

A treatise on the management of the teeth / by Benjamin James, M.M.S.S.

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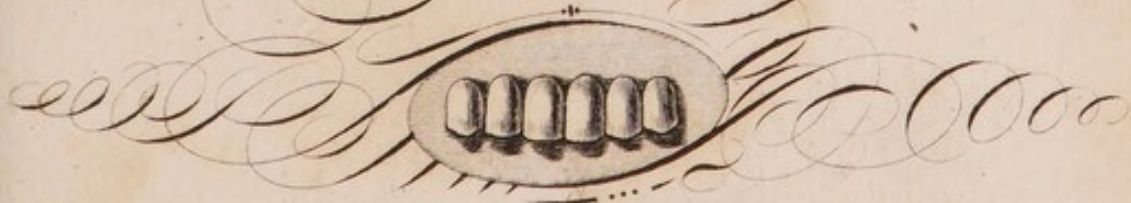


THE



Management of the

TEETH



BY BENJAMIN JAMES M.M.S.S.

BOSTON.

Published by Charles Callender.

1814.



A

TREATISE

ON THE

MANAGEMENT

OF THE

TEETH.

BY BENJAMIN JAMES, M. M. S. S.

==

" SOLATIUM AFFLICTIS."

==

BOSTON :

PUBLISHED BY CHARLES CALLENDER,
No. 11 Marlborough-Street.

PRINTED BY JOSEPH T. BUCKINGHAM
Winter-Street, 1814.

District of Massachusetts, *to wit* :

District Clerk's Office.

BE IT REMEMBERED, that on the fifteenth day of December, A. D. 1813, and in the thirty-eighth year of the Independence of the United States of America, Benjamin James, of the said district, has deposited in this office the title of a book, the right whereof he claims as author, in the words following, *to wit* :

A Treatise on the Management of the Teeth. By Benjamin James, M. M. S. S. "Solatium Afflictis."

In conformity to the act of the congress of the United States, intituled, "An act for the encouragement of learning, by securing the copies of maps, charts, and books, to the authors and proprietors of such copies, during the times therein mentioned;" and also to an act intituled, "an act supplementary to an act, intituled, An act for the encouragement of learning, by securing the copies of maps, charts, and books to the authors and proprietors of such copies, during the times therein mentioned; and extending the benefits thereof to the arts of designing, engraving, and etching historical and other prints."

WILLIAM S. SHAW { Clerk of the district
of Massachusetts.

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TO THE READER.

THE utility of popular treatises on the teeth may be inferred from the success, they have met with in many parts of Europe.

As the same causes exist here, which, in the old world, destroy the human teeth, it may not be amiss to make an attempt to disseminate information on a subject of such universal importance. Had it been taken up by any other per-

son, the public would not now experience this intrusion upon their patience. Whatever may be the fate of this publication, it will be a cause of gratification, if it do but lead to a more finished production from some abler hand.

In a treatise of this nature, calculated for general information, it is not proper to enter into a minute detail of the anatomical structure of the teeth : a previous knowledge of anatomy and physiology would then be necessary, to enable the reader to keep pace with us. We shall, therefore, only give descriptions, which, to be generally understood, will need, neither the aid of technical phraseology, nor the prior acquaintance with any preliminary science.

The teeth are so important, in dividing our food, as well as in conversation, and are, besides, so highly ornamental, as to render it a positive duty, with every one, to study the causes, which lead to their premature destruction.

When, through negligence, many of them have decayed, and the remainder are rapidly falling into the same condition ; it is pleasant to learn, that the disease may be stayed ; that the places of the absent teeth may be supplied with others, both useful and ornamental ; and that those, which have become partially diseased, may be rendered of service to us, as long as we continue our attentions.

The hollow cheek, the putrid saliva, which contaminates the whole system, the foul breath, and days and nights of

agony, are not the worst consequences of our neglect ; the unpitying and murderous hand of the dentist is, alone, a sufficient punishment for our carelessness.

The great impositions, which have been practised by some, who call themselves dentists, render it necessary, that every one, who values his teeth, should be able to distinguish the impostor from him, who understands his business. To communicate the information, necessary to enable all to make this distinction, is one of the objects of this work.

Most people may be deceived at the time of an operation ; though woful experience in a few months unfolds the deception. The impostor is sought for to make reparation, or to receive merited

punishment ; but the bird has flown ; he is gone to practise his tricks and deceptions among those, who know not his character ; until prudence drives him into another seclusion from revenge, into another *shoal of gudgeons*.

In all occupations, it is safer to employ those only, whose permanent residence enables us, at all times, to call them to account for negligence or deception. The itinerant dentist ought, therefore, never to be trusted.

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CLEANLINESS.

THE first and most important object is the cleanliness of the teeth. Without attention to this necessary duty, it is useless to think of preventing disease, or of keeping them in a sound state, when the skill of the dentist has been put in requisition.

In making choice of a brush, we should not choose one so soft as to pass over the interstices of the teeth, nor one so hard as to tear the tender gum from

its connection with the tooth. When we are satisfied that the brush possesses a suitable degree of stiffness, we should be careful not to carry it too long in a horizontal direction, for fear of producing the evil just mentioned. A direction from the root to the crown serves to elongate, and spread the gum more elegantly upon the enamel.

The tops of the teeth, as well as their inner surfaces, require the visitation of the brush. Though we should be careful to clean the teeth after every meal, it is more particularly necessary before retiring to rest; the foulness, which has been all day accumulating, is thus prevented from committing its ravages during the night.

When the gums are spongy, and liable to bleed, from the slightest touch, a hard brush, though apt to occasion much bleeding at first, eventually gives them much firmness, and in a short time effects a cure.

COLD WATER.

WHEN we consider the opposite effects, produced by cold and warm water; and that cold water braces, and strengthens parts, with which it comes in contact; while warm water relaxes and debilitates, we are naturally induced to prefer the former, for the teeth and gums.

If we attend to the process used in the manufacture of glue, we may obtain a just idea of the evil consequences resulting from the use of warm liquids.

By boiling bones, either rasped, or entire, they give out their jelly, or gelatinous part, to which they are indebted for their solidity and cohesion. A moderate degree of heat, such as the mouth can bear, produces the same effect as boiling water, if it be applied for a length of time.

DENTIFRICE.

IT is safer to trust to a brush, and cold water, altogether, than to use dentifrices, of the composition of which we are doubtful.

Those powders, which are extolled for immediately whitening the teeth, are all pernicious, as they produce their effect by a decomposition and removal of the surface of the enamel ; and, if often used, they rob the teeth of their elegant covering, and eventually leave a row of

decaying, brown, and offensive stumps, which ruin the health, and disgust the nose and eye of the observer.

Cream of tartar is a very common ingredient, in these noxious dentifrices, which, like acids of all kinds, ought to be avoided by those, who do not wish to sacrifice their teeth to a temporary elegance of appearance.

The ashes of wood, or tobacco, are hurtful, from the large portion of alkali, or pot-ash, which they contain. It is from ashes that we obtain caustic, the most powerful substance for the decomposition of animal bodies. The lapis-infernalis, or infernal stone, owes its chief activity to the principle, with which ashes abounds; it is capable of destroying the soft parts of the body, in a short

time, and, though slower in its operation upon the teeth, its effects are as certain in the end.

Every economical house-wife, who makes her own soap, knows, that bones contain a large portion of fat ; and that, by boiling them in lye, the fat is extracted, and the texture of the bones destroyed, in a few hours.

Alum, table-salt, and all other saline articles, are improper to be used alone, or to enter into the composition of dentifrice. The acids, which make a part of such substances, are generally of the most powerful kinds.

When the gums are relaxed, or spongy, and liable to bleed, some bracing powder, such as the Peruvian bark, is useful. Powdered charcoal, under vari-

ous names, has been in very common use ; but, we feel convinced, from the experiments of a friend, whose acquaintance with the subjects we are treating of, is very extensive, that its grinding powers are not exceeded by any other dentifrice, with which we are acquainted.

Many dentifrices contain so large a proportion of grinding substances, viz. coral, pumice-stone, emery, &c. that one hour's steady application of them, with a brush, has removed the enamel from a tooth, placed in a vice for the experiment.

From this fact we may ascertain, pretty nearly, the time required for the destruction of the enamel, under the daily use of the powder. Suppose such dentifrice to be used for ten seconds each

day ; by this calculation, we see, that it requires but one year's perseverance in its use, to ruin the teeth.

When we have a dentifrice, the qualities of which we are desirous to ascertain, it may be mixed with water. If there be any acid in its composition, an effervescence will be produced by putting into it a small quantity of salt of tartar, or pearl-ash. When an alkaline ingredient is present, a similar effect is produced by the mixture of vinegar, or other acid.

After washing away all the light, and colouring parts of the dentifrice, we find, at the bottom of the vessel, the sand, emery, pumice-stone, &c.

It is to acids, generally, that all preparations for the teeth owe their activity,

whether in the form of electuaries, balsams, tinctures, or powders.

There are, at this time, in Boston, several persons, known to the writer, who have been so indiscreet as to use a lotion of vitriolic acid, and water, for whitening the teeth. The effect, at first, surpassed their most sanguine expectations; they have now only the mortifying conviction, that neither art, nor time, can ever remove the filthy discolouration, which has ensued.

The omission of an easy precaution, when directing for patients the elixir of vitriol, has laid the foundation for much unhappiness. In the common mode of drinking this medicine, every tooth is exposed to its destructive influence. By sucking it through a tube it may be taken

without touching the teeth, and with perfect safety.

To obtain an idea of the injury sustained from the frequent use of vinegar, (and all vegetable acids have the same effect ;) a sound, and well-enamelled tooth, may be placed in a wine glass full of vinegar ; on taking it out, eighteen or twenty hours after, hollows may be noticed in the enamel, and erosions on its surface, similar to iron, when pitted with rust.

If we put a tooth in any of the mineral acids, an immediate alteration may be perceived ; in a few hours' time, the enamel is entirely destroyed. By diluting these acids with water, their solvent power is not proportionally weakened.

From what has been said, we may perceive the great necessity of caution in selecting a dentifrice for the teeth ; having obtained one, which contains neither acid, nor saline articles, we have much discretion to exercise, in its use. Once or twice a week is sufficiently often ; if any discolourations remain notwithstanding, we had better let them alone.

TOOTH-ACHE.

THE external crust, or covering of the teeth, is so hard, as to strike fire with steel. This substance, which is called enamel, entirely covers all that part of the tooth, that is not included in the jaw and gums.

Within the enamel is a bony substance, which is the immediate covering of the marrow, nerve, or sensible part of the tooth. The enamel is rarely thicker than the twenty-fourth part of an inch.

It is so thin, and, as has been shown, is so easily destroyed, by a variety of causes, that breaches are often taking place, and exposing the bony part of the tooth.

In this state of the disease, there is a remedy, which will be noticed, when we come to the subject of filling or stopping the teeth. Very few are fortunate enough to discover the decay, until it has proceeded to the nerve itself, exposing that exquisitely sensible part to the violence of every thing entering the mouth, and producing tooth-ache.

We know of no certain remedy, in this disease, but extraction. Palliative applications are very numerous, and are sometimes successful.

The effect of fear, in suspending the tooth-ache, is very striking. The pres-

ence of the operator, or the sight of his extracting instruments, is generally sufficient to lull, or suspend the pain for hours ; and has, not unfrequently, removed it altogether. It is probably upon this principle, upon this excitation of fear, that dentists depend, when they undertake to cure the tooth-ache by burning the ears. Who has not heard of the practice of London mountebanks, who, with their charms, as they call them, have so often amused, deceived, and cheated the populace ?

The whole secret consists in artfully creating an emotion of the mind, sufficiently powerful to withdraw its attention from the tooth. As soon as this new feeling has subsided, the pain returns with its usual violence ; having

kept off just long enough for the juggler to receive his fee, and disappear.

A drop of laudanum on lint, placed in the hollow of the tooth, oil of mint, of cloves, or any of the essential oils, do sometimes suspend the pain. The cajeput oil is declared to be almost a certain remedy in this affection, whether from a rotten tooth, rheumatic acrimony, catarrh, &c. though it be only applied to the gums. *See the American Dispensatory, by Dr. Thacher.*

Good effects have been known from opium and camphor, in equal parts, formed into a paste, and placed in the hollow of the tooth on a little lint, and repeated several times.

Not more than half a grain of opium is necessary in such an experiment ;

when used without regard to its quantity, serious and even fatal consequences have ensued.

We have met with cases of violent pain, proceeding from the irritation of teeth, which have become dead by being closely jammed in a crowded jaw. These teeth were literally squeezed to death; their superficial discolouration is an undeniable proof of their destruction, and as they irritate the jaw as foreign substances, extraction becomes necessary. This kind of irritation, and consequent ulceration, are very common consequences of dead stumps. The roots of the front teeth are rendered less troublesome, and are generally cured, by placing artificial crowns upon them, to be hereafter described.

The teeth are often subject to great uneasiness from the accumulation of tartar about their necks, which gradually displaces the gums, and not unfrequently renders them so loose, that they drop out. An early removal of the tartar would have obviated this difficulty.

Mercury and the mineral acids, which are now in such common use, have destroyed many an elegant set of teeth; a misfortune unhappily attended with as much pain as any other mode of destruction.

It is common to meet with severe pain in the ear, arising from one or more defective teeth on the same side; the manner of relieving it is obvious.

It frequently happens that pain, swelling, and inflammation, extend very rapidly over the whole jaw, from the difficulty which the wisdom teeth experience in their protrusion ; sometimes from the firm resistance of the gum, but oftener from want of room. It now becomes necessary to divide the gum upon the teeth, with some cutting instrument, that will reach the part. If they do not advance, nor the pain subside in a day or two, we must extract a tooth as near as convenient, and thus make room for them.

When the throat and contiguous parts have been much inflamed from this cause, and have resisted all other means, for several weeks, this operation has given immediate relief. The wisdom teeth

do not often make their appearance, until the age of twenty, and, in some persons, not till many years after.

In instances of considerable inflammation of the jaw and face, nice judgement is required to ascertain, whether we shall perform our operation directly, or defer it until this severe symptom has subsided.

There is but one direction in this case, that may be considered as generally applicable; which is, if the inflammation be rapidly extending itself over the face, and throat, much danger is threatened, and an immediate operation is required. If, on the other hand, the inflammation give us any encouragement of its early subsidence, we avoid operating for the present, and with soft, warm, and emol-

lient applications, bring the parts into that state of ease, which will render our operation safe, and easy.

Some authors, as if fearful that the dentists may not have sufficient employment, endeavour to encourage inattention to the teeth. Instead of acknowledging that disease arises from external means, they impute its origin to internal causes ; and thereby inculcate a theory, which bears the same relation to our teeth, that the doctrine of election does to our souls ; for if every thing go by predestination, of what consequence is it, to one or the other, to soul or body, whether we give them a moment's attention, or carelessly let them shift for themselves ?

Mr. Fox observes, that : “ Caries has
“ its origin in the bony part of the
“ crown of the tooth, the structure of
“ which becomes gradually destroyed,
“ &c.” He further observes : “ when
“ caries has made some progress inter-
“ nally, a small opaque spot appears upon
“ the enamel, where it covers that part
“ of the tooth which is diseased, and
“ the bony part of the tooth situated
“ underneath this spot will be found of
“ a dark brown colour ; when the decay
“ has advanced so far as to destroy the
“ texture of part of the bone of the
“ tooth, the enamel loses its support,
“ then breaks away, and a cavity is dis-
“ covered in the tooth. It is in this way
“ that caries first originates ; and it is by
“ no means uncommon for a person, in

“ a very short space of time, to discover
 “ cavities in several teeth which had
 “ been supposed perfectly sound.

“ In the mastication of hard sub-
 “ stances, pieces of the enamel are brok-
 “ en off, on account of the texture of
 “ the bony part being destroyed by the
 “ caries, which had previously gone on
 “ internally.”

We may suppose from Mr. Fox's fre-
 quent repetition of the same ideas, that
 he is determined to make converts of his
 readers. Let us see what he has to say
 further : “ The proximate cause of ca-
 “ ries appears to be an inflammation in
 “ the bone of the crown of the tooth,
 “ which, on account of its peculiar struc-
 “ ture, terminates in mortification.”

If Mr. Fox's theory be true,* why do we not suffer pain from this inflammation of a part, in which, its presence proves the existence of organs of sensation, of vessels and nerves? on the contrary, we feel no great uneasiness, until the disease has exposed the very centre of the crown.

Richerand tells us that a bone, when inflamed, manifests the most exquisite feeling. It would be absurd for believers in Mr. Fox, to attempt to explain how it is, that disease so often happens

* Indeed we might call it Hunter's theory. In speaking of caries, Mr. Hunter says: "It does not arise from external injury, or from menstrua, which have a power of dissolving part of a tooth; but we may reasonably suppose that it is a disease arising originally in the tooth itself."

in the corresponding sides of two teeth, at the same time.

There are but few, whose experience does not teach the fallacy of this doctrine. There may be, without doubt, diseases of the teeth originating within ; but they furnish no suitable reason for neglecting all attention to the teeth, especially when we know, that in most instances, disease is the inevitable consequence of neglect.

There are various improper practices, which bring on decay of the teeth, and consequent tooth-ache, such as raising heavy weights with them, cracking nuts, using metal tooth-picks, &c. &c.

That kind of tooth-ache, which happens in sound teeth, is often aggravated by extraction. When a tooth is pain-

ful, and does not appear to be defective, we have many circumstances to take into consideration : We should learn whether it arises from sympathy, from cold, from tartar, or other causes.

SYMPATHETIC TOOTH.

ACHE.

WHEN the painful tooth appears sound, and the opposite of the other jaw, or its fellow on the other side, is defective, there is a strong presumption that the pain is a consequence of that sympathy, which so often displays itself in diseases of other parts.

Here the mode of proceeding is obvious; the extraction of the diseased tooth relieves its sympathizing fellow.

If the rotten tooth be not removed, it is remarkable that the sound tooth shortly becomes affected.

A gentleman, suffering from this species of tooth-ache, was advised to have the rotten tooth extracted; as it did not ache, and it being difficult to convince him of the existence of sympathetic pain, he insisted on the removal of the sound tooth, which, for judicious reasons, was refused.

Another person, less scrupulous, extracted it for him, and thereby occasioned an immediate aggravation of the complaint; the pain remaining in the socket of the extracted tooth, until his senses convinced him of the necessity of removing the original aggressor upon his quiet.

RHEUMATIC
OR
NERVOUS TOOTH-ACHE.

THERE is another species of tooth-ache, for which it would be rash to attempt a cure, in the usual way. Whatever impropriety there may be in calling it rheumatic, or nervous, is of little consequence, provided we can make ourselves understood.

That spasmodic tension, increased action, and fullness of the vessels, accom-

panied with heat, and extreme pain, which so frequently result from checked perspiration, or, as it is commonly called, a cold, are apt to sieze the gums, teeth, neighbouring glands, &c. giving the disease a resemblance to tooth-ache, and appearing to require extraction for its relief.

The attentive observer, having ascertained the nature of this case, will avoid irritating, by extraction, parts already violently inflamed. He will rather endeavour to restore the healthy action of the skin; to guard the body from any fresh cold, or damp air, and, if necessary, he will apply bread and milk, or onion poultices, on the cheek, or irritating or blistering plasters on the back of the neck, or behind the ears.

A liniment, composed of spirits of hartshorn (*aqua carbonatis ammoniæ*) one part, and of sweet oil two parts, makes an excellent application for the face and throat.

In these cases, the disease often extends along the jaw, producing in many of the teeth, that sensation, which, in tooth-ache, is generally confined to one.

There is a symptomatic disorder of the teeth, which is produced by various derangements of the health. We ought, in none of these instances, to adopt the common method of applying hot and stimulating articles to the gums, such as rum, brandy, ginger, &c. for, like extraction, they add to the violence of the disease.

In addition to the remedies mentioned above for these affections, it will be advisable to take cooling purges, to keep the mouth moistened with warm decoction of marsh-mallows, comfrey-roots, or chamomile; to take opium with moderation, or to bleed, according to the urgency of the case, until the original affection, on which it depends, has subsided.

Having pointed out the most common occasions of the tooth-ache, it is unnecessary to perplex the reader with a confused account of other causes, which can be understood only by the experienced practitioner. Our task will be performed, if we do but convince our readers, how absurd it is, whenever they are in pain, to run to the first person,

who will take out their teeth, *without*
asking any questions.

QUACK REMEDIES.

There are three very common means, by which tooth-ache, or other pain, may be removed, or alleviated. The first is by relatives. The second, by lessening the quantity of fluids in the inflamed

QUACK REMEDIES.

THE absurd fears, which many people entertain respecting the extraction of a tooth, often make them dupes to mercenary empirics ; a few observations, however, will show the absurdity of throwing away money for nostrums.

There are three very evident means, by which tooth-ache, or other pain, may be removed, or alleviated. The first is by sedatives. The second, by lessening the quantity of fluids in the inflamed

part. The third, by a diversion, or removal of the disease, from one place to another.

The first purpose is answered by the internal use, or external application of opium, or its tincture, called laudanum. This drug, variously disguised, forms the basis of nearly all the quack-remedies for the tooth-ache, of the present day. The ill consequences, which follow the use of such applications, might be prevented by a knowledge of their component parts; but such information cannot be given with the nostrum; the secret of its composition would thus be disclosed, and the quack would put it out of his power to benefit himself any further by the deception. Every thing essentially necessary to be known, in the use of opium, has

been communicated in a previous article.

The second purpose is answered by the use of purgatives; by smoking, or chewing such substances as occasion a flow of saliva; or by exciting perspiration from the skin, by warm fomentations, or poultices.

The third purpose is effected by a method, which is successful in a variety of complaints; we attempt to cure the disease by exciting a new one, and seem to give the old complaint an opportunity to get well, while the attention of the system is withdrawn to the new disease. Irritating applications, of every degree of power, from that which simply raises pimples on the skin, to those which produce a complete blister, answer the third intention.

So far as these three intentions can be answered by nostrums, they may be useful ; but it would be absurd to apply them except for the first, and as we are totally ignorant of their strength, it is ever unwise to have recourse to them.

Much credit has often been attached to quack medicines, from their application being made, when the inflammation and pain have begun to subside. The duration of tooth-ache very rarely exceeds three, or four days, and the bug-bear apprehensions, which are entertained about extraction, prevent the sufferer from obtaining a speedy relief ; he bears the pain with some fortitude, for the first day ; the want of sleep, during the night, and the aggravation of his complaint, leads him on the following day to try many

remedies, as simple as they are useless. Worn out at last by the violence of his sufferings, he seeks relief in the use of tooth-ache drops, which are so ridiculously puffed in the papers of every day. Either by a subsidence of the inflammation, or by a discharge of matter from the jaw, he is relieved ; he extols the nostrum last used, and unwittingly leads others into the same deception.

When again afflicted with the tooth-ache, if the patient will suffer the complaint to proceed, unmolested, he will be sensible, that we have not been guilty of exaggeration.

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FILLING, OR STOPPING TEETH.

IF people were more generally acquainted with this excellent mode of stopping decay, but few teeth would require extraction.

The first appearance of disease is a brown, or yellowish discolouration of the enamel. Teeth, in this state, should not be meddled with; a proper attention to cleanliness is sufficient to prevent their going any further; but when the enam-

el is eaten through, and the disease begins to take hold of the bony part of the tooth, immediate recourse must be had to plugging, or filling it.

When the disease takes place between the teeth, filling them is generally impracticable ; they have then no chance of being saved but by filing, or separating them, as hereafter described. Some writers have made a distinction between wet and dry caries ; the former chiefly affecting the upper surface, rapid in its progress, and requiring immediate attention ; the latter, attacking the sides, proceeding slowly to destroy the teeth, and requiring no attention, for several years. We, however, feel justified in filling a tooth, whenever there is a sufficient breach, or loss of substance to admit of it.

When the disease has not proceeded so far as the nerve, we may always venture to put in a suitable filling. If the nerve be uncovered, or alive, it must be destroyed before we proceed any further. To answer this intention, it is common to introduce into the diseased cavity, either the caustic, or hot iron ; the strong mineral acids, or essential oils.

The sensibility of the nerve being destroyed by any of the means just mentioned, we next proceed to the removal of the diseased parts, and having wiped the cavity dry, a filling of gold, silver, or other proper metallic substance, may be firmly crowded into the tooth.

Though the teeth may be so far decayed, as to be of no service in chewing the food, filling them, when practicable,

prevents their getting worse, and cures the fetor of the breath, which invariably arises from foul teeth. Roots may be cut, or filed down to the gum, and filled with the same materials, or wood, with the same beneficial results. When filled in this way, they are not so liable to attacks of tenderness and inflammation. Lead is often used as a filling, but as it is a substance so easily corroded by the acids, which are washing its surface every day, no suitable dependance can be placed in it.

When we have filled a tooth, and great uneasiness has followed the operation, we must remove the filling, and substitute some resinous substance, until the cavity possess less sensibility.

FILING, OR SEPARATING THE TEETH.

THE greatest part of those, who have occasion for artificial teeth, owe their misfortune to neglect, usually arising from ignorance, and which might have been prevented by very little trouble in the commencement of the disease. Whoever suffers many days to pass, without removing the foulness from the gums, and teeth, harbours a powerful enemy in his mouth—a mass of putrifying matter,

which lies undisturbed, until it has effected breaches in the enamel.

As the lower teeth are constantly washed by the saliva, and drink, this accident does not so often happen with them ; it is chiefly in the upper jaw, where the teeth are too high to be affected by the same causes, that the greatest ravages are committed. The dissimilarity of form in the upper and lower teeth, contributes very much towards producing this difference of effect. The sides of the upper teeth lie closely together, while the crowns of the under teeth touch only at that point, which is most distant from the gum. For this reason, noxious accumulations, between the upper teeth, cannot be so easily removed, as between the lower teeth. It is therefore in the

power of the file to destroy the greater aptness of the upper teeth to decay.

Collections of foul matter, when suffered to remain for a certain time between the teeth, produce an effect, which is often discovered too late. When disease has happened from this cause, it is generally near the gum, and affects the corresponding sides of two teeth, at the same time.

To prevent the disease from proceeding further, we make an immediate separation of the two crowns, by a thin, flat, file; thus removing the parts already affected, and preventing injury from future collections. By this process the teeth are saved, or at the worst, they last longer than would have been the case, if the file had not been used.

The practice of filing has often fallen into disrepute, from the unsuccessful operations of unskilful hands. There is an unjust prejudice against separating the teeth, arising from a plausible appearance ; for instance, a person's teeth have been for some time falling into decay ; the disease has made small external openings in the enamel, while the bony part within has become extensively diseased ; the teeth are nearly ruined, and a few days, whether the operation be performed, or let alone, produces their entire destruction.

At this period, separation can do but little good, and we are sure to hazard some reputation, if we operate under such circumstances.

The use of the file is likewise necessary, when the tongue, lips, or cheeks, are wounded by broken, or jagged parts of teeth. As soon as wounds have arisen from these causes, and the file cannot be so applied as to remove the offending part of the tooth, the whole of it ought to be extracted.

TRANSPLANTING.

THE transplanting of teeth from one head to another is an operation, the success of which is very doubtful.

Teeth, which have been drawn by mistake, do not always become firm when replaced in the jaw ; how much less should we expect a tooth belonging to another person, to become firm, when crowded into a socket of unsuitable dimensions.

The uncertainty of success is a strong argument against transplanting ; besides, we must pay dear for the experiment, and procure several persons to have teeth extracted from corresponding parts of their jaws, until we can get one that will fit ; or the transplanted tooth must be cut and filed very much to make it answer at all.

When we have succeeded in fixing it tolerably well in the jaw, it is tied as we wish it to adhere ; and upon most examinations afterwards, we have the mortification to see the borrowed tooth as loose as our worst enemies could wish.

In unsuccessful transplanting, there is not only a sufferance of pain, a loss of time and money, but there is a further loss to our patient of a valuable root, on

which might have been fixed, a handsome, firm, and durable artificial tooth.

If transplanting were successful oftener than it is, the communication and production of disease, which frequently ensue from this practice, render it a troublesome and hazardous operation ; so that it is now thought better to pursue any other mode of filling the mouth with teeth, than by that of transplanting.

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 saw a tooth set in wax at a low price
 and soon afterwards it became loose and
 the crown fell off; afterwards the substance
 of the root became so loose in the socket
 that it was necessary to remove it
 In artificial teeth, however, there is
 no such a thing as communication
 between a tooth and the crown, and
 the root is always so loose in the

ARTIFICIAL TEETH.

A FEW years only have elapsed, since it was considered a disgraceful violation of propriety, to wear an artificial tooth. The more correct reasoning of the present day justifies the use of them, whenever they can be serviceable. Divines, lawyers, and statesmen, whose sedentary habits have made them more subject to decayed teeth, than other classes of people, are not now ashamed to wear these

auxiliaries to their elocution ; and the ladies are no longer averse to call to their assistance these ornamental aids to conversation.

The further we depart from nature, or the more we indulge in the luxuries of the table, in the same proportion do our teeth suffer. That curse to civilized man, the tooth-ache, has not even a nominal existence in savage life. No animal but himself is tormented by it, and though he is too proud to take lessons from the monkey, or Hottentot, he has humiliating reasons for envying them, their exemption from the disease.

Among the various tribes of animals, we cannot discover any instances of rotten teeth, except when arising from fracture. The alternations of heat and cold,

experienced in our drinks, (for we are so whimsical, that some articles cannot be swallowed, without the assistance of ice ; and our broth, tea, and coffee must be almost scalding hot ;) the violent action of vegetable acids, which are in such common use ; pearl-ash, and sweetening in our puddings, and pastry ; and powerful spices with every thing we eat, are so many destroying engines of the teeth, and stomach. This being the age of the greatest refinement in cookery, there are consequently more rotten teeth than were ever known before ; the number of dentists have necessarily increased, and, as in other trades, we have workmen of all consciences, from ten dollar operators to six shilling botchers in bone and ivory. People should be able to form an idea of

the operation of setting a tooth, that they may become judges respecting the adequate fee. For setting an artificial tooth, in this town, some pay ten dollars ; others pay five, or three, according to the person employed. It would be difficult to point out any other difference, than the price, in most instances.

In setting artificial teeth, there is room for considerable imposition. It is chiefly in the country, that itinerant, self-styled dentists carry on their deceptions. Many of these honest folks do not know what enamel is ; they are therefore in the habit of working up bare bone, or ivory into teeth, and the deluded patient, being as ignorant as the person he employs, most cheerfully pockets, we might rather say, mouths, the deception. If these travell-

ing gentry did not commence their operations by extracting the roots, to which the new crowns ought to be attached, we could feel more charity for their ignorance.

There are, in certain towns in the vicinity of Boston, many young ladies, whose mouths have been filled with ivory teeth, which now look more like fortifications of tobacco quids, than like any thing human.

When caries has proceeded so far as to occasion any considerable deformity of any of the teeth, which have a single root, they then become suitable objects for this branch of our art.

An instrument, that will cut off the diseased crown, at once, nearly even with

the gum, is preferable to the file, not only because the file requires more time, but because it occasions much more uneasiness.

The crown being cut down to the gum, the half round file, which tapers to a point, must produce that degree of concavity at the top of the root, which will make a suitable lodgement for the crown, and enable it to come close to the gum.

If we find that the application of the file produces pain, except when the root is tender from disease, it is occasioned by the exposure of the nerve, which must be destroyed before we proceed further. To effect this purpose, an instrument, about the size of a brown thread needle, is introduced into the natural canal of the root, and carried as far as it will go ;

the remainder of the operation is now rendered free from pain.

Dentists pursue very different methods of fastening the new crown upon the root ; some drive the wire, which is attached to the crown, into the canal of the root, with cotton wrapped round it, to make it tight ; while others previously place a piece of wood in the root, and attach the crown to this substance.

As the cotton, of the former method, absorbs and retains the saliva, which, from stagnation, becomes offensive ; and as teeth, set in this way, are sooner loosened, we are induced to prefer the latter manner of setting them. When the root is filed down upon a level with the gum, we enlarge the cavity, or canal of the root, so as to remove the diseased parts,

and produce a sound and even caliber to receive the wood, which is previously drilled through its whole length, and shaped to fit in its place. A trifling enlargement of the canal is necessary, when wood is used, though there may be no diseased parts to remove. Well seasoned walnut will last many years, and give a surprising degree of firmness to the artificial crown.

As the root is now prepared, we are able to fit upon it, very perfectly, the new crown, which exactly resembles that part of the tooth, which was seen above the gum, before it had undergone any alteration from disease. We next drill a hole in the under part of the crown, so that it may precisely correspond with the opening of the root. A screw is now

made of gold, and screwed into the crown. That part of the screw, which does not enter the artificial tooth, is squared, and driven into the hole prepared to receive it.

When we engraft, it being the term applied to this operation, a preference is given to golden screws, as they are more durable than silver. There is another mode of engrafting, which is sometimes eligible; a hole is drilled into the crown, a piece of walnut driven into it, and so shaped as to fit the enlarged cavity of the root. There is, in this case, merely a substitution of wood for the gold wire of the former method.

When artificial crowns are formed from the large teeth of animals, such as

the hippopotamus,* or sea horse, setting them in wood is more practicable. Small teeth are so brittle, that they cannot part with more of their substance than is sufficient to admit the wire, without being very liable to break.

We are often obliged to form several teeth in one piece, particularly when there are not corresponding roots for each crown. If a person have lost from three to six teeth, or more, from the front of the mouth, and there be only two roots remaining, the whole block may be very conveniently attached to these roots by the screw and wood, or wood alone, as already described.

* The artist, who designed the vignette at the beginning of this volume, has given a distant view of the hippopotamus.

It is not eligible, perhaps, to set an entire block of teeth, when the roots are all good ; for it should be remembered, that when the crowns are set separately, and one of them decays, it does not affect the others ; but if they be set in one entire piece, an injury happening to one crown, from rot, or fracture, can be repaired only by a new set. The tooth of the sea horse, which must be used, when several teeth are to be made in one set, does not generally look so well, after wearing for some time, as the teeth which are used separately.

If there be no roots, to which the crown can be fastened, it is necessary to drill holes in it, and secure it by ligatures of thread to a tooth on each side. The wires, which are used for tying in

teeth, are improper, as they wear deeply into the teeth they surround.

After setting an artificial tooth, it is not uncommon for the face to swell, and occasion uneasiness. No blame, however, can justly fall upon the dentist, unless his operation be roughly performed, or the root be inflamed, or ulcerated, when he begins his work.

Artificial teeth, of a French invention, have been preferred in Europe, from their being made of earthy substances, and because they neither decay, nor affect the breath; they are, however, more brittle, less natural, and more expensive, than the kind in common use; and indeed nothing is necessary but cleanliness, and frequent rinsing the

mouth, to render the common artificial teeth, as sweet, and as durable as any others.

1840

Received of the Honble the Secretary of State
the sum of £1000 for the purchase of
the land at the mouth of the River
St. Lawrence in the County of
Quebec in the Province of
Lower Canada for the
purpose of building a
wharf for the use of the
Government.

Witness my hand and seal
this 10th day of June 1840
at the City of London
John Lubbock
Secretary of State

EXTRACTION OF THE TEETH.

THE extraction of teeth is considered by some as a simple operation. When the tooth is but little diseased, the roots neither diverging, nor locking so as to include a portion of the jaw, and being superficially set, a tooth may be extracted in any direction, by any body who merely knows how to get at it.

To extract with the least possible injury, (for every extraction is an act of

violence,) it is indispensably necessary, that the operator should be perfectly acquainted with the anatomy of the jaw, and contiguous parts.

A deficiency of anatomical knowledge often leads to serious injuries. How is it possible for those, who are ignorant of the existence of the large cavities of the upper jaw, towards which the roots of some of the grinders approach so nearly, to know how to avoid breaking open their thin floorings, or external walls?

The quackery of those, who pretend to draw teeth with such sudden despatch, as to give the patient *no time for pain*, and *before he knows where he is*, is too ridiculous to deserve a serious notice. Those, who think, that he is the best operator, who jerks out a tooth in the

twinkling of an eye, must suppose so from prejudices, which nothing short of sad experience can do away. Teeth, extracted so suddenly, almost invariably bring away with them the alveolar processes, (the sides of the sockets) which supported them; loosen the processes of the teeth on either side, and two sound teeth shortly fall a sacrifice to quackish despatch. These evil consequences, as well as those of a more serious nature, eventually make many of the advocates of jerking become proselytes to correct practice.

The celebrated anatomist, John Bell, observes, that: “The teeth are so closely embraced by their sockets, and we are so far from being possessed of any instrument, by which they can be pull-

“ ed perpendicularly out, that the sock-
 “ ets can seldom escape ; they are brok-
 “ en or splintered in perhaps one of four
 “ extractions, even by the most dexter-
 “ ous artists in that line.”

Repeated experience convinces us, that
 Mr. Bell did not devote his usual atten-
 tion to the subject, before he hazarded
 these expressions. To break, or splin-
 ter the socket, in one of twenty extrac-
 tions, is not necessary. The sockets are
 so elastic, that a tooth may almost always
 be pulled without apprehension, provid-
 ed an eye be kept on the tooth, when it
 is starting from the jaw. If we see it
 moving altogether in a lateral direction,
 we take off the instrument, apply such
 forceps as will most conveniently take
 hold, and raise the tooth from its place ;

a method which gives the least pain, and insures a safe extraction.

The gum should always be separated from the tooth, as low as the thin edge of the socket, before the extractor is applied. Though this precaution be not always supposed necessary, it is safe; for after repeated inflammation of the gum, it is often converted into a firm, tough substance of a cartilaginous nature, which, if it be not separated, follows the tooth, carrying along with it large strips of the gum, and leaving a part of the jaw divested of its natural covering. Disease of the jawbone is a necessary consequence of such unpardonable neglect.

The gum being separated from the tooth, a soft cushion should cover the

fulcrum of the extractor, to protect the gum. Some have preferred turning the teeth outwards, under the impression that less force is required than when turned inwards. The former method we conceive to be unjustifiable, except when the tooth, to be extracted, is wedged in like the key stone of an arch.

When the teeth are extracted outwardly, they bear upon the concave side of the external alveolar arch; when extracted inwardly they bear upon the the convex side of the internal arch. Every one knows that the least force applied on the concave side of an arch is sufficient to break it; on the contrary, the convex side is capable of bearing an immense weight.

Hence we may venture to assert, that there is a greater risk of tearing away the sides of the socket, by an extraction outwardly, than in the opposite direction. Another important reason for extracting inwardly is, that the external side of the tooth furnishes a more deep and secure hold for the claw of the instrument.

The outward processes of the wisdom teeth of the lower jaw are so thick and unyielding, as to endanger a longitudinal fracture of the jaw, if the extraction be outwards.

We wish it to be kept in mind, that it is not our intention to point out the most dexterous manner of extracting a tooth. We had rather ascertain how to perform it with the most safety. We

therefore place the fulcrum of the extractor on the inside, and the claw on the outside, of the tooth, with the exceptions above mentioned: the fulcrum now rests on the edge of the inner gum, the claw is pressed down, with a finger, under the enamel, until it meets with the resistance of the thin edge of the socket. We next apply the necessary degree of force to the instrument, recollecting as we turn the tooth out, that we must endeavour to raise it up as much as possible. We thus obtain a motion, which is composed of the horizontal and perpendicular direction; making, in this combination, an ascent of forty-five degrees, subject to some little allowance.

The force must not be suddenly applied ; it must be so slow as to give time to see the tooth move. The moment it has started, we decide whether the process be in danger of fracture, or not. If the process be likely to suffer, we withdraw the instrument, apply forceps of a suitable construction, turn the tooth into its natural position, and then raise it with little pain, or difficulty from the jaw. In speaking of extraction, the terms *up* and *down* apply only to the teeth of the lower jaw ; it is therefore evident, that the reverse is meant, when the upper teeth are to be extracted.

Whenever the thin edge of the socket is splintered, or broken, we had better remove the fractured pieces immediately, and thus prevent future uneasiness.

The removal of roots is generally more simple, and less painful than the extraction of teeth. Those roots, which continue to receive the pressure of the teeth of the opposite jaw, are firmer than others, which are not pressed upon. These last become more and more loose, until they fall out, or are extracted with great ease. The chief difficulty, in extracting roots, proceeds from their having decayed so low down in the jaw, or from the inconvenience of their situation. Force, applied to any part of them, usually turns them out; there is a precaution, however, which must be attended to, whenever the punch is used: it is absolutely necessary that the arm of the operator should be pressed firmly against his side. When attempting to extract

with this instrument, and with the arm elevated, if the punch slip, it is liable to plunge into the tongue, or roof of the mouth, or to occasion other considerable injuries, which are not unknown in this town.

We are so fond of novelty, in all the indulgencies, whether of necessity, or caprice, that we cease to wonder at the preference given to new operations over those, whose utility have been tested by time and experience. Were it not for this propensity to indulge in every thing new, we should express our astonishment, that the method of punching out teeth, in all cases, had ever found advocates in this place ; and that every petty innovation upon the established practice

of the best dentists should obtain so much attention and encouragement.

There are some rare instances, after extraction, of profuse bleeding, which may be easily stopped by crowding, with a probe, a little lint into the socket, upon which are placed cushions of rags, sufficient to fill up the vacancy between the crowns of the teeth on each side, so that, by closing the jaws, the dressing is kept firmly in its place.

TARTAR.

To explain the process by which tartar is formed, would be as difficult as it is uninteresting. It is sufficient that we know how to obviate its effects, when it adheres to the teeth, and how to prevent it doing any future injury.

Before the formation of tartar, we observe a yellowish viscid matter collecting around the teeth, which, if not removed, is eventually converted into a hard, grit-

ty, or stony substance of various shades of colour, from black to a light brown ; becoming more firm and extensive, the longer it is suffered to remain ; discolouring the enamel, and forcing itself between the teeth and gums, and, in the end, producing pain and inflammation ; ulcers and recession of the gums ; foul breath, caries, and looseness of the teeth, until they are entirely destroyed.

In removing the tartar, attention must be paid to the hardness, or temper of the instrument. An untempered instrument scarcely makes any impression upon the tartar, while one, that is tempered very highly, is liable to take hold of, and cut away the teeth themselves.

Ignorance, or inattention to this fact, is the reason that teeth have been either

not benefited, or much injured by the operation. The instrument, which removes the tartar, should be applied to that edge of it, which is insinuating itself under the gum, so as to raise it in layers, and render it unnecessary to have recourse to tedious and ineffectual scraping.

It is necessary to distinguish accurately between tartar, and discolouration of the enamel; for from mistakes in this respect, the enamel has been entirely scraped off, and the teeth ruined.

The quantity of tartar, which collects about the teeth, is occasionally so enormous, that cases are known of persons, who have had all the teeth of each jaw enveloped in one continued coat of it; a circumstance, which has given rise to

those stories propagated by the wonderful magazine, and by those, who love to deal in the wonderful, of people who have only one tooth in each jaw, extending from ear to ear !

Tartar should not be removed by dentifrice ; for whatever dissolves, or grinds it away, will have an effect upon the enamel, proportionate to the hardness of the tartar. When it is removed, the teeth may be brushed with some suitable powder, until the remaining discolouring matters are removed. From this time, more dependance should be placed on the use of the brush, and cold water, than on any dentifrice whatever.

IRREGULARITY OF THE TEETH.

THE milk teeth are seldom subject to any irregularity ; there are, however, instances of their coming in such an unnatural position as to do an injury to the cheeks, or tongue ; an injury, which extraction obviates. The same irregularity may operate as an impediment to the speech, or as a cause of derangement in the order of the second set of teeth.

A few years since, Mr. Fennell, the tragedian, whose success in the instruction of youth, particularly of the deaf and dumb, is well known, brought to me a dumb girl, who was not deaf, of six, or seven years of age : her dumbness, as Mr. Fennell supposed, arose from the extreme irregularity of all the milk teeth ; some of them pointing outwards to the cheek, others turning in towards the tongue, and wounding it, exhibiting every variety of position except the natural. I extracted the whole of the teeth for the little girl, whose courage, and submission to such frequent operations, gave proof of her intelligence, as well as her ambition to acquire the use of her tongue. Every day or two, a tooth was taken out, and it was very evident

that each operation removed an obstacle to her articulation. With the assistance of Mr. Fennell, she increased her vocabulary of single words, as the number of her teeth decreased, so that by the time the whole were removed, she was able to deal out a few short sentences, which were well pronounced.

With proper attention paid to the removal of the first set of teeth, the regularity of the second may be anticipated; and this attention must be kept up, until the first set are wholly supplanted by the permanent teeth; an event, which, as before mentioned, does not complete itself, until the child has attained his twelfth, or fourteenth year.

We are oftener called upon to cure irregularity, than to prevent it; we shall

therefore make a few remarks on those modes of proceeding, which appear best suited to our purpose.

When the permanent teeth have displaced the first set, the former are often observed to be so much crowded, and deranged, as to produce the appearance of unnecessary profusion in their number. The deformity thus occasioned, and the greater aptness of the teeth to decay, from the collection of foul matters in their numerous interstices, render it necessary to restore them as nearly to a state of perfect regularity as possible.

The jaw of a person very young is so soft and yielding, that a tooth, taken out at a considerable distance from a deranged tooth, makes room for it; the teeth on each side of the one extracted crowding

in to fill up the vacancy. But when the jaw has become more hard, and unyielding, we can make room for deranged teeth only by drawing those in immediate contact with them. Then, by gentle compression of the finger applied daily for several weeks to the deranged tooth, we see it come into its proper place as effectually as from ligatures, springs, or violence.

The most common, and the most unpleasant irregularity happens in the eye teeth, and those included between them. Young people of courage have submitted, when the teeth have been much crowded, to have one of the grinders extracted from both sides of each jaw, and in this way, have secured to themselves a set of handsome, useful, and lasting teeth.

Compression of the finger will usually bring teeth into their proper places, if room be made for them, and if attended to before age has given too much firmness to the jaw. This operation is extremely easy in children ; quite difficult in those who have all their teeth, (thirty-two in number ;) and not at all practicable with those, whose ages are far advanced.

DENTITION.

IN that important period of infancy, when the gums are inflamed and swollen ; when various parts of the body sympathize with the unyielding membrane, which resists the passage of the teeth ; we are called upon to bestow numerous attentions upon the little sufferer.

Considerably more than one third of the whole number of deaths happens a-

mong children, who have not attained their second year; and as the greater part of their diseases is in some way connected with teething, we may consider a very large portion of their deaths as arising from this complaint. In London, during one year, seven thousand two hundred and sixty-one children have died under two years of age. A melancholy consideration, and a proof either of neglect in medical treatment, or of the fatality of the disease!

The teeth of the child just born are as yet only small membranous bags, containing a white matter of a soft consistence, into which enter the nerve, and vessels, from which the nourishment and growth of the embryo teeth are to be derived. In a few months some of them

are forward enough to pierce their way through the membrane and gum.

The two front teeth of the lower jaw appear first, and with their sharp edges help along their more deeply seated fellows of the upper jaw. Next come the the two lateral incisors, or cutting teeth of the lower jaw ; the corresponding ones of the upper jaw soon follow. We now have four cutting teeth in the front of each jaw ; next to these, two grinders, on each side of both jaws, make their appearance. The dog teeth of the lower jaw next come into sight ; and the last of all, are the two eye teeth, making, in the whole, twenty temporary or milk teeth.

Though liable to exceptions, this is the most usual manner in which the teeth

make their appearance. The first dentition is generally completed between the second and third year. About the sixth or seventh year, one permanent grinder makes its appearance at each end of the two ranges of milk teeth, making four in the whole. From the twelfth to the sixteenth year appear four more, next beyond those last mentioned. About the twentieth year, come the four last grinders, commonly called wisdom teeth from the age in which they appear.

Instances have been recorded of children born with one or more teeth, already in a state of protrusion through the gum ; while in some subjects, twenty-two months have elapsed before the first tooth has been seen.

Were we to attempt to give an account of all the appearances, which attend upon, or which are the consequences of, severe teething, the reader would hardly pardon us for drawing up so long a catalogue. We shall therefore only give such a view of the subject, as we conceive will be generally interesting.

If an uncommon degree of restlessness, or fretfulness, take place in the child, about the time the teeth are expected to make their appearance, we may generally place it to the account of teething. When we observe that the child slavers at the mouth ; that its gums are swollen, and its little head tossed from side to side, as if seeking relief from pain ; but more particularly, if considerable fever, startings in the sleep, profuse discharges

from the bowels, spasms of particular parts, or general convulsions take place, our remedy must be promptly applied. With the gum lancet, or other suitable instrument, we make a free division of the gum, which we know to be deep enough by the grating sensation communicated to the hand from the tooth.

By dividing the gum, the highly sensible membrane beneath it is laid open, and the former is sometimes known to close and grow together again. The cause of irritation is, however, removed, and the gum, from its elasticity, yields to the pressure of the tooth, which sometime afterwards passes through without producing any of those symptoms occasioned by the irritation of the membrane. If the first division of the gums be not

attended with success, subsequent operations become necessary.

Though there be no division of opinion respecting the use of the gum lancet, still, authors disagree as to the propriety of putting hard things into the mouths of children to bite, rubbing the gums with the fingers, &c. The great degree of pleasure, with some exceptions, communicated to children, and the evident advantage occasionally arising from such practices, do, notwithstanding, evince their utility.

The first part of the paper is devoted to a general
 consideration of the principles of the theory of
 the differential equations of the second order.
 In the second part we shall see how these
 principles are applied to the solution of
 the particular cases of the theory of
 the differential equations of the second order.
 In the third part we shall see how these
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 In the ninth part we shall see how these
 principles are applied to the solution of
 the particular cases of the theory of
 the differential equations of the second order.
 In the tenth part we shall see how these
 principles are applied to the solution of
 the particular cases of the theory of
 the differential equations of the second order.

SHEDDING THE TEETH.

THE teeth, when perfectly formed, are such hard and compact bodies, that it would be absurd to expect the growth of the first set to keep pace with the increasing dimensions of the jaw ; the second set are therefore forming in the jaw, so as to take their places when it is sufficiently extended to receive them.

To facilitate the passage of the permanent teeth to their proper places, the

roots of the first teeth are gradually removed by machinery, which nature has formed for the purpose, constituting a process known by the name of absorption.

The absorption begins at the extremity of the root, and proceeds towards the crown just fast enough for the permanent tooth to advance, until no support being left for the old crown it falls from the gum, and the new tooth soon supplies its place.

The permanent teeth pursue nearly the same order in rising from the jaw, which was observed in the milk teeth; beginning to make their appearance about the age of six years. They do not dislodge all the first set until the twelfth or fourteenth year.

When the permanent teeth do not press into the situations occupied by the corresponding milk teeth, the latter do not suffer the absorption of their roots mentioned above, but retain their original places, and become what are called supernumerary teeth.

The teeth, which are intended by nature to be permanent, having made their appearance, require the assiduous attention of the parent, until the faculties of the child are sufficiently matured to enable him to attend the task himself.

The importance of attention to the teeth should be inculcated with his earliest lessons, and an impression thereby made, that will not be forgotten in manhood, and which will secure to him a

sound set of teeth, until, with the body,
they decay in the grave.

OCCASIONAL EFFECTS

OF

DISEASED TEETH.

IT may appear strange to most persons, to hear it asserted, that any condition of the teeth may contribute to the production of that fatal disease, which rages so generally in this country, and which occasions nearly one half the deaths recorded in the bills of mortality! It must be plain to every one that we mean consumption. Were this com-

plaint more rare, it might be less worthy of our attention ; but it is present every where, in every town, and in almost every family.

When a disorder has become so common, we are compelled to suspect a cause of its production even in our pleasures, and necessary enjoyments. It is, however, more rational to place its prevalence to the account of irregularity and neglect ; and we shall endeavour to ascertain, whether it may not be considered as one of the miserable consequences of bad teeth.

In a climate like ours, diseases so often terminate in hectic fever, that there are but few, who have not had an opportunity of observing its progress, or its most remarkable symptoms.

After extensive ulceration, or accumulation of matter, in any part of the body, an absorption of the matter takes place. It is thus carried into the circulation, contaminating and undermining the whole system ; producing a quickened pulse, debility, loss of appetite, and very irregular attacks of heat, cold, and sweating, with uncertain intervals and duration, until the victim to the disease finds relief only in death. When hectic symptoms appear, and none of the well known causes of the disease exists ; and especially if the patient have long been troubled with rotten, or ulcerated teeth, or with long continued collections of matter in and about the jaw, have we not just reasons for supposing that the hectic appearances are occasioned by the

neglected condition of the teeth? We therefore have another inducement to preserve our teeth, and to have them removed when defective; an inducement, which arises from the certainty of possessing an additional security against that deadly disease, consumption.

On each side of the face, above the roots of the grinders, there is a cavity, called the antrum maxillare, which communicates with the cavity of the nose by a small opening. Its use, in conjunction with other cavities, appears to be, to render the voice more sonorous, as the cavities of stringed instruments magnify the sound communicated to them by the vibration of their strings.

The antrum is lined by a membrane, which is so nearly in contact with the

roots of the large grinders, that inflammation is readily communicated to it from the teeth. When the inflammation has continued for some time, an abscess is formed in the cavity, and as the opening into the nose is rendered imperious by the disease, the matter is compelled to work its way through the jawbone, and muscles of the face.

From the apparently trifling neglect of a diseased tooth, and the consequent inflammation and formation of matter in the antrum, the bones of the whole face have been involved in general destruction.

In a patient troubled in this way, the disease has occasioned the entire destruction of the right upper jaw, the palate, and cheek bones, and the articulating

portions of the lower jaw, of the same side of the face ; the bones, which form the orbit of the eye and forehead, were considerably affected.

The symptoms, which indicate the existence of this complaint, are not often so strongly marked as to enable us to judge of its nature correctly. We should therefore be upon our guard, so as not to mistake common affections of the teeth for this dreadful disease, as well as to secure us from the consequences of oversight, when it actually exists.

During the existence of inflammation in the antrum, a sensation of tightness and weight, with throbbing, is felt in the cheek, and considerable pain is experienced, extending, from the part first affected, to the forehead. The cheek short-

ly becomes hard, red, and swollen, and a considerable fulness may be perceived within the cheek, above the roots of the teeth.

If we do not succeed in removing the inflammation, matter very soon forms, and an outlet must be made for it as early as possible. With this view, we extract the first or second large grinder, on the same side of the upper jaw, and make a perforation into the cavity, through the bottom of the socket. The second grinder appears to be more centrally inserted into the antrum, and generally has the preference given to it by operators.

Some authors recommend making a perforation within the cheek, above the roots of the teeth ; but as such an open-

ing appears to be too high to produce a complete discharge of the matter, it should not be attempted, except when the patient will not suffer a tooth to be extracted. As soon as the matter is discharged, decoction of bark, or diluted tincture of myrrh is to be frequently injected with a syringe into the cavity. If the bones be sound, the cure is soon completed, but if they have become diseased, the face does not get well until they come away, or are removed.

The formation of bony matter is not an uncommon consequence of disease in the antrum. In such cases, a bony tumor makes its appearance in the cheek, and increases in size, until the distortion of the features become frightful. Unfortunately it admits of no remedy; the

tumor increases in size, and the diseased action does not stop, till all the animal functions have ceased. Though the probability of suffering from such a dreadful complaint be very small, the possibility of our being visited with it is another strong incentive to the preservation of good teeth, and the removal of those that are bad.

A formation of bony matter about the roots of sound as well as diseased teeth, sometimes occasions so great a protrusion of their crowns, that the jaws cannot be brought together. This exostosis of the roots admits of no remedy but extraction. The cause of the disease appears to be a long continued inflammation, which is variously produced and communicated to the roots.

We have heretofore been noticing either the destruction of sound, or the formation of diseased parts, which are alike inconvenient and distressing. It is with pleasure that we bring our attention to a beautiful process, which has for its object the formation of new bone, when the teeth have been ground away by long continued use.

When the teeth are worn down by mastication, and the nerve has become nearly bare, by a peculiar action of the vessels, new bone is formed, and the nerve absorbed, until the cavity which contained it is entirely obliterated.

Were it not for this contrivance of nature, persons far advanced in life would experience much misery in one of their greatest enjoyments, for they

would suffer torture even in the indulgence of their appetite.

would suffer more even to the indul-

gence of their appetite.

are drawn from the earth, for medicinal

at it, the quantity of the medicine is

to be given in small quantities, like

the oil of the sweet almond, & so on.

and that in the morning, the evening,

and during the night, the water

is to be given in small quantities, and

is to be given in small quantities, and

is to be given in small quantities, and

is to be given in small quantities, and

is to be given in small quantities, and

is to be given in small quantities, and

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is to be given in small quantities, and

is to be given in small quantities, and

THE
ANALYSIS
OF
HUMAN TEETH.

BY W. H. PEPYS, JUNR.

As this treatise will probably fall into the hands of many, who will be pleased to meet with some remarks on the composition of the teeth, the writer offers no other apology for adding to his work Pepys's Analysis of Human Teeth.

ANALYSIS.

MR. CHARLES HATCHET, in his valuable paper on shell and bone, [Phil. Transact. 1799] enumerated the several substances which enter into the composition of the human teeth; it is to be regretted that the nature of his subject did not render it necessary for him to ascertain the proportions in which they are respectively found, as it could not have failed to have proved highly useful, and

his known accuracy would have precluded the necessity of any other person undertaking such a labour. Several good analyses of bone have been published, but I believe no accurate analysis of the teeth has yet been offered.

Bone, it has been observed, when exposed to the action of acid menstrua, becomes dissolved; that is to say, the solid or constituent substance of them is abstracted, and a gelatinous matter is left of the form of the original bone.

Nitric, muriatic, and acetic acids are capable of producing this change, which is accompanied with a liberation of an aeriform fluid, that precipitates lime in lime water, changes vegetable blues red, and by its gravity is known to be carbonic acid gas. These acid solutions

yield a copious precipitate with pure ammonia, which is again soluble in either of the acids. After the precipitation by pure ammonia, the solution of the carbonate of ammonia will still produce a new precipitate.

The precipitate of the first solution, by pure ammonia, as noticed above, is soluble again in the acids before mentioned; these solutions yield, with a solution of acetite of lead, a copious precipitate, proving the presence of phosphoric acid.

The precipitate obtained by the carbonate of ammonia is also soluble in either of the above acids, but with effervescence; and these solutions are not precipitated by acetite of lead; they fall, however, with oxalate of ammonia, car-

bonate of ammonia, or any precipitant of lime.

The great solubility of the phosphate of lime, in even the weakest of the acids, is very extraordinary. Phosphate of lime, mechanically suspended in water, is speedily and completely dissolved by passing a copious stream of carbonic acid gas through it.

With these facts before me, I have ventured to examine the several specimens of the human teeth; as the enamel, the bone, or roots, the teeth of adults, and the shedding teeth of children.

Previous to an account of the analysis, it may not be uninteresting to notice the action of some of the articles of the *materia chemica* on the teeth.

Sulphuric acid of the specific gravity 1.83, appears at first to have no action; in the course of an hour small bubbles are perceived, the roots become blackened, and in twelve hours the enamelled part busts, cracks, and separates, accompanied with an evident formation of selenite, by the action of the acid on the lime, which enters into the composition of the teeth.

Nitric and muriatic acids of the specific gravity of 1.12, act instantly on the tooth, accompanied with an evolution of a quantity of small air bubbles from the whole of the surface; about eight times their weight of these acids are sufficient for the solution of the solidifying principles of the teeth. The mass left undissolved has nearly the original form of

the tooth, is flexible, semitransparent, and easily divided by the nail.

The dilute acetous acid (distilled vinegar) has a very trifling action, but when concentrated, acts both on the phosphate and carbonate of lime.

Boiling nitric acid acts strongly on a tooth, with the evolution of carbonic acid, and a considerable quantity of azotic gas. The gelatine and solid substance are dissolved as the surfaces present themselves; but the operation being stopped at any part of the process, the residuum is firm and hard, but reduced in size proportioned to the time the tooth has been acted upon.

ANALYSIS OF THE ENAMEL.

ONE hundred grains of the enamel of human teeth, (carefully rasped) were placed in 600 grains of nitric acid of the specific gravity 1.12. Slight effervescence ensued, and after twelve hours 200 grains more of the acid were added. Allowing for the loss by evaporation in a corresponding vessel, after thirty-six hours it was found to have lost four grains and a half.

It was then diluted with four ounces of distilled water, precipitated by pure ammonia, and then filtered.

The precipitate obtained being dried in a water bath, at 212° , weighed 102 grains. It was then ignited, after which it was found to weigh 78 grains.

The filtered solution was then precipitated by carbonate of ammonia in solution, and filtered :

The separated precipitate being dried in a heat of 212° , weighed six grains.

Enamel then consists of

Phosphate of lime	-	78
Carbonate of lime	-	6
		<hr/>
		84
Water of composition and loss		16
		<hr/>
		100

A loss of 16 grains here takes place, which is easily accounted for, from the impossibility of directly ascertaining the state of dryness in which the ingredients existed originally in the enamel; for we have seen, that by drying the phosphate of lime in a heat of 212° , (after which it had the appearance of being as dry as possible) it yet contained so much moisture, as to yield a gain of 8 grains in the analysis.

On the other hand, when ignited, its state is driven to the opposite extreme, and there is a loss of 16 grains. It is impossible, however, that the materials could exist in the teeth, in a state of dryness to be compared with that produced by exposing them to such a high temperature. And it appears but reasona-

ble to conclude, that the real quantity of moisture lies nearer to that given by the heat of 212° , than to that given by ignition, and consequently, that the 16 grains, lost by exposure to such a high temperature, were chiefly water.

Bone, or roots of teeth, yielded by analysis in 100 grains,

Phosphate of lime	-	58
Carbonate of lime	-	4
Gelatine	-	28
		<hr/>
		90
Water of composition and loss		10
		<hr/>
		100

The teeth of adults yielded on analysis in 100 grains,

Phosphate of lime	-	64
Carbonate of lime	-	6
Gelatine	-	20
		<hr/>
		90
Water of composition and loss		10
		<hr/>
		100
Specific gravity of adults' teeth		2.2727

The shedding, or primary teeth of children, yielded an analysis in 100 grains,

Phosphate of lime	-	62
Carbonate of lime	-	6
Gelatine	-	20
		<hr/>
		88
Water of composition and loss		12
		<hr/>
		100

Specific gravity of childrens' teeth 2.0833

In these analyses, as in the former, the phosphate of lime was also exposed to a red heat, and consequently was reduced to a greater degree of dryness than that in which it existed in the tooth.

In all of them the carbonate of lime was dried in a heat of 212° (above which it would have been liable to decomposition) and the gelatine of the three last in the same temperature.

The End.

... of them the carbonate of lime
was added in a heat of 212° (above which
it would have been liable to decomposi-
tion) and the gelatine of the three last in

the same temperature.

The first

...

...

...

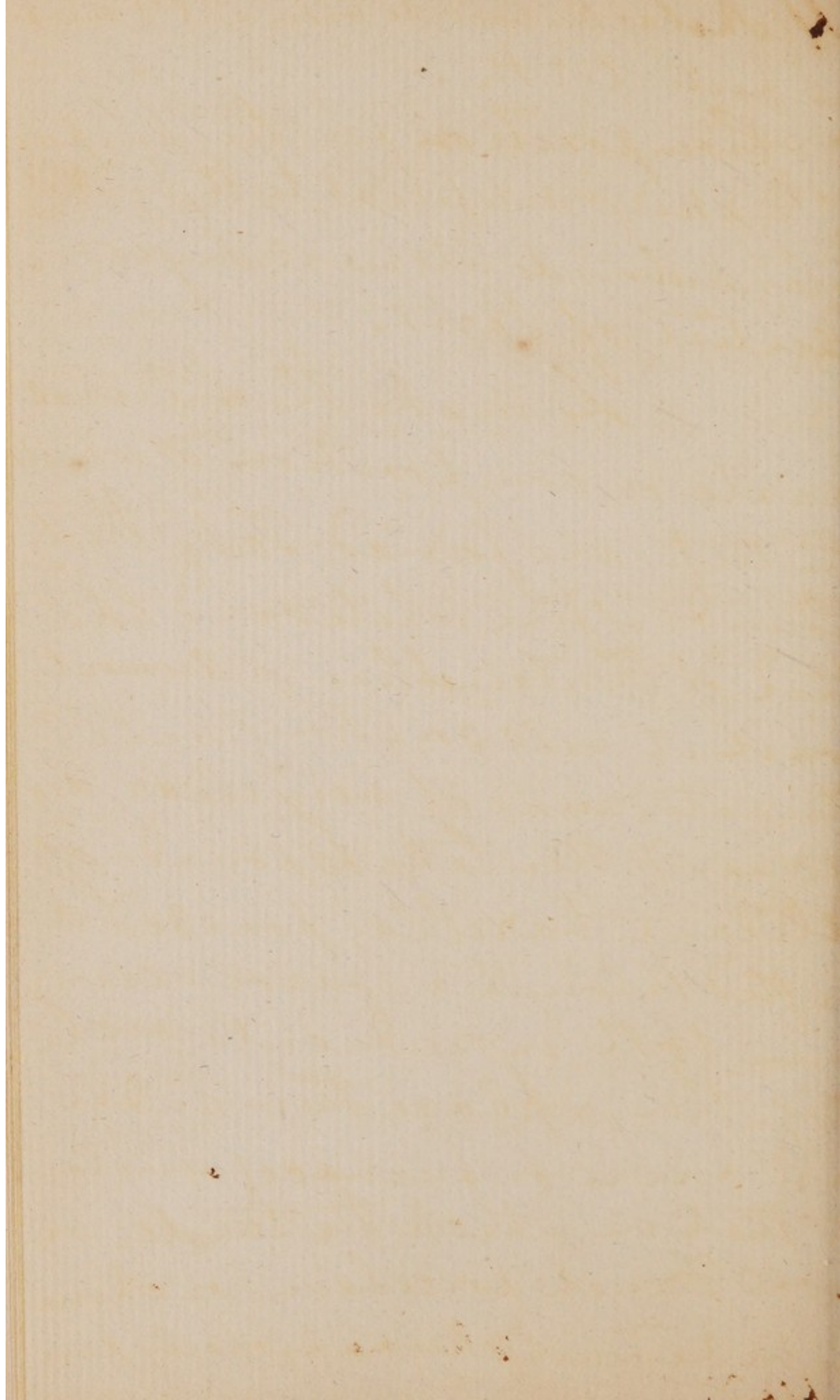
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Index. Turnover 6 leaves

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755

Nicholas Dubois de Chemant's mineral
al paste teeth.

Composition for the purpose
of making artificial teeth, by Nich-
olas Dubois de Chemant, Surgeon-
Dentist, of Paris.

To make the mineral
paste or composition of which
the teeth are formed; Take thirty
pounds of fine white sand, like
that of Fontainebleau or Amont,
wash it well 3 or 4 times, untill
the water runs of very clear; dry
the sand; then take 10 pounds of
Alicant barilla, pounded &
sifted through a coarse sieve;
mix both ingredients well
together, & place them under
an oven or furnace similar
to that in which the tender or
soft French porcelain or china
is baked) untill they are properly puri-
fied.

156 Take 7 pounds of this composition
pound & sift it, then mix with it
two pounds of the whitest & cleanest
well dried marl; moisten it in very
clear water, & grind it in a mill
(such as mustard grinders make use
of) unill it becomes fine, then take
it out & place it on plates of
plaster to dry, & the paste is complete.

To make other pastes, but of
a quality inferior to the above
Take about half an ounce of
English earth, such as earthen ware
is made of. add to it six grains
of the earth of Dombes, calcined,
three grains of Naples yellow,
& one dram of Prussian blue; mix
the whole together, as above, begin
= mix with the blue, then ^{the} yellow, &c.

Or take half ounce of Kaolin of
Limoges, thirty six grains of Saffron
of Mars, 36 grains of Naples yellow
one dram of Prussian blue; mix
whole together as before.

Or take $\frac{1}{2}$ oz of the dust of French
= porcelain, 6 grs of the Saffron of
Mars, 6 grs of earth of Dombes
calcined, 6 grs of Naples yellow

one draught of blue, made
of cobalt.

These pastes, the first
excepted, have their colour in
their formation, but in order
to give a colour to the paste
last described Take $4\frac{1}{4}$ lb of
A, to which add $\frac{1}{4}$ lb of Saffron of
mars, an one grain of Prussian
blue, finely powdered; mix them
well together.

Or take 24 Oz of the same
paste, 1 lb saffron of mars,
one grain of prussian blue
pound & mix them as before.

Or to 30, Oz of the same paste
add one ounce of the saffron
of mars, one grain of prussian
blue, pound & mix them as before.

Any of these compositions for
different colours, according
to the particular shade required

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are to be mixed & worked up with
this paste, at the time of its being
made.

To make the teeth so as to accu-
-rately to supply & fit the interval
in the gums, take a quantity of
softened wax & place it in the mouth
which being then shut, will give
the exact impression of the cavity
required to be filled up, in the
wax is poured a composition of
formed of plaster of Paris, such
as is mixed for cornice moulds,
which when dry gives a true
& solid model of the mouth.

Either of the above pastes when
you chose to use is then well knea-
-ed, so as to make it flexible & con-
-sistent & is pressed into the plaster
mould. The paste having now
acquired its proper shape, is taken
out of the mould, & laid on an
flat & hard surface, & is dried
either in the sun or before the
fire. When it is so far dried, as
not easily to be put out of sh.

159

carve out the teeth with a pen-
knife, or other sharp instrument
to the form you wish, after
which, you place it in the oven
on plates, made of earth, such
as are made use of for the French
Porcelain. as the paste indurys
loses some what of its thickness
spread or widens the way
would, when taken out of the
mouth, to an increase in extent
of about one seventh; which
is done by pressing on the mid-
dle of it with the thumb & finger
to determine the space by compasses
observe such holes as may be
necessary for the fastenings
upon the teeth are perfectly dry.

To make an enamel, take
ten pounds of best lead and
six pounds of pewter, calcine
them together, reduce the whole
into powder & pass it through

^{No 10}
a hair seive, then take ten pound
of sand, such as that of Fontaine
bleu, & 4 lb of barilla of Alicante;
mix them well together; sift
them through a hair seive; put
them into a crucible of proper
size, & place it under the oven
or furnace to be baked. Take
ten pounds of this mixture, clean
it well & pound it very fine,
add to it one pound of Spermace
& 1 lb of best lead, then 4 lb of borax
mix the whole together, & put
them into a good crucible under
the oven. Afterwards you clean
& pound it well & add to it
many ounces of red lead as the
are pounds of Enamel; moisten
it with water & pass it through
the mill. This enamel mixed
with clear water, is now to be
applied to the teeth with a hair
pencil, after which the teeth
are again put under the oven
or furnace, till the enamel

hardened; observing that the
degree of heat must be milder
than is necessary to purify the
paste as just mentioned, observe
also that the Enamel must be
laid on the paste that is form-
ed of ~~the~~ Kaolin of Limoges, in
the same manner as is usual
in common hard porcelain

That part of the teeth which
is intended to represent the gums
is coloured with a quantity of
carmine, according to the shade
required, mixed with spirit
of turpentine, & laid on with
a hair pencil, after which
they are again placed in
the oven, but in a still
milder degree of heat & when
the colour is dry, the teeth are
fully complete.

To make springs & fastenings for
whole sets of ~~teeth~~ take any
quantity you like of gold, at

The standard of 20 carats; con-
 =vert into wire of the thickness of
 a small pin, but before it is so
 reduced, that is, about 3 holes
 before the last, of the machine thro
 which it is to pass, make it red in
 the fire, which will make it fit
 for the intended spring. After
 passing it through a mixture
 of three ³/₄ fourths of common water
 & one of aqua fortis, you twist
 it hard round a mandrel, of
 the thickness of which you
 wish to make the spring, that
 is, in proportion to the hinges
 in which it is to be put. The
 hinges must also be made of
 gold of the same standard
 they are soldered on a plate
 of gold, which is placed on the
 side of the set of teeth. The flat
 part of the hinge must be bored
 with a hole large enough for
 a drop pin, thro which
 you pass the pin, which is

to join the spring to the hinge,
taking care to solder a plate
of gold to the bottom of the
hinge which should be about
 $\frac{1}{8}$ of an inch in length & $\frac{1}{10}$ in
thickness within. Single, double
triple & 6 teeth are fastened
in the usual known manner

Repertory of arts & manufactures.

London 1797 Vol VI p 379 to 385.

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Porcelain Leath H
R 4 parts Earth or Clay
4 parts Glaze
1 part Silax. Mix

To enamel

R 60^{grs} Glaze
4 Oxyd of iron or brick

A remedy for decayed teeth & diseased gums.

Specification

The pyroligneous acid and pyroligneous or empyreumatic oil (tar or balsom) obtained from the distillation of wood (or other vegetable substance ~~of what so ever~~ kind and even from the common wood root) is when properly used or applied a sovereign preventative or remedy against the arising or decay of the teeth & the disease consequent thereto and to the human mouth -

This has been satisfactorily

proven in numerous instances during the period of more than two years in which time I have been in the daily habit of using them for that purpose.

The pyro ligneous acid and Pyro ligneous or empyreumatic oil (tar or balsom) it is well known are obtained by the distillation of woods of any kind or other vegetable substance and even wood soot, in a close vessel and to which heat is externally applied until the wood or other vegetable matter contained in such vessel is reduced to a perfect carbon and yields no further product.

The specific properties and uses of the above preparation or mixture (viz) the pyro ligneous acid

and pyroligneous oil (tar or balsam) however differently modified, is that by the highly antiseptic qualities which they possess they counteract the caries in the teeth allay the pain and irritability in the vessels of the tooth or teeth lessen the morbid sensibility and arouse and restore to a healthy tone the energies of the surrounding parts, when in a state of disease.

The above pyroligneous acid & oil when used for the purposes specified, either separately or combined are not only susceptible of but must necessarily be differently modified as circumstances may require. - Hence when applied with a view to counteract a deep and extensive caries or decay in a tooth or teeth and to destroy or allay the great

sensibility and pain of the part. I apply the pyro ligenous oil with a very small proportion of the acid aromatized with the oil of cinnamon cloves, or other essential oils to the cavity of the diseased tooth or teeth on a doppel of cotton or lead and this is repeated several times as occasion may require to produce the desired effect.

When applied to correct or counteract a general disposition in the teeth to decay for scorbutic, ulcerated or otherwise diseased state of the gums and mouths, I use a saturated solution of the pyro ligenous or empyreumatic oil and pyro ligenous acid to which is added three or more parts of water to one of the pyro ligenous mixture.

with this mixture the mouth is to
be gargled twice or thrice each day
or as occasion may require. —

These modifications or mixtures
I denominate the odontalgic bal-
-sion or odontalgic or antiscorbutic
-chisin for the teeth and gums

In fine what I claim as my
peculiar discovery improvement
or invention and for which I
claim a patent is the exclusive
privilege of using, vending or
causing to be used the empyreus-
-matic or pyrologneous oil (tar
or balsom) and acid obtained
in whatever mode or manner
by the distillation of wood or
other vegetable substances and
even wood soot which oil and
acid when properly modified,

¹⁸⁶ proportioned or applied is used
for the purpose of arresting or
counteracting the caries or decay
in human teeth and the diseases
consequent thereto and to the human
mouth

Edw. H. Hays

Witness

Henry Yeasley }
Nicholas P. and S. }

Patented Feb 11th 1824

A Copy of a copy taken from the
office

11



100/100



