet, pure bread and fruits.

Good foods that are not properly prepared make poor building materials. You cannot build a fine house of logs fresh from the woods, or of odds and ends of timber chopped to pieces and soaked in various strong liquids. You can not build a fine body of raw or half-cooked grains, of potatoes, beets, and other vegetables soaked in fat or vinegar.

It is a greater accomplishment to be a good cook than to be an author or a musician. But to be a good cook does not mean simply to prepare foods so that they will have a pleasant taste and perhaps tempt you to eat more than you need. It means to prepare foods so as to bring out their natural flavor, to

make the building material they contain as valuable and useful as possible, to increase the digestibility of foods that contain much woody fibre, and so to combine the foods served at each meal that all will agree and be digested, so that every little worker will get what it needs. To be that kind of a cook is not beneath the finest lady in the land.

The animals do not need cooked food. They do not know enough to cook it. Their digestive organs are made on purpose to digest raw foods.

The mind of man enables him not only to plant and tend and harvest his food, but also to prepare it and to change it in various ways to make it more digestible and more pleasing to the taste. Most of his foods need to be cooked in some way.

Raw starch is indigestible. Raw potato, or rice, or corn does not have much taste. This is because each little starch cell is surrounded by a woody wall or capsule. Before it can be acted upon by the saliva or the gastric juice, this wall must be broken down. The best way to break the little grain walls

and to set the starch free is to cook the grain. Boiled starch is soft and gummy. Baked starch is dry and brown.

The outside of a loaf of bread is brown. We call it the crust. It is the best part of the entire loaf. When the crust is chewed a few moments it gives a sweet taste. The starch has been changed by the saliva into a form of sugar. If the entire loaf of bread were like the crust, it would be much better material for the body workers. The more thoroughly bread is baked, the more wholesome it is. If it is soft inside, if it is not sweet and light, it becomes sticky and stringy, and soon sours. Sour bread makes a sour digestion, a sour temper, sour feelings, as well as a sick and sour stomach.

Bread should not be eaten until it is a day or two old.

If sliced bread be placed in the oven and baked at a very high temperature—360 degrees—the starch is changed into a form of sugar called dextrin. Dextrin is much more easily digested than starch.

Whole wheat bread is made of the whole

kernels of wheat after the bran or husk has been removed. Graham bread is also made from the whole kernels of wheat. It is called graham bread after Dr. Sylvester Graham, who first called attention to the value of this kind of bread. Graham and whole wheat bread are very wholesome and nourishing. They are fine materials for boys and girls to use in building strong bones and muscles.

Good bread may also be made from rye.

Corn-bread is very different from wheat bread. It more easily breaks to pieces. This is because wheat contains a gummy substance called gluten, while corn does not. Children often make gum from new wheat by chewing the kernels. They can do this because of the gluten it contains.

White bread made from patent flour is a very poor food. A dog fed three weeks on such a food would starve to death.

Hot bread and biscuit, soda biscuit, and all foods in which saleratus is used are the poorest kind of building materials.

Rice that is first browned in the oven and then steamed is more wholesome than plain

boiled rice. It takes about one hour to cook rice thoroughly, and about one hour to digest it.

Wheat, oat-meal, barley, and corn-meal should be cooked from three to seven hours.

It is impossible to change these grains into good building material by cooking them fifteen or twenty minutes. Wheat that has been malted, rolled into tiny flakes, and then thoroughly toasted, is almost a perfect food.

Beans, peas, and lentils need to be cooked several hours. The skins of these foods, as well as of fruits, are indigestible, and should not be taken into the body.

Most fruits are better raw than cooked. A few, like the prune and the apricot, are improved by cooking.

Potatoes when properly cooked make a good building material, because they contain the most digestible form of starch and also mineral matter that is needed in building different tissues. Potatoes are most wholesome when baked. The starch of a baked potato is the most easily digested of all the starches.

Hard-boiled eggs and fried eggs are not

good materials. Eggs should be poached or boiled soft.

Fried foods of all kinds are bad materials.

Pork is an unclean and dangerous food. It causes many diseases, and often contains a little animal or parasite called the trichina, that makes terrible mischief in the body.

Foods may be natural and simple and properly prepared, and still fail to reach the little workers in good condition. You must take good care of them all along their journey through the living canal. You lessen their value if you eat hastily or overeat, or if you drink very much at meals. Food should be chewed without any fluid in the mouth excepting saliva. It should never be washed into the oesophagus by water or any other liquid.

If you drink much during a meal, the progress of the food is delayed, because the gastric juices are diluted and the fluids in the stomach must be absorbed before digestion can begin.

If you drink very cold water, iced lemonade, or any cold drink, the delay and trouble are greater yet, for not only must the liquids

be absorbed, but the food that has been cooled by the deluge of cold fluid must all be warmed up again before digestion can go on.

It is a waste of good materials to eat when you are very tired or very much excited. Fatigue, worry, trouble, grief, anger, fear, all interfere most seriously with the work of the body builders, especially those of the living canal. Fear almost stops digestion. It checks the flow of saliva, so that your mouth is dry. Perhaps you have tried to give a recitation before a school, and found your mouth so dry you could hardly speak. You were afraid.

In China a man accused of a crime is ordered to chew dry rice, to show whether he is guilty or not. If the saliva does not flow, and he can not chew the rice, he is said to be guilty. It is supposed that the knowledge of his guilt made him afraid, and that fear caused the saliva to cease to flow. So you must come to the table rested and happy, and take plenty of time to eat your meals. Cheerfulness and happiness make the blood flow

more freely, and every little cell that has to do with digestion works with a will.

It is a waste of good materials to eat between meals. However, if you are hungry and it is not too near a meal time, a little fruit, that is mostly water, will do no harm.

The last meal of the day should be light, and taken from two to four hours before going to bed. If you eat chiefly fruit for supper, you will sleep better and be much more refreshed than if you eat too heartily.

[XXXV.]

A Terrible Enemy to the Little Workers.

When fruit juice is fresh it is good for the little workers. If it is boiled and quickly canned, it will keep sweet for years. But if it is allowed to stand open for two or three days in a warm room, a change takes place in it.

Among other things in the air are tiny plants called yeast plants. They can not be seen without a microscope. Some of these little plants are on the outside of fruit. When the juice is pressed out of the fruit the yeast plants get into it, and if they are not killed by boiling, they begin to grow by eating the sugar in the fruit juice. The little yeast cells are fond of sugar, and grow very rapidly when they can get it.

Every living cell, as it grows and works, throws off waste substances. The yeast cell forms at least two waste substances. One

is a gas called carbon dioxide gas. The gas rises to the top of the juice, forms little bubbles, and passes off. It is the gas in yeast that makes dough rise. The gas is held in by the dough, but as the bread gets warm the heat expands the gas and pushes the bread up. Then the gas escapes. All the little holes in the bread show where the gas was held prisoner for a while.

The other waste substance thrown off by yeast cells is alcohol, and this remains in the fluid. If a large amount of alcohol is made, it kills the yeast plant, and then no more is formed. Alcohol is a deadly poison to every living thing.

These two changes produced by the working of the yeast cells are called fermentation. All alcoholic drinks are fermented drinks. Fermented fruit juices are called wines. Beer is made from the fermented juice of grains.

If fermented fruit juice is boiled, the alcohol is driven off. If the vapors driven off from the fermented juice are cooled and collected, they form brandy.

In the same way whisky is made from the fermented juices of corn, rye, and other

grains. This process is called distillation. You can distill water by taking a cup of ice water and holding it close to the spout of a boiling tea-kettle. Drops of water will collect on the outside of the cup and run off. This is distilled water.

Every little kernel of wheat, barley, and rye, contains starch and gluten. These are the foods provided by nature for the young plant. Each tiny starch cell is surrounded by gluten. By a beautiful process, part of the gluten is changed into a substance called diastase, that turns the starch into grape sugar. The grape sugar is the little rootlet's food. This is the reason why the roots of sprouting wheat, barley, and rye are sweet.

When the kernel of grain is wet and exposed to a mild temperature, it begins to sprout. The brewer sprouts the grain and lets it grow for several days. Then he stops its growth by drying it. Next he mashes it, and soaks it in water, to get out all the sugar and diastase. He allows this fluid to ferment by adding to it yeast and hops. In this way he makes beer.

The flour that can be put on the tip of a

knife has more real food in it than several gallons of beer. A five-pound loaf of bread contains more food than twenty-seven barrels of beer.

One bushel of grain will make about two gallons of whisky.

Alcohol, then, is a waste product of yeast cells and acts as a poison to the cells. It is formed only by fermentation. It is never found in nature.

The waste products of any organism that are poisonous to that organism are poisons to all higher forms of life. Hence alcohol is a poison to plants, to animals, to men.

When fermentation takes place in fruit, the sugar, that gives most of the food value to the fruit, is eaten up by the yeast cells, and a poison is left in its stead. When fermentation takes place in grain, the food stored in the grain for the plant and for man, is changed into a poison that shortens life. So, every alcoholic drink is made at the expense and works the destruction of natural food.

The first record of the effect of alcohol upon man is this: "And Noah began to be an husbandman, and he planted a vineyard:

and he drank of the vine and was drunken."

Noah, however, probably did not know that sour grape juice would make him drunk, for nothing was understood in those days about alcohol and fermentation. Alcohol was discovered and named about six hundred years ago, by a wise Arabian. He called it *Al Ghole*, the Arabian word for "evil spirit," because he recognized that when people drank it it made them act like demons.

In that age men were searching for the fountain of perpetual youth, and the drink that should be the elixir of life. Some thought they had found it in alcohol, and so alcohol was also named *aqua vitae*, or "water of life." But thousands have learned that it is always the water of death.

Alcohol is the same, an evil spirit, a water of death, whether it is taken in beer, ale, porter, wine, brandy, whisky, cider, rum, or any other drink.

If a little pure alcohol be placed on the skin and covered by a watch crystal, it will blister the skin. Alcohol produces a warm or hot feeling in the mouth and stomach.

An ounce of pure alcohol in the empty

stomach of a dog will cause instant death. Beer slows the digestion. Stronger drinks containing alcohol may stop it entirely.

Some people claim that alcohol is a food. But if the little cell workers could tell what they know about it, they would cry out in one mighty chorus, "No, no; alcohol is not a food. It hinders us, deceives us, benumbs us, poisons us, kills us."

Food is changed by the little workers into building material. But alcohol can not be changed into living cells. Not only does it resist every effort to make it less harmful, but it also prevents the food from being acted upon easily.

Alcohol circulates in the blood as alcohol. It robs the stream of life of water. It robs the red corpuscles of oxygen. It poisons the little workers of the liver, steals their oxygen, causes more blood to collect there than is good for you, and if used habitually brings a great deal of trouble and sickness to all the little liver cells.

Alcohol paralyzes the nerves that control the blood vessels. So they become larger than they should be. This is why a man's

face is flushed and his skin hot after he has been drinking. By and by the walls of the blood vessels are so relaxed that they stay that way all the time. Then the veins in the face can be seen, and the nose is always red. But the man is not really warm. His skin is kept warm at the expense of the delicate and important parts of the body inside. It is not the wall of a house that needs to be kept warm, but the rooms and the people within. So it is not the walls of the temple, but the beautiful rooms and the living workers that need to be kept warm by the blood. All these are endangered by the use of alcohol, for it drives the blood to the surface, where it gives off heat that belongs elsewhere. It makes a man feel warm, and so he is not careful to protect himself against cold. But he needs protection more than if he had not taken the beer or wine or whisky.

In 1786 Prince Patunkin, prime minister of Russia, under the Empress Katarina, gave a state dinner to the peasants. All ate heartily and drank brandy freely. A very cold night set in, and by the next morning sixteen thousand of the drinkers had been frozen to

death. The brandy had weakened instead of protecting them. Lumbermen who work in the woods all winter know that if they drink they will suffer more from the cold. Arctic explorers who abstain from all alcoholic drinks endure the intense cold better than those who do not.

Alcohol is no better protection against heat than cold. It increases the discomfort and suffering caused by heat, and makes one more likely to have a sun stroke.

The nerve that controls the heart is depressed by alcohol, so that the heart beats more rapidly. At the same time the force of each heart beat is lessened, and the walls contract less perfectly.

In the very smallest amounts alcohol has a benumbing effect upon the nerve workers, and on all the little body builders, so that their working capacity is lessened. A man who drinks beer can not shovel as much dirt as a temperate man. A soldier who drinks can not march as well or obey orders as quickly as one who does not.

This terrible enemy of all the body workers poisons the brain cells very much as opium,

ether, and chloroform do. The faculties that are developed latest in life are the first to be injured by it. Self-control gives way, the judgment becomes poor, one becomes talkative and quarrelsome.

Alcohol stupefies the brain cells, and deceives the man. It makes him believe that it helps him to think, but when he becomes sober he is ashamed of his thoughts. It makes him feel strong when he is weak, rich when he is a beggar, happy when he is miserable, well when he is sick, warm when he is cold, active when he is hardly moving, good when he is bad. "Wine is a mocker." Large quantities of it will so deceive a man that a chair or table may seem to him a monster. He is close to delirium tremens. "Strong drink is raging." He may commit any crime. "Whosoever is deceived thereby is not wise."

When the habit of drinking has cut a deep pathway through the brain, it holds you its victim in bands stronger than iron.

If you learn to say No, while you are a child, if you learn to regard the body as holy, if you learn to think first of its beauty and what it needs, and second of your own pleas-

ure, when you are a man you can not help being manly, you will have self-control and true character.

Nobody ever intended to become a drunkard. But we have learned, you and I, how easy it is for the little brain workers to form a habit. They learn a good habit as easily as a bad habit. They learn a bad habit as easily as a good habit. If you give them one drink, it is easier to give them the second. If you refuse them the first, there will never be a second. So the old injunction, "Touch not, taste not, handle not," is the very best one to give the little body builders with regard to their terrible enemy, alcohol.

[XXXVI.]

Thieves and Murderers.

When you drink tea you are bringing a thief into the living temple. It goes to every little nerve worker, and robs it of energy.

Every cup of strong tea contains from one and a half to three grains of caffein, and from eleven to twenty per cent. of tannin. Caffein is a poison to the little builders, and tannin hinders the canal workers from digesting food.

Tea is not a food. It has no food value. It is a stimulant, a whip, to every working cell.

After you have used tea a few years, it is plain to be seen that your body workers have been robbed of energy. Your nerve workers have grown weak, and you say you are nervous. Your hands tremble, you have the headache, your heart acts strangely, it beats rapidly, you can not sleep.

When you drink coffee you are again admitting the same thief. But in coffee there is not nearly so much tannin as in tea. There is more caffein in a pound of tea than in a pound of coffee, but coffee is made so much stronger than tea, that the effect on the body is about the same. Coffee contains some fat, but it is indigestible, so that in coffee also there is nothing that can be used in building the body.

Tea and coffee are not only thieves, but liars. When they get into your stomach, they tell you that you do not need any more food, they are sufficient. They take away your hunger so that you do not eat enough. You feel "braced up" by a cup of tea or coffee because you are deceived. You borrow the strength that belongs to to-morrow, and by and by your bank account of strength is gone.

Tobacco is a murderer. It does not rush upon the little workers with a dagger and kill them instantly, but steals among them secretly and slyly and poisons them to death.

When tobacco first enters the temple it makes the little workers very sick. The

stomach workers try to make it go out again, and very often succeed, sending everything else in the stomach with it. It makes the brain workers dizzy and faint. It makes the muscle workers tremble. It gives you a headache. The cold sweat pours out upon your brow. Your heart beats more rapidly. Every little worker in the body is weakened. Its work is almost stopped for the moment.

But if you keep on using tobacco, by and by the little builders will accept it and try to do their work in spite of it. Then this wily destroyer has everything his own way. He poisons the canal workers, the liver workers, the muscle workers, especially those in the living fountain, the workers in the breathing rooms, the workers in the living wall, and every little brain and nerve worker. Digestion fails, the liver, the heart, the lungs, grow weak, the pores in the skin are stopped, you lose your self-control and love of right, you become selfish and coarse and morally weak.

Smoking injures the throat, weakens the vocal cords, and frequently causes cancer of the lip and throat.

A few years ago I lived near a German

farmer who raised tobacco. One autumn after gathering his tobacco crop and washing the leaves, he poured the waste water from the washing into the swill and fed it to a fine drove of thirty fat hogs that he expected to sell in a few days. The hogs drank the tobacco water, and soon after became very sick. As a result twenty-seven of the thirty died.

If you wish to develop a strong body and a pure mind, you must keep this deadly destroyer entirely out of the temple. If you smoke cigarettes or chew tobacco, you will be stunted in growth, weakened in lung power, weakened in muscle power, weakened in heart power, you can not make the temple beautiful. Your skin will be sallow, and your expression faded. You can not keep up with your classes, you can not remember well, you will lose all interest in high ideals, in truth and nobility.

Thousands of boys are killed every year by cigarettes. Tobacco is always and everywhere a merciless destroyer.

Opium is another deadly enemy to the little cell workers. It is a juice obtained from

the unripe heads of the white poppy, a plant of Asia.

Opium contains a poison called morphine, after Morpheus, the god of sleep. Because opium causes stupor and sleep, it is called a narcotic which means making numb.

Morphine is sometimes given to relieve pain, but it should never be taken if you can stand the pain without it, and never even then except as ordered by a physician.

Pain is the warning of the nerves that there is trouble in the body, trouble that must be relieved, that endangers the life of the little workers. Morphine makes the nerves stop crying, but it does not stop the trouble. The warning ceases, but the inflammation, the congestion, the disease grows worse and worse, until you do something besides give morphine. Opium causes the nerve cells to cry out peace and safety, when there is no peace.

Sometimes people find the effect of opium so pleasing and soothing that they keep on taking it after the pain is gone. They keep on drugging the little workers until they are

slaves to a master that rules them with cruel and terrible power.

Mothers often give their babies soothing syrups containing opium, to quiet them and to keep them from crying. Nothing is more harmful, even dangerous, to the tender body of a child. This is a practice that has caused the death of thousands of babies and injured hundreds of thousands more. A baby has been known to be killed by one drop of laudanum, a fluid preparation of opium.

Opium, like alcohol and tobacco, weakens the will power and changes the entire character. It makes the person using it untruthful, sly, and suspicious.

Knowing the graces and the treasures of the living human temple, who would let loose within its walls thieves and robbers, murderers and destroyers, to ravage its beautiful rooms, to irritate, deceive, stupefy, and poison its millions of faithful little workers?

To understand the body is to love and to protect it.

[XXXVII.]

The Sum of the Body.

There are in the perfect human temple:

Of distinct bones, fitly joined together 243

Of voluntary muscles, each with a name, more than..... 600

Thousands of miles of blood-vessels, including of arteries, more than.... 1,000

Of arteries large enough to have a name 550

Of nerves that carry messages to and from the brain, more than..... 600

Thousands of sympathetic nerves besides.

An area of skin that if spread smooth would cover from 15 to 17 square feet.

Of sweat glands in the skin.....2,500,000

If spread out smooth, they would cover an area, it is said, of 11,000 square feet.

Of sweat pores to the square inch in the palm of the hand..... 2,500

So many sweat pores in all that if they

were united end to end, they would make a sewer nearly ten miles long.

A breathing surface in the lungs that if spread out flat would cover 2,000 square feet, or an area equal to a lot fifty feet long and forty feet wide.

Of surface in the skin and lungs for cooling the body by evaporation, square feet 13,000
Of air cells in the lobes and lobules of the lungs, about..... 725,000,000
Of mucous membrane lining the alimentary canal, feet..... 80
Of suction pumps, called villi, in the small intestines, about.... 10,000,000
Of heart beats during the first day of one's life, about..... 201,600
Of heart beats during one year.. 37,843,200
Of heart beats during a life of seventy years, about..... 2,649,024,000
Of blood expelled from the heart by each beat, more than six ounces.
Of blood lifted during seventy years, tons 496,692
Of fibres in the sight nerve..... 1,000,000
Of cells in the pillars of the organ of

Corti 26,000
Of fibres in the floor upon which the pillars rest 24,000
Of waste matter thrown off by the skin in one day, 2 pounds.
Of saliva made in one day by the salivary glands, 3 pounds.
Of gastric juice poured out during twenty-four hours, between 10 and 20 pints.
Of bile made by the liver each day, 16 ounces.
Of fluid and waste secreted by the kidneys, daily, between 2 and 5 pounds.
Of water given off by the lungs daily, 10 ounces.
Of hairs in a normal head of hair....250,000
Of nerve cells in the brain and spinal cord 3,000,000,000
Of red blood corpuscles..... 22,500,000,000
Of white blood corpuscles.... 53,000,000
Of all kinds of cells, of little living, breathing workers, according to a German writer 26,500,000,000,000

[XXXVIII.]

The Beauty of the Temple.

A sweet, healthy baby is the most beautiful thing in the world. We love and delight in the young of almost all animals—the chick, the kitten, the pup, the fawn, even the little baby pig. Sometimes we say, "It is a pity they must grow up." But we do not mean this, for it would make us feel very bad indeed if the young things we love, especially babies, did not grow up.

In the plan of the Architect, the living temple was to be perfect and beautiful as a baby, a child, a youth, a man. What the baby lost in soft, pink flesh, and clinging charm, the child would gain in firmer muscles and more active brain. What the child lost in natural freshness, in innocence and guilelessness, the youth would gain in skill and knowledge. What the youth lost in quickness and grace, in enthusiasm, faith, and

buoyancy, the man would gain in strength and vigor, in repose, serenity, and sympathy.

Now and then we see a grand old man whose white hair crowns a living temple of beauty and majesty supreme. His form is erect. His bearing is full of force and dignity. His step is firm. From his keen eyes, the living windows of his soul, flash the fires of eternal youth, of quenchless faith. His whole countenance is alight with the gathered courage and love and victory of eighty years.

We never think, What a beautiful baby that man must have been! What a pity it is that he grew up! We think, Here is a man that made the most of his life. He used the gifts the Creator gave him. He took the materials provided by God and nature and out of them built the temple day by day and year by year, faithfully, joyously, hopefully, bravely, according to the great Architect's plan.

He complained not. He worried not. He yielded not to appetite. He loved his fellow men, and worshipped God. At the close of life the temple stands, a finished structure approved by God, revered by men,

ready to be given back to Him who gave it, to become a part once more of the everlasting, unchangeable mystery of life and death.

Too often we see a feeble old man whose white hair crowns a tottering frame. His eyes are dim. His step is uncertain. A sorry object, he sits bent over in the chimney corner and mourns the past.

Sometimes we see a young man whose temple is a ruin. Its walls are sunken and discolored. From the living windows gleam sullen fires of fear and hatred and despair. His face is marred and furrowed by evil habits. Of him, alas! it could be said, What a pity it is that he grew up.

And the greatest pity of it is that it need not have been. It was not in the plan of God for him. It is not in the plan of God for you, or me, or any one. If the feeble old man and the ruined young man had treated their little workers right, they would never have been where they are to-day.

The face is the most beautiful and expressive part of the living temple. It is on the face that millions of the brain workers make the record of their daily life. The work of

the muscle workers is shown by the movements of the body, by running, jumping, eating. The work of the canal workers is shown by the flesh and fat you take on, by your growth in height and strength. The work of the little hair cells is shown by the new hair that comes in and the old hair that grows long. The work of the brain cells is shown partly by what you say and do, but most of all by what is written throughout the years, upon your face. Every thought you have, every feeling you have, every purpose you form, makes a mark upon your face. The muscles, nerves, and tissues of the face are so arranged that no thought, no feeling, however subtle, however secret, can escape. It is caught and held forever in visible form.

More than fifty muscles arranged in pairs, with one exception, cover the bones of the face, and form the soft tissues. Many of these are sheathed in delicate sheathes finer than the finest lace. Over the muscles is a layer of fat that fills the hollows and gives smoothness to the countenance. All these muscles are controlled by a pair of nerves, called the facial nerves, that come directly

from the lowest part of the brain and are themselves controlled by the mind. These facial nerves are more sensitive than any others. They are not sensitive to things touching the face, but to mental touches. Not only are all these different tissues wonderful in structure, but since they are designed to express what is in the mind, nature has made that part of the skin which covers them peculiarly delicate and beautiful. This is spoken of as the complexion, and was first so called because of the complex arrangement beneath.

Above the eyes and covering the lower part of the forehead is a broad, thin muscle, that spreads out into a wide, white tendon, and passes over the top of the head to the back part, where it becomes muscle again. This muscle is called the occipito-frontalis. It is one of the muscles expressing attention, surprise, terror, horror, grief, despair, sorrow, and care. In ordinary action it raises the eyebrows slightly. This action occurs when one is paying good attention. If that which holds the attention grows in intensity, the eyebrows are raised still higher, the eyes are

wider open, thus producing the expression of surprise. If the action is still more exaggerated, the forehead is thrown into transverse wrinkles, giving the expression of fright or horror.

Between the inner ends of the eyebrows there is a little muscle called the corrugator supercilii, or wrinkler of the eyebrow. This muscle is attached to the bone beneath the eyebrows and to the skin. When it contracts, it draws the eyebrows together and downward, throwing the skin into deep vertical folds, or wrinkles. This is the "frowning" muscle; it also expresses pain, suffering, sorrow, and distress. These two muscles, acting together, and producing transverse and vertical wrinkles, are called the "grief muscles." Aristotle said that a forehead loaded with wrinkles indicates a gloomy, morose, and overbearing disposition.

The lips are formed by one muscle called the orbicularis oris, which entirely surrounds the mouth. At the angles of the mouth the fibers pass in different directions, and blend with other structures. This muscle closes

and puckers the mouth, and also assists in protruding the lips. This closing and protruding of the lips is opposed by ten other muscles, and the action of these muscles accounts for the great difference in the lips of different individuals.

One of these little muscles called the risorius, draws back the angles of the mouth, and hence is regarded as the "smiling" muscle. When it is well developed, it produces dimples in the cheeks.

A smile is the printed picture of a thought or feeling. Victor Hugo said: "The good God has placed the smile of a dog in its tail." God has placed the smile of a man in his face.

Other muscles are used in expressing laughter, doubt, scorn, contempt, gloom, sorrow. Certain muscles of the lower lip that are used in crying are the least under the control of the will, and hence are the first muscles of the face to act. A child about to cry first uses these muscles to drop the corners of its mouth. A person who cries and feels gloomy a great deal of the time shows this by the lines of his face that take a general down-

ward direction. You can draw a picture of a happy or unhappy face simply by turning the angles up or down.

Solomon said, "A merry heart maketh a cheerful countenance;" also, "A man's wisdom maketh his face to shine." "As he thinketh in his heart, so is he."

Your face then shows just what you are. It gives panoramic views of your inmost life. Through its living windows others may look and see your character.

Several of the New Testament writers, in speaking of Jesus, said, "His face did shine as the sun." Knowing the story of the body, we can understand this now, as never before. No wonder the face of Jesus shone. No evil thoughts were written there,—no hatred, passion, greed, selfishness. Through the living windows of His soul shone the light of perfect love to men, of perfect faith in God.

Jesus Christ was the only perfect living temple ever built. We must think of Him as beautiful in body as well as in mind. The word "healthy" means "whole" or "holy." Jesus Christ was "holy" or "whole" as a man, from the human standpoint. He did not sin

against the moral law. He did not sin against the physical law. We could not imagine Him as abusing or neglecting the little body workers. He worked in perfect harmony with the Master Architect, to build one living, human temple that should be a model for all men, throughout all time. Therefore, disease could not approach Him. If we could work as perfectly in harmony with the Master Architect as He did, disease could not approach us.

"By beholding we become changed." If we study the plan of the Architect, if we study Christ, and nature, and the laws of life, we shall learn better how to build. We shall think more carefully how we build. The Master Builder will work with us until we too may stand approved of God, honored by men, our faces alight with the gathered faith and love, courage and victory of many years.

END.

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