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DENTAL SCIENCE

DR. ROSCOE A. CARTER

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DR. R. A. CARTER

DENTAL SCIENCE

A HANDBOOK

FOR THE USE OF

COLLEGES, SCHOOLS

AND

THE GENERAL PUBLIC

By

Dr. Roscoe A. Carter

CAREFULLY ILLUSTRATED

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No. 2.

DENTAL SCIENCE.

CHAPTER I.

Teachers.

In writing this book I would ask first the aid of the teacher and parent. It is necessary to have the co-operation of the environment of the child to distil into its life the many things essential to its physical being as well as its spiritual life.

A child has its many strange impressions and a little encouragement in such a time is the motive power of their success in that line of thought. Therefore the thing I would impress on the minds of the teachers and parents is that a child's development of physical powers is as essential as the development of his mental powers. A well-developed brain is, in a way, useless in a deformed or crippled body.

My object is to urge the teacher to work through the child on the parents. Very few parents know very much about their children's teeth until the little fellows begin to cry from a tooth pain, which is the most excruciating pain known to human suffering, some forms of which are very difficult to arrest.

There is no part of the body neglected as badly as the teeth. I have had, in my practice, patients come in for treatment that did not know how many teeth they were supposed to have, what they looked like or anything about them, only that they were in their mouth and were giving them trouble. What can you expect of parents of that type? They never give their own teeth any thought, therefore what chance for dental treatment do their children have?

This little book is written for the purpose of raising the standard of intelligence as well as health. Through you teachers, who are at the head of the intellectual world, is the best channel by which this bit of information can reach the homes of the universe. Of course the parents are not expected to know all, but you teachers can enlighten the home as well as the child in this matter, In this little book you will find all that is necessary for your work along this line.

I find that the public in general are clamoring for this kind of a book. We have our books of dental surgery, but this is the only book, which adheres to the care and attention of the teeth alone, which is in the hands of the general public. In this work I have tried to simplify and bring everything down to an ordinary understanding. I hope in time to see a dental chair or examiner in every school, large and small.

CHAPTER II.

Parents.

I am writing this chapter for your pleasure and the child's benefit. I wish I could talk with every parent in this world, but, since I am not able to do so, will say what I can with my pen.

There is not an organ in the body that, in my opinion, is any more important than the teeth. Now it is the duty of you parents to be on the look-out for anything that will be detrimental to your child's teeth. Therefore I urge you to study this book thoroughly, and, as far as possible, explain the work to your child. If you do not understand, you should consult a dentist. Any dentist would look over your teeth or your child's teeth for consultation and tell you what to do, for we are all interested in the work.

CHAPTER III.

Lessons Incidental to First Dentition.

Though the eruptive process of dentition is a physiological action, it is very often attended by a serious irritation. During early childhood, the tissues are all soft, more vascular and sensitive, the nervous system predominating. Hence it is, that the system at the period of first dentition is so susceptible to nervous impressions. In infancy too, the system is less capable of combating diseases, and a large portion of the alarming great mortality of this period is traceable to the irritation caused by dental evolution.

INDICATIONS.

From the fifth to the seventh month, as a rule, an increased flow of saliva begins. This is a healthy manifestation as it tends to keep the mouth moist and cool. This "Drooling" is due to the irritation of the facial or fifth pair of nerves, which are sensory to the teeth and are nutrition to the salivary glands. When the irritation becomes more pronounced, the secretions are somewhat

checked and the mouth becomes hot and dry, with ulcerations on the tongue and mucous membrane of the mouth, and inflammation of the gum over the advancing tooth or teeth.

A condition, quite opposite to this in appearance, is a white and hardened gum overlaying the advancing tooth. This offers a greater resistance than the inflamed condition, and is often neglected, especially by physicians and parents, owing to the absence of the appearance of any congestion. The child becomes wakeful, peevish and cross, loses its appetite, then, if relief is not given, this may be followed by persistent nausea, diarrhœa, spasms or convulsions.

TREATMENT.

The first action to be taken is to remove the irritation by freely lancing the gums over the coming teeth, the method used being shown in Cut No. 1, on page 12.

If the convulsive stage is reached, the patient's feet should be placed in hot mustard water and cold cloths applied to the head; or, the whole body should be put into a warm bath. Such measures cause relaxation of the muscles and also have a soothing effect on the nervous system.

No. 1.
A.B.C.

CHAPTER IV.

Anatomy of the Teeth.

THE teeth are divided, externally, into three parts, viz.:—

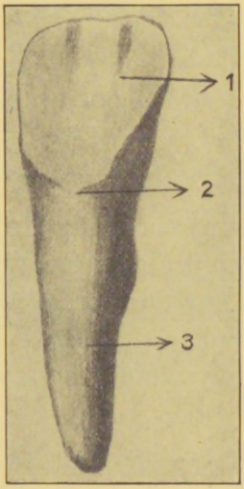
1. Crown
2. Neck
3. Root

internally,

1. Pulp or Nerve.

The crown, (1), as shown in Cut No. 2, on page 14, is the part which projects freely into the mouth. The neck, (2), is surrounded by the gums. The root, (3), is the portion covered by the alveolar process of the jaw, by which the whole tooth is held in position.

The pulp or nerve—see Cut No. 5—is inside of the tooth and contains nerves and bloodvessels, the form of which is in accordance with the tooth in which it lies.



No. 2

CHAPTER V.

Dentition.

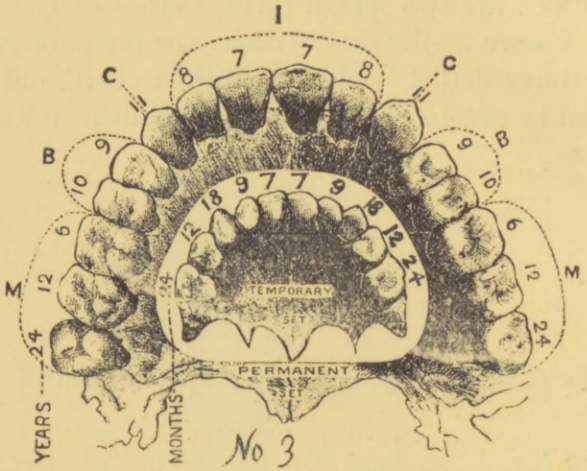
THERE are two sets of teeth, that of early childhood known as the first, primary or temporary set, sometimes called "baby or milk teeth," and the second or permanent set of later youth and adult life.

THE TEMPORARY SET.

The temporary set has twenty teeth, ten in each jaw.

Cut No. 3, on page 16, represents the teeth in their relative position in two upper jaws,—the smaller or inside one representing the temporary set of childhood, the external one, the teeth in later youth or adult life.

The four teeth in front, on the smaller jaw, two on either side of the medium line of the face are the *incisors* or "cutters." See cut No. 3, teeth Nos. 9, 7, 7, 9. They have chisel-like or wedge-shaped edges which enable us to bite or cut our food.


I
C
C
B
B
M
M
TEMPORARY SET
PERMANENT SET
YEARS
MONTHS
No 3

Adjoining these incisors are the *canine*, Cut No. 3, teeth Nos. 18, 18,on either side of each jaw. These teeth are somewhat pointed at the edges, after the manner of the tooth of a dog. They assist the incisors in cutting the food. The remaining teeth of the temporary set are *molars* or "grinders." See Cut 3, Nos. 24, 12, 12, 24. There are two on each side of either jaw. These teeth pulverize the food. The grinding surfaces are grooved and upon them are three or four conical elevations, more or less marked.

The teeth of the temporary set are cut according to the table below, which refers to Cut No. 3, small jaw.

Name of teeth	Nos. of teeth per cut		Age of cutting
Central Incisors	7	7	5 to 7 months
Lateral Incisors	9	9	9 to 11 "
First Molars	12	12	12 to 14 "
Cuspids or Canines	18	18	14 to 18 "
Second Molars	24	24	18 to 25 "

THE PERMANENT SET.

The teeth of this set are much larger and stronger than those of the first set. These are thirty-

two in number, sixteen in each jaw, viz.:—four incisors, Cut No. 3, teeth Nos. 8, 7, 7, 8, big jaw; two canine, Nos. 11, 11; four bicuspids, Nos. 10, 9, 9, 10; and six molars, Nos. 24, 12, 6, 6, 12, 24.

The bicuspids, found in the permanent set only, are between the canine and the molars, two on each side of either jaw. They are shorter and thicker than the canine and assist the molars in grinding the food.

The permanent teeth originate near the roots of the temporary teeth. As they develop, they press upon these roots and cause their absorption, the temporary teeth being shed eventually as little conical crowns with convex bases.

The first tooth of the permanent set to erupt is the "Six Year Molar," so called because it erupts about the sixth or seventh year. Cut No. 3, Nos. 6, 6.

Now, if possible, I wish to explain very clearly about this tooth which causes the most loss of tooth structure and more pain than any other tooth in the mouth. Nine times out of ten, when a child comes for treatment, that is the tooth that brings him in. When I tell the parents it is a second or permanent tooth, they will say, "Why, that cannot be so, that child has never lost a tooth there." As a rule that is the tooth which causes the first toothache.

The fact of the case is, that the tooth comes just back of the last tooth of the first set, consequently a child does not have to lose one of his first teeth that he may have one of these molars come. This is where most people are mistakened. *Remember*, the first tooth of the second set comes just back of the last tooth of the first set.

THE ERUPTION OF THE PERMANENT TEETH
(Shown in Cut No. 3, larger jaw)

Name of teeth	Nos. of teeth per Cut		Age of cutting
First Molars	6	6	6 to 7 years
Central Incisors	7	7	7 to 9 "
Lateral Incisors	8	8	8 to 10 "
First Bicuspids	9	9	10 to 11 "
Second Bicuspids	10	10	11 to 12 "
Cuspids or Canines	11	11	12 to 13 "
Second Molars	12	12	12 to 13 "
Third Molars or Wisdom Teeth	24	24	16 to 25 "

THIRD DENTITION.

Cases of third dentition are reported by a number of writers, but undoubtedly the majority of these reports refer to teeth that, in reality, are a part of the second set, which failed to emerge at the normal time, but instead appeared in old age

when there was sufficient room for them, and the jaw had atrophied.

The writer has extracted two well-developed third molar or wisdom teeth, (which had never emerged from the gums), for a patient fifty years of age. This was after extracting the second molar roots. It was known that the patient had never had any wisdom teeth. Third Dentition is very rare and I have my doubts about its ever occurring at all.

CHAPTER VI.

Toothache.

It is sometimes difficult to determine whether a child is crying from toothache or other troubles, but there is a way to find out. The child will cry at first by spells if he takes anything into his mouth, as you will notice at such a time. But this does not always happen. Sometimes he will begin to drop his ring or bite whatever he has or begin to place his hand in his mouth, even all his fingers, and go around crying. At night he may "drool" or roll around but never, as a rule, will he lie on the affected side. If you touch the child's teeth, no matter which one, he will cry. He eats very little, will not at first drink cold water, or does not like cold air, but as the trouble continues he objects to warm water and will drink cold water.

Watch the child's jaw closely for a swelling and consult a dentist. After the child is old enough to tell his troubles you may examine his teeth yourself. You will find a cavity. The symptoms are thermal change. Cold water or anything cold will pain worse. After a while the tooth will begin to feel sore to the touch and seem longer than the

rest. Then the jaw will swell and he will have an ulcerated tooth.

Do not wait for all these symptoms. If it is a small child consult a dentist once in two months. After the child is five years old consult a dentist twice a year at least, but the oftener the better.

HOME TREATMENT.

If it is not possible to get to a dentist, you can sometimes arrest a toothache temporarily, at home, by cleaning the cavity with a blunt hatpin or a toothpick. Dip a small piece of cotton in creosote and oil of cloves, equal parts. If there is only one in the house use that, but be very careful with creosote as it will burn the mouth. Place this cotton in the cavity with a toothpick. Carbolic acid, chloroform, ether, peppermint, wintergreen, alchohol and laudanum are all very good for a temporary treatment. Often hot cloths or a hot water bag will alleviate the pain but as soon as possible a dentist should be consulted.

CHAPTER VII.

Disease of Hard Dental Structure.

DENTAL CARIES OR DECAYED TOOTH.

"Dental Caries" or "Decay" is the gradual softening and disintegration of the tooth substance, proceeding from the periphery toward the pulp or "nerve." It first appears as a chalky, opaque spot in the enamel, in which the structure is loosened and gradually broken down.

In studying the causes of any disease, they are divided into predisposing and exciting. By "predisposing" we mean such causes as render the system or organ liable to attack, yet, in themselves, they are not sufficient to cause the disease. By "exciting" we mean such causes as are actually responsible for the establishment of the disease.

The etiology of Dental Caries will, therefore, be considered both from the predisposing and the exciting standpoints.

THE EXCITING CAUSES.

The exciting causes of dental caries are primarily

due to an acid condition of secretions of the mouth. This may be the result of fermentation of food debris around and about the teeth when left in a fermentative condition, or acid taken in the food. The tubuli of the exposed area of dentine is evaded and forms a habitation for many varieties of micro-organisms.

There is no place in man's anatomy more fitted to the development of "bacilli" or "germs" than in the mouth. The environment is perfect and the temperature is just the right temperature to develop germs, for not only decay of the teeth or "caries" but for typhoid fever, tuberculosis and many other diseases. Thus it is plain that a hygienic condition of the mouth or "Oral Care" is essential to health. (Read the chapter on CLEANING THE TEETH.)

The micro-organisms active in the destruction or decalcification of tooth structure are:

1. Those of fermentation—the yeast plant—technically known as *streptococcus*.

2. Those responsible for the destruction of the dentine—the *bacilli*—a cylindrical or rod-like bacteria.

These micro-organisms do not act directly on the dentine, but they multiply in a cavity of decay by millions, their product being an acid, which in its turn attacks and decalcifies the dentine.

THE PREDISPOSING CAUSES.

The predisposing causes of dental caries are numerous and are, in most cases, due to constitutional or systemic disturbances.

The character of the structure of the teeth, regarding both the quality and quantity of the several tissues, is an important factor. This is well illustrated by the inter-globular spaces frequently met with, both in the enamel and dentine. These spaces are the result of some systemic disturbance during the period of calcification of the teeth, and later from weak points, or predisposing causes of caries.

The position of the teeth is often a factor in the frequency of caries in those organs; that is, whether they stand so all surfaces may be cleaned readily, or whether they are very irregular, presenting numerous surfaces for the lodgment of fermentable substances.

The general tone of the system, whether giving to those organs their needed nourishment, or a nerve or blood supply of a sluggish nature, and the effect of illness and the relation of sex, also present predisposing characteristics.

DENTAL CARIES DURING ILLNESS.

In severe illness several conditions favor dental caries.

1. The lack of nutrition causes the teeth to be less able to resist destructive influences.

2. The abnormal acid secretion aids in the destruction of the tooth substance.

3. Fermentation often gains progress without hindrance, on account of the patient's inability to keep the surface properly cleaned.

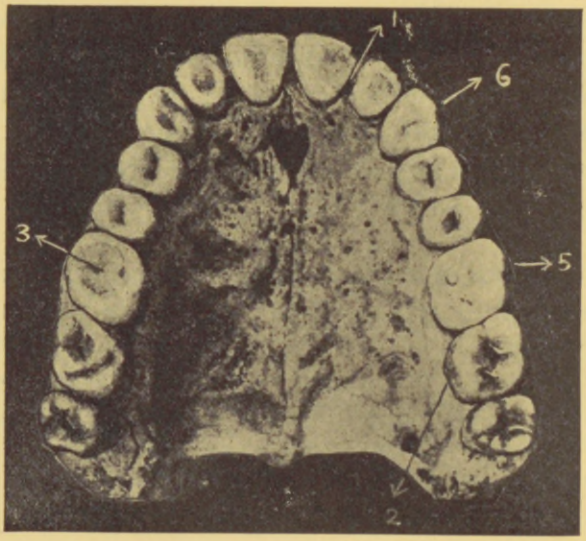
CHAPTER VIII.

The Proximal Surfaces.

THE proximal surfaces are the surfaces between the teeth. See No. 1, Cut No. 4, page 28. Such surfaces are convenient positions for the lodgment of fermentable substances; in consequence fully 65 per cent of the appearance of caries occurs on these surfaces of the teeth.

From some statistical examinations, made by the writer, dental caries may be classified in the following groups:

	Per Cent
Superior Central Incisors	14.4
Inferior Central Incisors	0.6
Superior Lateral Incisors	14.
Inferior Lateral Incisors	0.8
Superior Cuspid	7.
Inferior Cuspid	0.9
Superior First Bicuspid	10.
Inferior First Bicuspid	3.
Superior Second Bicuspid	8.
Inferior Second Bicuspid	5.
Superior First Molar	16.
Inferior First Molar	14.5



No. 4

	Per Cent
Superior Second Molar	11.
Inferior Second Molar	12.
Superior Third Molar	2.5
Inferior Third Molar	3.

CHAPTER IX.

The Relative Location of Dental Caries.

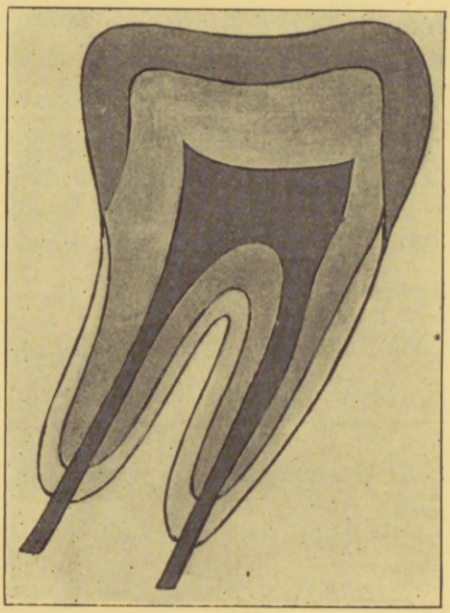
BEFORE giving the relative positions of the cavities, I will explain them by Cut No. 4, on page 28. Proximal is the surface between the teeth in the same jaw—Cut No. 4, No. 1. Labial surface is the surface next to the lips—Cut No. 4, No. 6. Palatal is next to the palate or roof of the mouth on the upper jaw—Cut No. 4, No. 2. Masticating is between the grinding surfaces of the back teeth—Cut No. 4, No. 3. Buccal surface is next to the cheek—Cut No. 4, No. 5. The Lingular surface is next to the tongue on the *lower jaw.*

TABLE GIVING RELATIVE LOCATION OF DENTAL CARIES.

Name of Teeth.	Prox.	La.	Pal.	Mas.	Buc.
Superior Central Incisors	95%	1%	4%		
Superior Lateral Incisors	94%	1%	5%		
Superior Cuspid	98%	1½%	½%		
Superior First Bicuspid	93%	½%	6½%		
Superior Second Bicuspid	92%	½%		7½%	

Name of Teeth.	Prox.	La.	Pal.	Mas.	Buc.
Superior First Molar	35%			61%	4%
Superior Second Molar	20%			75%	5%
Superior Third Molar	4%			95%	1%
Inferior Central Incisors	99%	1%			
Inferior Lateral Incisors	98%	2%			
Inferior Cuspid	95%	4½%	½%		
Inferior First Bicuspid	91%	1%		8%	
Inferior Second Bicuspid	91%	½%		8½%	
Inferior First Molar	30%			64%	6%
Inferior Second Molar	16%			78%	6%
Inferior Third Molar	2%			95%	3%

Notice:—The above table is made without respect to age or sex.



No. 5
A Perfect Tooth

CHAPTER X.

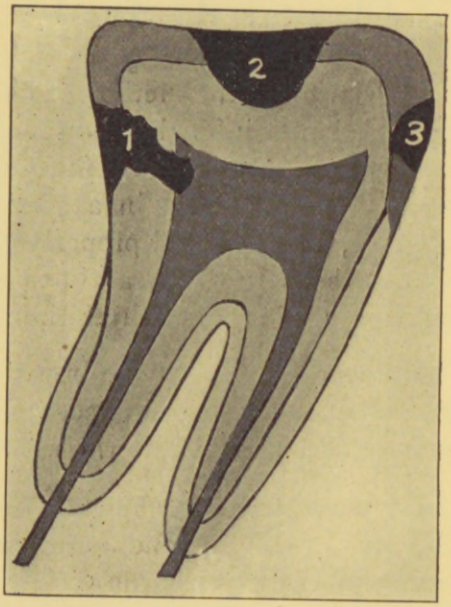
Cleaning the Teeth.

In this description of the method of home cleaning of the teeth do not infer that this is all you can do, for it is not. When you have faithfully cleaned your teeth at home you are in a good condition to visit a dentist, for he should properly clean them once in six months. In the meantime, you should clean them thoroughly two or three times a day.

Please look over Cut No. 5, the imperfect tooth, on page 34. It shows the various positions and the advancement of decay relative to the nerve or pulp.

In the first place, for your home cleaning, procure two brushes, a soft one and a stiff one, for you cannot determine which is appropriate for your mouth till you have tried them both. If the stiff brush makes the gums bleed, use the softer one.

In the morning, first rinse out the mouth with warm or tepid water, at the same time washing the teeth with the tongue. Then take one-half tumbler full of warm water with as much salt and soda as you would easily pick up between your thumb and finger. Dip the brush in this solution, then wash the teeth

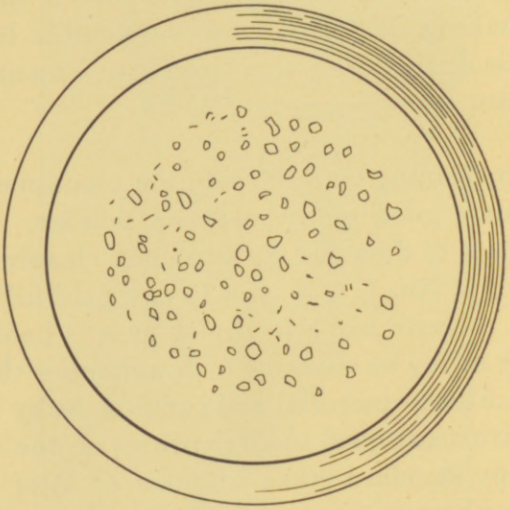


No. 5
An Imperfect Tooth

thoroughly, bringing the brush from the upper gum down to the lower gum and back. Then rotate the brush across the grinding surfaces. See Cut No. 4, No. 3, on page 28. Do not expect that washing across the teeth will do the thing correctly for it only cleans the outside surface and washes or brushes the food in between the teeth, thus making the teeth more susceptible to dental caries or decay unless they are washed up and down afterward.

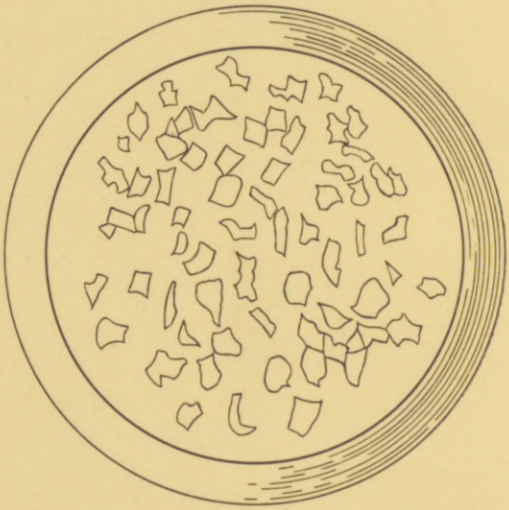
After cleaning with the solution mentioned, wash with some good tooth paste or powder. Always use a piece of floss silk for proximal cleaning. See Cut No. 4, No. 1. If you have a gold filling, use a quill. Never use a toothpick as it is liable to injure the filling by slivering or roughening the edges of any filling material and cause a leaky filling. There are many good tooth dentures on the market. I use any standard make at noon or after dinner. Wash with warm water and brush, using some good dental paste, then rinse well with water. After supper wash with water and then the paste as before. The last thing use some form of magnesia. That will leave the mouth in an alkaline condition and not in the acid condition spoken of in a previous chapter.

The condition of the mouth relative to bacilli is shown in two cuts, Nos. 6. By leaving the mag-



No. 6
Safe Bacilli

nesia in the mouth over night relieves the acid condition of the saliva and helps to promote cleanliness. Do not use any gritty substance or acid as it will spoil the enamel, also any good filling you may have.



No. 6
Dangerous Bacilli

CHAPTER XI.

Drugs Which Should Be Used With Care.

THERE are some drugs which should be used with caution as they are very injurious to the teeth and gums. Remember that it is as essential for the gum to be in good health as the teeth. Any form of iron should be taken either in coated tablets, or, if it is in a liquid form, by sucking through a straw. (A straw may be obtained at any soda fountain.) For small children who need iron, it should be given in small tablets placed on the back of the tongue, then giving water. But, as a rule, small children do not need iron as much as they do another drug, which is, any form of mercury. The results of taking mercury cause constitutional disturbances by loosening the gums. This drug should be avoided at all times unless prescribed by a physician for diseases which require the drug. Never use mercury before consulting a doctor; he will understand it, or, at least, he ought to.

No. 7

CHAPTER XII.

Thumb Sucking.

THE habits of thumb sucking, and lip and tongue biting are responsible for the cause of some malocclusions; also for the aggravation of a great many cases caused from other primary factors. Thumb sucking is not as frequently a positive factor in malocclusion as it is generally supposed, but that it does affect the arch (or jaw) is certain. Usually but one side of the mouth is affected, according to which thumb is used, although it is not uncommon to find that the thumb is held in the center of the mouth, thus protruding the central incisors. When the thumb is held on either side of the mouth, the incisors on that side are protruded. Cut No. 7 presents a very clear picture of the result of thumb sucking.

TREATMENT FOR THUMB SUCKING.

A very practical method used to prevent a child from sucking its thumb is to enclose its hand in a polished aluminum ball. It is a small ball, large enough to cover the hand and has a sleeve attach-

ed. This is tied to the child's arm and worn as much as possible, especially at night, until the habit is broken. Such a device is on the market by the name of "Hand-I-Hold Babe Mit." It may be procured of R. M. Clark Co., Boston, Mass. The wearing of mits of this kind will enable the child to use its arms, yet, at the same time, prevents the possibility of the child getting its fingers or thumbs into its mouth. It is much more humane than tying the arms. The ball is ventilated by several small holes. The sleeve and ball may be easily sterilized by boiling.

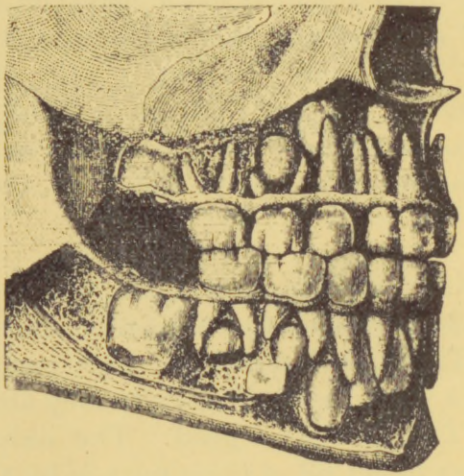
CHAPTER XIII.

Extraction.

As a rule, if a patient has a toothache he goes to a dentist with the intention of having the tooth extracted. Now, nine cases out of ten, teeth that have ached for the first time can be filled with very little inconvenience. In most instances badly ulcerated teeth can be treated and filled, crowned or bridged.

I consider the extraction of the temporary teeth more important than the extraction of permanent teeth. There are cases where these teeth may be filled for a short time, but usually they are retained too long for the child's good. The only method nature has to get rid of these teeth is by absorption and decay (or caries). The irregularity of a large number of teeth is caused by leaving the first teeth in too long, that is, until the second set has started and grown by the roots of the first set.

Cut No. 8, on the next page, shows the jaw cut away, thus exposing the second set in progress of development. Notice that the second set is trying to grow straight. If these first teeth are not re-



No. 8

moved, the permanent teeth will strike on their roots and be started in an abnormal course. This causes them to grow irregular, and is detrimental both to looks and mastication. To prevent this, there is a time when the first teeth should be extracted, whether they are decayed or not, that they may make room for the second set in their respective positions. The old proverb, "A stitch in time saves nine," aptly applies to this part of dentistry, for it is very expensive, and also very strenuous work, on the part of the patient, to have irregular teeth straightened, but, after they have come, this is advisable. As a rule, these teeth do not articulate or come together so that they can be used to their fullest capacity as an organ of mastication. The teeth, being irregular, do not match, one jaw relative to the other.

Cut No. 9, on page 46, shows the result of leaving the temporary teeth in too long. All the second teeth are apt to come out of place if left to themselves. Therefore you see it is very important to consult a dentist often.

No 9.

CHAPTER XIV.

Defects of the Palative Organs.

One of the most distressing deformities to which the human frame is liable is found in a defective condition of the palative organs. This is known to surgeons as cleft palate.

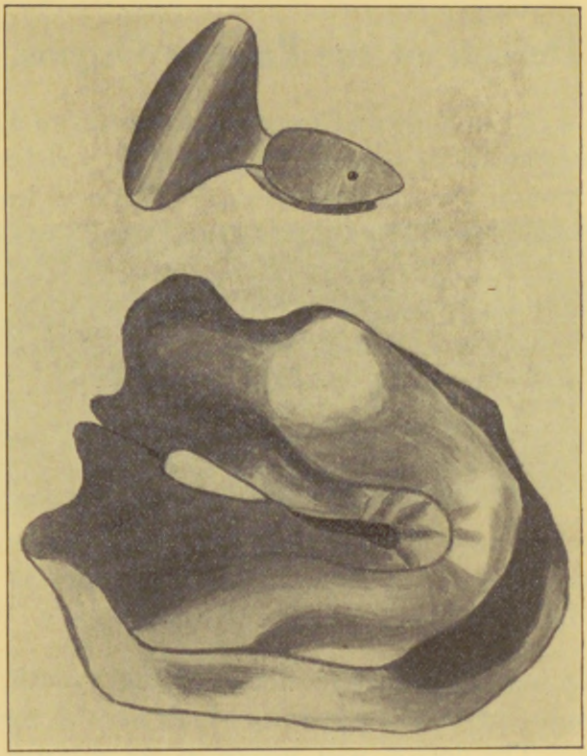
The unfortunate sufferer is compelled, in a large measure, to be an alien among his fellowmen and an object of compassion to the considerate.

Cut No. 10, on page 48, shows a cleft palate, with the device for its treatment.

A child may have this defect, but it cannot be known until he begins to talk. The voice is hollow and the child is not able to sound *h* or *s*.

The harelip is another defect of the mouth. It is a splitting of the upper lip which may be seen at birth. The doctor will notice it, as a rule, and will give you information in regard to treament.

The cause of these defects is really unknown, but they can be helped by the surgeons and dentists.



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