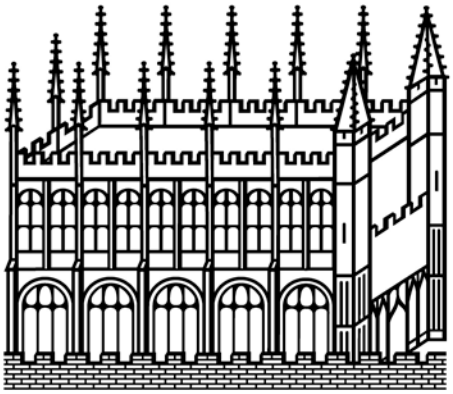

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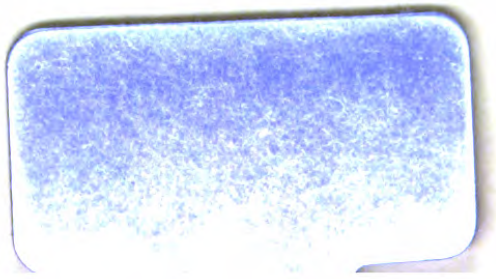

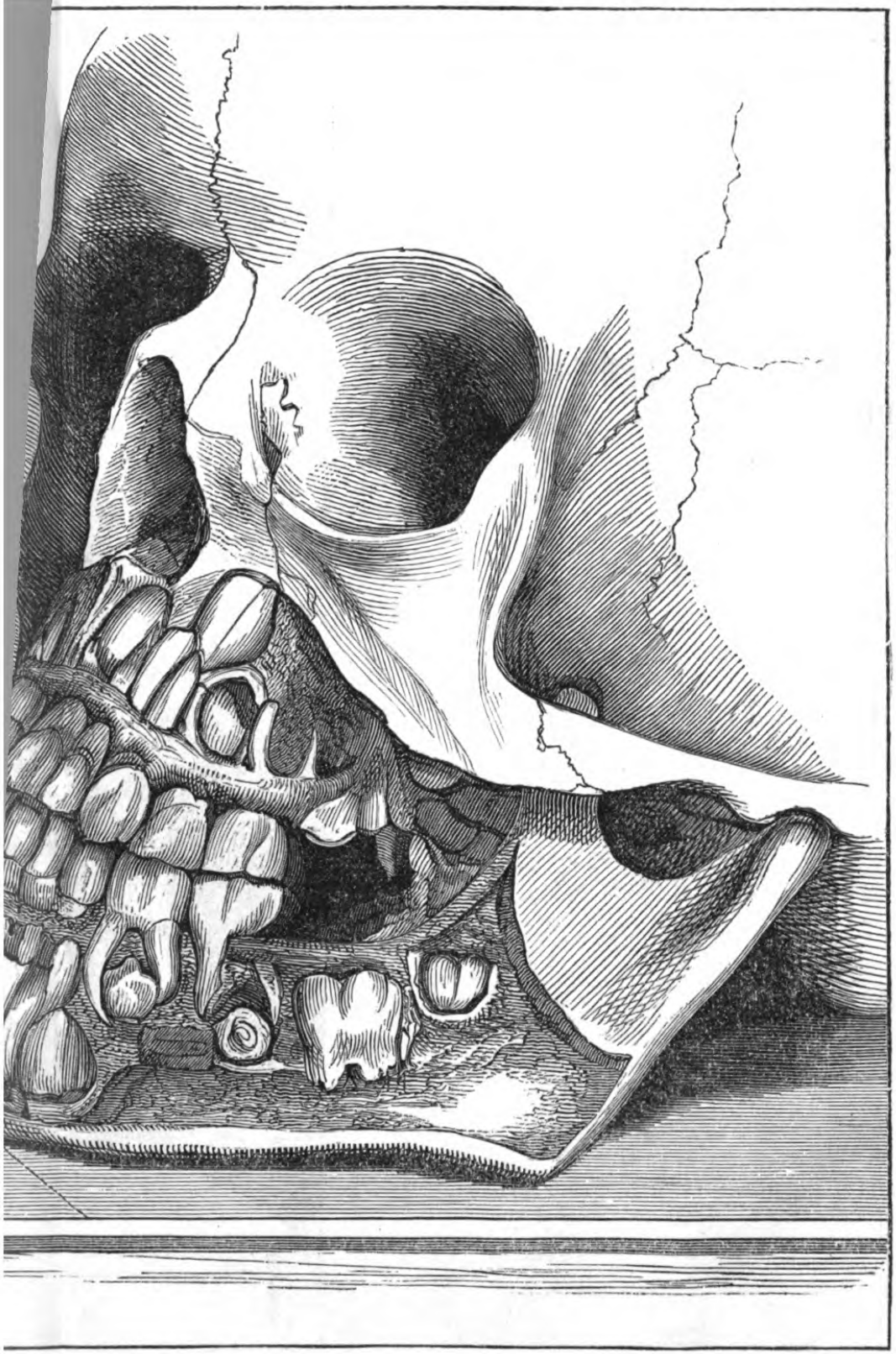

OF THE DISSECTED JAWS OF A CHILD FIVE YEARS OF AGE,

From a Preparation in the possession of the Author.

Title.)

ADVICE ON THE MANAGEMENT

OF THE

TEETH;

WITH

PRACTICAL OBSERVATIONS ON THE DISEASE

COMMONLY CALLED

CARIES OR DECAY,

AND

HINTS FOR ITS PREVENTION AND CURE.

BY RICHARD WHITE,

SURGEON-DENTIST, NORWICH.

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CHARLES SLOMAN, YARMOUTH.

1844.

TO

ARTHUR TAWKE, M.D. OXON.

This little Work

IS MOST RESPECTFULLY

AND GRATEFULLY

INSCRIBED.

PREFACE.

THE AUTHOR, for some time past, having thought a work on the MANAGEMENT OF THE TEETH would not be unacceptable to the reading *Public*, has devoted his leisure moments to the production of the following pages. He does not flatter himself that they are free from faults; but he feels sure that the *system* he advocates is based upon a solid foundation.

In writing thus *expressly* for the PUBLIC, he has clothed his ideas in language adapted to the mass of general readers, avoiding all technicalities, and thinking with the poet—

> "Expression is the dress of thought, and still
> Appears more decent, as more suitable."

From the strongest conviction of its utility, he has recommended an early attention to

the state of the mouth and organs connected with it, as well to *prevent* disease as to *arrest* it in its course.

He has been induced to quote liberally from other authors, that the public may see the general system of practice recommended by him is not a wild chimera of his own,—feeling that the opinion of many individuals would be considered of greater weight than the solitary remarks of so humble a professor as himself.

He regrets the subject has not been taken up by abler hands, and for the imperfect manner in which he has executed his task, he must claim the lenity of an indulgent public. A few persons benefitted by its perusal, will amply repay him for the time spent in its composition.

St. Giles' Street, Norwich,
March 25th, 1844

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PART I.

GENERAL VIEW

OF THE NUMBER, ARRANGEMENT, STRUCTURE, COMPOSITION OF THE TEETH, ETC.

"When man was fashioned by the Power Supreme,
Strange and mysterious as the fact may seem,
And cause of wonder; to his frame was given
Peculiar structure by the hand of heaven:—
Imperious laws distinctively his own,
To other animated forms unknown."

BROWN'S *Dentologia.*

THE teeth in the human subject are distinct organs, of a bony structure, attached to the jaw bones for the purpose of dividing and masticating the food previous to its introduction into the stomach for digestion.

Each tooth is composed of a crown and fang or fangs;—the crown performs all the offices of mastication; the fang serves to attach the tooth to the jaw bone by being inserted into the alveolar cavity or socket.

The teeth are of various sizes and shapes, and all are beautifully adapted to the several offices they have to perform.

There are two distinct substances that enter into the composition of the teeth—*bone* and *enamel;* the bone is organized, the enamel is generally considered not so; but upon this subject the most eminent dental physiologists are at issue. The greater portion of the tooth consists of bone; the enamel forms only a thin layer upon the surface of the body of the tooth.

The bony portion of the tooth is composed of cartilage and earthy salts. When kept dry and free from acid matters, the teeth are very indestructible; so much so, that they have often been found in ancient places of sepulture quite perfect after every other portion of the body had been destroyed.

There is a cavity in the interior of every tooth, corresponding in shape to the tooth itself, filled with a pulpy substance which forms a bed for the nerves and vessels that ramify its bony structure, and they enter it by a minute canal or canals at the extremity of each fang or fangs.

The *enamel* of the teeth is principally com-

posed of the phosphate and carbonate of lime. The *bone* has the same salts in its composition in nearly the same proportions, but with the addition of gelatine and water.

The bone composing the teeth was once supposed destitute of all organization; but it is now generally admitted that it is supplied with nerves, blood-vessels, and absorbents, although from the density of its structure its organization is inferior to that of other bones.

The cavity of a tooth is lined by a highly nervous and vascular membrane, and the fang is covered by the periosteum, both of which are intimately connected with its bony structure.

In the adult, the total number of teeth is thirty-two—sixteen in each jaw; still this is subject to great variation, owing to the last grinder, or wisdom tooth (as it is commonly termed) being deficient. There are four classes of teeth, namely—*incisores*, or the front teeth; *cuspidati*, or the canine teeth; *bicuspides*, or the small grinders; and *molares*, or the large grinders. In each jaw, four *incisores*, two *cuspidati*, four *bicuspides*, and six *molares*.

The *incisores* are situated in the front of the jaws, and, as their name implies, are intended

for the cutting or incising of the food. The *cuspidati* are placed next to the incisores. "The uses of the cuspidati," says Mr. John Hunter, "seem to be, to lay hold of substances, perhaps even living animals;" but this appears rather a far-fetched application of their uses. Mr. Thomas Bell says (which is a much more rational view) he "considers them as intended for the purpose of tearing such portions of the food as are too hard to be readily divided by the incisors." The *bicuspides* appear to a certain extent to assist in mastication, or rather to tear rough substances preparatory to their more perfect trituration by the *molares*.

In the form and arrangement of the teeth, we observe how admirably they are adapted for the various duties allotted to them,—whether we consider them as ornaments to the human countenance, or as organs provided to perform an important function. Mr. Thomas Bell, in his admirable work on the Teeth, in making physiological observations on the natural food of man, says:—

"The endowment of reason, that greatest, best gift of the Creator, appears, if we consider the perfection of human organization, to be particularly, and in its highest degree, even

exclusively, adapted to the conformation and requirements of man.

"This high and divine endowment should never be lost sight of in our reasonings on the human structure, and the physiology and habits of our species; as it is only with the allowances and modifications, which the possession of a quality so infinitely higher than the instinct of other animals necessarily supposes, that the actual habits of man can be viewed as compatible with his organization. Although these habits,—now essentially arising from, and combined with, a state of civilization, which, in a greater or less degree, must be allowed to exist in every known tribe of our species,—cannot be considered, in any one instance, as actually and exclusively *natural;* yet we may be led, by a careful examination of the structure of the different organs, and by an analogical comparison of them as they exist in man, with the same organs in those animals which most nearly resemble him in structure, but which are still found in a perfectly natural state, to a plausible supposition, at least, of what were originally his natural habits; and which would have still continued so, but for those changes which

have arisen from the possession of this very endowment.

"With this view of the subject, it is not, I think, going too far to say that every fact connected with the human organization goes to prove that man was originally formed a frugivorous animal, and therefore, probably, tropical, or nearly so, with regard to his geographical situation.

"This opinion is principally derived from the formation of his teeth and digestive organs, as well as from the character of his skin, and the general structure of his limbs. It is not my intention now to go further into the discussion of this subject, than to observe, if analogy be allowed to have any weight in the argument, it is wholly on that side of the question which I have just taken. Those animals, whose teeth and digestive apparatus most nearly resemble our own, namely, the apes and monkeys, are undoubtedly frugivorous; but as from their organization, they are necessarily tropical animals, and without the gift of reason, by which they might have overcome the difference of temperature by artificial means, they remain still restricted to their original food, and confined to the very limited climate

to which their structure peculiarly adapted them.

"The reasoning powers of man, on the contrary, have enabled him to set climate at defiance, and have rendered him, in all cases, more or less an artificial being. No longer restrained within that range of temperature to which the delicacy of his frame, no less than the nature of his original nutriment would have confined him, he becomes the denizen of every climate and the lord of terrestrial creation."

FIRST DENTITION,

OR THE IRRUPTION OF THE DECIDUOUS OR MILK TEETH.

No precise time can be named when the temporary teeth will make their appearance through the gums. Sometimes they are cut as early as the third or fourth month, but more generally between the sixth and tenth. These teeth are twenty in number,—ten in each jaw,—four *incisors*, two *canines*, and four *molars*. The two *central incisors* of the lower

jaw are those first cut; these are followed by the corresponding teeth in the upper jaw; the next are the *lateral incisors;* then the *anterior molars:*—they are succeeded by the *canines;* and the first dentition is completed from between the eighteenth to the thirty-sixth month by the irruption of the four *posterior molars.* The temporary teeth are much smaller than the permanent ones, and are of a less firm and solid texture; consequently, very subject to disease.

The irritation occasioned by cutting the first teeth varies in different cases. Sometimes the pain, if any, is passed over unheeded; at other times it is of the most violent nature, frequently causing convulsions and derangement of the whole system. Fevers and irruptions over various parts of the body are no unusual attendants. The latter should not be checked, but allowed to take their course, as nature is trying to throw off the extra excitement which has arisen in the system at this period. The *irritation in the gums* should be reduced by properly lancing them; which operation seldom fails of producing immediate relief. This remedial means (of no trifling importance) should not be neglected from day to day, but

had immediate recourse to. Mothers, though, in their over-fondness for their offspring, frequently object to the use of the lancet, little dreaming of the injury that is then being occasioned to the future state of the jaw, as regards the perfect formation of the *second set of teeth*, which at that period is in progress.* As a general rule, to preserve the teeth, all unnecessary irritation should be reduced as soon as it is occasioned. When this is acted up to, there is but little doubt that the teeth may be preserved many years; for the God of nature, who is ever wise and bountiful, never intended that the human teeth should have been of a less perfect character than the like organs in the rest of animated nature.

The irruption of the first set of teeth being completed, but little requires to be done by the dentist for the next three years. If caries should attack them early, and toothache follow, it will be advisable to resort to a palliative mode of treatment, never having recourse to extraction unless it should be found, from the pain and extensive inflammation, that there is fear of the permanent teeth suffering from an

* See my remarks on the "Causes of Caries."

imperfection in their formation, occasioned by the derangement in the jaw brought on by the pain. If leeches be applied to the gum in the vicinity of the diseased tooth sufficiently early, they will afford relief and prevent any bad result. It is sometimes very difficult to prevail upon children to have a leech in the mouth; but when it is practicable, it should always be tried before anything else is done.

From the age of two years, children should have their mouths washed out, and their teeth cleaned with a very soft small brush, night and morning. The water should be tepid. The following Tooth Powder may be used, if water alone is not found sufficient to keep the teeth clean.

Take of—Prepared Chalk,
Calcined Magnesia, each half an ounce.
Mix for a Dentifrice.

At the age of five years, the child should be taught to use the brush himself, under the inspection of an attendant; and if the teeth have not been properly cleaned, this attendant should afterwards brush them, in the inside as well as on the outside. But few children will be able to accomplish the operation satisfactorily at that age without assistance; still

it is advisable to make them attempt it, for by so doing, in future years it becomes a habit they would not willingly neglect.

If at the age of four or five years any of the teeth should be so decayed that pieces of food or other extraneous bodies get in and find a lodgment there, thus decomposing them and rendering the mouth unpleasant, it is advisable to have recourse to some temporary stopping, which will generally ward off the toothache until the first teeth are shed, which is always desirable.

SECOND DENTITION,

OR THE SHEDDING OF THE DECIDUOUS TEETH AND THE CUTTING OF THE PERMANENT TEETH.

None of the first teeth should *ever* be extracted, unless from certain causes you are *compelled* to have recourse to that measure. At the age of six the mouth should be inspected by the dentist, as at that period the permanent teeth are about making their appearance.

Sometimes the first four grinders are cut as

early as the fifth year: *they* rarely require the interference of the dentist, as the jaw has always elongated to make room for them behind the other teeth at the posterior part of the mouth. With the central incisor teeth the case is very different: their progress should be closely watched, and with them *frequent* interference is required.

At the time appointed for their protrusion through the gums, the fangs of the first teeth occupying the front part of the mouth, sometimes are not at all absorbed, or but partially; so that their attachment to the jaw is too great to admit of the permanent teeth pushing them out of their places; they keep their position, and the permanent teeth (if the case is neglected) are compelled to make their appearance either before or behind the others. This is a case always requiring the attention of the dentist, and he should know when to assist nature and when to leave her to her own powers. More harm has been done to the permanent teeth by extracting the temporary ones, when such was not required, than by leaving nature to herself.

Bell, in his work on the Teeth, when treating of irregularity, relates the following case

which came under his notice; and that is but *one* of *the many* occurring with a too unprincipled race of practitioners, ignorant of the management of the teeth, but too fond of the "fee" which they are enabled to pocket after the operation is over.

"A fine healthy boy about seven years of age, whose maxillary arch was ample and well formed, with every appearance of sufficient room for the permanent teeth, was taken to a dentist to have his mouth examined. This person, without a moment's hesitation, and without informing the parent of his intention, placed the child's head under his arm, and instantly removed, with great dexterity, eight teeth, *all of which were firm*, nor was there any appearance of an irregular arrangement in the approach of the permanent ones. It was indeed some months before any of the latter made their appearance, by which time the remaining temporary ones on each side had approached each other, and contracted the space between them. The consequence was, that the teeth were, ultimately, so irregular from want of room, as to require the loss of four of the permanent ones, viz. the first bicuspis on each side, both in the upper and

lower jaw, to allow of their acquiring their proper and regular situation. It is to be remarked, that the other children of the same family, and they all greatly resembled each other, were not subjected to similar treatment, but nature was suffered to proceed in her own way, with very little assistance; and in no one of them is there the slightest irregularity."

This state of things has been brought about from the exorbitant charges of the more successful and better-informed dentists, which deter many from consulting them in "children's cases"—of all cases the most important, and requiring the thought of a reflective mind; for no two cases will require precisely the same treatment. Another class of practitioners have arisen, who are not content with their own peculiar department—that of *making* artificial teeth, as workmen to the regular educated dentist—but they must embrace also the surgical department, for which their minds or education never intended them: performing *operations* (?) and giving their *advice* (?) at the same rate at which they had been accustomed to "repair a brooch" or "set a pin."

Mr. Snell, an eminent dentist, in a work which he published in 1832, justly observes—

"It is to be hoped, that in time, patients will be able to discover that educated men are successful in a far greater number of instances than even the most fortunate of advertising empirics. But it is an old complaint, and unhappily, though old, not an obsolete one, that ignorant pretension, especially when wrapped in mystery, is more attractive to the million than modest ability. It is consoling, however, to the respectable practitioner to know, that while empirical trickery may confer an evanescent fame, sound scientific acquirement is the only basis on which can be founded a reputation solid, progressive, and enduring."

During the period the deciduous teeth are being shed, the mouth should be looked at by the family dentist every three months at least, and in some urgent cases every month; although, perhaps, operations may not be performed more than three or four times during the period of second dentition.

Upon examining the dissected jaws* of a child five years old, they will appear crowded with teeth; for beside the first set, which are through the gums, the whole of the second,

* See frontispiece.

with the exception of the four wisdom teeth, are forming, making altogether forty-eight teeth. Now the jaws of a child at five or six are much more contracted than they become in after years, so that these teeth are found beautifully packed one above another, in order to occupy the least possible space,—the permanent teeth being generally placed somewhat behind the temporary ones during their progress; in which situation they frequently make their appearance through the gums, if neglected, and are occasionally the source of considerable trouble to bring into a regular position by various mechanical means.

The precise period at which the temporary teeth are shed, to make way for the permanent ones, varies in different individuals; the state of the health, the forwardness of the child, and other causes, tending so much to alter it. The usual age perhaps is six or seven, although I have known it as early as five.

It will perhaps be advisable to give the average ages at which I have observed the change to take place; and upon comparing my notes with the statements of Mr. Bell, I find they pretty well agree. The teeth of the lower jaw are here indicated, and they usually precede

the upper teeth of the same classes by about two or three months.

The first molars ..... 6½ years
Central incisors ..... 7 ,,
Lateral incisors ..... 8 ,,
First bicuspids ..... 9 ,,
Second bicuspids .... 10 ,,
Canine .... 11 and 12 years
Second molars ..... 12 and 13 ,,
Third molars (or wisdom teeth), 17 to 25, and in some few instances 30.

In nine cases out of ten, if the mouth of a person is regularly seen by a dentist (who has paid attention to the prevention and treatment of irregularity) during these years, no "gold bars" or other mechanical contrivances will be required to insure a regular set of teeth.

PART II.

IRREGULARITY OF THE TEETH—ITS PREVENTION AND CORRECTION.

It would be useless for me, in a work like the present, to describe the surgical treatment necessary to prevent irregularity, or the mechanical means to be adopted to correct it when existing. Suffice it for me to say that it may, by means in the power of the dentist, not only be *prevented*, but *corrected*, in almost every case that presents itself from the age of twelve to thirty.

Mr. Robinson, the editor of "The British Quarterly Journal of Dental Surgery," * relates the case of a barrister, in his twenty-eighth year, whose professional calling was so

* Since writing the above, to the disgrace of the British dentists this valuable publication has been discontinued; the proprietors having suffered severe losses, by not receiving as subscribers the ignorant "*legion*" for whose improvement it was intended.

much injured by the imperfect state of his articulation, occasioned by an irregularity in the dental arch, that he was induced to apply for assistance, requesting Mr. R. to extract the irregular teeth and supply artificial ones, which Mr. R. objected to, until he had tried the necessary means to rectify the deformity. By wearing a thin plate of sea-horse bone for three months, which was not attended with the slightest inconvenience, the teeth were brought into their proper position, in which they have remained for more than twelve months, and will most undoubtedly continue so until the period when nature has appointed they should be shed.

Before this case was attempted, the age of twenty-one was generally considered the latest period at which any remedial means might be adopted with success.

SCALING THE TEETH.

We are now to suppose the whole of the permanent teeth through the gums, well arranged in their position, and free from caries.

It next becomes a matter of importance to consider how to keep them so: there are means, plain and easy in their application, that will tend, as far as human power can, to preserve them.

About every twelve months they should be examined by the dentist, and freed from the salivary calculus (or tartar) which, in some mouths, forms to a considerable extent, and cannot by means of brushing be kept under. Not that the tartar that usually accumulates upon the teeth will decay them; but from the irritation that is set up in the gums, from their abhorrence of its proximity, diseases are frequently engendered in the membrane lining the alveolar cavities, as well as that upon the fangs of the teeth, which very often ends in the suppuration of this membrane (the periosteum), the gums and alveolar processes; so that the teeth after a short time drop out of the mouth one by one, and, to their owner's surprise, apparently quite sound.

There is amongst many persons a prejudice against scaling the teeth, from a fear that the enamel is injured by the process. This is without grounds; for if proper instruments are used with caution, the teeth do not expe-

rience the slightest injury from the operation, but, on the other hand, great benefit.

Lord Byron, who perhaps paid greater attention to his teeth than any other person of his day, made it a rule to have them scaled and examined every year.

It has been the custom of some dentists, ignorant alike of the composition of the teeth and of the laws of chemistry, to apply an acid to those organs, in order to remove the tartar with greater facility; which process not only took off the tartar, but played havoc with the enamel, destroying that quite as fast,— thereby denuding the bone, and rendering it sensitive and easily affected by every change of temperature, proved by introducing any thing very hot or cold into the mouth. The teeth were made to look beautifully white, and well they might, for a coating of the enamel was gone, which had stood the action of various aliments upon it for many years.

The teeth, both the enamelled and the bony portion (as I have in the former part of this treatise observed,) are formed of nearly neutral salts, having lime for their basis, which is readily acted upon by all acids, — they should consequently be taken into the mouth

with great caution, even when administered as medicines or used in the form of gargles; in fact, a glass tube should always be used, so that the fluid reaches the back part of the mouth without touching the teeth. All are aware of the sensation that is produced upon the teeth after taking an acid medicine, even when it is greatly diluted;—they appear to become rough, and softer than usual. This is nothing more nor less than the outer surface of the enamel dissolved by it; and although the layer so destroyed is very thin, yet it is sufficient to become perceptible, and, if the practice be continued, it will soon destroy the body of the tooth; for proof of which, I would refer my readers to those persons who have taken a long course of acid medicines without proper caution, and they will find very many of their teeth are gone or diseased.

After an acid medicine has been taken, or an acid gargle used, the mouth should be rinsed with water containing a small quantity of the carbonate of soda dissolved in it, which will immediately neutralize the effects of the acid. No *tooth powder* that has the *least* particle of an acid in its composition, should ever be used upon the teeth, although

many of the dentifrices puffed off as rendering them perfectly white, contain some as the active principle.

Salivary calculus, (or tartar), is a deposit from the saliva, and whatever tends to increase the secretion of this fluid, adds to the accumulation of that calcareous substance upon the teeth. It is much more abundantly formed in some mouths than others, and appears to depend upon constitutional causes for its production. The teeth that the tartar generally first finds a lodgment upon, are those in the immediate vicinity of the salivary glands, which are the incisors of the lower jaw, the sub-lingual ducts being placed (as their name signifies) under the tongue, just behind these teeth; and the exterior surfaces of the molar teeth of the upper jaw, the parotid glands discharging their contents upon them. Whilst under the influence of mercury, these glands are particularly active, and the flow of saliva is increased to an enormous extent.

Scaling the teeth is an operation seldom attended with any pain; and when we consider the comfort derived from having the teeth clean and the breath free from all fœtid taint (which the deposition of this substance always

occasions,) no one, paying any regard to their own cleanliness or the feelings of those with whom they are brought in contact, we should naturally suppose, would for one moment object to its removal. The earthy matter of the salivary calculus combines with the mucus of the mouth during its deposition, which, from a diseased condition, is frequently of a fœtid nature, finds a lodgment upon the teeth, and from putrid decomposition becomes highly offensive. Mr. Thomas Bell, in his treatise on the Teeth, justly remarks—"When the disgusting effects of its accumulation are considered, it would appear impossible that any persuasion could be necessary to induce persons to obviate so great a nuisance, even on their own account; or if they are too debased to procure their own comfort and cleanliness at the expense of a very little care and trouble, they surely have no right to shock the senses of others, who possess more delicacy and propriety of feeling than themselves."

PART III.

THE SYMPTOMS OF CARIES,

OR DECAY OF THE TEETH.

Of all the diseases to which the teeth are liable, that of caries is the most common, and one that causes the greatest destruction to those organs if not early attended to,—it is so insidious and rapid in its attacks, that the most beautiful teeth, one after another in the quickest succession, give way to its destructive progress, until whole sets are destroyed; whilst perhaps the unfortunate sufferers were scarcely aware that any had been long diseased. It is a disease the *early* symptoms of which are difficult to be detected by an inexperienced eye. The first warning that the subject of its attack has of its approach, is an extreme sensitiveness in the body of the tooth, when anything either much above or below the temperature of the body is taken into the mouth. If no further notice is taken

of this warning, in a short time, particularly during the prevalence of easterly winds, a nervous twinge is felt, showing that the highly nervous membrane lining the internal cavity of the tooth has not its original protection against the action of external agents. This state of things may continue a short time, but certainly not long; after which the membrane becomes inflamed, and then is experienced the acute pain of toothache. When the disease has proceeded thus far, the person seldom troubles himself to examine the state of the rest of the teeth, — if the pain continues a short time, he either sends for some one who is considered an easy extractor of teeth, or he pays him a visit: the operation over and the pain gone, no more is thought of the remainder, and in all probability (as is too frequently the case) the operator does not see the necessity for examining them.

Many surgeons, however talented they may be in their profession, will candidly confess they know nothing about the diseases to which the teeth are subject, or the treatment necessary for their cure. Thus the rest of the teeth, many of which in all probability were in incipient stages of decay, are left to

their fate, and remain unthought of until a few months more, when the same warning of toothache follows, and another like operation is resorted to. This may be repeated year after year until many valuable teeth are sacrificed, and perhaps at last the person is induced to pay some one a visit who devotes his time and thoughts to this particular branch of surgery; and then he is made acquainted with the fact, that in all probability the whole of the teeth he has lost might have been saved, if a judicious mode of treatment had been pursued with them in proper time.

Sometimes, though rarely, caries is not followed by pain; and Mr. Thomas Bell justly remarks, that "In some cases it happens that the teeth become so gradually decayed, that instead of the membrane being soon exposed, and toothache consequently produced, it becomes absorbed before the decay reaches the cavity, and the tooth breaks away without ever having occasioned pain. This peculiarity appears to depend upon some cause connected with the original structure of the teeth, as I have often known an individual lose a great number of teeth in this way, without ever having suffered toothache."

Caries, in the *incisors* or *front teeth,* usually first shows itself by a light brown or darkish spot under the enamel upon their sides of contact, and generally about midway between their cutting edges and the gum; the darkness increases from month to month, and a larger quantity of the enamel at last gives way, affording a more ready access to the fluids of the mouth, which assist very materially in bringing on the decomposition of the bony substance. If the enamel be removed from over the small dark spot, the bone underneath will exhibit a dark brown, black, or whitish appearance, regulated by the density of the structure of the tooth. It almost always commences upon the exterior surface of the bony portion of the tooth, and proceeds, if not interrupted in its course, towards the centre until it reaches the internal cavity, when other diseases are set up, and the tooth generally becomes past all cure. Sometimes this disease commences upon the anterior surface of these teeth, upon a level with—a little above—or immediately under, the edge of the gum.

Caries, when it attacks these teeth upon their sides of contact, may, at its earliest

stages, be effectually stopped; but when it is allowed to continue its course, becomes the most difficult case for the dental surgeon. It also frequently attacks the *small* or *lateral front teeth* at their posterior surface, in a depression which they frequently exhibit; and this may be detected by the dark hue that pervades that part of the tooth.

The *incisors* of the *lower* jaw are rarely the subjects of decay. The *cuspids* or *canine teeth* are usually attacked upon their sides of contact, a little above the level of the gum; but sometimes upon their anterior surfaces, a little above or upon a level with the gum, the disease will show itself.

The *bicuspids* or *small grinders*, of both upper and lower jaws, are very liable to be affected by this disease; in them it is generally first discovered upon their sides of contact, and is seldom detected unless they have been subjected to a very close examination, or pain has been felt in their vicinity; from observation, a dingy hue may be discovered under the enamel, particularly upon their posterior surfaces, which will lead the dentist, who takes an interest in his profession, to separate and carefully examine them. Sometimes it

commences in the depressions upon their grinding surfaces; occasionally (though rarely) upon their anterior surfaces, upon a level with the gum.

The *molar teeth* or *grinders*, from their position, uses, and formation, are perhaps more subject to caries than any other of the teeth; for, being larger, a greater surface is exposed to the action of the fluids of the mouth. In the depressions upon their grinding surfaces, small dark spots may be observed, which from month to month go on increasing in size and depth. The disease frequently commences upon their sides of contact, and in the depressions observable on their anterior and posterior surfaces, as well as at their necks just above the gum.

The last *molars* or *wisdom teeth*, although they are not cut until between the age of eighteen and twenty-five, seldom last but a few years; in fact, they are often considerably decayed, before they have made their appearance through the gums, and their structure seldom appears perfect throughout. Mr. Thomas Bell says, "This probably arises from their being formed at a later period of life than the other teeth, when the constitu-

tion is doubtless in a less favourable state for the production of newly-formed parts than during early infancy, when the process of new formation is going on with rapidity in every part of the system."

THE CAUSES OF CARIES.

My views respecting this disease will be found somewhat novel to those entertained by most dental pathologists in our own country. One I may mention, standing first and foremost in the dental profession in England, for whom both personally and professionally I entertain the deepest respect, and who has done more than any other man towards arriving at the true causes of the diseases of the teeth, gums, and parts connected therewith, and the successful mode of practice to be adopted for their cure, has not, I think, sufficiently accounted for this disease. In these remarks I am supported by many eminent dentists in America, as well as by the views of one or two practical men in our own country. In a work like the present,

intended for public use, I feel I should be departing from my original intention were I to point out the difference that really exists in our separate views,—eventually I purpose to enter more fully into the subject, in a work more particularly intended for the profession.

Caries evidently arises from four different causes.—1st. *An imperfection in the original formation of the teeth* (or constitutional cause.) 2nd. *Lateral pressure of the teeth upon each other.* 3rd. *The accumulation of tartar.* 4th. *A peculiar state of the fluids of the mouth.*

It is those teeth that are well formed, well arranged, and are of a firm texture, that seldom decay; whilst those that are imperfectly formed, irregularly placed, and of a soft texture, decay from the most trivial causes. These considerations lead to the first division of the causes of decay, *an imperfection in the original formation of the teeth.*

The density and shape of the teeth are most undoubtedly influenced by the state in which the general system and the mouth are in, during the period of their production. The bony portion of the tooth is first deposited in a cell provided for its reception in the jaw below the temporary tooth, and the first permanent

molar is observed in process of formation at birth, which proceeds slowly, but at the age of twelve months will be found to have considerably advanced. The enamel is deposited on the exterior surface of the bone whilst the tooth is forming. The rest of the permanent teeth are formed in the same way, and by the time that the whole of the temporary teeth are through the gums, ossification will be found to have considerably advanced with the incisors, cuspids, and bicuspids of both upper and lower jaws, although the latter will not be in so forward a stage as the former. At eight years of age the whole of the permanent teeth (with the exception of the last molars or wisdom teeth) are more or less ossified; and from birth to this age we may consider the first cause of decay takes its origin.

The first permanent double teeth frequently become diseased at an early age; sometimes, when they pierce the gum, a dark hue is observed under the enamel upon their grinding surfaces, and if the spot be examined a small opening is found in the enamel, furnishing an easy ingress to the fluids of the mouth, which materially assist in decomposing the

bony portion of the tooth, which from its first formation was of an imperfect character. These teeth, as I have before observed, are being formed when the infant is at the breast, and are not completed until the sixth year. During this period many sources of irritation are set up in the infantile constitution, none of which are productive of greater injury to the second set of teeth than the irruption of the first.

There is frequently an extreme degree of irritation about the mouth during this period, which necessarily must affect the parts connected with the formation of the permanent teeth, and compel them to perform their functions improperly, the result being an imperfect tooth, composed of either too much calcareous matter and too little cartilaginous, or vice versa; and perhaps on some spots the enamel will be found quite deficient, when decomposing and acid matters act upon and corrode the imperfect bone, layer by layer, until the effects become visible and the tooth is found to be carious.

Some eminent dental pathologists in this country, have considered caries of the teeth to be in fact a mortification of the bony

substance, preceded by an inflammation; this theory is a fallacious one, and not in accordance with the present practice of dental surgery. I shall not, however, attempt to refute their arguments here, as it has already been done by one or two practical men in England; but at greater length by the most eminent dentists in America.*

The principal and direct cause of caries is the corrosive action of external agents. Among these, undoubtedly, the acid formed in the mouth by the decomposition of vegetable matter is one of the principal. In the depressions upon the grinding surfaces of the molar teeth the food finds a lodgment, and continues from day to day until the acid has formed and acted upon the enamel, which is frequently imperfect in those parts. Hereditary predisposition to decay (as it is generally called) shows itself by an imperfection

* In that country (to the disgrace of the parent state), it must be acknowledged, dental surgery is practised upon a much more respectable footing than it is here, its professors being men of education and not the mechanics of yesterday, but recognised as professional men — members of a college devoted to dental surgery, and which college has been duly chartered by Congress.

in a particular tooth or teeth, which frequently exists throughout a family, or at least through that portion in which there is a great family resemblance. Instances without number are on record, in which a particular tooth has decayed at a certain age with the father or mother, and the result has been, that the like loss has been sustained by the children throughout the whole family.

The immoderate use of mercury in early infancy, whilst the second set of teeth are forming, produces teeth of an imperfect texture, which are frequently the subjects of decay at an early age; and this fact should be borne in mind by medical men, when introducing this medicine into the system.

I do not consider that there is any chemical agent evolved in the decomposition of one tooth that would decay the adjoining one, as has been frequently supposed; but there can be no doubt that the food and other substances taken into the mouth, find a lodgment in the cavity of the diseased tooth, decompose and form an acid of a corrosive nature;—and the enamel of the adjoining tooth will frequently be found broken down from (another cause of decay to be hereafter spoken of) *lateral*

pressure, when the acid obtains admission to the bony substance and acts upon it.

It is necessary though, in the production of caries, that the corrosive fluid should not only touch the exposed bone, but remain there for some considerable time; which is proved by the fact that when the teeth are filed to prevent any unnecessary pressure, even so much that the enamel is quite cut away, they are rarely affected with caries, though they are exposed to the action of heat and cold, which are considered by some authors the most powerful exciting causes of decay.*

Lateral pressure of the teeth upon each other, is another fertile source of decay. From the age of twelve to eighteen, the jaw will be found almost too full of teeth; in fact, in some cases, from a slight malformation of the jaw, there is not sufficient room for the usual number of teeth.

The pressure of the teeth upon each other in these cases is very great, and the enamel, in all delicately-formed teeth, is compelled to give way; it is not observed, (as it occurs between the teeth upon their sides of contact,)

* Harris.

but goes on for a year or two, when they change colour and are found in a rapid state of decay. Here, as in the other cases, the corrosive fluid readily finds an entrance and acts upon the exposed bone. The front teeth and small grinders are generally first affected, but the large grinders are not exempt.

The accumulation of Tartar. There is but one description of tartar, that I have been able to discover, possessed of a corrosive property, and this tartar is of a greenish hue, and of a somewhat greasy character; it generally attacks the front teeth, as well as the canines of the upper jaw, on their anterior surfaces close to the gum; and if it be allowed to remain long it corrodes the enamel, when it penetrates to the bone of the tooth and produces a certain, though, in some cases, a tardy species of decay.

A peculiar state of the fluids of the mouth. This is a somewhat rare disease, still in an extensive practice it is frequently met with. The fluids of the mouth appear to possess a solvent property, so that tooth after tooth is denuded of its enamel, both on the cutting and anterior surfaces. The incisors, canines, and small grinders are those first affected.

The teeth, when attacked by this disease, still retain their natural colour, and in the latter stages present the appearance of being broken, their cutting edges assuming a rough character. The teeth generally are of a very light hue, and somewhat more transparent than usual; they are sensibly affected by heat and cold, and their substance is usually of a soft texture. The patients' breath, in these cases, appears to be powerfully impregnated with an acid, and their complexions are unusually fair. Females are much more subject to it than males.

THE PREVENTION OF CARIES.

There is a description of caries that takes its origin from an early day, and, to prevent its destructive effects, recourse must be had to those means best adapted to insure such a result.

I have already observed that the irruption of the first set of teeth, is one of the principal causes of the destruction of the second. The

mouths of children whilst cutting their milk teeth are generally in a most irritable state; but the mouth is not the only portion of the system that is affected by it, for at that tender age the nervous system is so delicately sensitive, that the most distant organs are frequently sympathetically affected, and the powers of the infantile constitution are thus required in another quarter, to the injury of those parts that are in the course of formation. An imperfect deposition of both *bone* and *enamel* is the result, which, in a few years, shows itself in the early loss of the teeth.

There is generally a fever accompanying first dentition, which in some cases runs very high, so much so as to endanger the life of the little sufferers. This is regarded as the most critical period of life, and has often proved one of bereavement and sorrow.*

* "Since in childhood the first sufferings begin, in childhood also the foundation of a good or bad constitution is laid. It is at this critical time that the greatest attention should be paid to the state of the gums, to mark the protrusion of the teeth, as well as the after changes; for it is only by knowing the steps and order of their progress, that proper aid can be given to the efforts of nature, during the years of childhood."—L. S. PARMLY'S *Lectures*.

When we observe the convulsions and various diseases brought into action, we cannot be surprised at the imperfect working of the formative organs that are to produce the second teeth. The irritation of the gums is occasioned by the pressure of the milk teeth, which are trying to force their passage through them. But the gums are frequently very indurated and not easily to be perforated; when their absorption keeps pace with the growth and protrusion of the teeth, the pressure is scarcely or not at all sensible. The practice of giving children coral and other hard substances to play with, in order that they may put them into their mouths, with the idea that it will assist the teeth in making a passage through the gums, cannot, I think, be too highly censured; for instead of effecting an absorption, it only assists in hardening them, making the irruption far more difficult than it would otherwise be; it amuses the child, and for a while dries his tears, whilst it is laying fresh pain in store for him. The only means of affording any permanent relief, and of preventing future disease, is to lance the gums deeply; not merely to scratch the surface, as is most frequently done, but to make

an incision quite down to the tooth, and rather longer than the width of the tooth, so that it may easily make its escape through, which it will effect with little difficulty, for the gums, before much stretched by the pressure of the tooth, will now cause the incision to remain open until the tooth makes its appearance.

There is not the least danger in this operation, if properly performed, although parents sometimes object to it. When it is over, the almost instant relief that is afforded, is a sufficient recommendation to its being had recourse to the next time, as soon as it is required, and hundreds of children have been saved from an untimely grave by its early adoption. Whenever the gums of children look of a deep red colour, and are much inflamed, whether the pain arises from the irruption of the first teeth, or from any other cause, the only certain remedy is the lancing them, and in some urgent cases free scarification.

Preparations of mercury, which at this early age, are often freely administered, should (if the preservation of the teeth is considered,) be given with great caution, as no medicine acts

so powerfully upon the forming tooth and organs connected therewith, as this dangerous yet most useful mineral.

Another cause that affects the formation of the second set of teeth, is inflammation and intense pain, arising from exposure of the internal cavity of a first tooth, producing toothache, which takes place between the ages of four and ten years. This pain should be relieved by the reduction of the inflammation and other necessary means as soon as possible; not by the extraction of the temporary tooth, but by applying leeches to the gums, and shielding the internal cavity of the tooth, from the action of external agents and changes of temperature, by means of some temporary stopping. The offending tooth should not be extracted, if it is possible to relieve the pain without it, which in most cases may be easily done, as the jaw generally contracts when the temporary teeth are extracted too early, so that there is not sufficient room for the permanent teeth to arrange themselves regularly, when they make their appearance. This consideration should never be lost sight of by the dentist when he is requested to operate.

Prevention of caries occasioned by the pre-s sure of the permanent teeth against each other, should be attended to between the ages of twelve and eighteen; if the jaw is then found too crowded, and the teeth have assumed an irregular position, room should be made for them, either by the extraction of one or both of the last small grinders, or by passing a thin file between those that seem to press most against each other, although the enamel upon their points of contact is not yet fractured.

The necessity for children (from the age of three years and upwards) having their teeth and gums properly brushed, every morning, cannot be too strongly urged; for the gums get hardened by these means, and are not so liable to be affected by changes of temperature and things taken into the mouth. Particles of food should not be allowed to lodge between the teeth, for they readily decompose and become agents in the production of a corrosive acid.

A small quantity of the carbonate of soda, dissolved in the water used by children in cleaning their teeth, will be found very serviceable in counteracting the effects of the

acid and neutralizing its corrosive properties. The calcined magnesia, is a good dentifrice for children, as it is possessed of alkaline properties, and is not of a stimulating nature.

THE TREATMENT OF CARIES.

When this disease has once commenced its destructive ravages upon the teeth, no time should be lost in arresting its progress, as a few months' neglect may allow it to gain a footing which it will be difficult to eradicate. In the earliest stages of its existence its cure is easy and certain; but when proper remedial means are not sufficiently early resorted to, the result must be uncertain.

It will be the duty of the dentist, when examining the state of the teeth, to point out those in which there are symptoms of disease, and explain the treatment necessary to preserve them. My object in this treatise, is to familiarize the public with the subject, so that on looking at their teeth they may know when disease is visible, and the means that are required to remove it, and prevent its recurrence.

Caries from *lateral pressure*, particularly when the front teeth are affected by it, may in its earliest stages generally be removed by passing a thin file between them, — thus taking away the diseased bone. This instrument should be used with caution, or it may be the means of injuring rather than benefitting the teeth. Its improper application has brought great disrepute upon the operation; but hundreds have benefited by its use, when guided by the hand of one looking upon the teeth as organized bone. The whole of the decayed, and in fact discoloured bone, must be removed, or the operation will be of no avail, as decomposition will go on just the same as though nothing had been done.

There is perhaps no operation in dental surgery, against which a greater objection prevails amongst the public, than that of filing the teeth; still, when performed with judgment, I am convinced nothing can conduce more to the preservation of those organs than the *careful* application of the file, in thousands of cases that come under the dentist's care. Very many teeth are (when it is used *sufficiently early*) rescued from an untimely destruction, and preserved through many years;

in fact, as long as though they had never exhibited symptoms of decay.

"Filing is an operation (says Dr. John Harris, in a paper published in America during the year 1835), when skilfully performed, of great importance, in the treatment of decayed teeth; but when performed without the proper skill and judgment, as is too often the case, it cannot be too strongly censured.

"Notwithstanding the prejudices of society, and the conflicting opinions of dental authors in relation to this operation, I shall attempt to show, that its merits have been too much estimated by its abuses, and that the discriminate use of the file does not necessarily cause the teeth to decay.

"The histories of the Bramins of India, and the negroes of Abyssinia, furnish sufficient proofs to establish my last proposition. The Abyssinians are a ferocious and warlike people, and, to make themselves appear more savage, they file their teeth to points, so as to make them resemble the teeth of a saw, or those of carnivorous animals.

"It cannot be supposed from the character of these people, that either much skill or judgment is exercised in the performance of

the operation, though it no doubt requires a considerable time to remove so large a portion of the enamel and bony substance of the teeth, without producing pain. The operation with them is of ancient origin, and, notwithstanding the extent to which it is carried, we are credibly informed, that their teeth are remarkably sound, healthy and very rarely decay.

"The Bramins of India, also have long been in the habit of using the file, principally, I believe, for the separation of their teeth; but whether for the purpose of removing decay or beautifying them, I have never been able to learn, but, from the circumstance of their having good teeth, it is most likely used for the latter purpose."

If the decay should be found to extend much beyond the surface of the bone, other instruments must be used to remove it, and when a proper cavity has been made, and its parieties are composed of healthy bone, it should be plugged with gold in such a manner that it becomes impervious to the fluids of the mouth. Other substances besides gold have frequently been used for stopping carious teeth, but none are so well adapted for the purpose as this metal, because it is not subject to oxidization,

whilst most of the other metals are. *Metallic compounds,* fusible at a low temperature, have been used by many dentists; but the major part of those who have paid attention to the subject, discard them altogether and confine themselves to gold, which, although it requires much greater mechanical skill in adapting it to the various cavities, renders the teeth "stopped" so much more permanent, that they do not object to the extra time and trouble required for its application.

It will be useless for me to explain the manipulation required to complete the operation,—my object alone being to point out to those suffering from the disease, the *means* by which a permanent cure may be effected. The operation, if performed sufficiently early, is seldom attended with pain; but if deferred from month to month, and then attempted, in the majority of cases, the reverse will be the result, as many of my readers, I have no doubt, have felt, whilst undergoing it; this has been in bad cases, when the internal cavity of the tooth was exposed, and the stopping pressing upon the highly nervous internal pulp, inflammation was produced.

So imperfectly have teeth been "stopped,"

by some persons practising as dentists, that in the course of three months after the operation was performed, the stopping came out of the cavity, and the disease was found going on more rapidly than ever, which was enough to make some,* who did not thoroughly understand the nature of the operation, doubt its efficacy altogether.

No rule can exist without an exception; but in this operation, if sufficient care is taken, the exceptions are very rare; and I can with the greatest confidence state, that nine cases out of ten, if properly attended to, will be found to answer most successfully; at least, such has hitherto been the case in my own practice.

When the carious cavity of a tooth is so tender that it will not bear the pressure of the gold, no one should attempt to stop it until all sensitiveness has been destroyed. Should the membrane lining the internal cavity of a

* I once heard a surgeon question the benefits arising from it, he having only seen teeth stopped with this fusible deleterious compound. However, after I pointed out the manipulation required to "stop" teeth successfully, and stated cases to him where from six to ten teeth were saved in one mouth, for twenty years after they had been "stopped" with gold, he became as great an advocate for the practice as he had previously been an enemy to it.

tooth be exposed and become inflamed, or if the inflammation has terminated in suppuration, this membrane must first be effectually removed; which desideratum the author has lately been able to accomplish in many cases when the teeth have been condemned to extraction. The operation is of a simple character, and seldom attended with any pain. After the membrane is gone, the tooth will not be productive of future pain, and the stopping may be successfully introduced into the cavity, rendering the tooth again serviceable.

The "Succedaneum" of puffing notoriety has been much used upon a too credulous public, in every case where a cavity was found in a tooth; and sometimes even laid upon stumps. This kind of practice has brought "stopping" teeth into disrepute; for, in ten cases out of twelve, an amalgam of mercury and silver oxidizes and crumbles away, so that in five or six years, even in the best of cases, and frequently before three months, the cavity is again empty, and the disease as destructive as ever.

It is the practice of some dentists who have not paid much attention to the general principles of surgery, and who are ignorant of

the pathology of the teeth, to extract a tooth for a patient which has been the cause of much pain; and whilst the gums and parts connected with the teeth are in an irritable and inflamed state, to stop some other teeth in the mouth, (immediately after, in the vicinity of the one extracted,) in which symptoms of decay are visible. This practice is decidedly wrong: sometimes it may answer, but frequently there is that sensitiveness about all the teeth in both jaws, that the treatment is unsuccessful, and the operation suffers in repute. It is a much more scientific, and far better mode of practice to wait a day or two, until all irritation has subsided, and the mouth has resumed its wonted quiet, before the others are attended to.

No tooth should ever upon any consideration be stopped until the carious cavity has been properly excavated; it is not sufficient to make an opening just to receive the stopping, but the *whole* of the decayed bone must be removed, and if this precaution be not taken, the decay goes on just the same as ever. The author has known teeth that have been stopped ten, twenty, thirty, and even forty years, and yet to remain perfectly sound.

This must be acknowledged some little proof of the advantages accruing from the operation; but in all these cases gold was the stopping used; and so convinced is he of the fallacy of attempting it with succedaneums, mineral pastes, and the like, that he has long since discontinued using them, confining himself entirely to gold and platina; but of the two he considers gold by far the best metal, and would like to see all dental operators confine themselves to its use, whenever the cases will admit of its application. Platina, from its proximity to the colour of the enamel, is sometimes preferable for the front teeth; yet even with them gold may generally be used.

Teeth may be stopped in any part where decay shows itself; whether it is upon their sides of contact, their posterior, anterior, or grinding surfaces; the same manipulation being required, with trifling variations.

Caries, from an accumulation of tartar, may be arrested in its first stages by removing the corrosive matter, and keeping the parts acted upon very clean, by means of some cretaceous tooth powder applied with a brush. Sometimes filing is required, though not often;

and stopping is rarely had recourse to in these cases, as the diseased surface is much too large to be benefited by it.

The disease of the teeth, engendered by a corrosive, or rather peculiar solvent property possessed by the fluids of the mouth, can seldom (or, I might perhaps say, never) be benefited; the only remedial means that can be recommended by the dentist, is to use some alkaline tooth powder (magnesia with carbonate of soda), and to administer alkaline medicines internally, as the stomach is generally loaded with acidified matter, showing itself in the various acid eructations so prevalent throughout this disease. In these cases the physician's aid must be called in, as the disease generally arises from constitutional causes.

PART IV.

TOOTHACHE.

THE toothache is a pain but comparatively few persons escape through life, and in every succeeding age the teeth become more liable to it from their imperfect formation, which now puts on an hereditary character. It is a pain, the causes of which have not been much attended to, either by persons practising as dentists, or by the medical profession; but it is now proved by those who have directed their thoughts to the subject, that it may be relieved, in almost every case, if proper remedies are resorted to. The usual way of treating it, has been to put something of a hot or stimulating nature into the cavity of the tooth, which for a few moments increased the pain, but afterwards somewhat relieved it —upon the homœopathic system, ("*similia similibus curantur*,") very effective when nature herself is sufficiently strong to throw

off the disease. The treatment of toothache should always be in strict accordance with every principle of medicine and surgery, and not of an empirical nature, as it generally is. The disease evidently arises from several causes, many of which require different modes of treatment.

When the membrane lining the internal cavity of a tooth has been inflamed, causing the toothache, and the pain has abated, the inflammation has generally ended in suppuration, and there is a fœtid discharge from the cavity, which sometimes renders the mouth unpleasant, and the breath positively offensive. The suppuration frequently continues for a long time, and occasionally until the whole membrane is destroyed. No tooth can ever be permanently stopped whilst this disease is going on, although the operation is frequently attempted by those ignorant of the diseases of the teeth. Of course, if the aperture required for the escape of the pus is stopped up, an accumulation must take place, and then a heavy dull aching and continued pain is felt in the tooth, and sometimes along the whole jaw. The pain is different from toothache in the first stages, but after a time

the cavity is so filled with the pus, (which is pressing on all sides to find an opening to escape,) that it then becomes intense—far more severe than common toothache. The only remedy is to remove the stopping or the tooth, either of which operations will generally afford immediate relief. As the tooth will continue to be a source of occasional pain whilst the membrane and nerves exist; if it be not extracted, the membrane and nerves should be destroyed.

Should any inflammation have been produced in the gum around this tooth and the adjoining ones; to prevent further injury to the rest of the teeth, leeches should be applied to the inflamed parts, and all irritation will speedily subside.

THE EXTRACTION OF TEETH — WHEN THE OPERATION IS NECESSARY.

When a tooth becomes so far decayed that the internal cavity is exposed and the crown fractured, there is but little chance of its being stopped and rendered again serviceable; should it therefore be a source of pain, it is

far better to have it extracted than to allow it to go on aching from day to day, producing an inflammation in the gum, which frequently extends to the sockets of the neighbouring teeth, materially affecting their connection with the jaw.

The pain of extraction is increased when the gum is much inflamed, for the parts connected with the articulation of the tooth are rendered much more sensitive by continued irritation. There is not now that objection to the extraction of a tooth there was some few years since:—

> "Pain flies its presence; anguish wipes her tear;
> To hope's fond vision rainbow-hues appear."

Cartwright deserves our thanks for introducing more generally the "forceps," and setting aside the "key" instrument, which had been, and still is, to the disgrace of many dentists, the instrument of their choice. I feel convinced, however, the day is not far off when all will see that the "forceps" are the instruments pointed out by every principle of mechanics and by strict surgical views, as the proper instruments for extracting teeth with the least pain.

I cannot compare the action of the "key"

upon a tooth and the alveolar processes, to anything else, in familiar language, than to the act of drawing a nail out of a piece of wood with a hammer; for there is the same pressure, and in precisely the same proportion (calculating the relative tenacity of each), upon the jaw with the "key" instrument, as there is upon the wood with the hammer.

The action of the "forceps" is the same as extracting a nail with a pair of pincers: here the pressure is perpendicular and there is no pressure upon the wood; and the absence of pressure upon the alveolar processes is what is wanted when operating upon the jaw.

Cartwright might well establish a reputation for extracting teeth with comparatively so little pain, whilst the rest of operators were using a different instrument, based upon a false principle. He has obtained a well-deserved "name," which he will ever retain whilst connected with the profession; but there are many dental operators now who can use the "forceps" with great dexterity. The "forceps" undoubtedly require much greater practice than the "key" instrument does, before the operator can use them with proper confidence.

OBSERVATIONS ON THE STATE OF THE GUMS AT THE AGES OF FORTY AND FIFTY.

"Now black, now deep, the night begins to fall
A shade immense."

At the age of forty or fifty, a change frequently takes place in the teeth and their connection with the jaw,—many diseases are set up when those organs have been neglected, and sometimes when the greatest care has been taken with them, as regards cleaning, and having them regularly attended to.

Free living and the debaucheries of early days now show themselves upon the gums and the sockets containing the teeth; and at this age the mouth frequently wants more attending to than it did in early life, if it is wished to preserve the teeth to the longest possible period.

The hue of the gums is changed from the natural colour to that of a dark purple; their vessels look distended; they recede from the necks of the teeth, become very sensitive to the touch, and frequently bleed when brushed; the teeth appear to get longer, and their attachment to their sockets is evidently not so firm as formerly. Sometimes a small quantity

of pus may readily be pressed out from under their edges around the necks of the teeth—they feel hot, tender, and irritable—frequently exhale a fœtid odour—and all variations of temperature are more acutely felt than formerly.

The teeth seldom decay after this age, and their loss is almost always occasioned by disease in the gums or the alveolar processes, (the bony sockets by which the teeth are connected with the jaw). It is desirable to keep the mouth and gums free from all irritation, if it is wished to retain the teeth during the natural period appointed for their existence.

Patients frequently remark that the teeth were not formerly lost at so early an age as they are at the present day, and that the poor, who do not consult the dentist, usually retain them many years longer than their more affluent brethren. This is too true, and is easily accounted for. In the first place, the diet of the poor is simple, and of a very different character to that which the rich make their daily fare. The various stomach diseases are not so prevalent among the *lower orders* as they are amongst those in the *higher walks*

of life; and the constitutional stamina of the former class now (from the habits of the latter) must be acknowledged far superior.

The diseases of the gums, if taken in time, may be easily got under, but *no time* must be lost; for when the sockets containing the teeth get diseased to any extent, the case will frequently, if not always, prove a hopeless one. The distended vessels must be unloaded, either by applying leeches to the gums or scarifying them, and using some astringent lotion; but in this, as in every other disease, the treatment must depend upon the various circumstances connected with the case. I have frequently seen cases (by proper attention on the part of the patient to my directions) terminate most successfully, when I had almost given them up as hopeless ones. With the increase of years, the predisposition to these diseases is increased, and extra attention is required. The stomach should be made to perform its functions healthily, and the teeth should be kept perfectly free from tartar. All irritation occasioned by stumps and decayed teeth, should be reduced by their extraction; and any unnecessary pressure upon a particular tooth should be removed.

It has frequently been supposed that the stomach is the cause of unpleasant breath; this is but rarely the case, for generally it is occasioned by an accumulation of tartar upon the teeth; diseased teeth, and the effluvia arising from unhealthy gums.

I have during my practice had patients under me to attend to their teeth, whose breath has been most offensive, making the occupation anything but pleasant; but by the time that the whole of the teeth and gums were rendered healthy, (which was accomplished perhaps at two or three sittings,) the breath became perfectly pleasant, to the no small gratification of its possessor. This desideratum has been attained by scaling the teeth, stopping some of the diseased ones, and extracting those past cure; the latter an operation not so awful as may be imagined, or as it was before I introduced an improvement in the shape and description of my instruments. I have had patients who did not object to my extracting five, seven, nine, and (in one case) thirteen teeth and stumps at one sitting, and if the pain attending the operation had been so *very severe*, this could not have been borne.

PART V.

CLEANING THE TEETH.

"If sloth or negligence the task forbear
Of making cleanliness a daily care;
If fresh ablution, with the morning sun,
Be quite forborne or negligently done;
In dark disguise insidious tartar comes,
Incrusts the teeth and irritates the gums,
Till vile deformity usurps the seat *
Where smiles should play and winning graces meet,
And foul disease pollutes the fair domain,
Where health and purity should ever reign."—Brown.

We will suppose the teeth to have been scaled, the diseased ones stopped, and the gums rendered healthy. Now to keep both teeth and gums free from disease, it is necessary that the former should be brushed

* "The influence which the teeth exercise over beauty, justifies the pre-eminence I attribute to them over all the other attractions of the countenance. This ornament is equally attractive in both sexes: it distinguishes the elegant from the slovenly gentleman, and diffuses amiability

every night and morning, both upon their anterior and posterior surfaces, with a tooth powder, which should be varied according to circumstances, as no tooth powder, however excellent in its composition, will do for every class of teeth. When the gums are perfectly healthy, and there is no predisposition to disease, it cannot be of too simple a character. But few persons brush their teeth properly; their anterior surfaces are well polished and look beautifully white, whilst the interstices, their sides of contact, and posterior surfaces are coated with tartar of various hues—sometimes yellow, but more generally dark, from the colouring matter it imbibes from the various things introduced into the mouth.

TOOTH BRUSHES.

Two descriptions of tooth brushes must be used.—No. 1. A serrated tooth brush.

No. 2. A plane surface tooth brush.

over the countenance, by softening the features. But it is more especially to woman that fine teeth are necessary, since it is her destiny first to gratify the eyes before she touches the soul, and captivates and enslaves the heart."—*Dict. Sci. Med. Paris.*

No. 1 is to be used perpendicularly: when cleaning the outer surfaces of the teeth, its serrated points should be inserted between the teeth to free them from all tartar that is deposited there, and which, in the first instance, is easily removed, as it is very soft and does not adhere to the teeth with any degree of tenacity. The brush should not be composed of hair of too hard, or too soft a quality, for if too hard it will tear and irritate the gums, and if too soft, will not sufficiently penetrate between the teeth.

It is found very difficult to brush the teeth of the lower jaw upon their posterior surfaces with the tooth brushes now generally in use; however, if my directions are paid attention to, I think, this difficulty may be easily got over. Of all the brushes recommended for cleaning inside the front teeth of the lower jaw, the serrated brush is decidedly the best; it should be so used that one of the grooves will admit the cutting edges of the teeth, so that the serrated point comes directly upon their backs. The brush must be used horizontally in this case.

The front teeth of the upper jaw on their inner surfaces should be cleaned in the same

way. The molar teeth of both upper and lower jaws, on their anterior and posterior surfaces, will be cleaned with the greatest ease with this brush, by using simple strokes from the gums to the grinding surfaces of the teeth; the points of the brush will effectually remove all pieces of food that have found a lodgment between the teeth, as well as the tartar deposited in its soft state.

No. 2 is to be used horizontally, and is more intended as a polisher than anything else; it should not be a very hard one. A fair quantity of dentifrice should be taken upon its surface, and applied briskly upon the teeth all around the mouth in both upper and lower jaws.

The water used for cleaning the teeth should be of tepid temperature, if the mouth contains any teeth that have been, or are diseased.

DENTIFRICES.

Supposing the teeth and gums to be free from disease, I can strongly recommend the following tooth powder to be used every day.

Take of —Precipitated Chalk, 1 oz.
Powdered Orris-root, ¼ oz.
Essential Oil of Bitter Almonds, 2 drops.
Mix for Tooth Powder.

Should the breath be unpleasant—occasioned by stumps or decayed teeth—and the teeth generally are of a yellowish hue, of a rough character, and the interstices coated with tartar, the following may be resorted to.

Take of —Camphor, 2 drachms
Spirits of Wine, 1 drachm. Mix and powder.
Then add—Precipitated Chalk, 1 oz.
Powdered Cuttle Fish,
Powdered Peruvian Bark, of each 3 drachms.
Mix for Tooth Powder.

Various other forms might be given, but the above are sufficient in all common cases, and when anything further is required the dentist should be consulted.

LOTIONS FOR THE GUMS.

It is frequently desirable to use a lotion for the gums when they are very tender and irritable, as well as when there is a degree of languor in their circulation; but as these

lotions must vary according to the cases requiring them, I do not feel justified in giving any forms for them, with the exception of one; and let the disease be what it may, *that* cannot injure them, but add to the cleanliness as well as pleasantness of the mouth; and this may always be used after cleaning the teeth with a dentifrice.

It has been customary, with many dental practitioners, to treat the diseases of the gums empirically, and recommend a particular lotion in every case. This system is decidedly wrong. When the gums are not diseased, it matters but little what is used; but when they are, the aid of therapeutics should be called in to our assistance. A large tea spoonful of the following lotion may be mixed with a wine-glass full of water, and the mouth gargled with it after cleaning the teeth.

Take of—Tincture of Rhatany, 1 oz.
Sulphate of Alum, 1 drachm
Distilled Water, 2 drachms
Oil of Orange Flowers, 3 drops
Spirits of Wine, 2 drachms.
Mix for a Concentrated Lotion.

TOOTHPICKS.

It is the popular opinion, that picking pieces of food from between the teeth, as well as from the cavities produced on their surfaces, injures them. This is an error, provided proper toothpicks are used for the purpose, and, instead of the habit being attended with injury to the teeth, it is of decided advantage; for the food, after a time, if allowed to remain, decomposes, and (as I have before observed) a corrosive acid is formed, which acts powerfully upon the teeth, and in the end destroys their substance.

Metallic toothpicks are decidedly injurious and should never be used. The best are made with fine silken cord, waxed, which renders it sufficiently stiff for the purpose, and may be used with the greatest safety whenever required. The toothpicks made from quills I can also recommend; but their points should not be too sharp, for fear of injuring the gums.

PART VI.

IMPORTANCE OF THE TEETH FOR THE PRESERVATION OF HEALTH AND BEAUTY.

But few persons are aware of the many diseases that are engendered by an unhealthy state of the mouth, occasioned by diseased teeth. Indigestion, general debility, nervousness, tic-doloreux, and many other affections are produced from this cause.

When the gums are tender and irritable, the food is not half masticated, but is introduced into the stomach before it is prepared for the action of the gastric juices; they are unable to digest the mass, because, from the state of it, they cannot act upon the minute atoms of which it is composed: hence arises indigestion. And after that disease has been protracted from day to day, a debility of the stomachic organs is produced, and then follow the various diseases occasioned by the imperfect action of those organs. Not only do the

teeth bear an important part in the production of general disease, but many diseases are productive of the greatest injury to *them*. Fevers, indigestion, and, in fact, all stomachic affections, if they do not affect them *directly*, do through the agency of the *gums* and parts connected, which at once shows the necessity for having the teeth examined after every severe illness.

It is not my intention here to tread in the paths of medicine, or to pass beyond the boundaries of my own particular department of surgery, therefore, I shall be brief in my observations connected with this portion of my subject, and only give the opinion of some eminent medical men upon it. Dr. Harris, an American author, says, "The putrid and offensive matter that is thrown off by decayed teeth, and turgescent and ulcerated gums, imparts to the air that passes to and from the lungs a most disgustful odour, which is sometimes so great as to contaminate the atmosphere of a large room, and render it exceedingly unpleasant for any one, except the person affected, to respire it.

"This state of the breath, although it may sometimes be the result of other causes, is a

natural and almost inevitable consequence of carious teeth and diseased gums, and, without doubt, frequently occasions, especially in persons of a phthisical habit, very serious affections of the lungs."

Dr. Rush observes: "When we consider how often the teeth, when decayed, are exposed to irritation from hot and cold drinks and aliments, and from pressure by mortification, and from cold air, and how intricate the connection of the mouth is with the whole system, I am disposed to believe they are often unsuspected causes of general, and particularly of nervous, diseases. When we add to the list of these diseases, the morbid effects of the acrid and putrid matters which are sometimes discharged from carious teeth, or from ulcers in the gums, created by them, also the influence which both have in preventing perfect mastication, and the connection of that animal function with good health, I cannot help thinking that our success in the treatment of all chronic diseases would be very much promoted by directing our inquiries into the state of the teeth in sick people, and by advising their extraction in every case in which they are decayed."

An eminent American dentist* observes (when treating "of the influence of diseased teeth on the stomach and other parts of the system") that, "physicians of the present day (in that country) are beginning to pay more attention to this subject than those of a former period. They have discovered that many of the local and constitutional affections of the body, are sometimes produced by an unhealthy condition of the teeth, and that they cannot be removed without first restoring these organs to health. Some time ago, an eminent physician of this city† informed me that he had frequently observed the deleterious effects of diseased teeth, and that in chronic and nervous affections, he always examined these organs, and if he found them to be diseased, directed the patient to the dentist, whose remedial agents alone, had, in several instances, been sufficient to restore the general health. Several other medical gentlemen have favoured me with their views on this subject, which perfectly agree with that here stated.

"If it be true, that the 'mainspring in the cure of disease, is the seduction of its causes,'

* C. A. Harris, M.D. † Baltimore.

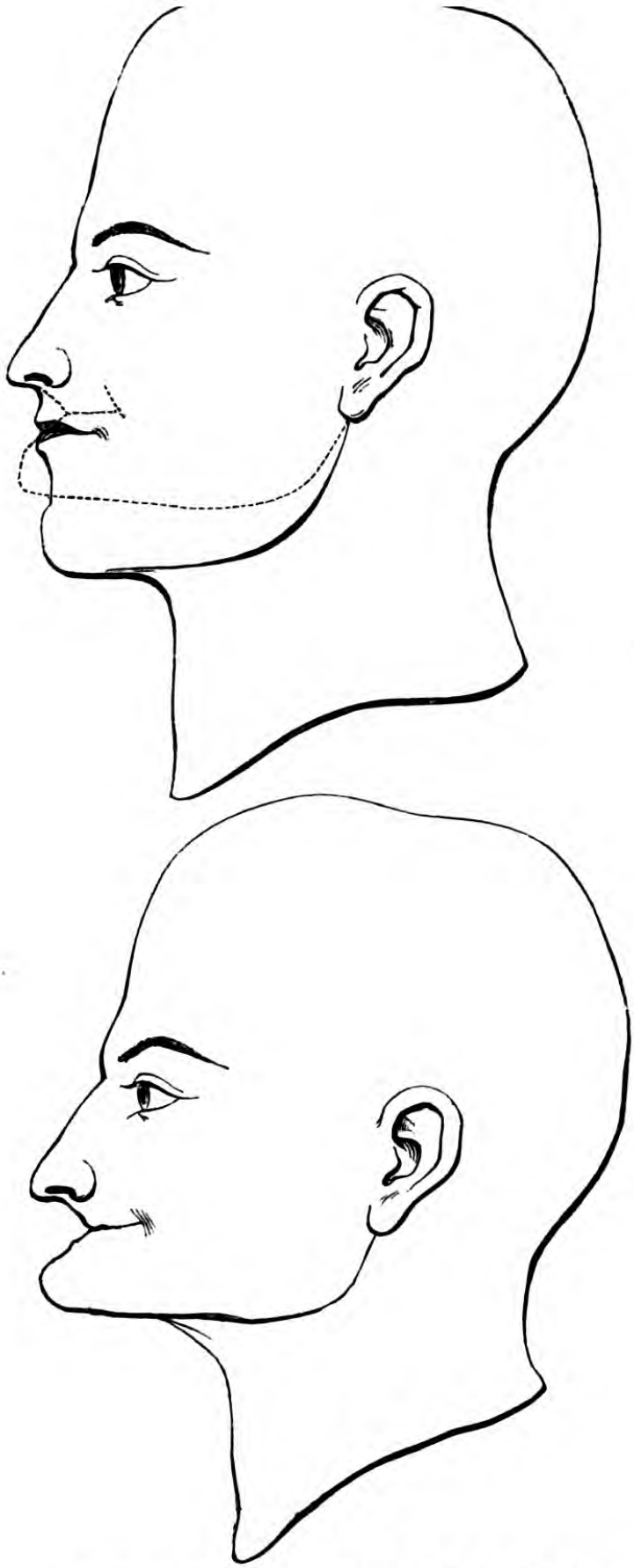
as a late medical writer observes, and if the diseases of the teeth, gums, &c. exert a morbid influence on other parts of the body, then it is essential that these should be perfectly understood, and that in the treatment of those disorders that are produced by them, such remedies should be applied as will tend most effectually to their removal. Unless this be effected, the efforts of the physician, although they may for a time arrest the progress of such disease, will, in the end, prove unsuccessful."

In the course of my own practice, many patients have been sent to me where medicine has been administered and continued for some time, without any benefit accruing; but when the teeth and gums have been put into a healthy state, they recovered very rapidly. Neuralgia facialis or tic-doloreux, pains about the upper extremities resembling rheumatism, cases of dyspepsia, and various nervous affections, have been cured or greatly relieved by the same means; but as this subject will form part of another work I have in contemplation, I shall not introduce cases here, as they would not interest the general reader.

Such, then, being the importance of attending to the state of the teeth as a matter of

health, we will next consider them as giving beauty and expression to the human countenance. But few persons are aware of the contraction that takes place in the length of the face from the loss of the teeth, or, if they do observe it, seldom consider its cause. In the case of an aged person, after all the teeth have disappeared, the face becomes shorter by about an inch and a half, which is pretty well the entire length of the teeth of the upper and lower jaws; in fact, a person is so altered in appearance by this devastation in nature's economy, as to be scarcely recognized by his oldest friends, if they should not happen to meet for a few years.—(*See adjoining plate.*)

"The teeth," says the Editor of the *French Dictionary of Medical Sciences*, "are the finest ornament of the human countenance. Their *regularity* and *whiteness* constitute its chief attraction. If the mouth exceeds its ordinary size, fine teeth serve to disguise this defect of conformation; and the illusion that results from the perfection of their arrangement, is often such, that we imagine that it would not have appeared so well even had it been smaller. Observe that lady smile, whose mouth discloses the perfection of their



THE SAME FACE WITH AND WITHOUT ARTIFICIAL TEETH.—*Page* 76.

arrangement. You never think of noticing the extent of the diameter of her mouth. All your attention is fixed upon the beauty of her teeth, and the gracious smiles that so generously expose them.

"The influence that the teeth exercise in the production of beauty, justifies the pre-eminence that I have assigned them, over all the other attractions of the face. Let a woman have fine eyes, a pretty mouth, a handsome nose, a well-turned forehead, elegant hair, and a charming complexion; but only let her teeth be bad, blackened by caries, or covered with thick tartar or viscid concretions; let her, in a word, exhale a contaminated breath, and the moment she opens her mouth, she will cease to be thought beautiful. If she, on the contrary, has small eyes, or a large nose, and is even positively ugly, yet if her teeth are regularly planted, white and, above all, entire (or at least those of them that are visible), she, however frightful she may be, will appear agreeable the moment a smile comes to her aid, and will hear those words whispered around her that are so consoling to her vanity, 'Ah! what beautiful teeth she possesses.'"

SUPPLYING THE LOSS OF NATURAL TEETH BY ARTIFICIAL ONES.

It is not at all surprising, considering the important functions the natural teeth have to perform, that their loss should be supplied by artificial ones, and to such a state of perfection has this art now arrived, that these substitutes may be made subservient to almost all the purposes required of them; their articulation with the jaw may be rendered so perfect, that even the closest observer is unable to detect wherein they differ from those placed in the mouth by nature.

The comfort that is derived from their use, both in mastication and articulation, has now become so generally known, from the immense number of persons having recourse to their aid, that it will be useless for me to enlarge upon it.

Much injury has undoubtedly been done to the cause of mechanical dentistry, from the improper insertion of artificial teeth; which has been productive of much mischief, and many of the remaining natural teeth have been destroyed, as well as the general health

affected by the irritation occasioned from the operation. On the other hand, provided they are supplied by one having a proper knowledge of the anatomy of the parts, familiar with the laws of mechanics, and practically acquainted with the subject, there is not the least fear of the slightest pain or inconvenience being occasioned by their adjustment.

"This operation," says an eminent American author,* "though acknowledged to be of great importance, and performed by every one having any pretensions to a knowledge of dentistry, is, unfortunately, generally the one least understood. By its improper performance, the mouth is frequently so much injured, that all attempts to restore it to health are rendered abortive. An artificial tooth imperfectly inserted, often occasions the two adjacent teeth to loosen and drop out; and if the deficiency thus produced is again unskilfully supplied, the destruction of two other teeth will, in all probability, follow. In this manner whole sets are frequently destroyed.

"A correct knowledge of the anatomy of the maxillary organs, mechanical tact, surgical

* Dr. Harris.

skill and experience, are necessary to enable a person to construct, adapt, and insert artificial teeth, to suit every variety of case that requires them, so as not to injure the parts with which they must be connected, or the health of the general system; and at the same time to subserve, to the greatest possible extent, the purposes of the natural organs, and to be inartificial in their appearance."

Teeth are inserted upon various principles, and the peculiarities depend upon the cases for which they are required. No given rule can be laid down; but all must rest with the skill of the dentist, for scarcely two cases will require precisely the same mechanism.

Provided any of the front teeth or small grinders become carious down to the gum, and the fang is found healthy and the parts around free from all irritation, the crown of another tooth may be pivoted upon the stump, and rendered serviceable for ten or a dozen years. And when it is adjusted with nicety, no one, even in looking into the mouth, will be able to discover the artificial tooth. This is an elegant way of replacing lost teeth, and four or five may frequently be placed in the mouth upon the same principle.

When from pain or diseased fangs the *whole* of the tooth is lost, recourse must be had to the system called "insertion on a plate." A thin gold plate is formed and beautifully adapted to the gums at the back of the teeth, and is attached to a tooth or teeth at the back part of the mouth. Upon this plate artificial teeth are fixed, varying in numbers from one to twelve; they are "let down" quite to the gums, so that, even with this number, by close inspection, their artificiality is not to be detected. They are worn with the greatest comfort, and after a time the wearer becomes so familiarized with them as scarcely to feel they *are* artificial.

A *whole* upper set is sometimes supplied without the lower, but this is upon a different principle, and requires great skill in its adaptation; in fact, it is beyond the bounds of a mechanic's work, and becomes the employment of a philosophical artist. For here natural philosophy must be called in to the dentist's aid, as the whole piece must be supported by means of capillary attraction and atmospheric pressure. A piece of sea-horse bone is carved out to fit the roof of the mouth, very correctly in every part, and by

exhausting the *air* from under its surface, by means of *capillary attraction*, the moisture of the mouth is drawn in between the piece and the gum, and the air is expelled, bringing into operation the *atmospheric pressure*, which amounts to fourteen pounds upon every square inch. This pressure, provided the exhaustion is complete, is quite sufficient to keep the piece steady in its place; it is not too much, rendering the wearing of it painful or unpleasant; it is imperceptible, being equal in every direction.

The piece can be removed instantly, at the pleasure of the wearer, by simply raising one extremity with the tongue. Human or mineral teeth are fitted upon (or rather into) this plate of bone, and artificial gums are carved out of it, and rendered the same color as the gums in a healthy state are wonted to assume.

Whole sets of teeth are frequently made by fitting plates of gold to both upper and lower jaws, and teeth are fitted down upon them. They are connected and kept in their places by means of spiral springs.

Sets of teeth are also carved out of the tusks of the sea-horse and sea-cow, with human or mineral teeth let down upon it. This is not

so durable as the former plan I have mentioned, still it is frequently available for many years.

The pain that has sometimes been experienced by persons wearing artificial sets of teeth, has generally been occasioned by an error in what is technically termed the "bite," and some dentists have not paid sufficient attention to it; or if they have, sufficient time has not been devoted to obtain a correct one before the teeth were given to the wearers.

When this "bite" is not correct, the pressure cannot be equal, nor can the teeth sit steadily upon the gums. It is the same as having the natural teeth started from their sockets by imflammation of the periosteum, or other causes, rendering the whole of the pressure (in closing the mouth) upon them, which is often very painful; and if such is the case with nature, I fear we must look for the same result (when there is unequal pressure) with art.

A pivoted tooth requires no different management to the natural tooth; in fact, it should be looked upon *as* one of the natural, and treated accordingly.

When one or more teeth are fitted down upon a gold plate, if they are of what is termed mineral composition, they will not require taking out of the mouth oftener than once in three months. The gold, as well as the teeth, should then be washed with a little soap and warm water, by means of a soft tooth brush.

They may also be cleaned whilst in the mouth, with the rest of the teeth, every day, as it will not tend in the least to injure them, provided the tooth brush is carefully used.

When the *human* teeth are worn, it is desirable to take them out of the mouth once a month, and soak them during the night in spirits of camphor, and the gold plate may be washed with soap and water before soaking them. By attention to this, they will be rendered as pleasant as the natural teeth.

Either a *top set* alone, or a *top and bottom*

set, should be taken out of the mouth every night when retiring to rest—placed in spirits of camphor, and allowed to remain in it until the morning, when they may be replaced in the mouth. If the strong flavor of the camphor is objected to, they may, upon their removal from it, be dipped a few times into a glass of water, which, in a great measure, will remove it. If the flavor of camphor is very much disliked, they may be laid in Eau de Cologne during the night, which will answer pretty well the same purpose.

The following powder may be used every day to clean them with :—

Take of — Camphor, 2 drachms.
Spirits of Wine, 2 drachms. Mix and powder.
Then add—Powder of Cuttle Fish, 4 drachms.
Prepared Chalk, 1 ounce. Mix for powder.

CONCLUDING REMARKS.

From the foregoing observations, it will be found desirable that *parents*, as well as *dentists*, should do their best to remove the *cause* of disease. It *has not been* customary to consult the dentist respecting the state of the

mouths of children at a *sufficiently early period* to *prevent* disease; in fact, his opinion is seldom taken until disease is so far advanced as to admit of a doubt respecting the successful treatment of the case first requiring his aid. What is the cause? Is it because the public have not confidence in those practising as dentists, as regards their professional attainments? Or do they think no benefit would accrue from these early consultations? One fee at this period would most assuredly prevent a host of expensive operations in future years! It is not economy that is considered, for most persons pay most liberally and cheerfully for all dental operations—it is simply because they are not aware of the advantages to be derived from such a step. Have they been told of them? Certainly not, and perhaps even now for a time they may doubt them.

Man has become, to a certain extent, an artificial creature; his diet being of a very different description to what it was when he was first formed and placed in Paradise by his Maker, surrounded by the fruits growing in that heavenly garden. This alteration in diet, doubtlessly, predisposes the teeth to

diseases which otherwise, in all probability, would have never existed. For why should these organs be less perfectly formed than the other portions of the human frame? Assuredly all was perfect once; man has himself brought about the change, however unwilling he may be to acknowledge it. The brute creation are not subject to diseases in the teeth; for they, guided by instinct, partake of *the food nature* provided for them.

One cannot contemplate but with feelings of the deepest gratitude those invaluable gifts to man—the heaven-born sciences of medicine and surgery which have now become, through the blessings of Divine Providence, the most important sciences of our era. Without their existence, the frightful mortality that would everywhere assail us, cannot but occur to every thinking mind. Through the aid of these sciences diseases are arrested, and we find the ratio of mortality every year decreasing, both in our populous towns and in our villages.

The teeth too, now, by the aid of dentistry, are rendered serviceable through a much longer period of time than they would have existed without resorting to the benefits this

science is capable of affording. Their diseases may be *not only arrested* but *prevented;* which fact, I hope, I have sufficiently accounted for.

"Disease begets disease," and an imperfection in one class of organs (the teeth) renders another (the stomach) incapable of performing its functions properly; functional derangement of the stomach produces derangement of the system generally, and an imperfect working of all its powers, existing and creative. Its effects may be *partial* or *complete;* if *partial*, the result may be handed down from one generation to another, although the direct results are scarcely more than perceptible; but if *complete*, there is an end to its existence.

It is not my intention to introduce more physiological truths, as this work has even now exceeded the limits I originally intended it should. I trust that the means which I have pointed out to prevent disease, will be considered *quite* as important to society at large as the treatment to be pursued, to combat it when already existing.

THE END.

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