THE MOUTH
and
TEETH

MAUDE MULLER TANNER, D. M. D.

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By

MAUDE MULLER TANNER, D. M. D.

PORTLAND, OREGON

PREFACE

This work is inscribed to my much esteemed friends, whose timely counsel and kindly advice made possible my professional career:

Burton Lee Thorpe, M. D., D. D. S., of St. Louis, Mo.
R. O. Clarida, Professor of Education, Marion, Ill.; and
G. V. Black, M. D., D. D. S., L. D. D., of Chicago, Ill.

Dr. Black was regarded and stood pre-eminently highest as one of the greatest authorities on Dental and Medical Education. As an educator he had no equal in the dental profession. His works are eagerly read and consulted with by the profession, and the laity as well. The following is an extract from a letter by the Professor of January 21, 1911, in which he replied to the author's request as to the prospects of advocating this book to be used as a text-book in the public schools:

"I am very decidedly of the opinion that if our children could be taught to take proper personal care of their own teeth, that teaching would do more good than can be done by all the doctors in Christendom."

G. V. Black.

Portland, Oregon, December 26, 1916.

INTRODUCTION

The aim of this work is to teach the evils of neglect of the mouth and teeth, its results, and how to overcome them. Prevention is better than the best cure.

It is expected this book is to be read and studied by school children, therefore, it is written as simply and clearly as possible, leaving out all words and terms that would tend to confuse young minds.

Older people will obtain a vast amount of knowledge from it, and will get excellent results by following its teachings.

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THE MOUTH AND TEETH

CHAPTER I.

Anatomy of the Mouth and Teeth

What do we mean by anatomy? As we shall consider it, anatomy is the science which treats of the structure of the body.

While we know in a general way that the body is composed of minute particles, or atoms, we should learn as much about the composition, development and use of these structures as is possible, so that we can keep the body in good health, as nature intended.

We think our young readers will agree with us, and that they would tell us, should we have the pleasure of talking with them in person, that their bodies are made up of bones, muscles, fat, nerves, arteries, veins, blood, hair, nails and teeth. But to tell how many bones, nerves and blood vessels there are, and how they are distributed throughout the body, would be a difficult and useless task.

So we are going to tell you something about your body, to give you a better idea of how it is made up, but we will pay more attention to the mouth and teeth, as the mouth is the main entrance to the body and requires great care to maintain good health. We know that the framework of the body is made up of bones, but no doubt you never thought that this framework contains two hundred bones of all shapes and sizes, classified according to shape and use; namely, long, short, flat and irregular. They are all very important, so that if one of them were missing we would be crippled or imperfect.

The face contains fourteen bones, and the head eight. You will learn about the rest of the bones of the body as you advance in your studies, but the bones of the face and head which form the cavity of the mouth will be the starting point, or foundation of our study in this book. And even of these, there are too many for you to learn of at this time, so we will begin by telling you about those which form the lower part of the face and the mouth, or the upper and lower jaw.

These bones are placed in such a manner that they form a cavity or hollow place called the mouth, which contains glands, teeth, tonsils, the tongue and other structures. There is a very soft, delicate lining in the mouth called the mucous membrane, which has somewhat the same duties to perform as do the skin of the body. The lips open or close the mouth at will.

QUESTIONS.

1. How many bones in the body?
2. How many bones in the head and face?
3. What is the main entrance to the body?

CHAPTER II.

The Lower Jaw

We will tell you about the lower jaw first, as it is not as complicated as the upper one. It is made up of one bone, somewhat the shape of a horseshoe. This bone forms the chin and the lower part and sides of the face. Right up close to the lower part of the ears, this horseshoe-shaped bone is joined or hinged to the bones of the head, so that we can move the lower jaw freely in several ways. These different motions of the lower jaw are necessary both in talking and in chewing food properly. The act of chewing or grinding food with the teeth is called masticating, so you will understand what this word means when you see it hereafter.

FIGURE 1

FIGURE 2

Figure 1. Normal Occlusion. Buccal View (Turner).
Foot note. Figures 1 and 2, showing normal occlusions of teeth in position. Arrow indicates the hole in the bone for the purpose of permitting blood vessels and nerves to enter the bone. (Figure 2 opposite side.)

The lower jaw bone contains the lower teeth placed in it, in the shape of an arch, and these teeth, as well as the bone itself,

must have food upon which to live. So the bone has little holes or openings (see figure one) in it to let blood vessels and nerves pass in and out.

These blood vessels carry in to the bone the blood, different kinds of mineral salts, and other things taken from the food we eat, which are necessary for the support and life of the bone and the teeth, just as the sunshine, air, oxygen, water and earth are necessary for the growth of the little flowers in your gardens. While the body is young these things are required for its growth, and when it is grown and fully developed, we still need all of these things to keep the body warm and healthy so that it can do its work, and therefore maintain life.

The arteries carry the food materials into the bone and teeth, while the veins carry out the waste products which are of no more use, and are to be thrown off as used up material. If a blood vessel is hurt or injured, or is cut in two, or becomes diseased, the food supply of that certain part of the body will be cut off, so that the bone and the tissues surrounding the injury will die from want of food.

The nerves in our bodies are like the wires of a telephone system. They carry messages to the brain and back again, to all parts of the body. When we are going to take food into the mouth, chew the food, laugh, cry, sing, or perform any act, the nerves take the message to the brain, telling the brain centers what is wanted. These brain centers then send a message back, telling the mouth to open or close, our eyes to close, or look at different objects, or telling our legs to walk, run or jump, just as we wish. The nerves that enter the holes in the lower jaw bone, along with the blood vessels, are so arranged that every tooth in the lower jaw is supplied with a little fine nerve, which goes into the tooth through a little opening for that purpose at the end of the root of the tooth.

The lower jaw bone is heavy and very strong, but a severe blow will easily break or fracture it. It is weaker on the sides of the face, back of the chin, than anywhere else, so that fractures or breaks take place at that point oftener than at other places on the bone.

The bone has little grooves, ridges and rough places on it, to which muscles are fastened, as they could not stay so firmly attached to a smooth surface.

This bone is one of the very first in the body to be formed. Along the upper edge or border of the bone, where the teeth are set into it, it is porous, somewhat like a honeycomb, so that many times when a tooth has to be extracted or taken out, a part of this honeycombed portion of the bone will remain fast to the root of the tooth and come out with it. People often become alarmed at this and think that the jaw bone has been broken, when it is only a little piece of this porous, spongy part of the bone that has been broken away, and really amounts to very little, as this part of the bone only serves to hold the teeth in place. When the teeth are lost, this part of the bone absorbs or disappears after a few months or years, leaving the bone smooth and dense.

The jaw bone is seldom broken in the extraction of teeth, although in some cases the jaw may be dislocated in the joints or even in suddenly opening the mouth. However, these accidents rarely occur when the muscles of the jaws are strong and healthy, but usually take place when they are weak and unhealthy.

When we are young there is only room for ten teeth in each jaw, but at certain ages, as you will find later, these little teeth are lost, one, two or three at a time, until they are all out. Then following these little teeth come the large, permanent ones, which are supposed to last throughout life. There are many cases where the little teeth stay in the mouth too long, so that they

become wedged between the permanent teeth, spoiling the arrangement of them.

Oftentimes, through neglect and disease, the permanent teeth are lost while we are very young. That is why we are going to teach you about the mouth and teeth, and their care, and how to prevent the loss of the teeth, because good health depends upon good teeth and a healthy mouth, and without health we make a failure of everything we go about, for, pray tell us, who can really do the best, and make the most of life, when hindered and held back by poor health and a bad personal appearance?

QUESTIONS.

1. How do the different parts of our body get their food?
2. How are the waste products of this food carried out of the body?
3. After we have grown up, why do our bodies still need food?
4. How are messages carried to the brain from all parts of the body, and back again?
5. Upon what does our health depend?

CHAPTER III.

The Upper Jaw

The upper jaw, which contains the upper teeth, is made up of two bones which join very closely together in the middle of the face, along an imaginary line called the median line, meaning the middle or center line of the face. To locate this line, take a point in the center of the forehead and run your finger downward, between the eyes, down the nose and over the tip of the nose, and over the mouth down to the tip of the chin. This line will come right over the place where the two bones which form the upper jaw join together.

These two bones are shaped somewhat like a cube or a pyramid and have a large hollow space inside of them, called the Antrum of Highmore, after Highmore, the name of the man who first found this space. The word "antrum" is a Latin word meaning a cave or hollow chamber. Each one of these bones has four surfaces or sides. One surface forms part of the cheek, one forms part of the inside of the nose, another helps to make up the hollow socket called the orbit, which holds the eye, while the other surface joins with other bones of the head. There are also flat projections from the inner surfaces of these bones which meet each other and make up what we call the roof of the mouth.

On the under surface of these two bones, we find a ridge of the same porous, honeycombed bone, shaped like an arch, just as we found on the lower jaw bone, in which the upper teeth are held fast. So, you see, the upper jaw bone is of great importance, as it helps to form the face, the inside of the nose, the hollow for the eye, the roof of the mouth, and besides all of this, holds the upper teeth in place.

We will now explain to you a little more about the Antrum of Highmore. From what we have told you about the shape and location of the bones forming the upper jaw, you can easily understand that the Antrum would be located right under the eye and back of the part of the face called the cheek, therefore making two of these hollow spaces, one on each side of the face. The inside of the nose, or the air passages, as they are called, is right between the two hollow spaces, and there is an opening from each antrum into the nose. The mucous membrane, or the lining with which the mouth and the nose are lined, extends from the nose into the Antrum, and lines it also. There is a fluid secreted or given off from the mucous membrane of the Antrum, just as there is from the mucous membrane of the nose. This fluid flows out through the opening into the nose, keeping the inside of the Antrum moist, and helping to keep the air passages of the nose moist and free of dust. This moisture, which flows down through the nose, not only carries away waste matter, but it also washes away dust and dirt, which are taken into the nose as we breathe.

The Antrum is often subject to different forms of disease, which cause serious trouble and severe pain. On account of the close relation of this cavity to the eye, the teeth and the nose, they, too, often become diseased. Sometimes when the Antrum becomes diseased the eye will be pushed out of its socket by the severe swelling and pressure. A good many of these troubles in the Antrum come from the teeth, their roots often penetrate the floor of the Antrum, and you can see that if such teeth are diseased they will easily carry the disease into the Antrum. Foreign substances, or things that have no business there, are often forced through teeth which are badly decayed or broken down into the Antrum, and will immediately start trouble. Toothpicks, pins, bits of bone or particles of food are some of the things that might give rise to trouble of this kind.

Neuralgia, or pain in the nerves, is often brought about by pressure on the nerves, due to swollen and feverish tissues, or due to the presence of tumors or cancers, as they are commonly called. These are unnatural growths sometimes found in the body, which, like weeds in a garden, will crowd out the useful structures among which they grow, and only serve to cause trouble. Owing to the thinness of the bone forming the sides of the Antrum, a tumor can easily force its way into the Antrum, enlarging the face, causing the eyes to bulge out, closing up the nose, and in extreme cases causing the mouth to become closed so that it cannot be opened. Of course, the seriousness of such conditions will depend upon the growth and size of the tumor. In some cases the teeth even have to be extracted to make room for a growing tumor, if it has gone so far that it cannot be taken out by a surgical operation. Little or nothing can be done for such cases after they get a good start, unless we have the growth and a part of the jaw removed by a surgical operation.

Some of the nerves and blood vessels which supply the upper teeth pass through the Antrum, so that any trouble beginning in these teeth is apt to get into the Antrum, or, on the other hand, trouble beginning in the Antrum is very likely to affect the teeth which are near it, or penetrate the floor of the Antrum. Most of the troublesome conditions in the Antrum are started from decayed teeth, the roots of which extend into the Antrum. If the trouble is allowed to go too for, before anything is done to stop it, nature becomes unable to throw off the poison which is formed by the process of decay, and serious operations are often necessary. Even extreme measures of this kind will sometimes fail to save us, and hopeless invalidism or loss of life may follow as the result of lack of care. People are likely to forget, or fail to realize, that such serious results can and do come from a little thing like a decayed tooth.

In speaking of the upper jaw we usually think of it as one bone, as the two bones which make it up are so closely and firmly

united. When they fail to unite, as they sometimes do, we have the deformity known as hare-lip and cleft palate, not always both, but sometimes.

When teeth are extracted from the upper jaw, the same thing may happen, which sometimes happens with the lower jaw, of which we told you in the previous chapter, that is, little pieces of the honeycombed portion of the bone which holds the teeth may be taken out with the tooth.

Fractures of the upper jaw are very difficult to manage, because it is so hard to keep bandages in place. A heavy blow will crush the walls of the Antrum and, as a rule, will leave a disfigured face.

In children under six years of age, the upper jaw contains ten teeth, while in adults, or grown-up people, it contains sixteen teeth.

The upper jaw bone is of great importance in the formation of the face, as we have already told you. It is also a very difficult bone to operate upon, and an operation on it, usually ruins the appearance of the face. Therefore, any trouble or disease affecting it or the teeth held in it should be carefully and skillfully treated as soon as discovered. Physicians seldom treat such cases, or have much to do with them, especially if the trouble comes from the teeth, but leave that part of medical and surgical work to the dental profession.

QUESTIONS.

1. What is the Antrum of Highmore?
2. How may it become diseased?
3. Why should it be so carefully guarded from disease which might enter it through decayed teeth, and from accidents?
4. What is often a cause of neuralgia?
5. In what way do bad teeth affect the eyes?

CHAPTER IV.

The Mouth

The mouth is the entrance to the stomach and intestines, or the digestive tract. Another name for the digestive tract is the alimentary canal, which means the canal or channel through which we receive our food or nourishment. The mouth is an oval cavity, which is bounded in front by the lips, on the sides by the cheeks, above by the bony roof, known as the hard palate, in the rear by the soft palate, below by the tongue and the muscles which form what we call the floor of the mouth, while behind it opens into the throat. The mouth is lined throughout with a thin lining called the mucous membrane, which begins at the lips. When it is healthy, this membrane is a rose pink color. Its particular work, or function, as we call it, is to line the mouth and to secrete or throw out from many little glands a somewhat thick fluid. This fluid becomes mixed with other fluids secreted in the mouth, about which we will tell you presently, and serves to make the food moist, so that it may be easily swallowed. This membrane is well supplied with fine nerves, which make it tell us quickly when things are too hot, or too cold, to be taken into the stomach.

The mouth is supplied with other secretions or fluids which are formed and thrown out by certain glands into the mouth. These secretions have the name of saliva. These glands are located in the sides of the mouth and under the tongue. The largest pair is the Parotid glands, which are located just below and in front of the ear. This gland weighs from one-half an ounce to an ounce, and is well supplied with blood vessels and nerves. (It is this gland which swells up when we have the mumps.) The fluid which is secreted by the gland flows out

into the mouth through a little tube or duct, as we call it, opposite the second molar tooth in the upper jaw.

The next in size of the glands of the mouth are the sub-maxillary glands. "Sub" means under, and "maxillary" refers to the jaw, so that the name of the gland tells us where it is located, that is, under the lower jaw. There are two of these glands, one on either side of the chin. They are much smaller than the Parotid glands, weighing but one-fourth of an ounce, and, of course, give off much less fluid. The ducts from these glands open into the mouth under the tongue in what we call the floor of the mouth and, like the larger Parotid glands, the Sub-maxillary glands are well supplied with blood vessels and nerves.

The Sub-lingual glands are smaller yet, and the name, too, tells us where they are to be found, for "Sub" (as we have just told you) means under, while "lingual" refers to the tongue. The Sub-lingual glands, therefore, are located in the floor of the mouth under the tongue. Small ducts carry the fluid from the glands to the mouth.

Now, these glands are very useful, as they furnish the fluid called saliva, which moistens and softens the food as we chew it, so that it may be swallowed and digested. They are tender and easily bruised, and become diseased or infected as we say, either by uncleanliness in the mouth itself, or through poisons which get into the blood and then into the glands.

We should keep the mouth as clean as possible, in order to give these glands a chance to keep clean and well and do the necessary work. Their function, or work, is to make saliva and pour it out into the mouth, and, for this reason, the three sets of glands are called the Salivary glands. The saliva is a very important fluid and does a number of useful things for us. In the first place, the glands pour out a great deal more saliva when we begin to eat than they do at other times, so that it mixes with the food as we chew it, moistening and softening it, and making it

easy to swallow. As we are unable to detect the taste of food unless it is moist, it is of great assistance. The saliva contains a peculiar substance called ptyalin, which is able to change the starch in certain foods like bread and potatoes into sugar, so that it may be more easily digested. And besides doing these things, the saliva moistens the lips, the tongue and the mouth, so they will not become dry and hard.

You can see, then, how important it is to chew the food so thoroughly that it will become perfectly mixed with the saliva, and thus allow the saliva to do its work. Without the saliva we could not swallow, talk or use the mouth in any way. A man named Horace Fletcher began to study the effects of properly chewing or masticating food a few years ago, and has shown to the world that much ill health can be prevented by thoroughly chewing the food and mixing it with saliva before swallowing it. In fact, his teachings have become so well known that we often speak of a thorough chewing of the food as "Fletcherizing."

The amount of saliva secreted or poured out into the mouth in twenty-four hours is about three pints. If the food is not properly chewed and mixed with the saliva, it is swallowed unprepared for the stomach, and the work of digestion is left entirely to the stomach and the remainder of the alimentary canal. This, you see, overworks the stomach and the intestines, causing them to wear out and become weak, while the mouth and the Salivary glands do not get the amount of work or exercise which they should have, so they, too, suffer and get weak, just as our arm does when carried in a sling for a long time on account of some injury. When we swallow the food without chewing, the Salivary glands get lazy and will not pour out the right amount of saliva, and the mouth and teeth do not get the exercise which they need. Nature's first step in digestion should take place in the mouth, and food not well mixed with saliva will not digest well, but putrefies or decomposes in the stomach

and intestines, throwing off harmful gases and other poisons into the system.

Most people are human sewers, anyway. They eat hurriedly, swallowing their food with an effort or washing it down with things to drink, gulp down soup and soft foods, and never taste half of what they eat. Thus they carry into their stomachs masses of food that decay and leave them ill. (The real mystery is that they live at all.) Then they wonder why they have headache, boils, bad breath, foggy brains, gout, eczema, etc. They have simply been poisoned by their own food.

The saliva contains a number of different mineral salts and waste products which are thrown off by the glands into the saliva. But occasionally these mineral salts and waste products do not stay dissolved in the saliva and pass on through the saliva as waste, but separate from the saliva and form a solid mass or deposit. Deposits of this kind are called calculus, meaning a little stone. The common name is tartar. These deposits may take place within the glands themselves, in the ducts of the glands, or on the teeth in the mouth.

Sometimes the glands will not be able to throw these waste products off into the saliva, and will become filled with a large deposit, forming a stony-like tumor or growth, which will often become infected with poison and give trouble. The duct or outlet of the gland may become stopped up by a deposit of this kind, stopping the flow of saliva into the mouth, and causing enlargement of the face, so that surgical operations are often necessary to remove such growths. If the glands and their outlets are working properly, then these waste products in the saliva find their way into the mouth and commonly find a lodging place on the teeth, or, if there are crowns or plates worn in the mouth, they will deposit on them as well. This is the form of

calculus, or tartar, that you are most familiar with. In many cases these deposits on the teeth will become so large that they will be larger than the teeth themselves, and, as they attach very firmly to the teeth, and are almost as hard as stone, they are difficult to remove. These deposits can be easily removed if taken in an early age of formation. If not removed, they will cause great harm. (We will tell you more about this later.)

The mouth is the food chopper, with the teeth as the grinders, and is a very important part of our digestive system, but I dare say *not another organ of the body* is so *abused* as are *the mouth and teeth.* And shouldn't *common sense* teach us that if the teeth or grinders are out of repair *the work of digestion and nature's whole plan* will be upset, and the *whole system* will have to pay the penalty?

As long as our bodies are *clean* and *free from poison,* we are going to be healthy. Therefore, the mouth, of all parts of the body, should be kept clean and in a healthy state, for bad, decayed teeth and a filthy mouth are responsible in most cases for stomach troubles, rheumatism, tuberculosis and many other diseases which upset the whole system.

If for no other reason than from a social standpoint, that is, for the sake of other people, we should take the utmost care of the mouth and teeth, for there is nothing so sickening as badly decayed teeth and a bad breath. The sight of a mouth filled with decayed teeth, and the odor from it, is enough to make one sick. A bad breath is a signal of danger. The breath is poison to begin with, as it carries out poisonous waste products from the body, so you can see how much worse it must be when further poisoned with decayed food, tooth structure, tissues and the products of decay that go hand in hand with such conditions.

The most serious question is, "Why don't people take care of their mouths and teeth?" We take a daily bath, and wash our

hands and faces many times a day, and why? For cleanliness, of course. Nature demands it, and we form the habit when very young, so that we feel most uncomfortable when these things are neglected. You will now be able to understand why your mouths and teeth need the bath and scrubbing much more than your hands do, for they come into contact with all the food that is taken into the body, and will poison this food as it is swallowed if they are full of decayed matter. Some of the surfaces of the teeth are self-cleansing, that is, they keep fairly clean by the action of the food, tongue, lips and cheeks, but there are so many grooves on the teeth and spaces between the teeth which do not cleanse in this manner, that little bits of food will lodge there and stay until removed. If it is not removed, it commences to decay in about fifty minutes, and it will not be long before you find the teeth also are beginning to decay in these very places. One who has bad teeth and a diseased mouth, as we have described in this chapter, need not be surprised if diseases of every known kind attack the body at any time.

QUESTIONS.

1. What is the alimentary canal?
2. What is saliva and where is it collected?
3. What are the uses or functions of the saliva?
4. Name the salivary glands, and tell where they are found.
5. Why should the ducts of these glands be kept clean and healthy?
6. How much saliva should be poured into the mouth each day?
7. Why should we chew food thoroughly?
8. What is calculus, or tartar?
9. Why should we have clean mouths and teeth?

CHAPTER V.

Bacteria of the Mouth

Let us tell you first what we mean by bacteria. They are *very, very small* organisms or plants, belonging to the vegetable kingdom—*so small,* in fact, that they can only be seen with the most powerful microscope, and for that reason are called micro-organisms, meaning *very small* organisms. They are so tiny that millions of them could be placed on the head of a pin, or in a drop of water. Besides being called bacteria or micro-organisms, they are also known as germs and microbes.

Now, the mouth is a hot-bed or a growing place for these little organisms. Some authors tell us that there are from twenty to thirty different kinds of bacteria or germs in the mouths of healthy persons at the same time. They multiply very fast in dark places where there is warmth and moisture, as there is in the mouth, so you can understand why the mouth is spoken of as a hot-bed for bacteria. And you can imagine the untold numbers of them that must live in a dirty mouth.

Bacteria are to be found almost everywhere. The air we breathe, especially in poorly ventilated rooms and in crowded cities, and in low swampy places, is full of bacteria. The water which we drink and most of our foods are full of them. It is said that there are very few if any bacteria in a few certain places high up in the mountains and on the high seas, where the air is supposed to be very pure, but so far as we are concerned, they are present practically everywhere. They have been found in the frozen polar regions, where there is snow and ice the year round.

There are many kinds of bacteria, those which are useful, and those which are harmful. Examples of the useful bacteria would

be the bacteria which change cider into vinegar for us; those which sour or ripen the milk, when we wish to make cheese, or those which form nitrogen in the ground for plants to grow upon; also yeast producing bacteria, and the kind that destroy dead animal matter. You can see that such bacteria as these would be essential to life. On the other hand, there are many varieties or kinds of bacteria which bring about disease in the bodies of animals and human beings. For example, colds and la grippe, tuberculosis (or consumption, as it used to be called), typhoid fever, scarlet fever, diphtheria, measles, smallpox, or any of the contagious diseases, are all produced by certain bacteria, each kind of disease being produced by its own special germ or bacteria. Not only will some of these diseases spread from person to person, but they may also be given by man to animals or by animals to man. For instance, tuberculosis can be given by cattle to people, either by eating meat or using milk from cows suffering from this disease. That is why we have meat and milk inspectors to guard us against getting diseased meat and milk for our food. Fowls, fish, dogs, cats, monkeys, rabbits or any of the lower animals may have tuberculosis, but as the lower animals usually live more naturally, get more fresh air and sunshine, and eat more natural foods, they are, as a rule, less apt to have disease than is man. However, if we shut animals up where they do not get the air and sunshine, and give them poor food, they will soon contract various kinds of diseases. You can see how the same thing will apply to man.

Authorities tell us that some bacteria can be boiled for several minutes, or even hours, without being killed, while others will be killed at the boiling point of water. Substances which will kill bacteria or prevent their growth until they die of starvation are called antiseptics or germicides. The chemicals used to fumigate sick rooms, or to wash out wounds, are examples of them. Sunlight is one of nature's best remedies to kill harmful

bacteria, so do not be afraid of it, but live in it as much as you can. Electricity will also stop the growth of bacteria. While a great amount of heat will kill bacteria, a certain amount of it, as well as moisture, food, and, in some cases, air, is necessary for their growth.

Bacteria cannot thrive well in clean, healthy places, for they will die of starvation or want of food. But in a dirty mouth we find all the things needed for their growth—heat, moisture, darkness, food and air. And since we have seen that bacteria are found almost everywhere, and since there are but few things we can do to keep our bodies free from them, or to stop their growth, should we not make use of the easiest and simplest method of fighting them, when it is within reach of everyone? Yes, surely we should. And that easy and simple method of fighting them is to *keep clean.* The poorest person can have fresh air and sunshine and can keep clean. Use water, and lots of it, using care that it is pure.

QUESTIONS.

1. What are bacteria?
2. How many kinds are found in the human mouth?
3. What conditions are favorable to their growth?
4. What will stop their growth or kill them?
5. Are all bacteria harmful?
6. Where do most bacteria live?

CHAPTER VI.

The Temporary Teeth

There are two sets of teeth in the human mouth during life, the first set called the temporary teeth, and the second called the permanent teeth. We will tell you about the temporary teeth first. They are called temporary because they only last during childhood and are then lost. They are often called "baby teeth" or "milk teeth." There are twenty of these temporary teeth, ten in the upper and ten in the lower jaw.

FIGURE 3.
Showing the temporary teeth, as they are situated, and their size at birth.

When a tooth first comes through the gum into the mouth we speak of it as erupting. The temporary teeth begin to erupt usually between the ages of five to eight months, and continue to erupt in regular order until the whole set of twenty are arranged in two nice rows from one side of the mouth to the other. The lower teeth erupt in advance of the uppers by a few weeks, or months, in some cases. It usually takes from twenty-four to thirty-six months for all the temporary teeth to come through the gums, although in some cases they are earlier, and in some cases later. Poor food and poor health will often cause a delay in the eruption of the teeth. Many children suffer but little pain while their teeth are coming through, while others suffer a great deal, often having fever, chills and spasms and trouble with their stomachs.

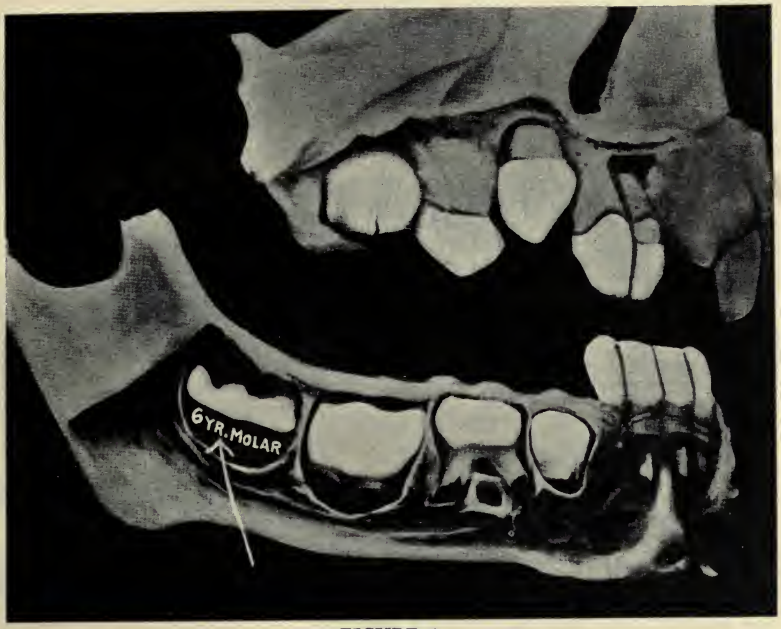

FIGURE 4.

Showing the teeth in the bone and the ones through the gums, at one year. Note the 6-year molar.

Children often suffer a great deal while they have their temporary teeth, not only when they are erupting, but from other troubles that come from decayed teeth, such as toothache, earache, headache and troubles with the eyes and throat. These troubles in young children can nearly always be traced to bad teeth. We are talking now especially about the temporary teeth, before the permanent ones have made their appearance.

Parents make a great mistake in thinking that because the little teeth are soon to come out, there is no use in taking care of them. This is wrong, very wrong, for how can a little child be happy, and how can he come up to your expectations, if he has poor health? And common sense teaches us that with decayed

and irregular teeth it is *impossible* to have *good health.*

The mouth and teeth of the child should be kept clean from the very first. The teeth of the baby demand attention every day, just as the teeth of a grown person. Temporary teeth should be saved from decay and retained in the mouth of the child until the permanent teeth erupt. A dirty mouth, full of decayed teeth, causes paleness, loss of sleep and loss of appetite. Parents do not seem to realize that such conditions must be changed or the whole life of the child will be affected. All of nature's strength is needed to build up strong, healthy bodies, and should not be used to combat disease. It is at present estimated that about seventy per cent of all diseases originate above the chin, and that at least ninety per cent of all diseases of the mouth and teeth are preventable.

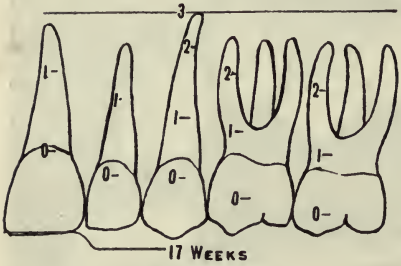

FIGURE 5. (*Black*)

Illustrates the temporary teeth at the average age of the complete calcification, which is about three years of age. 0 designates the amounts of the teeth calcified at birth.

The roots of these teeth only remain their full length about one year, which is between three and four years old. Absorption of these roots will be complete, leaving only the crown of the teeth, until they no longer have support in the bone, hence they become so loose they almost fall out of their places of attachment. However, if the nerves or pulps of these little teeth die, absorption of the roots will not take place, or continue absorption at that point of their length where the pulp died.

The regularity or nice arrangement of the permanent teeth depends much upon the way the temporary teeth are retained. That is, if the temporary teeth are lost too early, or if they are allowed to stay in the mouth too long, the permanent teeth come in very irregularly. Many times the permanent teeth do not force the temporary ones out as they should, so that, in place of coming in where they should, they will be crowded out of their natural positions.

With decayed temporary teeth thus wedged in between two of the permanent teeth as they are coming in, you can readily see how the new teeth will be exposed to decay from the bad one, or how they may be forced out of their places by the temporary tooth.

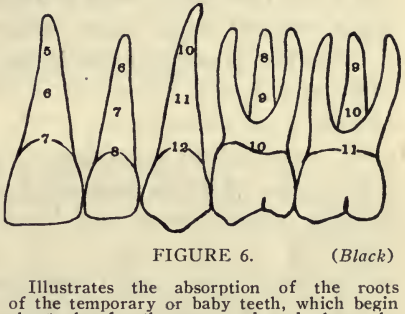

FIGURE 6. (*Black*)

Illustrates the absorption of the roots of the temporary or baby teeth, which begin about the fourth year, and end about the twelfth year.

Many people do not know that children's temporary teeth have long roots on them, though they surely do.

Children, and grown-ups as well, will soon avoid chewing the food on the side of the jaw where an offending tooth is constantly aching, so that the chewing is all done on the other side of the mouth, or if both sides are lame no chewing is done, leaving the rest of the teeth practically idle. In this way the food is only about half chewed, but that is not the only harm that is done. The teeth which are not being used will decay more quickly than those that are in constant use, for the reason that they will not be self-cleansing, as teeth should be which are doing the work that nature intended they should do. Then, too, the development of the cranium, the muscles and the whole side of the face not in use will be hindered as the structures are not functionating and become stunted through lack of use.

The mother or nurse should see that the mouth of the baby is kept thoroughly clean from the time it is a day old. The little mouth and nose may be kept clean by wiping them out with a clean soft cloth dipped in a very mild solution of boric acid, or even clean, warm water. In this manner the baby's mouth and nose may be kept clean and healthy, and the baby taught to care for itself at the same time. When the little white teeth begin to come in, have a little tooth brush with which to wash

and clean the baby's teeth at least once a day. Take the time at night, the last thing before bedtime.

Another good plan for mothers to follow is to take the little folks to a dentist every few months, once a month if indicated, and have an examination of the teeth to see that no decay or other troubles are occurring. This will tend to lessen the fear which most children have of a dentist. Parents make a great mistake when they do not have the temporary teeth filled and cared for just the same as they would the permanent teeth. It causes very little pain, if attended to before the decay has gone far enough to make the tooth sensitive to work upon.

Only ignorant people will neglect the temporary teeth of the child until they are so badly decayed that they continually ache, causing pain and nervousness to the child. It is difficult to explain how much harm is done by neglect and failure to take care of the temporary teeth until they are ready to come out of their own accord. Not less than eighty-five per cent of the children of today are permanently injured for life through neglect and lack of care, at the proper time, of the temporary teeth. Stomach trouble, deformities, mouth breathing, infectious diseases, troubles with the eye, ear, nose and throat are usually caused by bad temporary teeth. They should have the same care which the permanent teeth receive. It is well to remember that a few cases are on record where a child never has permanent teeth. Therefore, if the temporary teeth are lost they have no teeth at all.

Good teeth mean good health, therefore, take care of the little folks if you wish them to be all you desire.

QUESTIONS.

1. What are the temporary teeth, and how many are there?
2. Why should the temporary teeth be filled and kept in the mouth until they are ready to come out of their own accord?
3. How does the regularity of the permanent teeth depend upon the temporary ones?
4. Can a person suffering from bad teeth be well and happy?

CHAPTER VII.

The Permanent Teeth

The permanent set of teeth begins to erupt about the age of six years, and as they are frequently mistaken for temporary teeth, little attention is paid to them, because a great many people think that as long as the temporary teeth are to be lost soon, anyway, they do not need to be cared for. Thus mischief is done, which can never be repaired. It is safe to say that nine out of twelve of the permanent six-year molar teeth are either lost or are so badly decayed and broken down that they might as well be out, before the child is ten years old. These molars, four of them in number, come in behind the temporary molars, and should, by all means, be taken care of. It is very wrong to allow them to decay so that they will have to be taken out, because it upsets the arrangement of the rest of the teeth, just as pulling a stone out of an arch in a building would spoil the shape and beauty of the arch.

There are thirty-two of the permanent teeth, sixteen above and sixteen below. We will give you the names of the teeth in this set, the time each one erupts, and the number of roots each one usually has.

UPPER TEETH

Name and Number	*Time of Eruption*	*Number of Roots*
Two Central Incisors	6th to 8th year	One
Two Lateral Incisors	7th to 9th year	One
Two Cuspids	11th to 13th year	One
Two First Bicuspids	9th to 10th year	Two
Two Second Bicuspids	10th to 11th year	One
Two First Molars	6th to 7th year	Three
Two Second Molars	12th to 14th year	Three
Two Third Molars	17th to 30th year	Three

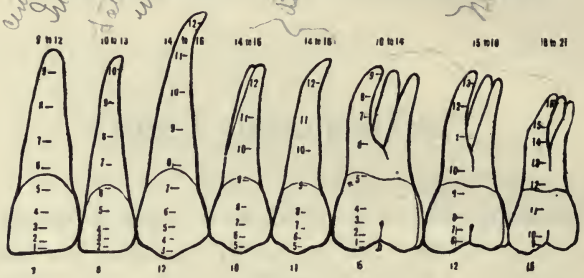

FIGURE 7. (*Black*)

A diagram of the upper right half of the permanent teeth below each tooth. The figures represent the average year of the eruption of that tooth. Upon each tooth figures are placed, representing the date in years of the calcification or development of each tooth, beginning at one year and ending at twenty-one years.

By following the figures from tooth to tooth, the completion of calcification of each tooth can easily be determined, as the lines indicate (have pupils demonstrate). The figures at the apex of the teeth represent the average year at which the ends of the roots are fully calcified.

LOWER TEETH

Name and Number	*Time of Eruption*	*Number of Roots*
Two Central Incisors	6th to 8th year	One
Two Lateral Incisors	7th to 9th year	One
Two Cuspids	12th to 13th year	One
Two First Bicuspids	9th to 10th year	One
Two Second Bicuspids	10th to 11th year	One
Two First Molars	6th to 7th year	Two
Two Second Molars	12th to 16th year	Two
Two Third Molars	16th to 30th year	Two

The time of eruption varies, of course, in many cases. We will tell you why these teeth have the names they do, as this is something you should understand.

The first two are called central incisors because they stand in the center of the row, and because they are used to bite or incise the food.

The next two are called lateral incisors because they stand to the sides of the center of the row, and because they, too, bite or incise the food.

The cuspids are so named from the fact that they each have one cusp or point. They are called canines by some, but cuspid is the proper name for us to use. Animals like the dog and cat have canine teeth, but people have cuspids, although they serve to tear the food, the same as the canine teeth of the dog and cat,

or other meat-eating animals. This is why the name canine is sometimes applied to them. The upper Cuspids are also sometimes called "eye teeth," because they are right under the eyes, but we will not use this name. In the same way the lower Cuspids are sometimes called "stomach teeth," but this name is wrong and should not be used.

The Bicuspids take their name from the fact that they each have two points or cusps, Bi- meaning two.

The Molars are named from a Latin word, *Mola,* meaning a millstone, because they are the teeth that do the grinding of the food.

We will now tell you something about the way a tooth is made up, and what it has inside of it. Each tooth is divided into three parts: (1) The crown, or that part of the tooth which can be seen in the mouth; (2) the root, or that part which has grown in the jaw bone and covered by the gums; (3) the neck, or the place where the crown and the root meet, right at the edge of the gums.

The outside of the crown is covered with a very hard white substance called enamel, which is made to stand a great deal of pressure and wear without hurting it. The color of it differs considerably with differ-

CROSS SECTION OF A TOOTH

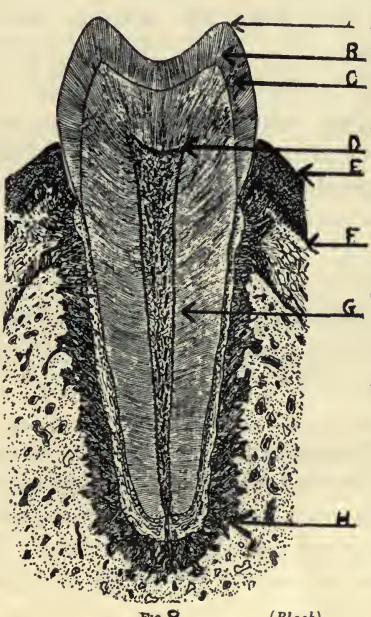

FIG. 8 (Black)

ent people. When kept clean the enamel is very shiny and has a high polish, which makes it self-cleansing, as it were.

Underneath the outside covering of enamel is another substance called dentine, which is not so hard and dense as the enamel, and makes up the main part of the tooth, both in the crown and roots. If the dentine in the crown of a tooth decays it will leave the enamel as a sort of shell, which will be easily broken into pieces. Inside of the dentine there is a hollow space filled with a soft mass of tissue called the pulp, commonly spoken of as the nerve of the tooth. The pulp does contain nerves, but it also contains blood vessels for the nourishment of the tooth. From these nerves in the pulp very fine fibers run out into the dentine. They are so fine that they cannot be seen with the eye, and their business is to carry messages of approaching danger to the pulp from the tooth to the brain and to nourish the dentine.

Just as the crown of the tooth is covered with a layer of enamel, the root of the tooth is covered with a thin layer of tissue called Cementum. The root is then surrounded with a very thin, firm membrane, which clings tightly to it, holding the tooth in its socket in the jaw bone, and also giving nourishment to the tooth. If this membrane is lost through disease or injury, the tooth will in time get loose and come out. This membrane is well supplied with nerves and blood vessels. The end of the root tapers to a point called the apex, in which there is a tiny hole through which the nerves and blood vessels enter the pulp of the tooth.

If the membrane which holds the teeth in their sockets becomes injured by a heavy blow, by continued pressure on the tooth, or through overwork, it will become sore and swell, so that it will lift the tooth up a little ways out of the socket and make it very painful to close the jaws together, or to use the teeth in any manner.

The pulp and the enamel of the teeth are tissues of the body which are not self-repairing when injured or diseased. The same is true of the dentine to a certain extent, although the dentine does try to protect the pulp of the tooth from injury by building walls of new tissue when injury is threatening the pulp. If the pulp of a tooth is diseased or hurt badly, it will die. It may linger along for many months, or even years, but it will die in time. More often, however, it will die in a few weeks or months.

Many times when the dentine is irritated by decay, or by pressure and wear, it will throw up a wall of new, secondary dentine to try to protect the pulp from the injury it is receiving. This is the way nature has of trying to defeat decay. As a rule, one will be conscious of a toothache long before the pulp of a tooth is injured so badly that it will die, for you will remember that the nerve fibers all through the body of the tooth send their messages of warning to the brain just as soon as anything happens to them.

Sometimes a perfectly good and solid tooth will begin to ache, caused by a blow or an accident, and it will be impossible to see anything the matter with it at all. But it will keep aching so that something will have to be done to stop the pain, instead of pulling the tooth, as was done in former years. On examination the dentist will sometimes find some queer little things which look something like grains of sand or gravel, which have been causing the pain by their pressure on the nerves in the pulp. They are hard like stone and are called pulp-stones. Nature forms these stones in an attempt to protect the pulp when it becomes irritated. They can be taken out and the tooth filled and saved.

You remember we told you that the opening through which the nerves and blood vessels enter the tooth is very, very small. You can readily see, then, why the pulp of a tooth will die if very much swelling takes place in it. There is little or no room for the tissues to expand when they commence to swell, either

from disease or injury, so that the little opening is blocked up, the blood supply and nourishment of the pulp is cut off, and the pulp is simply strangled to death.

It must be remembered that the permanent teeth are just about ready to come through into the mouth many weeks before the temporary ones are lost. Many times the permanent teeth can be seen through the sockets of the temporary teeth which have just been lost. We wish to emphasize that between the ages of five and six years, usually just about the sixth year, the first four permanent molars come through before any of the temporary teeth are lost. Many people, therefore, mistake these four teeth for temporary teeth, and think that they will be replaced. So they are neglected until they are so badly decayed that they have to be taken out. Again, if the temporary teeth are not taken care of until they are lost, but are allowed to decay, these four permanent molars are in great danger of also becoming decayed, for one decayed tooth will decay the two next to it, if it comes in contact with them, and very few temporary molar teeth are lost which are not decayed. They are bound to decay if they are not taken care of and kept clean.

Many of the lower animals are cleaner and more healthy than human beings, because they have more natural habits, eat more natural food, and chew it more than we do, so that their teeth will last them as long as they live.

The decay of the teeth is more active between the ages of four and twenty than it is in adult life, which shows us the necessity of taking extra care of our teeth while we are young, and of giving the promptest attention to any indication of disease or decay as soon as it appears.

After the fifth year, parents should count their children's teeth occasionally, and when more than five teeth are found on either side of the lower or upper jaw, they can depend upon it that the last big one belongs to the second or permanent set of

teeth, and if lost, will never be replaced; and also that if it is extracted, the whole set of new ones to follow may be very irregular, as the new ones will try and fill in the space left by the extraction of the permanent first molar, and will crowd and push themselves out of line, leaving the individual a set of teeth that does not occlude (see Fig. 24 and 25) as they should, and destroying, at the same time, the beauty of the face and mouth.

The third molars often give a good deal of trouble in erupting into the mouth. You will remember from what we learned in the first part of this chapter that these teeth do not come into place in the mouth until all the other permanent teeth are there, so it often happens that there is very little room left for the third molars when they come along. In some cases they never get through the bone of the jaws at all, and there are some people, therefore, who never have third molars in the mouth. But if they do come through, as we have said, they may cause great pain and distress, and produce fever, sometimes upsetting the system generally. The popular name for the third molars is "wisdom teeth." If the eruption of the third molars has not yet taken place, people suffering from eye, ear, nose or throat trouble, neuralgia or other disturbances which cannot be understood would do well to seek the advice and examination of a competent dentist. Such conditions, in many cases, are entirely due to an empacted third molar trying to make its way through the bone.

QUESTIONS.

1. What is a sixth-year molar, how many do we have, and where are they found?
2. Do they come in before the temporary teeth are lost? (Yes).
3. Are they often mistaken for temporary teeth? (Yes).
4. What happens if they are lost?
5. How many teeth in the permanent set?
6. When do the first ones come in place?
7. When do the last ones come in place?
8. Name the teeth in this set in their order, and tell when they erupt.
9. What is the enamel of the tooth? The Dentine? The Cementum? The Pulp?
10. What holds the teeth in their sockets?
11. Between what ages is decay most active, and why?
12. Between what ages may the third molars come in place?
13. What troubles may the third molars cause when trying to come through into the mouth?

CHAPTER VIII.

Decay of the Teeth and its Cause

Decay of the teeth is due to the work of bacteria or micro-organisms in the mouth, and from no other cause.

As we told you in the chapter on bacteria in the mouth, there are several kinds of them in the mouth at all times. It is not known just what bacteria are responsible for the decay of the teeth.

First of all, bacteria cannot build their nests or homes where they are constantly disturbed or driven out, but when they are never disturbed, and are provided with plenty of food, as they are in the mouth, if food is allowed to remain on the teeth from meal to meal and never cleaned off, they grow rapidly in large numbers. By their "nests or homes," we mean that they build a strong wall or membrane around themselves and live inside of it, attached to the surface of the tooth. This nest will be fastened so firmly to the tooth that the rubbing of the lips or tongue cannot dislodge it. The favorite places, of course, for these little invisible mischief-makers to build their homes, are the deep grooves and pits in the teeth and the spaces between the teeth, where they are not easily reached by the tooth brush. So here they live securely in their nests and secrete or throw off an acid-like fluid which dissolves the tooth, or cause what we call decay.

In these places they are quite safe, as the tooth brush cannot readily get at them, nor can the tongue, lips or muscles of the cheek; neither is the saliva able to dissolve their nests and wash them away, so they grow and grow. They get plenty of food out of the starch, sugar, fat and water in our foods, and can have plenty of air if they need it. There are some kinds of bacteria that do not require air to live in, others do require air, and die

without it. The mouth is moist and warm, so you see they have everything suitable for their growth, and they go ahead and do their mischief without our knowing it, for a time at least.

As we have just said, their secretions, or the fluids thrown off by the bacteria, are the most harmful, as they secrete a kind of acid which has the power to dissolve the tooth structure; and after they have dissolved enough of the tooth, they finally reach the pulp and poison it so that it will die. You can now under-

CROSS SECTION OF A TOOTH

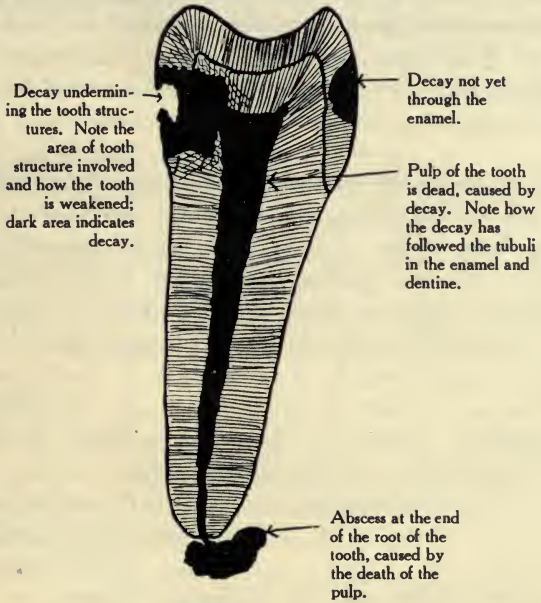

Figure 9

stand why the teeth will decay when they are allowed to remain covered with food debris all of the time. And as soon as the decay comes near enough to the pulp, it begins to ache. You can also understand why the stomach will suffer, when you are

constantly swallowing the decayed food from around badly infected teeth, together with dead and live bacteria, and the poisons which they make. The stomach becomes overworked in trying to throw off these poisonous things.

You wonder that people have any health at all, with their teeth in this condition, and you wonder how they survive as well as they do. Of course, some people do live and manage to keep going *in spite of such conditions,* but in all of our hospitals, institutions for the feeble-minded and insane asylums there are many inmates whose health has been wrecked by neglect of the teeth. And it does not stop there, for we find many criminals in our penitentiaries whose downfall can be traced back to bad teeth as the starting point for a poorly developed mind and body.

Nature provides the enamel, so hard and dense, as a shield or protection for the dentine and the softer structure of the tooth. Therefore, decay makes slow progress in the enamel, but when it once gets into the dentine, which has more animal matter in it, destruction goes on more rapidly. That is why the teeth break down so quickly after the enamel is once decayed through. Many times a tooth will be a mere shell of enamel before the person is aware of decay in the tooth at all. For this reason, people sometimes think that decay takes place inside of the tooth, but it never does. It always occurs from without, although the cavity or hole which we can see in the tooth may be very small, while two-thirds of the inside of the crown may be decayed.

The bacteria follow the line of least resistance, or go where it is easiest for them to get a hold. Now, in the dentine, there are countless tiny tubes or tubules (see fig. 8), as we call them, meaning very small tubes. These little tubes contain fine nerve endings which go out all through the dentine from the larger nerves in the pulp. So you see the dentine is really porous, or full of these little

tubes, which explains why it is easier for the bacteria to get into and destroy the dentine than the enamel, which is so much more dense and hard. This also explains why the inside of a tooth will sometimes be entirely decayed and gone, while the enamel remains as a mere shell.

These tubules in the dentine, as we have just told you, are filled with little nerves, which send warnings of danger to the pulp in the form of pain, and the nerves in the pulp then send the messages on to the brain. Many times only a few shocks of pain will be felt before the pulp is injured enough to make it die. When the decay in a tooth gets deep enough to reach the pulp the bacteria immediately get into the pulp and cause it to decay or putrefy. Then the tooth will get sore, and an abscess will form down at the end of the root, causing the face to swell, giving one a great deal of pain and suffering.

Therefore, frequent examinations of the teeth should by all means be made by a competent dentist about four times a year or oftener if indicated to prevent such conditions as these from coming about.

When decay of a tooth has come near enough to the pulp to cause it to die, the abscess which follows, if not taken care of right away, will go on and on, or, as we say, become chronic. The severe pain and swelling which was first present, will disappear, but the bacteria will still be at work inside of the jaw bone at the end of the root of the tooth. Nature comes to the rescue and throws off all of the bacteria and their poisons that she can through the intestines, the sweat glands in the skin and the kidneys. If these poisons were not carried off in this way, the person might die of blood poisoning in a short time. When such a condition is not properly treated, the bacteria will cause the decay of the bone around the root of the tooth, and of the end of the root itself, so that the root will be partially absorbed. The tooth will turn dark in color, and the gums will become soft, spongy, flabby, red and swollen; they will be sore to touch

and will bleed very easily. A very foul odor is usually present. Did nature ever intend that we should have conditions like this in her household? No, a thousand times, NO!

What kind of health can one expect to have with a mouth like this? The person with a mouth full of diseased teeth not only suffers, but is often very offensive to those with whom he comes in contact, because of bad breath. How many times have we all had to sit near someone in a street car, a church, or other public place, whose breath almost made us ill, and still, through courtesy, we could not very well move! And how many times have you turned aside from someone with a mouth so dirty and a breath so foul that you were thoroughly disgusted, or, in fact, sick at the sight and odor you had to endure? Have we made the causes of such conditions clear to you?

You can understand now why a person with a mouth like this will have indigestion, headache, heart trouble, rheumatism, nervousness, or, in fact, have the whole system upset. How can it be otherwise, when every mouthful of food which is swallowed is full of pieces of decayed teeth, pus from the abscesses, blood from the gums, decayed food crowded out of the cavities in the teeth by a fresh supply, thousands of bacteria, dead and alive, and the poisons which they are continually secreting? If you could see some of these bacteria under the microscope, you would think that a whole menagerie of small animals were wrangling together in a massive heap, for although bacteria are of the vegetable kingdom, they have the power of moving about.

If the cook were to get even one of the things I have just mentioned into nice, well prepared, delicious looking food, even by accident, and you should find it out, you would be highly insulted, and no doubt would refuse to eat the food. The food that we eat every day may be just as clean and wholesome and good as it can be, yet the very minute it is taken into a dirty mouth it becomes dirty, too, and is filled with poisons. Why,

then, have food inspectors and pure foods, when we turn right around and put the pure food into dirty and diseased mouths?

The nerves of a person who has allowed his teeth and health to go to ruin are almost "threadbare." He is miserable in looks and feeling, has no ambition to do things, and, in fact, don't care for anything. There is no pleasure in life, either for himself or those who have to be around him. And why? Simply because his food-chopper is out of repair and his whole body is starving to death for want of pure food and pure air.

What is the remedy for such a case, after all the mischief has been done? All we can do is to have the teeth properly cared for by the dentist, the mouth ridded of disease if possible, and then keep the mouth and teeth clean afterwards, so that such dreadful things won't occur again. But it is far better to form the habit very early in life of keeping the teeth nice and clean, and have the family dentist make frequent examinations, so as to prevent decay and disease from ruining our teeth and health.

Conditions such as we have been describing do not always come from personal neglect or carelessness. Severe sickness, when very young, may stop the growth of the little teeth, which are just beginning to form, so that when the teeth do come in they are not good and strong as they should be naturally. This is seldom the case. Then very often you will see ugly teeth with marks across them, or little holes or pits on them, which were caused by some disease like scarlet fever, measles or other contagious diseases, at the age when the teeth were developing. But even these cases can be overcome to a great extent by beginning in time and using constant care and keeping the teeth absolutely clean.

Remember that "procrastination is the thief of time," and that the time to begin taking care of our teeth is when they first come into the mouth, before any decay has been allowed to start.

QUESTIONS.

1. What is meant by "nests of bacteria?"
2. How can we keep bacteria from building their nests on the teeth?
3. Where is the favorite place for bacteria to build their nests on the teeth?
4. What do they need in order to live?
5. How do they cause the decay of the teeth?
6. Why do the teeth ache?
7. Does decay ever begin on the inside of the tooth? (No, never; always from the outside).
8. What is the cause of decay of the teeth?

CHAPTER IX.

Deposits on the Teeth

Many persons have deposits on their teeth, made up of a hard, gritty substance, something like stone, and known as calculus or tartar. These deposits are unnatural, and if not removed will in time cause the loss of the teeth, and this will mean great pain and sorrow.

Calculus or tartar is made up mainly of mineral salts. Now you know that the bones and teeth of the body have a great deal of mineral matter in them to make them firm and hard, and the system naturally needs a certain amount of these minerals, as well as other kinds of food, in order to keep the bones and other parts of the body repaired. As minerals are supplied to the body in the foods, the minerals, which have been used, are thrown out as waste, and some of them are found in the saliva of the mouth. These salts, which are composed of invisible parts held in the saliva, are ready to be thrown off as a waste product, about *three* to *five hours* after a hearty meal. They are then in a very soft state for about *eight* to *ten hours* after leaving or separating from the saliva, and begin to deposit wherever they can find a lodging place. Brushing and cleaning the teeth regularly and thoroughly will keep tartar off of the teeth to a great extent. If there are little rough places on the teeth, these little particles of mineral salts will lodge there. They will lodge between the teeth or any place where the movements of the tongue, lips and tooth brush, or the friction or rubbing of food in mastication will not keep them off. As the saliva is coming into the mouth all the time, you can see how these deposits will grow slowly but surely until, in some cases, they become as large or

even larger than the teeth themselves, if allowed to remain.

Of course, nature never meant that we should have great pieces of stony-like material hanging to the sides of our teeth, but it seems that we cannot always prevent it from depositing. However, we can have it removed. But the movements of the lips and tongue will not do it, and the saliva will not wash it off, and while regular cleaning of the teeth with a brush will help to keep the deposit from forming, it will not keep it off entirely in obscure places, so the remedy is, to have the deposit removed by mechanical means, as we say. That is, have our dentist remove the deposit with instruments.

FIGURE 10.

Showing both forms of deposits on the teeth. These teeth were all lost through these deposits. Arrow indicates salivary deposits. Dark rough areas show serumal calculus, extending to the end of the roots of the teeth.

There are two kinds of calculus or tartar, one called Salivary Calculus, and the other called Serumal Calculus. We will tell you about the two kinds, and explain why they are so named.

The salivary calculus, as you might guess from the name, is that which comes from the saliva of the mouth. It most often collects upon the lower teeth in the front of the mouth, because they are so close to the ducts of the Sub-maxillary and Sub-lingual glands, of which we told you in Chapter IV. You can see

that the most natural place for it to form on these teeth would be around the necks of the teeth, close to the gums. As the deposits grow and get larger the rough mass will press on the soft gums about the teeth and make them very sore, so that they will draw back and recede from the tartar to get away from the irritation, and leave the neck of the teeth and finally the roots of the teeth bare of gum tissue. When the gums and the spongy bone around the roots of the teeth become diseased in this manner, we call the disease Pyorrhea; and many, many people lose their teeth from this disease. About 95 per cent of all adults have pyorrhea; also children as young as three years old have lost their teeth from this cause. When it once gets started the bacterial activity and irritation will keep working their way deeper and deeper, until at last they have destroyed so much of the bony socket and the gum that holds the teeth in place that the teeth become loose and must be removed. Substances which are too hot or too cold sometimes cause toothache when coming in contact with the exposed roots of the teeth. Besides the pain we will suffer with this disease, our entire bodies will be poisoned by the pus from around the teeth, which is swallowed as fast as it is formed.

Small bits of the tartar deposits are often broken off in masticating the food and swallowed, and as these are always full of the poisons of the bacteria, they will cause trouble wherever they lodge.

A person with a mouth such as we have just been describing cannot be healthy or happy. The gums are so tender that they cannot be cleaned without pain, so they are neglected. One thus afflicted never gets a mouthful of pure food or water, for everything taken into the mouth is poisoned before it is swallowed. The stomach is overburdened with its own work, together with that of combatting these poisons and soon the intestines and other organs of the body are called on to help throw them

out of the system. All the machinery of the body is at last overworked, and the person becomes a wreck.

You should be just as careful in selecting your dentist as you would be in choosing a physician or surgeon in whose hands you place your life in cases of severe sickness, or serious operations.

The price of good work is a very small thing to be considered, compared to the possible loss of your life, limbs or teeth. But do not let conditions go so far that there will be any chance of your losing your teeth. Begin in time to take care of them. Prevention is better than the best cure. Consult a competent dentist, and have your mouth examined every few months, or at least four times a year. If you find out for yourself that something is wrong, have it attended to at once.

1 2

FIGURE 11.

Specimen 1 represents good honest clean work that will give fair service. Specimen 2 represents poor work, and loss of the tooth. Both specimens are filled with silver or amalgam.

In addition to forming deposits on the natural teeth, salivary calculus will also form on crowns, bridges and plates as well, and will be a source of irritation to the surrounding tissues, that is, it will make the soft parts of the mouth and gums sore and tender.

As we told you in Chapter IV, calculus many times lodges in the ducts or outlets of the salivary glands in the mouth, forming a kind of tumor or stony mass, likely having projections growing out in different directions. Bacteria find their way into these masses, diseasing them, and causing abscesses and swelling. These conditions do not always occur, but are apt to. An operation for the removal of masses such as these is easily and successfully done.

The other kind of calculus, called serumal calculus, comes from the serum, or thin fluid part of the blood, from which it gets its name. It forms on the roots of the teeth, and cannot be seen in the mouth as can the other kind which we have been describing. It is much harder, and is of a dark, ugly blackish brown color, but does not form in such large masses as the salivary calculus. It will deposit in patches on the roots where they are rough, or where the very small, delicate blood vessels, called capillaries, are close to the roots, so that it is easy for the deposit to escape from the blood and lodge on the roots of the teeth. Where there is a deposit of serumal calculus, the gums will be swollen and red; they may also be sloughing, that is parts of the gum will be dead, due to diseased conditions. A dark line will be seen through the pink gums near the necks of the teeth, which will help to locate the deposits. The pressure of these deposits upon the nerves will often cause neuralgia and other nervous troubles.

The removal of serumal calculus, as you can easily see, is more difficult and painful than the removal of salivary calculus, as it often extends to the ends of the roots of the teeth. Time and patience are necessary to perform the operation.

FIGURE 12.

Represents clean, well-kept teeth, with a high glossy polish, and free from deposits.

QUESTIONS.

1. What is Tartar or Calculus?
2. How is it formed?
3. How many kinds are there, and where are they usually found?
4. What disease comes from the formation of tartar and food debris on the teeth, and what will be the result if not cured?
5. What is the final effect of it?
6. Is there danger of the Salivary glands and their ducts becoming stopped up with deposits of calculus? (Yes).
7. How can we get rid of deposits on the teeth?

CHAPTER X.

Regulating Malarticulated Teeth

What do we mean by Malarticulated teeth? We mean teeth which are out of their natural positions, so that they do not come together as they should when we close the jaws.

FIGURE 13

FIGURE 14

Specimen represents the regulation of Case 13. Note how the upper teeth bite inside of the lower ones. A person with a mouth such as this is not normal, as they cannot breathe properly, nor can they masticate the food as it should be. 14 shows the case after regulation.

Figures 15 and 16 are the same as figures 13 and 14, side view.

In Figure 13 one sees a set of malarticulated teeth, before operation; while Figure 14 shows the same set, straightened by operation, to their natural position.

There are many things which will cause malarticulation of the teeth. Improper habits in children, such as sucking the thumbs or fingers, holding the tongue between the teeth, biting the lower lip, or breathing through the mouth; accidents; too early loss of the temporary teeth; too long retention of the tempor-

FIGURE 15 FIGURE 16

ary teeth, may all be causes of imperfect arrangement of the teeth, or malarticulation. In figures 17 and 18 you will see illustrations of sets of teeth which have been spoiled by children sucking the thumb and breathing through the mouth.

FIGURE 17 FIGURE 18

Of course, it is very unfortunate if, from any of these causes, the teeth should become malarticulated, but in every case of this

kind, the arrangement of the teeth can be greatly improved or helped by regulating them, or drawing the teeth into their proper positions. There are many reasons why a crooked set of teeth should be regulated, but health, comfort and appearance are the important ones.

Many people believe that if you should try to regulate the teeth, they would break, or some other harm would come to them, but this is not the case. Skillful treatment by the dentist, together with the help of the patient, will work wonders with a badly arranged set of teeth.

When the teeth are out of their natural positions, great harm will result. In the first place, the teeth that are in their right positions will have to do all the work of masticating, so that those which are out of line will not be self-cleansing, or working as nature intended they should be, and they will be much more liable to decay and disease. Besides this, with a badly arranged set of teeth, the food cannot be thoroughly masticated, so that double work is thrown on the stomach and the intestines, and bad health is the result.

Then the appearance and comfort of the patient are to be thought of, too. When the teeth are out of line, the whole expression of the face is changed. A mouthful of ugly teeth will attract a great deal of attention and comment, which is very embarrassing to the person who owns the ugly set of teeth. Bad teeth, either in their arrangement, or because of decay, will greatly mar the looks of any person, who would otherwise be normal in appearance. Figures 19-20 will show you how the skillful regulating of a bad set of teeth will completely change them into a useful, regular set, and at the same time, change a malformed face into a normal well appearing condition, and a healthy one as well.

When the teeth are out of line, only a few cusps or points of the teeth touch each other here and there, leaving great spaces between the teeth of the upper and lower jaws. It is impossible therefore, to masticate the food properly, for the grinding sur-

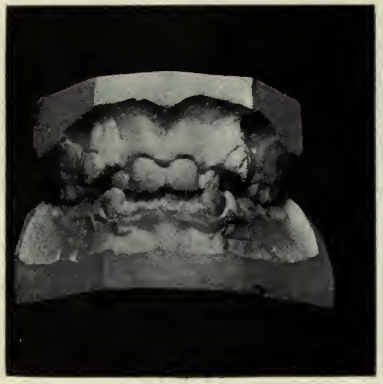

FIGURE 19.

FIGURE 20.

Figure 19 is a very irregular set of teeth, the upper cuspids protrude greatly, and it would be difficult for the person who had this mouth to close the lips together. Note how some of the upper teeth bite inside of the lower teeth. Also note how regular they are, and how nice they look in figure 20, after regulation, a mouth any one could be proud of.

faces of the teeth do not come together. How then can the food be chewed into a fine soft mass ready for the stomach? It is impossible.

This work of regulating the teeth should begin while the temporary teeth are still in the mouth. The main reason for beginning such work as early as possible, is that the bones in childhood are more easily controlled, making it much easier to bring the teeth into their right places, than if we waited until the bones grow heavier and stronger.

The appliances, or instruments for regulating the teeth are simple. Some cases of regulating yield more readily than others, and the operations will be finished in a few weeks, while others are stubborn, and will require months perhaps to finish. After the teeth have all been brought into line, they are held by the appliances, until the bone has grown around them sufficiently to hold them in their new place, otherwise, they would go back to their irregular state.

These appliances are annoying to the patient at first, and are somewhat hard to keep clean and sanitary, although with care and patience on the part of the patient and the dentist, very little real trouble will be experienced.

Sometimes the operation is a long and tiresome one, as the appliances are hard to keep in place on the teeth. They work loose and will bother the patient. Many dentists refuse to do this kind of work because the operations are apt to be long and tedious, although there may always be found good dentists who are making this work a specialty, no matter at what cost, trouble, pains or time. It is surely worth it and many times more, to have such an operation done, than to go through life with a bad set of teeth and a disfigured face, for not only does the health in general depend upon correctly placed teeth, but the beauty of the face and the voice as well.

In the chapter on habit, to follow, we will say more on this same subject of irregularity of the teeth and what causes it.

FIGURE 21. FIGURE 22.

Figure 21 represents a very abnormal irregular mouth and teeth, caused by mouth breathing due to adenoids and bad tonsils.
Figure 22 after operation and regulating the malformed arranged teeth. In this case the permanent teeth are not all erupted.

Irregular teeth cause many abnormal conditions of the nose, throat, eyes, ears and mind. A child who has abnormal teeth usually breathes through the mouth, and is therefore more susceptible to infections and accidents, and also to adenoids and many other bad conditions that will follow throughout life.

QUESTIONS.

1. Should irregular teeth be regulated?
2. Can irregular teeth perform their proper functions? (No.)
3. How do irregular teeth impair the digestion and health?
4. When is the best time to regulate the teeth?

CHAPTER XI.

Extracting the Teeth

To extract permanent teeth that can be treated, filled and saved, is wrong; it is a crime. If one permanent tooth be missing, we are crippled for life, and our bodies have to pay the price in pain and suffering. Only a few cases justify the extraction of a good permanent tooth, and they are where the third molars are giving much trouble in erupting, where they are crowding the other teeth and making them irregular, or where they are "impacted" in the bone and cannot erupt. By the word "impacted" we mean wedged in between the other teeth and the jaw bone so tightly that they cannot get through the bone and gum tissue.

To extract a tooth simply because it is aching, or because a filling has come out, or because a cavity is coming in it, is absolutely wrong. Every one of the teeth is of incalculable value to the stomach and the health. Then, again, one tooth depends upon another, so that when we remove one we usually put four more of the others out of working order. They will begin to tip over to try and fill up the empty space, will grow longer than they should, get out of proper positions and be more susceptible to disease. Keep every tooth you can. If they are decayed, have them treated and filled, but *keep them,* whatever you do. For after the permanent teeth are

FIGURE 23.
Showing an impacted third molar.

once gone, they are never replaced, and the only thing left for you is artificial teeth. But, no matter how skillfully they are made, they can never do the work that the natural teeth did, and they will never look like your own teeth. The muscles of the jaws are very powerful, so that with a good set of natural teeth we exert from 250 to 350 pounds of pressure, while from 30 to 40 pounds is all the pressure we can bring to bear with an artificial set of teeth. So you see we cannot do nearly as much chewing if we have lost our own teeth, but put more work on the stomach.

Then, too, the extraction of one or two teeth will often make a world of difference in the appearance of the face. In Figure 24-25 you may see a mouth which has been spoiled, as far as its usefulness and looks go, by the extraction of the permanent teeth, to try to regulate a badly arranged set of teeth.

FIGURE 24. FIGURE 25.

Figure 24 is a side view of a set of teeth that has been attempted to be regulated by extracting some of the teeth which were out of their natural positions. Only two points of the teeth strike each other on this side of the mouth.

Figure 25—This specimen is the same as Figure 24, the opposite side, showing only one point of the teeth striking together, only three points of the teeth in the mouth coming together, making it a physical impossibility to masticate the food. This specimen is a fine example of a dental cripple.

Of course, after teeth are so badly decayed and diseased that they cannot be saved by any means, they must be extracted. And sometimes when the temporary teeth do not loosen and come out of their own accord when they should, or when they become wedged in between the permanent teeth and cannot get out, it is necessary to extract them, although ordinarily they should become loose at the right time, so that they may be lifted out like little white pearls, with very little or no pain.

FIGURE 26.

Is a model of a child's mouth 13 years old, who is minus two upper lateral incisors. Note spaces between the teeth marked x.

This patient would be glad to have the temporary lateral teeth, but nature was not kind enough to her, so she will always have the spaces between the teeth. Figure 27 is an X-Ray of the mouth showing there will be no more teeth.

The temporary teeth should not decay, although they often do so on account of ignorance and neglect, and when they do they should be filled and taken care of, just as if they were permanent teeth. For sometimes it happens that nature has been defeated during the early life of the child, by some severe fever or other cause destroying the germs or buds of the permanent teeth, so that they never have permanent teeth, leaving the child with only the temporary teeth to last him during his life. If these are lost and decayed, you can see that the child would be left without any teeth at all. See Fig. 26 and 27.

If the temporary teeth are decaying, and have only a few weeks or even days to stay in the mouth, they should be cleaned out and filled, simply to keep the little patient from swallowing the decayed food which lodges in the cavities and which is forced out from time to time by a new supply;

also they should be filled to keep him from swallowing little broken pieces of the teeth. For who knows what harm a sharp piece of a broken tooth, covered with dangerous germs, might do if swallowed with the food?

Do not have good teeth taken out, as they were given you to use, just the same as your eyes, ears, hands or feet and other organs. You need them all, or nature would not have given them to you.

FIGURE 27.

Showing figure 26 by the means of an X-Ray picture to determine if two missing permanent teeth are hidden in the bone and cannot get through the tissues. They were not there.

Note how the ends of the roots of these teeth are not fully developed at the age of 13 years, as is described in figure 7.

QUESTIONS.

1. Is it right to extract teeth that could be saved if properly cared for?
2. What are the results of extracting teeth?
3. Is a person physically perfect or normal after the teeth are extracted? (No.)
4. What are the exceptions where it is advisable to have teeth extracted?
5. Do all people have a second or permanent set of teeth?
6. What might cause their failure to develop? (Fevers early in life or lack of nutrition or food.)
7. Should the temporary teeth be filled if allowed to decay? (Yes, by all means.) Why?

FIGURE 28.

FIGURE 29.

Figure 28 represents a model of mouth breathing, due to adenoids and bad tonsils. note the loss of the 6-year molar.
Figure 29 is the same model after the operation of regulating the teeth.

FIGURE 30.

FIGURE 31.

Figure 30. The lower arch of figure 30 represents a mouth as it should appear in arrangement of the teeth, all of the teeth in their respective positions to normal.
Figure 31. Upper arch set as figure 30, showing normal position of the teeth. The third molars have not yet made their appearance.

CHAPTER XII.

Old Fashioned Way of Thinking

Many people of today think and believe that because their ancestors did not have a great deal of dental work in their mouths, or did not use a tooth brush, and lived to be eighty or ninety years old, or more, that the people of today do not need any more dental work than their forefathers had done in their day.

Away back in those days possibly they didn't need so much attention as we do now; possibly some of them needed more. If their teeth ached, all they knew was to have them "pulled out." So the sufferer would travel twenty or thirty miles or more to the nearest town to the physician, who kept an old rusty pair of forceps, which he had probably used for years without ever really cleaning them. If the doctor was out of town, the barber or the blacksmith did the work instead. Imagine, today, a barber or blacksmith extracting your teeth!

But those are days of past history now, and things have changed very much. Why didn't those people have their teeth taken care of? Simply because people didn't know as much about the care of the teeth then as they do now.

Dental services were almost unheard of, and only a few colleges taught the science. In fact, the first dental college in America was founded in 1840. Very few men thought enough of the profession to take it up, and until late years women were not allowed to enter such colleges, so that the profession was very much neglected.

And again, as we have said, the methods of living and the foods eaten were very different from those of today, so that people's teeth probably did not decay so badly, because they were more nearly self-cleansing on account of the coarse, rough food

which they ate. Their foods were more natural, and were not so artificially prepared or so highly flavored as ours are today. Sugar was almost unknown by many people.

Their manner of living was more natural. Their houses were crude and open to the air. Their occupations took them out in the open. In fact, in every respect our ancestors lived more as nature intended. Their constitutions were superior to those of their descendants of today, and as a result, there was not as much need for dental services as at present.

Nowadays many physicians will not treat patients who are suffering from decayed, unsanitary mouth and teeth, but they will tell them to go to the dentist and have their mouths cared for before they will undertake surgical operations. And they are right, too. For it is of no use for the physician to treat them if the cause of their ailment is a decayed tooth which has not received the necessary attention from the dentist.

FIGURE 32.

Except by the use of the X-Ray pictures, there is no way of telling how the roots of the teeth grow. Roots such as this specimen cannot be filled properly.

FIGURE 32

The crooked roots of this tooth is evidence enough within itself why teeth should be kept clean and not allowed to decay and the pulp become diseased. This tooth could never be filled properly and would become a source of injury to the general health.

QUESTIONS.

1. What was probably the main reason for so little decay in the teeth years ago?
2. Will an unsanitary mouth impair the health?

CHAPTER XIII.

A Talk on Foods

So many of the foods which people eat nowadays are so prepared that they require very little chewing before they are swallowed. Therefore the teeth are deprived of the self-cleansing and polishing properties which the thorough mastication of coarser foods gives them.

The teeth get very little exercise when food of this kind is eaten, and there is always a great deal of it left in the grooves of the teeth, in the spaces between them and around their necks. The food merely glides over the teeth and between them, and much of it sticks to them, so that the teeth are not left with their surfaces smooth and well polished, as they are when coarser foods are eaten. With the coarser foods, too, there is far less of the food left sticking to the teeth. Where the teeth have smooth and polished surfaces, bacteria cannot cling to them so easily and build their nests. A glass of hot water with a few drops of lemon juice added, before bed time will aid the health and the teeth.

Such foods as pastries, white bread and the prepared breakfast foods have a great deal of starch in them, and, as you know, they stick to the teeth very easily, so that they make a fine medium or substance for bacteria to grow in. Corn breads and other equally coarse foods are not used enough, both for the nourishment they contain and the benefit they are to the teeth. When coarser foods are eaten, the teeth get the amount of exercise they should have, and the particles of food do not cling to them nearly so tightly, so that what food does stick to the teeth can be cleaned off by the usual means of brushing and cleaning.

The lower animals, and especially the wild animals, rarely have decay in their teeth, though the domestic ones do, such as the

horse, dog, sheep, etc. Wild animals that are kept caged up in zoos also often have trouble with their teeth. But the animals like the squirrel, fox, wolf and others that live continually in their natural state and feed upon nuts, herbs and meats rarely have decay in their teeth.

Take a pet dog or cat, and feed it on pie, cake, candies, sugar and other soft foods which it can gulp down without chewing, and in a very short time it is likely to have decay in its teeth. They will begin to ache and will soon break down, causing the animal much pain and distress. This is one of the reasons why household pets often get sick and die.

We can be a great help to nature in her efforts to keep our bodies well and strong, if we will eat coarse, well cooked food, ripe fruit, especially apples, and plenty of fresh vegetables, drink plenty of good, pure milk, get all the outdoor exercise and pure air we can, and, above all things, *keep clean.* Nature is our best physician, and when we disobey her laws our bodies will suffer. *Cleanliness is purity, and purity is everything.*

I hope my young readers will always remember these things, and notice how much more happy, healthy and successful the people are, who live simple, natural lives than the ones who abuse themselves by ignorance and negligence.

QUESTIONS.

1. Do we always eat the right kinds of food? Do we chew it properly?
2. Why do the wild animals not have much decay in their teeth?
3. What should be our first motto for good health? (Cleanliness, always, body and mind.)

CHAPTER XIV.

Tuberculosis

Tuberculosis, or consumption, as it used to be called, like many other diseases, very easily enters our bodies where the mouth and teeth are neglected. For, as we have already told you, a dirty mouth full of decayed teeth not only makes a harboring place for the tubercular germs, along with the other bacteria, but it also lowers the vitality or strength of the body, so that when the germs of this disease get located in our bodies nature is not able to drive them out or kill them, as she would be if the body were well and strong. Once located in a run-down body, the germs multiply very rapidly, and the person soon has tuberculosis. Little can be done for such a person except to live out in the open air as much as possible, on a diet of good nourishing foods, with plenty of milk, eggs, etc. On the other hand, a person with teeth in perfect condition, good digestion and robust health has favorable chances for recovery, for nature is not busy repairing other damage in the body, and can give all her time to driving out the germs of tuberculosis.

The lower animals, such as cattle, sheep, rats, cats, dogs and others, as well as fowls and fish, may have tuberculosis. Children should not play with animals that are sick, for tuberculosis, diphtheria and many other contagious diseases may be transmitted from animals to man. Flies, mosquitoes, fleas and other insects also carry the germs of many diseases about from one place to another. People should be very careful not to expectorate, or spit, in street cars, elevators, or in any public place, because that is a very easy way to scatter the germs of diseases which they may be carrying in their mouths, throats or lungs.

Tuberculosis and other diseases may also be transmitted from animals to man in meats and dairy products such as milk and cream.

Tuberculosis is called the great white plague because so many people die of it, and pyorrhea and decay of the teeth, of which we told you in Chapter IX, the disease of the gums and teeth, may be called the new white plague, as it is one of the causes that lowers the strength and vitality of our bodies, and makes us easy prey for tuberculosis and many other diseases.

QUESTIONS.

1. What do decayed teeth have to do with tuberculosis?
2. May the lower animals have this disease?
3. Should children play with diseased animals?
4. Name some animals and insects which carry disease germs?
5. Why is it wrong to expectorate or spit in public places?
6. How does pyorrhea make it easier for us to contract tuberculosis?

CHAPTER XV.

Uses of the Teeth

The main function or use of the teeth is to masticate the food. Besides this, they help to make the shape and beauty of the face. As we have told you and showed you in the picture in Chapter X, if any of the permanent teeth are lost, not only will the grinding power of the set of teeth be greatly impaired or decreased, but the lines and the expression of the face will be greatly changed. For the remaining teeth will crowd out of their right places, in trying to fill up the vacant space, and the cheeks and other parts of the face will fall in the spaces where the teeth have been lost.

Other changes also occur. The teeth act as a support to the spongy parts of the jaw bones which surround the teeth, and as soon as the teeth are gone this spongy bone will begin to disappear and allow the cheeks and lips to fall in still more. You all know how an old person looks without any teeth. Not only is the appearance of the face ruined, but the voice and speech also suffers. The tongue cannot be controlled as well, and the food cannot be swallowed with the same ease, to say nothing of its being chewed.

The teeth are very hard and can withstand many pounds of pressure. They vary in size and color, according to the age, and temperament of the person. They are not made to withstand extreme heat or cold, which may cause the pulps to die from the shock, or crack the enamel. For these reasons the food should be of a mild temperature, that is, not too hot nor too cold, when taken into the mouth.

QUESTIONS.

1. What is the function of the teeth?
2. Will the expression of the face be changed if the teeth are lost?
3. Does the loss of the teeth affect the voice and speech?
4. Will the teeth last a lifetime if properly taken care of? (Yes.)
5. Why should we avoid very hot and very cold foods and drinks?

CHAPTER XVI.

Hygiene of the Mouth

Hygiene is the science of health and its preservation, or the knowing how to keep well and strong.

Many hygienic measures and agents have been introduced and tried; some with success, and some with failure; but I dare say the most certain aid to health is cleanliness. Keep the body absolutely clean in all its parts, and health will follow, for nature abhors dirt and rubbish in her workshop. We are healthy, our cheeks rosy, and our faces happy, as long as our bodies are free from filth and germs which bring on disease. Then why not guard against disease and sickness by nature's own method by keeping clean?

As we learned in the chapter on bacteria, many of them are very dangerous, because they produce diseases. Each different kind of disease-producing bacteria produces its own disease. Thus, one kind of bacteria will produce typhoid fever, another malaria, and still another diphtheria, and so on. Pneumonia, smallpox, measles, scarlet fever, la grippe, colds and many other diseases are all due to bacteria or germs. You may come in contact with any of these germs at any time. Germ diseases may be contracted in various ways. You may shake hands with a person, or drink after someone who is just recovering from one or more of these diseases; you may take germs into the body in the air you breathe, for the air and dust are frequently full of them; or you may get germs in your food. They are also carried around in the water, and by insects such as flies, mosquitoes, fleas, ticks and bedbugs. So, with these harmful germs about us in so many places, you can see how easy it is for us to

get them on our hands and in our mouths. When they once get into the mouth, those which are not destroyed find a hiding place in decayed teeth, and between the sound teeth, where they thrive and multiply. They may stay there for weeks and months before being forced out of their hiding places into the blood. You may be surprised to become ill with typhoid fever, tuberculosis, or some other disease, and will wonder where you got it, when you have probably been harboring the germs of the disease in your own mouth for months. Would it not be far better to prevent their growth by destroying their hiding places in the mouth, and thus keep free from disease?

Many bacteria can withstand a good deal of heat or cold before they are killed, or require a very strong antiseptic to prevent their growth and destruction. By an antiseptic we mean a medicine which destroys the germs of disease or prevents their growth. Since these bacteria are so hard to kill, how, then, are we going to destroy them after they have gotten into the system? We can't boil them or freeze them to death, and medicines strong enough to kill them would kill us outright. All that can be done is to let nature try to kill the germs with her own remedies and then throw them out of the body, giving her all the help, of course, that we can. If nature is strong enough to throw them off, we will get well; if she is not, then death results.

Simple ways of living, with plenty of pure air and sunlight, pure food, absolute cleanliness of the mouth and teeth, with no decayed teeth in the mouth, and plenty of sleep and rest, are the best remedies against disease. Prevention is better than all the remedies for cure. Try it.

QUESTIONS.

1. What is the greatest aid to health?
2. What are some of the diseases produced by bacteria?
3. What are some of the ways that disease germs are scattered about?
4. How do decayed teeth help us to become diseased?
5. What is the best prevention of disease?

CHAPTER XVII.

Daily Care of the Mouth

We have said that the surest road to health, beauty and happiness is absolute cleanliness, but how are we going to know just what it means to be absolutely clean, unless we are properly taught?

The mouth is the vestibule or doorway to the stomach, in which the food is mixed and prepared for the stomach. If the mouth, then, is dirty and filthy, will not the food also be contaminated when taken into such a mouth? Will not the food itself be mixed with this decomposition, which is made up of thousands of bacteria and their poisons, pus, pieces of decayed and broken teeth and decayed foods? Can a person with a mouth like this be called clean? No, no! Yet such conditions are found in the mouths of a large number of people, say, ninety-five per cent of the people, old and young.

Well, then, what are we going to do to keep from becoming like this? Simply keep clean. And to keep clean means that we must use the tooth brush (not too large a brush) two or three times a day, never less than once a day. Use a good tooth brush with some good tooth paste, and plenty of warm water to rinse the mouth. The teeth in the back part of the mouth are harder to reach than the front teeth, and they should therefore be given extra good cleaning. Above all things, do not go to bed at night without thoroughly cleaning the teeth. You should make this the star performance in the cleaning of your teeth, for the reason that if you go to sleep with your mouth all dirty the little mischief-making bacteria will have from eight to ten hours to work in the mouth without a thing to bother them. But if you clean the teeth and mouth nicely before you go to bed, the bacteria

will not have much chance to build their nests on the smooth, polished surfaces of the teeth, nor will there be any food for them to live upon during the night. They will simply die of starvation, as they can't live in clean, healthy places where they cannot get a foothold or food to live upon.

The bacteria in the mouth are more or less disturbed during the day by the chewing of food, drinking, talking, etc., but if left in a dirty mouth over night they have a fine chance to get busy.

"Keep the mouth and teeth clean" should be our motto. We must form the habit, while we are very young, of cleaning the mouth and teeth three or more times a day with a good tooth brush and some good antiseptic tooth paste, which will help to keep the mouth and breath pure and sweet, and will also act as a deodorant.

The first thing in the morning, before a mouthful of food or liquid is taken into the mouth, we should rinse the mouth thoroughly with clean, warm water with a little common table salt or a little lemon juice in the water to make it cleansing. Even the warm water alone will do very well. This rinsing will clean out the slimy fluid, called mucous, which gathers in the mouth during the night, leaving the mouth cool and clean. Then after the morning meal the teeth should be carefully brushed, and after the noonday meal as well, never omitting the floss or tape between the teeth.

But, as we have said, the most important of these daily operations is the cleaning of the mouth and teeth after the last meal of the day, or before going to bed, for while we are asleep and resting the invisible little mischief-makers are hard at work trying to destroy our teeth and health. If the teeth have not been well cleaned, the bacteria have the advantage and always use it.

Cleaning the teeth will not take more than from three to five minutes. Three times a day would only mean fifteen minutes a day, or less than two hours a week. If it is not always possible

for you to brush the teeth after every meal, a good rinsing of the mouth will do a great deal toward removing the food left on the teeth, and the tongue is a fine tooth brush, especially so just after eating. Try it. But the busiest person can always find time to brush his teeth, if he will only make up his mind to do so.

The teeth, however, cannot be *thoroughly* cleaned with the tooth brush and paste alone, for there are many places between the teeth which the brush cannot reach. The food may be dislodged from these places with a toothpick, but if toothpicks are used they should either be made of quills or of soft wood, so that there will be no slivers broken off between the teeth to injure the gums. Many dentists do not recommend the use of toothpicks at all, for the reason that they are likely to injure the gums.

The best thing for removing the food from between the teeth is a sort of coarse waxed thread, called dental floss, which can be passed between the teeth in different ways and drawn back and forth with the fingers, as shown in the picture (Figure 33), cleaning the spaces between the teeth better than can be done in any other way.

Such things as needles, pins, crochet hooks, knife blades, or any of the common little household instruments, also coins, should never be put into the mouth, as they are liable to chip off the enamel of the teeth, wound the gums, or, indeed, the smaller ones like needles and pins may be swallowed.

Always be careful not to make an open wound in the mouth in any way, for, while there are many bacteria which do no harm in the mouth, just as soon as they can get into the blood through an open wound they begin at once to cause trouble and disease.

If you get the habit of cleaning your teeth regularly, the little time and trouble thus spent daily will perhaps save you many

hours of pain and sorrow and long and painful operations in the dentist's chair. Remember that clean teeth do not decay. If your teeth are clean and sound, your breath is sweet and whole-

FIGURE 33.

Dental floss, or better still, dental tape (can be had at any dental depot), drawn gently between the teeth will remove food debris from between the teeth, thus preventing their destruction. If one cannot get the tape between every tooth in the mouth, something is wrong, or if the tape is cut into in forcing between the teeth, this also indicates trouble. By all means have them examined and the trouble corrected.

some, your body is stronger, your personal appearance is better, and your success in any sphere of life is surer—all because you are clean. So don't you think it is worth while to spend fifteen minutes a day making war on the bacteria with your tooth brush?

We will call the tooth brush the general of our army, and the tooth paste the soldiers. The bacteria are the enemy. So,

if you have cleaned your teeth three times a day, that is three battles that day which you have fought against the enemy. Three battles a day, twenty-one battles a week, and over a thousand battles a year. But our armies must keep fighting all the time if they expect to win. The general in command will soon fag out, and the soldiers will all be used up after a little while, but it only costs a few cents to get new ones to put in their places. If we have patience and keep up the fight, we will win the victory—good teeth and good health.

The following illustrations accompany this chapter and the lessons taught by them should be practiced every day to achieve the desired results of preservation and prevent the loss of the teeth. Figures 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44 and 45 all illustrate the very best known practical ways of taking personal care of the mouth and teeth.

QUESTIONS.

1. When should we commence to take care of our teeth?
2. What should we use in cleaning our teeth?
3. How many times a day should we clean our teeth?
4. Why is it most important to clean the teeth before going to bed at night?
5. What is the best way to get food out of the spaces between the teeth?
6. What is the reason we should not use needles, pins, knives, etc., for removing food from between the teeth?

FIGURE 34.

Every person should be equipped with these articles, and by their persistent use prevent the diseases that attack the mouth and teeth and the general system. Any dental depot can furnish these articles. Or have your dentist get them for you and instruct you in their use.

FIGURE 35.

Showing how to reach the back and side of the last molar teeth with the tip end of the brush.

FIGURE 36.

Showing how to brush the grooves and pits of the back molars. These hidden places are where the food lodges mostly, and where cleaning is done the least. Be sure to observe if you are cleaning these places properly.

FIGURE 37.

Showing how to brush the teeth at the neck and gum line on the inside of the mouth next to the tongue.

FIGURE 38.

Illustrating how to brush and clean the gums above or below the teeth with the tooth brush.

Brush toward the neck of the tooth always, and not from the neck of the tooth. Use a medium stiff brush, and not too large a brush.

Experiment with different makes of brushes until you find the kind best suited to do the best service in your mouth.

FIGURE 39.

Illustrating how to massage the gums and clean the sides of the back teeth with a small piece of gauze wrapped around the forefinger.

Makes the gums pink, firm and healthy, free from hemorrhage if there is no calculus or ill-fitting crowns or poorly finished fillings to cause irritation.

FIGURE 40.

Illustrating how to clean stains of various kinds from the necks of the teeth with an orange-wood stick, with a piece of cotton rolled on the end of it. Used frequently will keep the stain and food debris from collecting on the teeth and prevent their decay and bad appearance.

FIGURE 41.

Illustrating how to use a pair of pliers to reach grooves and fissures of the teeth with a piece of cotton to remove debris and stain, where the toothbrush cannot reach.

FIGURE 42.

Illustrating how to irrigate between the teeth with a bulb syringe filled with water. This is a very fine method of cleaning between the teeth, as by only one other means can the debris be removed to an advantage from between the teeth, and that is the use of tape and floss.

Practice both methods and save your teeth.

FIGURE 43.

Illustrating how to fill bulb syringe with water. Press bulb to exclude the air, hold tight between the fingers and insert nozzle of syringe in a glass of water and release the bulb. It will soon be filled with water ready for use.

FIGURE 44.

Illustrating how to examine your own teeth by the aid of a mouth mirror.

Note the dark area in pits of the teeth. This represents small decayed places, which one would not know were in the teeth until great harm had been done to the tooth. By frequent personal examinations with a mouth mirror, one will find these places long before they have reached the dangerous stage. Have your dentist get you one.

FIGURE 45.

Illustrating how to locate cavities and stains on the sides of the teeth with a mouth mirror.

CHAPTER XVIII.

How to Use the Tooth Brush

There is quite an art in using a tooth brush, and very few people know how to use one properly.

There is always a right way and a wrong way to do things, and if we are not taught the correct way, we usually use the wrong way.

The right way to use a tooth brush is to give it more of a rotary motion, and not so much of the old scrub brush style, back and forth across the teeth. This rotary motion will clean the surfaces of the teeth in the back of the mouth very nicely—on the molars we should make the tooth brush move upward on the lower teeth and downward on the upper teeth (see illustrations in previous chapter), brushing the gums all we can, using care not to injure them. Be sure not to force the gums back from the necks of the teeth by the brush, but brush the particles of food out from between the teeth as well as possible. Brushing back and forth across the sides of the teeth does not let the bristles of the brush get in between the teeth, and simply touches the prominent places, which need cleaning the least of all.

Be careful in selecting a tooth brush; do not get one that is either too stiff and coarse, nor one that is too soft. A brush of medium stiffness is best. The best shape to buy has the bristles arranged in a curve, so that they will touch as many teeth at the same time as possible. The little bunches of bristles should be pointed, so they can get in between the teeth as far as possible, and at the end of the brush there should be a tuft of bristles longer than the rest with which to reach little corners in the back of the mouth. Experiment with all makes of brushes until you find one best suited to the shape of your mouth and teeth.

Do not use the same tooth brush too long—it is a good plan to have more than one brush at a time—and all tooth brushes are

almost bound to gather more or less debris and germs. Do not keep them until they are all worn out, because you can't do good work with an old worn-out brush.

Every member of the family should have his own tooth brush, and you should not let another person use your tooth brush under any circumstances. For the person in question might have a clean face and hands, clean clothing, and, as far as you can see, a clean, healthy mouth, and still have the germs of some disease in his mouth. You might, in this manner, get a disease that would take weeks, months or even years to get rid of, and which might cost you your life. So never let anyone use your tooth brush.

When traveling on trains there are always large quantities of dust floating in the air, filled with bacteria, which may lodge on your tooth brush, in your drinking cup or on your hands, so that it is never safe to use a tooth brush that has been exposed to dirt and germs in this way, without first sterilizing it. To sterilize anything means to treat it in some way which will kill the bacteria on it. Many people do not know that they should keep the soft tissues of the mouth clean and massaged as much as possible. Clean the tongue, using a tongue scraper, occasionally to remove accumulations and mucous, using great care not to injure the membranes in any manner.

Little squares of gauze (see Fig. 39) cut in pieces of about four inches square, and held on the index finger, going over the surfaces of the teeth and the gums at the same time, cleaning and massaging as we go, is thought by many to be a very good way to clean the mouth and teeth. Do not omit the dental floss by any means. The gauze should be kept in a clean covered jar. Every household should have a mouth mirror, and orange wood sticks, also plenty of gauze and floss (see Fig. 34) at all times to insure the mouth from disease.

QUESTIONS.

1. Describe the right way to use a tooth brush?
2. What kind of a tooth brush would you select?
3. Why should you never let another person use your tooth brush?

CHAPTER XIX.

Sterilization of the Tooth Brush

We just told you in the last chapter that to sterilize anything means to kill the germs or bacteria on it. This may be done in several ways; for instance, with boiling water, or with what we call antiseptic solutions, which are solutions or medicines that will kill the bacteria.

Very few people realize the importance of sterilizing the tooth brush and the retainer or holder in which it is kept.

When the tooth brush is taken from the mouth after being used, it is moist and filled with particles of food, tooth paste, saliva and bacteria. Now, you can easily understand how merely rinsing the brush off with water, either hot or cold, will not clean off all the debris, or kill all the bacteria. Even pouring an antiseptic solution over it will not kill them all, because there would be some in the center of the brush that it would probably not touch.

The best way, then, to sterilize tooth brushes and their retainers is either to boil them in clean water, or to keep them, when not in use, in a vessel of some antiseptic solution such as boracic acid.

If the brush is not cleaned by some such means, but is put away in the retainer, dirty and filled with bacteria, they will live and multiply, so that when the brush is used the next time more germs than ever are put back into the mouth on the very brush with which you are trying to clean it. Another good way to keep the tooth brush clean is to first clean it as well as you can and then pour boiling water through the brush, and leave it to dry in a clean, airy place.

QUESTIONS.

1. What do you mean by sterilizing a tooth brush?
2. What is the best way to sterilize tooth brushes?
3. What are antiseptics?
4. Why should the tooth brush be sterilized before being used again?

CHAPTER XX.

The Gums

We call the firm fleshy tissue surrounding the teeth the gums. In health they are of a rose pink color and surround the teeth in beautiful festooned curves, giving grace and beauty to the mouth, as well as protection, life and support to the bones and teeth.

The gums blend or join with the muscles of the mouth and cheeks. They are very firm and hard, enabling them to withstand considerable pressure. They have very few large blood vessels and nerves. The gums are not so likely to become diseased as may be supposed. They will resist irritation up to a certain point, but will quickly recede or draw back from the necks of the teeth when irritated. In such cases they often become stubborn to treatment and will not come back to their natural condition after severe irritation. After the extraction of the teeth the gum tissue, as well as the spongy part of the jaw bone, recede, leaving a space into which the cheeks and lips will fall.

The gums are covered with the same mucous membrane or lining which cover other parts of the mouth. In health the gums should be firm and hard and should not bleed any more than any other part of the body should bleed. But when they become irritated by deposits on the teeth or other causes, they become soft and flabby, bleed easily and are very tender and painful, so that cleaning of both the gums and the teeth is often neglected because of the pain it will cause. If nothing is done for such conditions, the case will go from bad to worse until the first thing the patient knows he has pyorrhea and will lose his teeth.

Therefore, when we clean the teeth, we should be careful not to injure or irritate the gums with the tooth brush or in any manner, but we should see that the necks of the teeth at the margin of the gums are thoroughly cleansed, to keep them from becoming lodging places for bacteria and disease. The gums need cleaning, just as the teeth and other parts of the mouth, and should be washed clean at the same time we are cleaning the teeth. Massaging or rubbing them gently with the tips of the fingers will keep them in a firm, healthy condition, but in doing this care should be taken not to push the gums away from the teeth or scratch the gums with the finger nails.

The lips, tissues of the mouth and the gums are frequently affected by unnatural growths called tumors and cancers, and by canker sores. Many children contract sore mouths from unclean milk bottles, and such conditions often affect the general health of the little ones, making them pale, thin and fretful. Their growth is often stopped for months and many of them die for want of pure food to build up their little bodies.

Older persons are subject to different kinds of diseases of the gums, according to the nature and extent of the irritation. These cases should have immediate attention, as they are liable to cause serious trouble.

Many men who smoke to an excess may have cancer of the lips, caused by the constant irritation and heat of the stem of the pipe. They rarely recover.

QUESTIONS.

1. Should the gums bleed? (No, no more than any other part of the body.)
2. What causes them to bleed?
3. Will the gums recover, without removing the cause of the trouble? (No.)
4. What are the functions of the gums?
5. What will cause cancers or tumors in the mouth?

CHAPTER XXI.

The Tongue

The tongue, which is the organ of taste, also helps to move the food about in the mouth while it is being masticated, and assists the voice and speech.

Like the gums and the other parts of the mouth, it is covered with mucous membrane of rose pink color, and is well supplied with blood vessels and nerves, making it very sensitive to the touch. On account of the large number of different movements which the tongue has to make in the process of chewing and swallowing food, speaking and singing, it is made up almost entirely of muscles.

On the top surface of the tongue are located the taste-buds, which contain the fine endings of the nerves of taste, so that when foods or other substances are moistened and brought in contact with the tongue, we get the sensation of taste through these taste-buds.

The tip and middle portion of the tongue are free in the mouth, and can be moved about at will, although many of the movements of it are involuntary, that is, they are made without our thinking about it.

Broken, jagged, decayed teeth will cut and tear the tongue, making it sore and liable to become diseased. This will impair mastication and speech, and also may result in chronic conditions that will cause serious illness and death.

The tongue should be cleaned when the teeth are cleaned, either by brushing it, or by using a tongue scraper, as it is possible for the tongue to become diseased like any other part of the mouth, if not kept clean.

QUESTIONS.

1. What is the function of the tongue?
2. How may we clean the tongue?

CHAPTER XXII.

The Voice and Speech

The voice and speech will be greatly impaired by badly broken, decayed teeth, as well as by the absence of teeth, as the tongue depends much upon the teeth for the formation of many of the sounds used in speaking and singing.

For this reason public speakers, singers and actors guard their teeth very carefully, to prevent their decay or loss. You could not imagine a brilliant or successful speaker or singer without teeth. In fact, we usually associate a clean, healthy mouth and good teeth with the brilliant and successful men and women in all walks of life.

If public speakers, singers, etc., did not take care of their mouths and throats they would not retain their power of function with the extra work which they have to do.

NOTE—People with mouths such as are illustrated in Figures 24-25 could never hope to be singers or speakers; articulation of words would be very badly impaired. Also Figure 16 would be the same; but Figure 15, which is the same as Figure 16 before operation, could articulate words normally provided a habit of using words incorrectly had not been formed before the regulation of the teeth.

QUESTIONS.

1. Will the voice and speech be impaired by the loss of teeth?
2. Do people with bad teeth or good ones usually reach the greatest success?

CHAPTER XXIII.

Habits and Their Results

Habits! What do they mean? They mean the ruin or salvation of the majority of people. Few persons stop to think what habit really means. We wonder why they do not think about what habits may do for them, and the only answer we can give, is that they have never been taught anything about the power of habits. Neither have they been taught about the good habits which should be formed to help them through life, and how to successfully avoid the bad habits.

Most habits are formed while we are very young, and if they are bad ones, the mischief will be done before anyone is aware of it. Habits are to blame for most of the irregular sets of teeth and ill-shaped faces. Many young mothers, and older ones as well, never dream that any harm will result if the baby sucks its thumb or fingers. It seems perfectly natural for the baby to put fist, fingers and, in fact, everything within its reach into its mouth. Thumb sucking will become a habit in a few days, and, not knowing any better, or having nothing else to do, the baby sucks its thumbs until they are nearly blistered, while the ignorant mother is glad of it, for it keeps the baby quiet. Right here, we want you to learn that it is very wrong for a baby to suck its thumbs or fingers, for great harm is sure to come from the habit. The bones will be forced out of their natural positions and become ugly and irregular in shape. Great harm is sure to come, for the one little habit may be the cause of the front teeth of the upper jaw protruding or sticking away out in front of the mouth, causing the mouth and face to be badly deformed; the air passages of the nose cramped and narrowed much smaller than they should be; and the voice and speech defective.

Not only will the face, mouth and teeth suffer from this habit, but the thumbs and fingers that are being so misused will also suffer. The bones in them will become smaller and flattened, and the fingers will have a shriveled look, as if they had been blistered by heat. Such fingers will never attain a natural size.

Figure 17-18 shows you a set of teeth which have been spoiled by the habit of thumb sucking.

Children with this habit rarely break themselves of it until they are grown up and quit it for their own comfort. But then it is too late—the mischief has already been done before they realize that they are crippled for the remainder of their lives, both in their mouths and hands. It is a crime which has been brought about in a peculiar way through the ignorance of the parents.

But such habits can be prevented if the parents will stop the habit when the child first begins to form it. Take the chubby little fingers out of the mouth, and note how soon the little one will notice that it is wrong. Babies require amusement just as grown people do, and if they are not allowed to put their fingers and thumbs in their mouths they will try to get hold of something else. Therefore, give them things to play with which they cannot get into their mouths. Under no circumstances, when they have been broken of the habit of thumb sucking, should they be given a substitute to suck, like the little rubber nipples called "pacifiers." The gums are sore when the teeth are trying to come through at about the age of six months, and at this time babies want to bite on everything.

If the habit of sucking the thumb or fingers cannot be broken by repeatedly taking the child's hands away from its mouth, then it is a good plan to tie little muslin mittens over the hands at night. Sew the strings on tightly so they cannot pull off, and tie securely over the hands. The baby will probably rebel at first, but after a few good cries it will go to sleep and

forget it. Keep these little slips or mittens clean and never use soiled ones. If they do not give results, then try night dresses without sleeves, buttoned across the bottom, so that the hands cannot get out at all. Usually with one or the other of these plans, the habit can be stopped. Never use strong medicines or pepper on the hands, as the baby is apt to rub its eyes and severely injure them. Many times baby is hungry and begins sucking the fingers or thumbs for this reason, and soon learns the habit.

Sucking the lips and tongue is another habit which is indulged in by many adults as well as children. People do it unconsciously and think little or nothing of the probable results of such a habit. But nevertheless the facial expression will be changed, the muscles of the mouth and face will become lax from the constant action, for they require rest the same as the remainder of the body. The lips will become rough and scaly and will be swollen and bleed easily. Then we have two conditions favorable for disease, namely, open wounds, and constant irritation and pressure. Unnatural growths, like cancers and tumors, are very likely to appear. So you see what serious results may come from a small beginning. In Figures 47-48 you may see how the habit of holding the tip

FIGURE 46.

Illustrates a case of a young lady 22 years old, who formed the habit of pushing the gum tissue and bone with her tongue, before the permanent teeth began to erupt. When they made their appearance she still kept up the habit and you see the results. It is impossible for the mouth and lips to be closed in a normal position, without distorting the muscles of the face, and by an effort, on the part of the patient.

Also she breathes through the mouth, and is always conscious of the deformity.

FIGURE 47. FIGURE 48.

Figure 47 illustrates how the habit of allowing the tongue to protrude between the teeth, all, or most of the time, spoiled the arrangement of the teeth.
Figure 48 is same as figure 47 after the operation of regulating the teeth, making them useful and beautiful.

of the tongue between the front teeth destroyed the arrangement of the whole set of teeth. Figure 49 shows how the habit of biting the lower lip ruined another set of teeth.

FIGURE 49.

Illustrating how biting on the lower lip ruined the shape of the mouth and teeth.

Gum chewing is another habit that ought really to be abolished. It is practiced by thousands, young and old. A few of the arguments against this habit are:

First. It changes the facial expression by the overworking of the muscles.

Second. It causes uncalled for wear on the teeth, not only from the excessive chewing, but also on account of the grit and impurities in the gum.

Third. It stimulates or excites the flow of excessive quantities of saliva when it is not needed, thus lessening the supply when it is needed to mix with the food at the meals.

Fourth. There is great danger in the probability of children swallowing the gum. The gum is indigestible and, if swallowed, it would have to pass through the alimentary canal in a lump just as you swallowed it. This, too, might be the cause of an operation or even death by stopping up the alimentary canal.

Fifth. It shows lack of refinement and culture.

Gum chewing in schools should be prohibited, for the little folks know no better than to chew one piece of gum for days and, too, probably pass it around from one to another. Suppose one of the children chewing a piece of gum which is being passed around from one to another, has some dangerous disease and does not know it. You can easily see how the other children would be exposed to the germs of this disease. Therefore, children should never think of chewing a schoolmate's gum, or using the same drinking cup that others are using, for that is another way to catch disease.

Tobacco chewing is a filthy habit and one which is very hard to break (so they say) when once formed. In the first place, it is very harmful to the body and mind, because tobacco is a poison. In this way it might be called a germicide, because it will kill germs, but it is such a terrible thing that it is never used for that purpose. Just as in chewing gum, the chewing of tobacco overworks the muscles of mastication, wastes the saliva, and wears out the teeth, for tobacco contains a great deal of sand and dirt, so that the teeth of habitual tobacco chewers are often worn down to the gums in a few years, making them very sensitive. The ugly brown stains left on the teeth are very unsightly, and the breath is sickening. It is certainly a habit which should never be started, and we should all have too much respect for our bodies, our mouths and our

teeth to abuse them in such a manner. Tobacco is very severe on the nervous system and also has bad effects on the lungs and heart.

Smoking a pipe is in some ways worse than chewing tobacco, as the lips are constantly irritated by the warm stem of the pipe, frequently causing cancer of the lips. It is an ugly and dangerous habit and should be avoided.

Many children get into the habit of breathing through their mouths when asleep, and at other times, too, as when running and playing. Little or no attention is paid to the matter, as the parents of the children do not know, or do not stop to think about the bad results, which will come from this habit. It will spoil the arrangement of the teeth, force the bones which make up the mouth, nose, and face out of position, and thus change the natural beauty and shape of the face.

Breathing through the mouth is not always a habit. Some persons have unnatural growths in the back part of the nose, which makes it hard for them to draw the air through the nostrils, so that they acquire the habit of breathing through the mouth. Such growths are called adenoids, and should be removed as soon as discovered, so that the child will not be deformed through the habit of mouth breathing.

As we have said, mouth breathing is very bad for the teeth, as it will spoil the arrangement of the teeth and leave them very ugly-looking. And at the same time, it spoils the looks of the face and lips. When the mouth is held open all the time, the muscles around it are stretched out of shape, the lips grow large and protrude, the nose is small and undeveloped, while the bones of the face are, of course, forced out of their natural shape and position. An operation to correct such deformities is very difficult, because there are so many things to overcome. Figure 28 shows a set of teeth forced out of shape as a result of mouth breathing.

Another bad feature of breathing through the mouth is that dust, dirt and germs flying in the air are taken into the mouth and on into the throat and lungs. The open mouth is like a trap, ready to catch everything that comes its way.

Still another bad thing about breathing through the mouth is the taking of cold air directly into the lungs, without its being warmed first by passing through the nostrils. The air breathed in through the mouth may be so cold that a severe shock to the lungs and the passages leading to them is produced. This will lead to irritation of the membranes lining the throat and the bronchial tubes leading to the lungs, and disease will then easily follow.

If we breathe through the nose as nature intended, these bad features are done away with to a great extent. The dust, dirt and germs in the air are caught in the front part of the nose by the little hairs and the moist surface of the mucous membrane lining the nose, the hairs acting like a sieve, preventing dust from going down into the throat and lungs. After these things have been caught by the hairs in the nose they are washed down by the fluids of the nose and discharged as waste.

Then again, if the air is breathed through the nose, it will be properly warmed before reaching the lungs, for nature has built the nose in such a manner that it will do this for us.

Sleeping with the head under the bed clothing is a bad habit which children are often allowed to form. Sleeping in this manner they are able to get very little, if any, fresh air, as the small amount of air under the covers is soon used up and poisoned by the breath, and then breathed over and over again. This is the reason so many infants are found dead in bed. Although probably in the best of health, they can easily be suffocated for want of fresh air.

Now that we have seen how many bad results come from bad habits, let us quit them, live right, get plenty of sleep in well ventilated rooms, or in the open air, keep the body warm and dry, keep clean, and take care of our teeth and our bodies. Then better health and a stronger race, with fewer invalids and cripples, will be the result.

Of all members of the animal kingdom, the human race abuse themselves more than any other. We deliberately do things which are not right, and then suffer for it. Notice how the lower animals are rarely sick, and when they are it is usually man's fault. And why do they not get sick? It is because they do not disobey nature's laws. They live in the open air, and not in small rooms and hot houses, where they are poisoned to death by bad air. They eat natural foods and, as a rule, will not eat things that are not good for them.

Chewing and biting the finger nails is a dirty habit and one that is very injurious to the fingers, to the teeth, the lips, tongue, throat, lungs, stomach and intestines. And why? To begin with, look at the fingers of a person who bites his nails. They are unsightly and malformed—not graceful as nature made them. The nails are intended to give protection to the ends of the fingers, as well as grace and beauty, but if we destroy them by biting them, the fingers lose their shape, the nails are left ragged and torn, the fingers will bleed easily where the nails are torn, and the condition will be very annoying. This habit is usually formed by weak-minded persons, and none of us want to be branded as weak-minded.

Then, the hands and fingers are dirty, especially under the finger nails, where bacteria find a very suitable lodging place in the dirt. Here they grow very rapidly, for they are protected and undisturbed, so the presence of bacteria under the nails is reason enough in itself for not putting the fingers into the

mouth. The nails are made of a hard, tough substance a good deal like the horns of an animal, so you can see that the constant biting of them would be very wearing on the teeth. For the same reason you will also understand how injurious these small pieces of the nails would be to the stomach and intestines when swallowed. Of course, they are indigestible, and therefore have to pass through the alimentary canal before they are thrown out of the body. Being hard and sharp, just like little slivers of hard wood, they may easily find a lodging place somewhere along the lining of the stomach or intestines, and then work their way on into some blood vessel or other organ, such as the kidney. Here there is no telling what trouble they may cause. Tumors, ulcers, abscesses or other forms of disease may be the result. So my young readers, please do not acquire this habit.

Look at the person whom you see continually biting his finger nails, and you will see a pale, weak, nervous, hysterical, unhealthy and unhappy person. Do you want to become like that? Then follow the advice which we have just given you, and never form the habit.

Probably one of the most thoughtless habits ever practiced by the human race is that of mothers chewing food and feeding their babies from their own mouths with their fingers, regardless of what condition the mothers' mouths, teeth or health may be in. This statement may sound ridiculous and absurd to many who read it, but this disgusting habit is surely practiced daily by many thoughtless and ignorant mothers.

How are people to know what is wrong and how to avoid bad habits, if they are not taught? Every year we raise thousands of dollars to fight the great white plague (tuberculosis), and spend vast sums in fighting other diseases and caring for the sick. Would it not be far better if we would teach the people how to keep free from these diseases? Would we not be money

ahead if we would teach our children, along with their other studies at school, how to take care of their bodies and prevent disease? The children will learn these things far more quickly than older people, so why not begin by teaching the children?

QUESTIONS.

1. Should a baby suck its thumbs or fingers? Why not?
2. What is a good way to stop the habit?
3. Should babies be given rubber rings or the so-called "pacifiers" to bite instead of the fingers? (No, they are dirty, and will deform the arrangement of the teeth, and the face.)
4. What do you think of gum chewing? What harm does it do?
5. How does gum chewing affect the digestion?
6. In what way does tobacco chewing affect the teeth?
7. Why is it wrong to breathe through the mouth?
8. Name the reasons for breathing through the nose.
9. Is mouth breathing always a habit? (No, sometimes it is due to growths, or adenoids, stopping up the air passages of the nose. These growths should be removed at once; also bad tonsils will cause mouth breathing.)
10. Why is it bad for the health to breathe cold air and dust into the lungs through the mouth?
11. How does the nose keep dust and dirt from getting into the lungs?
12. Why is it wrong for children to sleep with their heads covered with the bed clothing?
13. Why are people more sickly than the lower animals?
14. Why is it wrong to bite the finger nails?
15. When is the best time to teach people how to take care of their bodies?

CHAPTER XXIV.

Summary

Much has been said in these few pages regarding the care of the mouth and teeth and their relation to health. In this last chapter we wish to sum up what we have said, and call attention to the benefits to be gained by following the instructions which have been given. Also much repetition has been deemed advisable throughout these pages, in order to teach the many ways and mannerisms of the cause and prevention of bad health and the wreckage of growing young bodies. We see little human wrecks every day, who could have been healthy and normal if people were less ignorant and more preventable measures were taken.

First of all, we must have proper instruction and information about the teeth and their care. We must know how to care for

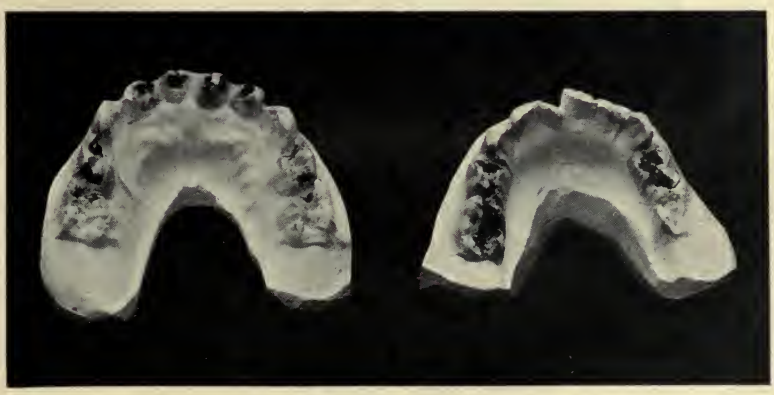

FIGURE 50.

Illustrates a little mouth with 25 cavities in the teeth with four chronic abscesses. Patient is five and one-half years old, always sick and a very bad disposition. After his mouth was put in good condition he got well and put on several pounds of flesh. Did not look like the same boy.

FIGURE 51.

Illustrating an X-Ray picture of a little patient's mouth, three years old. Note the long roots of the temporary teeth, also note how large the permanent teeth are, and how they are crowded in bunches. Can you understand what abscessed baby teeth may mean to the permanent teeth at their roots?

them and what means to use in so doing. We must understand the necessity of having teeth replaced, when lost, and of having them treated, when diseased. Many people, very intelligent in other things, are sadly lacking in the knowledge of the care of the mouth and teeth, and frequently suffer from ill health for long periods, due to troubles arising from the teeth, which they never suspect. Many teeth are extracted, which should, by all means, be treated, filled and saved.

The teeth form one of the most important parts of the digestive system. Without the teeth and mouth in good condition, food cannot be properly prepared before entering the stomach. Food must be tasted, chewed and enjoyed, if we are to receive the full benefit from it.

The speech depends greatly upon the teeth, and so does the natural beauty and expression of the face. These things alone ought to be abundant reasons to awaken general interest in the care and preservation of the teeth.

Dirty mouths and decayed teeth are always a menace to health, and if let alone will surely lead to disease.

The mouth and teeth form a very important and essential part of the economy of our bodies. That is, the body cannot get along and do its work without them. It is to be lamented, therefore, that so many thousands of parents are so neglectful of themselves and their children, that they have no daily routine of caring for their mouths, and allow their children to grow up without ever

teaching them anything about the cleaning of the teeth and the care of the mouth. Such ignorance or neglect is a crime. The mother should take a clean cloth and wipe out the mouth of the child, even before it has any teeth. However, children are, as a rule, left alone and without instruction until an aching tooth or an exposed pulp cries out with a voice that makes itself heard, announcing the results of the parent's neglect. The mischief has been done. The enemy has defeated nature, and the child pays the penalty in pain and sorrow.

FIGURE 52.

Illustrates the wide space between the two central incisor teeth. The cause of this is the attachment of the little membrane which holds the lip in position growing so near the edge of the bone and between the teeth and forcing them apart. A very slight operation would overcome this, and the teeth grow together in their normal relation, if done while the person is young.

It is really wonderful that so many people utterly fail to appreciate the importance of caring for their teeth until the truth is forced upon them through suffering. When they cannot stand it any longer they do not think of how to prevent further mischief, and of how to keep what teeth they have left, but of how quickly and cheaply they can be relieved of their suffering.

Cheap things always come high in the end, and cheap dental or medical services are the poorest kind of economy. Judgment and skill in any calling or profession are the results of hard labor, and should be looked upon with the highest favor and esteem. Therefore, in choosing a dentist, try and get one whose skill and integrity will assure you of the best work the profession can boast.

There is a vast difference in the teeth of different people,

as to the liability to decay. Some will stoutly resist the action of bacteria and decay, according to the general health, while others will be so very susceptible (frequently faulty development of enamel), that they will decay as soon as they come through the gums. Even in the same mouth some teeth will be more liable to decay than others, possibly due to weakness or sickness while the teeth were being formed. If we find that our teeth are very liable to decay, it means that greater care and watchfulness will have to be used to keep them in good condition.

However, whether the teeth be naturally good or bad, with diligent personal care, together with frequent visits to a good dentist, say every four to six months, or oftener if necessary, so that the first evidence of decay or disease may be cared for, there is no reason in the world why the majority of people could not have good teeth and perfect health to a ripe old age.

Clean teeth will not decay.

QUESTIONS.

1. Do people as a rule know enough about the care of the teeth, and their relation to health?
2. How does the digestion depend upon the teeth?
3. How does the speech and the appearance of the face depend upon the teeth?
4. Should a person neglect having the teeth cared for by the dentist, when needed? (No, a thousand times no. Better go with one or two meals a day or wear cheap clothing for a while, than to let disease get a foothold in the body.)
5. What is the only cause of decay in the teeth? (The secretions of bacteria, working in decomposed food left on the teeth.)