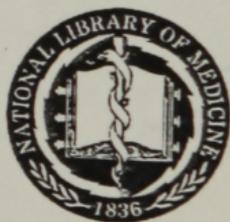
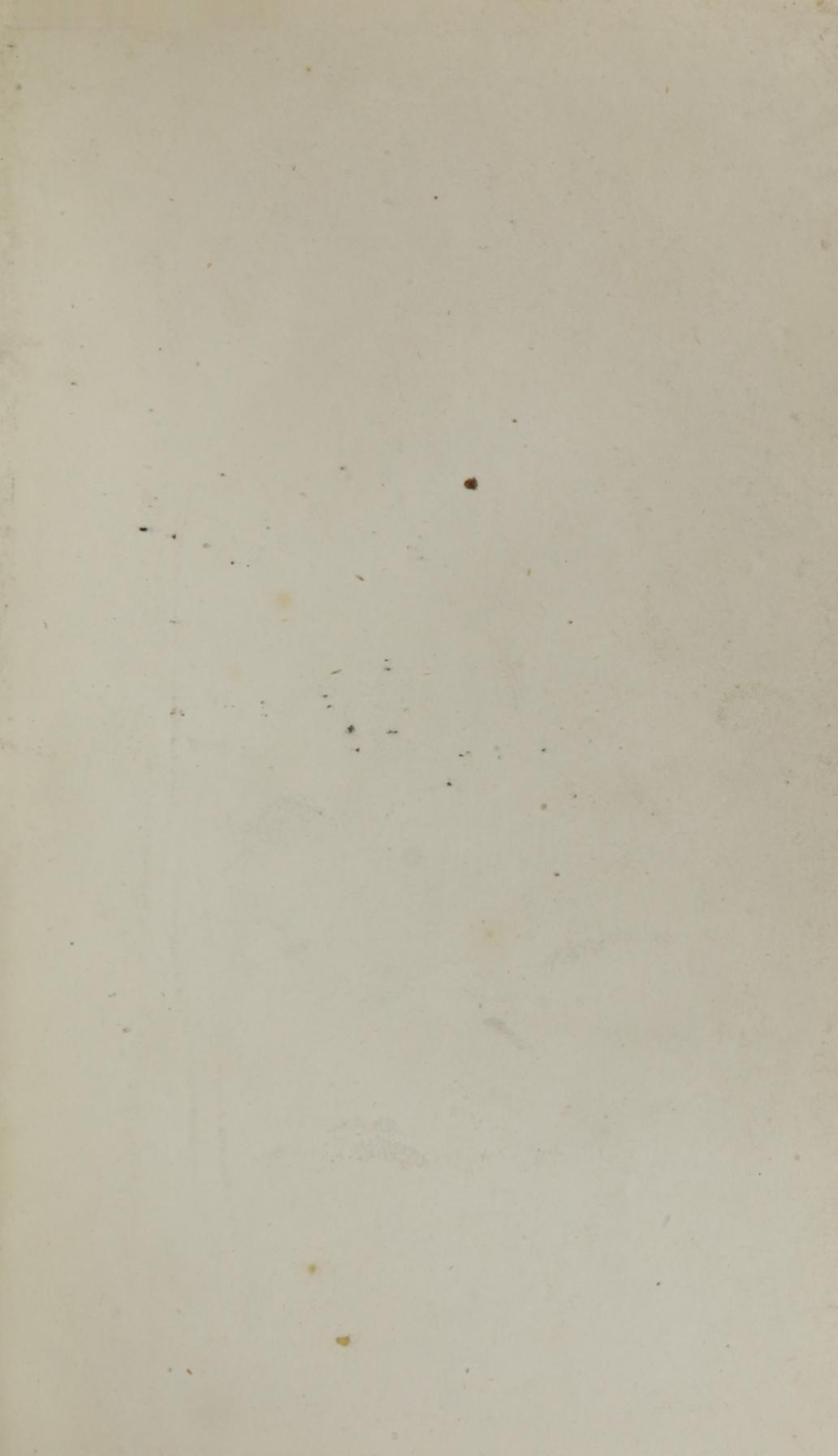
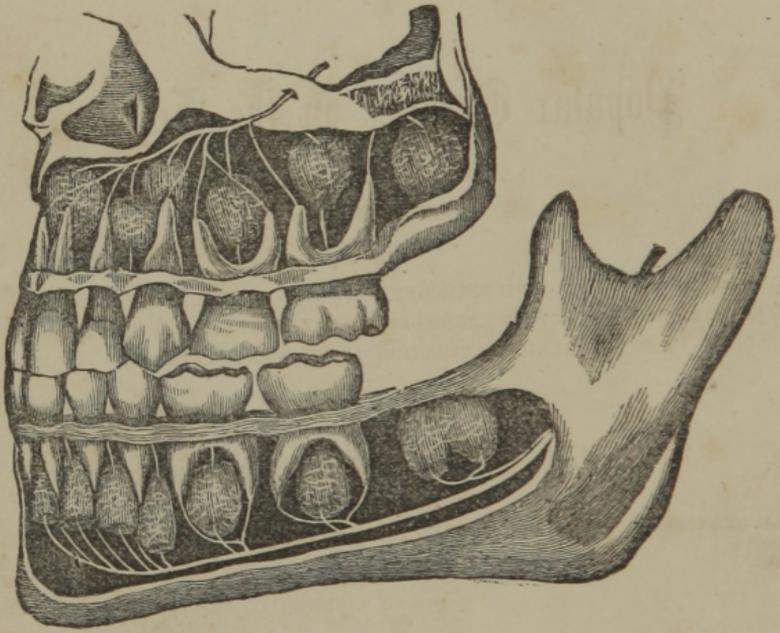




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Maxilla of a child, at the age of about four years, exhibiting the number, form, and position of the deciduous teeth, and the rudiments of the permanent ones, with their connections.

THE PRACTICAL  
FAMILY DENTIST:

A

Popular Treatise on the Teeth,

EXHIBITING

THE MEANS NECESSARY AND EFFICIENT TO SECURE THEIR HEALTH AND PRES-  
ERVATION. ALSO, THE VARIOUS ERRORS AND PERNICIOUS PRACTICES  
WHICH PREVAIL IN RELATION TO DENTAL TREATMENT.

With a Variety of Useful Receipts

FOR REMEDIAL COMPOUNDS, DESIGNED FOR DISEASES OF THE TEETH AND GUMS.

BY DEWITT C. WARNER, M.D.,  
DENTIST.

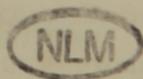
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201 William Street.

## P R E F A C E.

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IN submitting the following pages to the public, the author feels that he is assuming an important responsibility. By thus presuming to prescribe a course of practice involving the weal or woe of those useful and beautifying organs, *the Human Teeth*, he is aware that he renders himself liable to the censure of the dental profession, inasmuch as he has taken the liberty to denounce some of its views and practices as absurd, and tending only to evil. Conscious, however, of the rectitude of his intentions, and being fully persuaded that the wants of the community imperiously demand a degree of correct practical information in relation to dental treatment, which is not afforded from any source heretofore accessible to the masses, he has ventured to put forth this little Manual of Dentistry, believing that the practice here suggested is in strict accordance with the principles which govern the

economy of nature, and which, if once generally adopted, would establish a new era in the history of dental science. He has endeavored to present, in a concise manner, the erroneous views and practices generally entertained, especially by the dental profession, and to exhibit in some degree the vast evils which flow from this source; and to impress upon the mind the importance, as well as necessity, for the exercise of practical common sense in dealing with this subject, as with other matters of every-day life.

WILKESBARRE, *July*, 1853.

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# The Family Dentist.

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## INTRODUCTORY REMARKS.

IN common with other parts of the human organization, the Teeth are subject to disease. As other constituent members of the body, they are exposed to certain noxious causes, which tend to their premature destruction.

Few persons, indeed, in this luxurious age, are so fortunate as to attain to the meridian of life, without having experienced more or less of the evils which flow from disease of the dental organs; and it has become an interesting question, how far these evils may be prevented, or mitigated, by prophylactic and remedial means.

Quite a large class of individuals, in this country, styled Doctors of Dental Surgery, assume to

apply the principles of medical science, and the improvements in art appertaining to this profession, in practical demonstration of their utility, and immense sums of money are annually expended in remuneration for their services.

Almost every considerable town in the United States supports its local dentist, while numerous itinerants are passing from place to place engaged in this pursuit.

Their number is rapidly increasing, and it would seem, from this fact, and the extended service to which the community is calling them, that the utility of the profession was proportionately rising in its favor. But it is not so. A distrust of the ability to accomplish what is claimed for this profession by its most worthy members, pervades the public mind, especially that portion of it which has been subjected to certain generally prevailing influences. That there is just cause for the apprehension which is manifested, can not be denied. In this profession empiricism has been practiced to an extent probably unequalled in any other pursuit.

It is not uncommon to hear opinions expressed, and for advice to be given on this subject, in re-

lation to the application of some simple common-sense principle, which are directly adverse to each other, and which, when tested by experience, are found to be entirely different in their practical results.

Cases, therefore, are of frequent occurrence, of individuals making application to the profession for advice, and what in common parlance is termed "*dental operations*," with little or no expectation of receiving any benefit, even though the dentist to whom the application is made may promise all that is desired. For it is too true, that the fears of the patient are too often realized. So frequently, indeed, are the predictions of dentists contradicted by experience, that the community generally have come to look upon nearly all their operations as experiments invested with much uncertainty.

But there are too classes of persons, each entertaining distinct views in regard to this subject.

Men generally judge of the merits of a thing by the benefit it has conferred upon themselves personally, or from those received by others; and hence, while some place implicit confidence and faith in the preventive and remedial powers of

dental science and art, others are led to repudiate nearly the whole system of dental surgery as mere pretension, and incapable of conferring any considerable or lasting benefits.

It will be found, however, on inquiry, that the views of men who, from personal experience, have adjudged this matter, depend very much, whether favorable or unfavorable, upon the individual who has rendered to them the professional service.

A thorough knowledge of the principles of dental science, and the mechanical skill to carry them out in practice, should be possessed by every one who presumes to assume the important responsibilities which devolve upon all those who engage in the practice of this profession. Integrity of purpose is also an essential concomitant of these qualifications. If these qualities were attributable to all who engage in the practice of the dental profession, the public, no doubt, would have far less reason to question its utility. But if this were so, there are other considerations which rise up and present themselves as formidable obstacles in the way.

In the first place, there is much of practical error entertained by a large portion of the dental

profession ; not so much in relation to mechanical manipulations, as that which refers more particularly to dental physiology, and the recuperative operation of remedies. And in the second place, the generally prevailing ignorance which impresses the public mind in regard to this most interesting subject.

There is no subject—not even excepting that of practical medicine, of which dentistry has generally been considered as forming a part—the plainest principles of which have been so erroneously taught, and around which has been so much mystery thrown by its professors, as this one ; and, I might add with perfect truthfulness, none where imposition has been practiced to the same extent ; and hence the general ignorance and evil practices in relation to the dental organs, which prevail among the masses.

Some of these errors have been adopted from a misapprehension of the causes which operate to induce certain conditions of the teeth, and parts contiguous to them, while others have their origin in theory, sanctioned by high authority. The medical profession have sustained no inconsiderable

part in the establishment of these errors, and which has extended very much the evils resulting from their practice.

It is indeed surprising to one who views this subject in the light of science, when the absurd practices which prevail are presented to him, they are so repugnant to all correct scientific principles—and, in many cases, to common sense. And his surprise is not at all lessened when he considers that they emanate from a learned profession.

In the application of remedies, there is frequently a perfect want of a proper understanding of their effects. Circumstances involving the particular case are entirely overlooked, both by the dentist and those who are the subjects of their application; and results of the most pernicious character are often experienced from this want of knowledge, when, had the course been pursued which science indicated, the evils would have been entirely avoided.

As an illustration of what is here stated, the use of the common tooth-brush may be cited as a familiar example.

It is said of the celebrated Esop, who has given

us so many instructive fables, that his master, on going out with some friends on a hunting excursion, gave him directions to prepare dinner of the very best his larder afforded. On returning from the chase, a dinner was found served up entirely of tongue. On another occasion, he was ordered to prepare a dinner of the very worst his master's larder afforded. And again also, a dinner was served entirely of tongue. Esop being called upon for an explanation of the singular transaction, said that he had obeyed his master's injunction in the first instance, inasmuch as the tongue was designed for universal application, and when properly controlled and directed it was capable of conferring the greatest amount of good, and therefore was the very best thing in the world. On the other hand, when not controlled and directed aright, it was susceptible of becoming an instrument for the accomplishment of the greatest amount of evil, and therefore was the very worst thing in the world.

The tooth-brush is like Esop's tongues, with this difference—its application is limited to the dental organs. It is certainly capable, when properly constructed and timely applied, of effecting a vast

amount of good ; but there is no doubt that it has accomplished an immense amount of evil. The tooth-brush, as it is commonly found in the market, is a stiff, harsh instrument, and when used daily, if care is not taken to use it lightly, will, in a short time, produce an undue excitement in the most healthy gums. A very great proportion of those which have been, and are used at the present time, are constructed of the common hog's bristle, without any regard to the object to be accomplished by them. With most persons in the purchase of a *tooth-brush*, the price, and not the adaptation of the instrument to the end which ought to be had in view, determines their selection—acting upon the suggestion that a tooth-brush is a tooth-brush, “whatever may come out on't,” as there is generally no definite idea entertained in regard to it. It is remarkable, however, that dentists frequently prescribe this same article, harsh as it may be, and hence the mischief which the use of this instrument produces ; and hence also the idea which many entertain, that it is worse than useless to obtain the services of the dental profession.

There is, perhaps, no case presented to the

dental practitioner, which will be more readily recognized than that of individuals of from fourteen to twenty years of age, who have had their attention directed to the condition of their teeth—may be by the pain of a tooth in its incipient stage of the decaying process, induced by inflamed and irritable gums, and other causes consequent on the neglect of proper attention to cleanliness, which usually prevails at this time of life—and who make application to the profession for the purpose of having their dental organs put in proper order. Conscious that disease has commenced its destroying process, the patient, having no other source to which to resort for advice, or to obtain relief, applies to the dental profession. The position of the dentist, under such circumstances, is certainly a responsible one; for if his directions be strictly followed, they will tell in after years, either for the weal or woe of his patient.

And what is the course usually pursued in such a case, by the dental practitioner? If, on examination, he finds any of the teeth sufficiently diseased to require the operation of filling, that operation is performed without any previous pre-

paration, although there is frequently much tenderness from the existing inflammation. There is generally more or less of the substance called tartar deposited upon the teeth in such cases, and that is also removed by the operation called scaling. In effecting this, the gums are usually irritated to a considerable degree, as this substance insinuates itself below the margin of the gum, and adheres closely to the teeth, requiring considerable force to remove it. This operation performed, the gums remain in an irritable, inflamed state. To remedy this condition, dentists generally prescribe some dentifrice, of which there are a great variety, some of which are, in their effects upon the teeth and gums, decidedly pernicious. Having gone through this routine of practice, the patient is dismissed, with directions to procure a tooth-brush with which to apply the dentifrice, which application is to be made daily. The brush usually obtained is the one to which I have alluded, made of the common bristle, stiff and harsh, partaking more of the nature of the rasp than of an instrument fitted to be applied to the tender structure of the gums, and more especially in their excited condition.

But it frequently happens, that the attention of the individual has been arrested by the pain of a tooth, which it has been necessary to extract. The severity of this operation sometimes more than meets the expectations of individuals, and therefore the fear of again being subjected to a similar ordeal has, in such cases, excited a more perfect obedience to the professional instructions which have been given. The application of the detergent brush, and healing dentifrice, are sedulously attended to, and thus weeks and months pass. But by-and-by the individual observes, that although his teeth may have a little more polish on their exposed surfaces than formerly, his gums are becoming more sensitive, swollen, and liable to bleed on using the brush. The teeth themselves, also, along the margin of the gums, begin to manifest indications of tenderness to the touch, till, at length, may be in less than a year's time, the practice of using the brush has become so annoying, or absolutely painful, as to induce the abandonment of it altogether. The dental organs are now left to the influence of the same causes which had induced their diseased condition previous to

obtaining professional interference, with the additional irritation produced by the scaling instrument, and kept up with increasing severity by the daily application of the rasping tooth-brush, and frequently pernicious dentifrice.

Such circumstances never exist for any considerable length of time, without some manifestation of organic destruction. It is soon discovered, therefore, that caries, or mortification of certain portions of the teeth most exposed to the deleterious causes which tend to destroy them, has commenced its operation. Disease, under such circumstances, is generally rapid in its progress, modified, of course, by the severity of the operating causes.

What now is to be done? The healing powers of dental surgery have proved unavailing, and probably the patient inclines to the belief, that what has been done has hastened the present condition, and hence he has no confidence in the dental profession. But he needs no assurance that certain destruction awaits these organs, unless something is done. And yet, there is no other hope, except through this profession. As a dernier resort,

therefore, after much suffering, perhaps, the family dentist is again consulted.

The case now presents a different aspect from what it formerly did. There are, probably, some of the teeth for which there is no remedy, and the only proper course is their removal. There are others which require to be filled, and in order to accomplish this must be separated with a file. But all of them are in so inflamed and sensitive a condition, that a process of preparation is necessary—except for those which require extraction—to fit them for the plugging operation. But preparatory means are neglected, as time is necessarily consumed in the process. Aware of the repugnance which most people feel at the extraction of teeth, those which should have been removed are left in their position, and in many cases with the suggestion on the part of the dentist that to remove them would be doing an injury. The teeth which can be made to hold a plug are filled up, although this operation, under such circumstances, is sometimes very painful. The teeth being filled, the patient is again dismissed, with the injunction to be particular in the use of his tooth-brush.

The diseased condition of the teeth, when plugged under such circumstances, is not removed, but sometimes very much increased by the excitement produced by the filing and cutting away of the diseased substance. Hence, in a short time, the plugs fall out, the progress of decay continues, the sensitive nerves become exposed to morbid influences, and toothache, that "hell o' diseases," as Burns expresses it, generally supervenes; and finally, one by one, necessity compels their removal, until the individual is left, as thousands are annually left in our country, even in the springtime of life, perfectly destitute of those organs which Nature no doubt intended should be co-extensive with the other members of the physical organization.

The only hope of relief now left, is in the substitution of those expensive artificial means which human invention has devised to mitigate the ills of life which accrue to the unfortunate, and which, although they may render them much more tolerable, afford, in most instances, but a poor substitute for those naturally useful and beautifying organs.

The above picture is not overdrawn. Multitudes can testify to its truthfulness; and frequently,

although the result is the same, the reality, so far as suffering from dental disease is concerned, far exceeds the power of description.

But the question may arise, wherein are the errors of this practice, and how could the results stated have been avoided?

In answering these inquiries, the first important particular which presents itself is, the general neglect of parents and guardians in their attentions to the health of the dental organs of those intrusted to their care, during the period of, and immediately subsequent to, the second dentition.

That there is culpable neglect on the part of those who have the control of youth at this period of life, in this respect, and which has an essential bearing upon their future welfare, I shall, in subsequent pages, endeavor to demonstrate.

The second error, and one which it would seem a little reflection would render apparent to all, is the recommendation and use of a stiff, harsh, irritating tooth-brush. It is indeed surprising, that an instrument so illy calculated to accomplish the objects for which this one is designed, should receive the sanction of a learned profession, or con-

tinue to be so extensively used by an intelligent community. Should a physician be called upon to prescribe for a diseased eye, which disease had been induced by irritating substances, who, to remedy which, should order the daily application of a quantity of sandy particles to its delicate and sensitive surface, he would be considered as insane, and entirely unfit to be intrusted with the responsibilities of his profession; and the patient who would obey such a prescription, would be deemed incompetent to take charge of remedies which were to administer to his own necessities. Disease of the gums, in most instances, is induced by external causes, acting upon their exposed surfaces, by chemical or mechanical process. A harsh, irritating brush is prescribed as a remedy, and the injunction is implicitly obeyed. And yet the principle of action, and the effect produced, so far as experience can determine, are precisely the same in the one case as in the other; differing only in degree, varying according to the structure and excitability of the organ affected. The glaring light of a noonday sun, impinging upon the eye, is not more certain to excite inflammation in that organ, when

long continued, than is the continued use of the tooth-brushes commonly found in the markets to induce inflammation of the gums, and consequent decay of the teeth. How often does the Dental practitioner hear the expression, "My teeth and gums never troubled me, until I began to take care of them by using the brush."

Another, and the third error which appears in the case stated, is the unprepared and unsuitable condition of the dental organs at the time when the plugging operation is performed. This is frequently attended to under very improper circumstances, when all that is done only serves to increase the existing irritation, and hasten the period of their destruction. But to this I shall refer hereafter.

I repeat it again, the public needs very much to be informed on this subject, which has for its object the prevention of disease, and the remedial treatment of the organs which were evidently designed to perform so essential a service in maintaining the health and comeliness of the human structure.

The causes which act upon the dental organs to induce disease, and destroy them, should be studied

and thoroughly understood by all, as the interests of all are, to a greater or less extent, involved.

There seems to be an impression abroad, that the teeth, unlike other constituents which make up the human form, are transitory in their nature; or, rather, that they are rendered so by influences which lie beyond the reach of remedies, and which science nor art can control. That multitudes of teeth suffer premature decay in relation to the general structure, can not be denied; but why should the dental organs form so striking an exception? Why should these organs be doomed to destruction, while the health of the other members of the organization remains unimpaired? If obedience to the laws which control the health of other parts of the physical system secure, in any degree, their exemption from disease, why may not a like obedience, in regard to these organs, conduce to the same end? There is, indeed, no reason to suppose that such is not the case. But, on the other hand, there are a variety of facts which clearly demonstrate that these organs may be rendered almost entirely free from the influence of noxious causes. The teeth, as other members of

the physical structure, are subject to disease ; but there can be no doubt but, by the application of proper means, they may be rendered as free from noxious influences as the eye, the ear, or the hand.

What parent would expect his child to attain to manhood, entirely neglected from infancy in regard to cleanliness ; living in filth—no ablutions to the body—no change of linen from week to week, and month to month ? Would he not reasonably anticipate disease to be engendered, the constitution undermined, and, if death did not prematurely supervene, at least an enervate, invalid, and suffering body ? Can an individual live in the habitual violation of the laws of his being, and expect to go unpunished ? If there is no attention paid to cleanliness of the mouth ; if particles of food are allowed to accumulate about the teeth, and remain there to putrefy, and generate a pungent acid, so acrid as to excite inflammation in every living part with which it long remains in contact ; if, from these, the gums and teeth become diseased, and if, in the application of remedies, a mistaken apprehension of their *modus operandi* leads to the employment of those which only serve to increase the

mischief already begun ; if these are circumstances which appertain in some degree to a large majority of individuals who make up the community, is it at all strange that dental diseases, and consequent affliction, should so extensively prevail ?

The All-wise Creator has established rules for the regulation of all organized, animate as well as inanimate, matter, which can not be disregarded with impunity. He has endowed man with intelligence—with faculties capable of comprehending his own necessities, and, when properly directed, of providing for all his physical wants. He has also enjoined upon him certain moral duties. It is required that the mind which is given him should be exercised for his own best interests, present as well as future. It therefore becomes his duty to study to obtain a knowledge of the laws which govern his physical existence, and, by all the means within his reach, endeavor to avoid the dangers which beset him on every side ; to select those truths which the light of science and experience enable him to cull from among the errors which surround him, and which, in the case under consideration, may be an unerring guide to the indi-

vidual, and procure for him the realization of the saying of the wise man, that "So shall the knowledge of wisdom be—when thou hast found it, then there shall be a reward, and thy expectation shall not be cut off."

The rules of practice in relation to the organs under discussion are few and simple, and easy of application; and as they shall come to be generally understood and applied, the evils which have their origin in dental diseases will proportionately diminish, although perfect exemption may never be attained.

To place within the reach of every one composing the millions of the country, the knowledge which is deemed of so much importance to their welfare, the publication of this little manual has been undertaken. The design of the author is, to set before the common mind, in a clear and comprehensive form, the general principles of dental science and art, so far as they can be of general practical utility, divested of all useless technicalities; to exhibit the true causes of dental diseases—both natural and artificial—their mode of operation, and the results to which they lead, and

to point out the necessary prophylactic and remedial means which science and experience furnish.

In order to accomplish this responsible task, the published writings of most of those who have made this subject their study have been extensively consulted; which, with an extensive practice, both medical and dental, extending through a period of some seventeen years, inspire the author with a degree of confidence, if not in his ability to render the subject entertaining and attractive, at least in the truth of the deductions which he has made, and the efficiency of the practice he recommends.

THE GENERAL ANATOMY AND ARRANGEMENT OF  
THE HUMAN TEETH.

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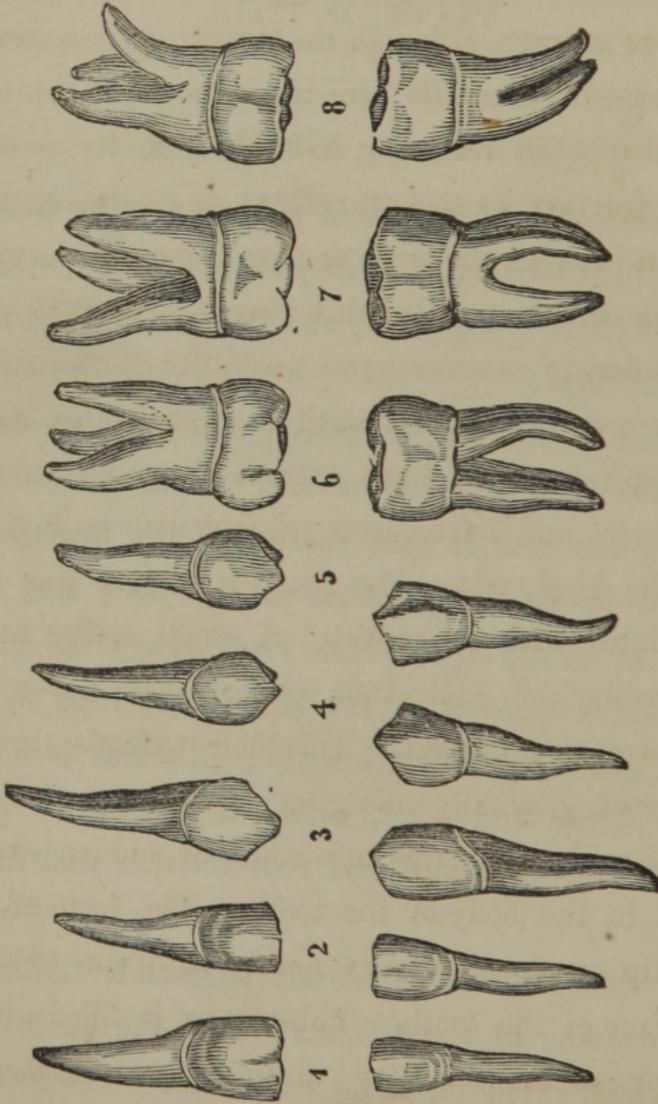
GENERAL ANATOMY.

THE teeth of the human subject may be defined as distinct organs, of a bony structure, set in bony sockets, and designed by the Creator to perform a special office.

Each tooth is anatomically divided into the body or crown, and the fang or root. In its natural position, the root is that portion of the tooth contained in the bony socket of the jaw; and the body or crown that which rises above the gum, and which consists of two parts—the bony structure, and a thin layer investing it, which is much more dense and hard, called the enamel. The part where the crown and root unite, is called the neck.

A thin, fibrous membrane surrounds the root, commencing at the termination of the enamel or neck, and extending to the extremity. The socket, also, formed by the jaw-bone, is lined by a corre-

sponding one. The surfaces of these membranes are in close contact with each other, but when in

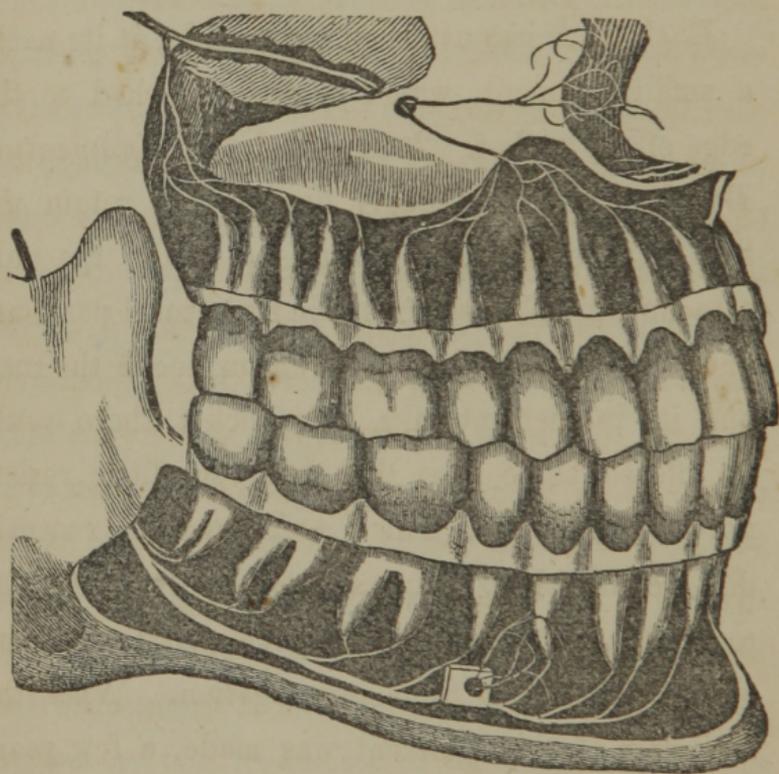


ANATOMY OF THE HUMAN TEETH.

a state of health have no direct vascular or nerv-

ous connection between them; but in a state of disease, when they become inflamed, an adhesion is sometimes formed, which renders them more difficult to extract, although the resistance is not much increased. Dentists sometimes, however, when by mischance in removing a tooth from its position they fracture its socket, refer to an osseous or bony union between the tooth and its socket, as the cause of the accident. But this reason is always cited in order to extenuate an unskillful performance. I do not assert that such a circumstance never transpired; but I have extracted many thousands of teeth, and have never yet met with an instance of the kind, where the root of a tooth was consolidated with its socket. A small orifice at the extremity of each root permits the nerve and blood-vessels to pass. This hole extends through the root, gradually enlarging as it approaches the neck, and terminates in a sinus or sudden expansion in the body of the tooth. The form of this cavity corresponds very nearly with the external surface of the tooth. This cavity is filled with a pulpy substance, very vascular, and extremely sensitive. This is what is commonly called the

nerve of the tooth. It consists of the expanded nerve and blood-vessels, filling perfectly the cavity it occupies, and is closely attached to its walls. From this source the tooth receives its nourishment



NERVOUS CONNECTION OF THE TEETH.

and sensibility. Destruction of this nervo-vascular substance by artificial means, is what is understood by dentists when they talk about killing the nerve to take away the sensitiveness of the tooth, in order

to preserve it by filling its cavity, when caries has penetrated to its sensitive part. Destruction of this nerve will effectually remove all sensibility of the tooth, but it also as completely destroys its vitality.

Each tooth has attached to ~~one~~ side, at its neck, a small ligament, which is also attached to the edge of its socket. It is called the *Ligamentum Dentis*, and is seemingly designed to retain the tooth in its position; for this is really the only attachment which secures it in its natural position; and if it were not for the uneven surface of the root, and its incasement in a bony socket, there would be offered, aside from this, but very little resistance to its removal. This ligament was but recently discovered, which evinces the neglect which the teeth have formerly received from anatomists and others engaged in their investigation. When the discovery of this ligament was made, a few years since, it was said that the excision of it would enable the dentist to remove teeth without pain, or much effort. But the resistance which it offers is very inconsiderable, and in the operation of extracting is trifling indeed.

## CHEMICAL COMPOSITION.

In chemical composition, the relative proportions of the constituent principles which compose these organs vary according to circumstances. The enamel differs very much from the portion which it covers, and also from the root, and all change with the age of the individual. The teeth are constituted of a calcareous or limy substance, and animal matter. The proportion of animal matter decreases as age advances. Thus, according to the analysis of an eminent chemist, the bony part of the temporary teeth consists of 68 parts of phosphate and carbonate of lime, and 32 parts of animal matter, in every 100 parts; and the bony portion of adult teeth, of 70 parts of the earthy salts, and 30 parts of animal matter. Also the enamel consists of 84 parts calcareous, and 16 parts of animal substance in every 100 parts.

It will be noticed that the proportion of animal matter is greatest in early life. It will be borne in mind, also, that in proportion to the animal substance is the vitality of the teeth, and their power to resist chemical action. But as the pro-

portion of animal substance decreases, is their liability to inflammation. Hence, it is observed, that the chemical agents which come in contact with these organs during childhood, excite inflammation; whereas, as age advances, inflammation is less liable to occur, until, at middle life, they operate almost exclusively, so far as the structure of the teeth is affected, by direct chemical action. This subject will be more fully explained hereafter.

#### FORM NUMBER, AND ARRANGEMENT.

The form of the teeth depends upon the position and special office they are designed to perform.

The *Incisors*, or cutting teeth, so named from their flattened wedge shape, and the office they perform, are eight in number, four upper and four lower, and occupy the front position. They have but one root each, which is of a rounded form. The body of the tooth, which is covered with enamel, is of a wedge shape.

The next in order are the *Cuspids*, or, as they are commonly called, *eye teeth*. They are four in number, two upper and two lower. The root of

the eye tooth is similar in form to the incisors, but is somewhat longer and larger, and a little more tapering in proportion to its size. The crown, or enameled portion, terminates in a point. From this circumstance it derives its name, *Cuspis*, signifying a point. In regard to extracting this tooth, there is a general impression that there is more danger than in removing the others. Many have a sort of superstitious fear that the eye will become affected, supposing it to have a particular connection with that organ. I have known many persons to suffer very much from disease of these teeth, from this superstitious dread of having them removed. But such apprehensions are entirely without foundation. This tooth may be as easily extracted, and with as little danger of subsequent difficulty arising from it as any other one, with a suitable instrument and a skillful hand.

The next in order of the adult teeth are the *Bicuspid*s, which name signifies two points. They are eight in number—four superior, and four inferior. These teeth commonly have but one root each, but sometimes two. They occupy a position next posterior to the cuspids or eye teeth, and take the place

of the molar, or grinding teeth, of the deciduous or temporary set. The first, or deciduous incisors, and eye teeth, correspond in form, number, and position with the secondary, or permanent ones. There are eight molars of this set. Of the temporary teeth, there are but twenty. Hence, there are no teeth of the deciduous set corresponding with the bi-cuspids of the permanent ones. The bi-cuspids occupy the place of the deciduous molar teeth, and hence the molar or grinding teeth of the permanent set have a position posterior to the deciduous ones. The molar teeth of this set are twelve in number, making the permanent set of teeth to consist of thirty-two when complete.

The first, or anterior molar teeth, make their appearance behind the temporary set quite early, usually at from five to seven years, and before any of the first set fall out. The second molar makes its appearance much later in life; and hence the mistake which is frequently made, by supposing the first permanent molar to be of the temporary set. This is an important fact, worthy of remembrance; for a general knowledge of what is here stated, would have saved multitudes of teeth. As

little attention is paid to the first set of teeth, being considered of short duration, so this one is suffered to decay from sheer neglect, even in cases where much anxiety and care are manifested in the preservation of the permanent set. Often, when called upon by parents to extract this tooth for their children, have I witnessed their surprise, on being informed that it was not of the deciduous set, and would not be replaced.

The molar teeth differ in form very much from any of the others, the lower ones having two roots, and the upper ones three. Each of these roots has its distinct nerve and blood-vessels passing through it, from its extremity to the body of the tooth of which it forms a part, where they unite in forming the pulpy expansion of that part.

#### THE FIRST DENTITION.

The deciduous, or milk teeth, as they are sometimes called, as has already been stated, are twenty in number. The age at which they first make their appearance varies considerably, and generally without any apparent cause for it. Instances are

not wanting, in which children have been born with two or more teeth; while in many other cases, they have not come through the gum until fourteen or sixteen months, or even as late as two or three years. In general, however, dentition may be said to commence at the age of from five to eight months, and usually proceeds in the following order, the lower almost always preceding the upper for a longer or shorter time:—The four central incisors, at from 5 to 8 months; the four lateral incisors, at from 7 to 10 months; the four anterior molars, at from 12 to 16 months; the four cuspids, or eye teeth, at from 14 to 20 months; the four posterior molars, at from 18 to 36 months. These periods, however, are given only as a general rule, liable to frequent exceptions, not only in the time at which the different teeth appear, but also in the relative order of their precedence.

The bodies of the deciduous teeth are not as large as the permanent ones, nor their roots as long. The process by which the deciduous teeth are removed, to make room for the permanent ones, is a natural one. True to her purpose, when the proper time arrives, Nature proceeds to remove the

roots of these teeth by the process of absorption. When there is no interruption of this process, the entire roots are removed, leaving nothing but the crown, which falls off, rendering it complete.

The process of removing the first set of teeth by absorption is a very intricate one, and many wonder on account of it. Most persons who have never investigated this subject, entertain the idea that the milk teeth have little, or no roots at all. Having noticed their own, perhaps, when they fell out, they come to the conclusion that all are alike, and having no knowledge of the absorbent process, suppose that roots were never attached to them. But the size of the roots of these teeth bears a similar proportion to their sockets as do those of the adult teeth to theirs, and the difficulty of extracting them would be equally as great, were not the bony structure of childhood more elastic and yielding than at adult age. But they are entirely removed by absorption, when Nature is not diverted from her purpose. It is a vital process. The same energies which gathered up the material of which bone is composed from the circulating pabulum of the body, and deposited the temporary roots in their

sockets, in order to make room for another and a permanent set, gathers them up again, and by a similar process removes them out of the way. And this is called absorption of the roots of the deciduous teeth. The bony sockets of the permanent teeth are frequently removed by a similar process, although a diseased one.

Previous to the appearance of the temporary teeth through the gums, their germs, with those of the permanent set, exist imbedded in their sockets. Each permanent tooth exists in connection with its corresponding temporary one, or rather seems to spring from it, and is attached to it. This attachment continues until, in the process of development, the permanent tooth acquires a condition to allow of its separation. It is impossible to tell, from the appearance of the deciduous teeth, or any other indications, at precisely what time this separation takes place, but it does not take place until near the commencement of the absorbent process upon the deciduous roots. This is an important fact, well worth remembering, and one which is particularly interesting to those who have the care of children.

In the operation of all natural causes which develop and perfect the physical organization, any infringement of the organic laws tends to deformity. It is particularly so in the development of the dental organs. The connection which exists between the temporary and permanent teeth can not be disturbed with impunity, until the order of Nature has so determined. Whenever, therefore, one of the milk teeth is removed from its socket by accident or otherwise, and the attachment of the gum of the succeeding tooth is broken up too soon, more or less injury, or perhaps entire destruction of it, is the consequence. There are frequent occurrences of this kind. The temporary teeth are frequently extracted under the impression that they will in due time be replaced. I have seen many cases where this operation had been untimely performed, where destruction of the secondary teeth had been the result. One case came under my notice where the untimely removal of all the deciduous teeth on the lower jaw, except the two central incisors, entirely destroyed the corresponding germs of the permanent ones, and this was done by a practitioner of medicine of considerable standing.

Those who have the care of childhood, therefore, should bear in mind the results which follow the too early removal of the temporary teeth, and should never allow of their extraction, except in extreme cases, unless there is unmistakable evidence that the danger referred to is past. The circumstances involving the particular case, will generally determine with sufficient plainness to enable any one qualified to perform this operation, to decide in regard to it.

#### THE GUMS, OR PARTS CONTIGUOUS TO THE TEETH.

The gums, or soft fleshy parts which cover the sockets of the teeth, have no direct attachment to the teeth themselves. Each tooth is surrounded by it at its neck, and is in contact with it, but it may be pressed away from the tooth down to the bone, with which it is united. The margin of the gum, therefore, is free about the teeth, and allows of the lodgment of particles of food between them, and also of chemical agents which affect them more or less injuriously. The construction of the gums

and teeth, and their arrangement in relation to each other, deserves to be well understood. It is the general impression that the gum is attached to the teeth, and dentists and physicians who extract these organs, are in the practice of cutting around them in order to facilitate their removal. A gum lancet has always been considered an indispensable instrument of the dentist's case, and the medical practitioner who appears abroad without his pocket knife, is deemed entirely unprepared for all the emergencies of his position. Cutting around the tooth has always been considered a prerequisite to its extraction, and whenever a mishap has occurred in the operation, it has been ascribed to the neglect of properly cutting the gum. If the tooth was very hard to remove, and very painful, it was not sufficiently loosened by cutting the gum. If the gum was lacerated in the operation, and such accidents are sometimes extremely tedious to bear, the patient consoles himself with the censorious reflection, that if the gum had been entirely cut loose from the tooth, the difficulty would not have happened.

It is strange, indeed, that such a custom should

so universally and so long prevail, where such important interests are involved. Universally there is a dread of the pain produced by the removal of a tooth, but generally there is more pain realized in the operation of cutting the gum than extracting the tooth; at all events it is frequently so. How often is the remark made by individuals, in anticipation of the removal of a tooth, that "if it were not for the cutting the gum, I should not mind it." And yet, no possible benefit can accrue from this operation. It is, to say the least of it, entirely useless. It is frequently decidedly injurious. If there is no attachment between the gum and the tooth, what necessity can there be for cutting the gum? Certainly none at all. But whenever the gum is lacerated, it will be found that the edge of the bony socket is fractured off, which, adhering to the tooth, takes a portion of the gum, with which it is connected, with it. When a lancet has been passed around a tooth, making an incision in the gum down to the bone a little distance from the tooth, as is commonly the case, the portion so removed from the main gum is very liable to be removed with the tooth, with the portion of bone

to which it is attached. This result very frequently follows when the common instrument, the turnkey, is used. Laceration of the gum need never occur on the removal of a tooth with the forceps, where it is not subjected to the lancet, if the operation is dextrously performed. All that is ever necessary previous to applying the extracting instrument, is to press the gum away from the tooth with any instrument suited to the purpose, in order that the extracting forceps can pass up so as to clasp the neck of the tooth. If the gum is not inflamed and sensitive, it will cause no pain, but every advantage will be thus obtained.

Having given this general view of the structure of the teeth, and parts contiguous to them, I proceed to consider, briefly, the

#### CAUSES WHICH AFFECT THEM INJURIOUSLY, AND THEIR MODES OF OPERATION.

The causes that act upon the dental organs injuriously are few and simple, and easy to be understood. But it has been truly said, that, that

with which the world is most familiar, it least understands. The fact that certain causes affect the teeth, and that the habits of individuals are such as to allow them their full development and force, is the main reason why those causes have not been properly considered and rightly understood. They have become so familiar that they do not impress the mind or excite the attention, and therefore they are generally almost entirely overlooked. When they shall become thoroughly and generally understood, and the proper means adopted to prevent their injurious effects, the labors of the dental profession no doubt will, to a very great extent, be dispensed with. That there are means which are available and efficient to this end, I shall endeavor to demonstrate.

#### TEETHING, OR THE FIRST DENTITION.

The time which generally first demands the attention, and at which the operation of some of the various causes begin to exert their influence, is that period of infancy in which the first dentition, or teething, takes place. This is a

very interesting period to those who have the care of childhood—to parents and guardians—and their attention is generally called to the consideration of the dental organs, but in other respects than as regards the influence which their condition may exert upon the welfare of these organs in after life. The time of teething is a critical point of childhood. It is not my design, however, to enter into a discussion of this subject, for to enter upon a history of the consequences which result from the irritation of teething, were to treat generally of all the diseases of infancy; for there is scarcely an ailment to which this period of life is subject, which is not at times produced, or at least augmented, by this cause. It is sufficient for my purpose simply to state that there frequently remains, after the first dentition is complete, an irritable condition of the teeth and gums, as the consequence of that process, which being allowed to continue, affects, in some instances, very seriously the deciduous teeth, and the germs of the permanent ones attached to them. The unhealthy state of these organs here referred to would generally subside spontaneously, however. were it not that

other noxious agents were brought to act injuriously upon them. As I have already stated, there is generally but very little attention paid to the condition of children's teeth and gums, previous to the falling out of the first set, unless attended by painful disease; the prevailing impression being, in regard to them, that they exert but little or no influence beyond their own time of duration. Hence, under ordinary circumstances, there is no thought directed to these organs in reference to their cleanliness, or even to their decayed condition, except the complaints of the little sufferers awaken sympathy, and thus induce momentary attention; and hence the many aches and pains, as the toothache and the earache, which are incident to childhood. Nearly all of them have their origin in the neglect of the proper means necessary to the cleanliness of these organs. From the time that the first dentition is complete, until the individual approaches puberty, and the permanent teeth—all except those called the wisdom teeth—are perfectly formed in their sockets, no attention at all, with now and then an exception, is given to the condition of these organs. But it will be re-

membered that the same causes, with one exception, which act upon and destroy the teeth at a later period, exert their energies upon them during this time also. And it is at this time of life, in most cases, that the seeds of dental disease are sown. It is, therefore, just as necessary that means should be used to protect the dental organs against the influence of certain morbid agents, which, without proper protection, will produce the result which has become so general, as it is that the body should be guarded against the various causes which tend to its destruction. The miasmatic exhalations of the fenny marsh, or the damp and chilly changing winds of autumn, are not more certain to engender disease of the human constitution when brought to bear with full force upon it, than are the noxious agents developed by the putrefactive decomposition of substances which find a lodgment about the teeth and gums, when, for the want of the proper detergent means, they are allowed to spend their energies upon these organs in their irritable condition, which teething generally produces. What I wish to impress upon the mind of the reader here is, the fact that the main, immediate cause

of dental disease consists in the irritation and direct decomposition of the substance of the teeth, by irritating chemical agents, which are generated by the putrefactive decomposition of particles of food, resulting from the want of proper cleanliness; and that this cause acts both upon the deciduous as well as upon the permanent teeth, and that, in a greater or less degree, the impression produced upon the first is extended to the second ones. All other local causes are secondary to this. Let the proper means be adopted to prevent the operation of this cause, and let those means be timely applied, and ninety-nine hundredths, at least, of the teeth which, under present circumstances, prematurely decay and are destroyed, would remain co-extensive with other parts of the physical organization.

The causes which affect the teeth injuriously are of two kinds—those which affect them through the medium of the general system, and those which act directly upon the substance of the teeth, either by inducing inflammation and consequent mortification, or by direct chemical action, effecting decomposition.

The first of these may be denominated predis-

posing causes, for without the accession of others permanent injury of the teeth would seldom occur. Any active agent, which induces general irritation of the whole physical system, and particularly of the dental organs, is of this class of causes. But I refer more particularly to those general irritating causes which, while they act generally, exert a specific influence upon the dental organs.

Dentition, both the first and second, may be considered as belonging to this class of predisposing causes, and holding the first rank. The various mercurial preparations which are used in medicine, also belong to this class, and these are the only ones of sufficient importance to require particular notice.

The causes which affect the dental organs by direct local action, by inducing inflammation and its consequences, or by direct chemical process, and which demand special consideration, are—first, the acid or chemical agent produced by the putrefactive process, and which is generated to a greater or less extent in all cases. Secondly, the tartar which is deposited upon the teeth, and becomes a source of disease; and thirdly, the improper use

of remedies, and the use of improper remedies. These form quite an extensive class of causes. They consist of the tooth-brush, of various preparations as dentifrices, of filing the teeth, and also of plugging them, etc.

The above are the main causes which affect the dental organs, and tend to destroy them, and which it is deemed of importance to be well and generally understood. To these, as involving the general pathology of the teeth, the attention is now called.

#### DENTITION AS A PREDISPOSING CAUSE OF CARIES.

That there is, generally, during the first dentition, more or less general irritation of the system, and local irritation of the organs connected immediately with the teeth of children, is a fact too well known to require any further argument for its establishment, than the simple statement that it is so. In many cases, extreme irritation and inflammation of the gums take place; but in all cases, even where teething is effected in its most natural and perfect manner, there is more or less irritation of

the gums during the process ; and generally, at this day, children are so accustomed to confectionery, and consequent stomach ailments, that there are very few who complete the process of dentition without an irritable or inflamed condition of these organs remaining as the consequence.

The irritable state of the teeth and gums resulting from the first, as well as the second dentition, would, in nearly all cases, subside spontaneously, if other causes were not brought to act in conjunction with it. But in addition to the predisposition to disease already existing as above stated, other and more potent causes are allowed to exert their influence—to continue, and frequently augment the common evil, until, as a general thing, caries, and consequent destruction of the teeth, follows.

There are other predisposing causes which frequently contribute, with that of dentition, to produce the condition referred to ; but it is not necessary to refer to them here, as the general principle is comprised in the facts already set forth. My object is mainly to impress upon the minds of those who have the care of infancy and

youth, the fact that there is a predisposition to dental disease induced by certain causes at the periods referred to, and that hence the importance of using those means necessary to prevent the accession of other causes, which, when allowed to exert their united influence, are productive of so much evil.

#### CHEMICAL AGENTS—THE RESULT OF PUTREFACTION.

It has already been observed, that those having the care of children usually pay little or no regard to the condition of the organs under consideration, after the first dentition is accomplished, provided there is no uncommon manifestation of disease. The child is allowed to pass on from year to year, without ever once, perhaps, having had applied any detergent means, so essential to the health of the teeth and gums. The food is allowed to accumulate about the teeth, and at this period the gums are usually more or less tumid from the effect of dentition, and serve especially as a lodgment to particles of food. Vegetable and animal sub-

stances, allowed to accumulate and remain in a fixed point, and combined with a certain degree of heat and moisture, undergo what is called the putrefactive fermentation, resulting in the production of gaseous substances, which act, by their pungency, upon the organs with which they come in contact. It is not necessary, here, to go into a discussion of this subject, for the purpose of proving out the specific composition of the deleterious agent or agents developed under such circumstances; it is sufficient for all practical purposes, to know the fact that there is an acid substance produced, which not only irritates and inflames the gums and sensitive portions of the teeth with which it comes in contact, but also acts by producing direct chemical decomposition of the enamel of these organs. That such is the case, is susceptible of demonstration. Any one may satisfy himself of this, by the examination of his own teeth. Offensive breath, with most persons, arises from this cause. A diseased throat or lungs may have this effect, by the putrid effluvia which is exhaled from them; but these are exceptions. The mass of people are not so unfortunate as to be

subject to these afflictions. But where cleanliness of the teeth is neglected, there is a tainted breath. There are no exceptions. Every individual, whatever his general health may be, who neglects to apply proper detergent means to his mouth, as containing the dental organs, subjects himself in some degree to the evils which arise from the putrefactive decomposition of alimentary substances; the intensity, only, being modified by circumstances.

Childhood and youth, owing to the want of proper attention, are the periods particularly obnoxious to the operation of this cause. From the effect of dentition, the gums are generally more or less swollen and irritable, and more especially during and immediately subsequent to the second dentition. During this period, the food more readily finds a lodgment about the teeth.

It is well known that animal and vegetable substances in combination, when placed under certain circumstances, undergo the putrefactive fermentation. It is well known, also, that an acrid chemical agent is the result of this process; and it will be readily seen, that the condition in which alimentary substances are placed, when lodged about the

teeth, is favorable to this process. It may be fairly inferred, therefore, that this corroding agent would be developed, and that inflammation of the gums and teeth, as well as direct chemical decomposition of certain portions of the latter, would be the result. Such, indeed, experience proves to be the case. Irritation and inflammation of the gums and parts of the teeth not covered with enamel, which are exposed to its influence, are always present in some degree, where there is no attention paid to cleanliness. The teeth always commence to decay at such points as are most exposed to the action of this corroding agent generated by putrefaction. Those teeth which present the largest contact surfaces, and which are in other respects so located as to expose them to the constant contact of putrid particles, are always the first to be affected with disease. On the contrary, the polished surfaces of teeth are the last to become carious. Indeed, where they are kept perfectly free from the action of corroding substances by cleanliness, they never decay. As, for instance: their labial and lingual surfaces seldom are the seat of caries, and never, except when a natural depression, or other defect,

is present, or perfect neglect of cleanliness affords a lodgment for putrid particles upon them. Teeth which, from their natural position, or from accident—as the extraction of an intermediate tooth—stand sufficiently asunder to prevent the lodgment of particles of food upon them, very seldom decay at all. The observation of this fact probably suggested the pernicious practice of separating teeth, though sound, with a file, when close together.

It is evident, therefore, when, from dentition or other predisposing causes, the gums are swollen, and, with the teeth, are excited to an undue degree—as they usually are, especially at the time, and immediately subsequent to the second dentition—that if, under these circumstances, cleanliness be neglected, a new and potent cause of disease will necessarily supervene, and disease of the teeth will be the necessary consequence.

I have stated that the period at, and immediately succeeding, the second dentition, was that most favorable to the development of causes which tend to the destruction of the teeth. It will be found, on close observation, that in a great majority of cases where these organs become diseased, the

time of its commencement is referable to this period. From what has been stated, the reason will appear obvious.

At this time, also, of the second dentition, or about the age of from twelve to fifteen years, another cause begins to operate in conjunction with those which have been referred to, and, in many cases, adds very much to the potency of these evils. I refer to the substance commonly called

#### TARTAR.

This substance exists in solution, or suspended in the saliva, and is deposited from it upon the teeth. When first deposited upon them, it is in a soft and cheese-like state, and is easily removed; but it soon hardens, and frequently becomes so indurated, when allowed to remain, that it nearly equals, in this respect, the tooth on which it is deposited. In its composition, it resembles somewhat that of the teeth. It is composed principally of the carbonate of lime. I am not aware that this substance exerts any direct injurious influence upon the teeth upon which it is deposited; but, in

some instances, seems to serve as a protection to them from other causes. But, as this substance is generally deposited, first of all, at the necks of the teeth, and especially underneath the free edge of the gum, it thus presents a rough surface to that structure, and also affords a lodgment to putrid particles, and other corroding agents. Its first effect, therefore, is to excite more or less irritation of the gum, producing increased redness and sensibility, with sponginess, and the separation of its edge from the necks of the teeth. As this accumulation increases, the effects keep pace with it. The gum generally becomes exceedingly painful, as this and other causes combine to operate upon it, so as to render the ordinary operation of brushing the teeth almost impracticable; and thus, by inducing a neglect of the common means of preventing its accumulation, it becomes the unavoidable cause of its continued increase. Absorption of the gum and alveolar process, or bony sockets of the teeth, is the next consequence, which gradually goes on until the teeth, losing their support, become loosened, and at length fall out.

A temporary and fallacious support is sometimes

produced by a large quantity of tartar, which forms one continuous mass around the loosened teeth ; and instances have occurred in which several teeth, thus cemented together, have come away without being separated from each other.

The lower front teeth are more particularly liable to this concretion than any others ; and hence it happens that, although these teeth, owing to their form and position, are attacked with caries far less frequently than others, yet there are scarcely any teeth which are so commonly lost as these.

Accumulations of this limy substance are seldom found on the temporary teeth. Usually, it is not noticed until about puberty, or till the fourteenth or sixteenth year. It would seem that the growth of bones during childhood and youth requires all that the system can supply of earthy matter, for that purpose. The saliva of the adult, however, always contains it in a greater or less degree ; and hence, where there are no means adopted for the purpose of preventing its accumulation, it will always be found in some quantity about the teeth.

In regard to the nature and source from whence this substance comes, generally there is but very

little knowledge. I have been surprised at the ignorance sometimes manifested by men, in other respects of general intelligence, but of this substance having no definite idea, notwithstanding their health and comfort were so intimately connected with it. Cases are frequently met with, where the tartar, by becoming detached in scales from the teeth, has led the individuals to suppose the teeth themselves to be crumbling to pieces. In all cases where this substance is allowed to accumulate, other causes, which have been referred to, are, as a necessary consequence, allowed to act in conjunction with it; for the most proper means to be adopted as a remedy for this evil, are equally so for the others. The means, then, by which the formation of this substance can be obviated, or at all events its accumulation prevented, becomes a matter of no small importance. When this concretion has become indurated, and attached to the teeth, it can not be removed except by instruments adapted to the specific purpose. The operation by which this end is accomplished, is termed scaling the teeth. To this, as a remedy, I shall have occasion to refer hereafter.

In regard to the causes of dental disease which have been discussed, it will be observed—that dentition, in most cases, leaves the gums and teeth in an irritable or inflamed state; that this condition would generally subside naturally and spontaneously, did not other causes supervene. But this condition predisposes to disease of the teeth; and, being thus exposed, the corroding agent generated by putrefaction almost universally induces more or less caries of the temporary set. These teeth, as has been stated, are generally viewed as of little consequence, being of short duration. But this is a very great error. Important and lasting results may, and frequently do, depend upon disease of the first set of teeth. From the want of cleanliness which they sometimes suffer, disease, to a degree that destroys prematurely the connection which exists between the rudiments of the permanent teeth and the temporary ones, may occur, and thus a lasting injury be effected in the deformity or total destruction of one or more of the secondary teeth. Numerous instances might be cited where injury done to the temporary teeth had produced deformity of the secondary ones, by in-

interrupting the natural course of their development; and an instance came under my observation, where, by the premature extraction of the deciduous teeth of the lower jaw, the germs of all the permanent teeth which were attached to them, except the two central incisors, were entirely destroyed. These two were so far developed as not to be materially affected by the unnatural operation.

But inattention to the temporary teeth is commonly indicative of their treatment during adolescence. Usually the second dentition takes place under the unfavorable circumstances which have been stated, and now another important influence gradually supervenes, to increase the excitement and assist the general evil tendency.

The deposition and concretion of tartar upon the teeth, in addition to the other active agents, is in most cases sufficient to effect, sooner or later, the destruction of the dental organs; and hence it is, that during the period of adolescence the permanent teeth almost universally become in some degree carious.

It is not generally until the individual approaches manhood, that he is induced to resort to the de-

tergent means necessary for the well-being of his teeth, unless the subject is forced upon his attention by the pain of disease at an earlier period. This, however, is often the case. But, with many individuals, self-respect, as age advances, leads to the adoption of means by which the personal appearance may be improved; and, as "a mouth without teeth is a mouth without charms," these organs receive an adequate share of attention. For various reasons, therefore, after the second dentition is accomplished, the attention of individuals is turned to the consideration of these important organs.

To cleanse and purify the teeth from the influences to which they have been subjected during their long night of neglect, is generally the first idea that suggests itself to the individual, and is practically the first step usually attempted to be made in the process of prophylactic or remedial applications. To accomplish this desirable end, custom has given a sort of universal sanction to the use of a particular instrument. Hence, whatever may be the condition of the dental organs at the time their claims are considered, whether in an

advanced stage of disease, or comparatively healthy, the first, and frequently the only means resorted to, to improve their appearance or correct their diseased state, is the tooth-brush.

#### THE TOOTH-BRUSH AS A CAUSE OF DISEASE.

This instrument, as commonly obtained in the shops, is made from the ordinary hog's bristle. Probably not less than seven-eighths of those now in the markets of our country are thus composed. Indeed, they are too well known to require description. When made of this material, they are generally stiff, and always harsh when applied to an inflamed or sensitive surface, such as the dental organs more frequently present.

Subjected as the teeth are to the influence of the causes which have been briefly adverted to, it requires no argument to prove that the additional daily application of an instrument like the common tooth-brush would only serve to increase the excitement and accelerate the evil. Experience proves most unquestionably, that this instrument,

as it is usually constructed, does not accomplish, in a single particular, the object for which it is designed; for its legitimate object is to remove from about the teeth the deleterious agents which have been described, and cleanse them from all impurities. But the interstices between the teeth and about the free margin of the gum, so very essential in the detergent operation, can not be reached by it; and hence it is, where individuals are assiduous in their attentions to these organs, using the brush daily, under the impression that they are doing all for their preservation that science or art can suggest, and yet are doomed to submit to the gradual encroachments of carious disease. The truth is, the real, active agent which corrodes and destroys the teeth, is not reached at all in most cases by this instrument; but, so far as an effect is produced by it, it tends to augment the evil.

The remark is often made, that dental disease arises from hereditary taint—the physical defect of the parent being transmitted to the offspring. There are many instances where this would seem to be the case, where whole families seem to be afflicted with the same transmitted evil. But it

will be found on close inquiry, in all such instances, that the individuals concerned have either been very particular in their attentions to these organs—knowing the evils under which their progenitors had suffered, and dreading its transmission—have sedulously applied the brush and the dentifrice, both of which, probably, like the fabled siren, “lured but to destroy;” or, being impressed with the belief that remedies were useless “where fate had set its seal,” have neglected them entirely, and thus allowed the free action of every evil cause.

There may be, and probably is, a slight difference in the constitution of the teeth of different individuals; also in the composition of the saliva from which the limy deposit, or tartar, comes; in the form of the teeth, etc. All these may have a tendency to evil in particular cases; but these, if facts and experience can be allowed to testify and determine, need only a more sedulous application of the proper remedies to obviate their evil tendencies. But this can not be accomplished by rasping the teeth and gums continually with a stiff, harsh brush, or the application of a corroding dentifrice.

THE DENTIFRICE, A CAUSE OF  
DENTAL DISEASE.

The composition of compounds, professedly designed to beautify and preserve the teeth, demands particular consideration. The dentifrice is one of the humbugs of the age; or, rather, many people are humbugged by them. Almost every dentist has his nostrum, by which he professes to accomplish certain purposes. Many of them are at best harmless in their effects; some are beneficial, and frequently very necessary; but there are others which are imposed upon the community, which are decidedly injurious. They appear in the market in various forms—some in that of paste, some in powder, and others in a fluid form. Multitudes of teeth have been more or less injured, or entirely destroyed by them. These compounds frequently contain properties which act chemically upon the substance of the teeth. For the purpose of rendering them more white and beautiful, various acids are combined with other ingredients. Cream of tartar, or tartaric acid, the citric and oxalic acids, and others, are frequently used for this

purpose. From neglect of the teeth, the enamel sometimes becomes very much discolored. This discoloration in some cases can not be removed without considerable trouble; and yet most persons, especially females, have a strong desire, where this is the case, to have this defect removed. Chemical compounds are therefore prepared and offered to the community under the guise of a dentifrice, with some high-sounding technicality attached, in order to invest its operation with magical obscurity, for the purpose of cleansing and beautifying and preserving these beautiful organs.

Since the above was written, I have been shown an article of this sort offered very extensively for sale, a kind of preserving fluid. It proved, on examination, to be a weak solution of oxalic acid, put up in small bottles of two drachms each; and, what is very remarkable, it found many ready purchasers, some of whom are persons of considerable intelligence.

To those at all acquainted with the chemical combinations of acids with other substances, the effects of such compounds will be perfectly plain.

The oxalic acid, when applied to the enamel of the teeth, combines with the limy portions of which it is in part composed, rendering them of a pearly whiteness. But this is only a temporary effect. Repeated applications, even of a very weak solution of these substances, will finally destroy the organization of the teeth; and instead of the white and beautiful appearance which they first assume, they become permanently discolored, and at last crumble to pieces. This has been the fate of thousands, and all the result of cupidity imposing upon trusting ignorance.

But there is another substance which has obtained a considerable degree of celebrity, and recently seems to be acquiring quite an extensive application as a dentifrice, against which the public needs to be warned, as it undoubtedly is the source of much mischief. I refer to the use of charcoal. The use of this substance as a dentifrice, and preservative of the teeth, was suggested by its known affinity for putrid substances, and its power to arrest putrefaction. Charcoal, applied to substances undergoing putrefactive decomposition, will arrest this process for a time; the idea was con-

ceived, therefore, of making use of it to arrest the putrefactive process which has been described as taking place about the teeth of individuals, where perfect cleanliness is not constantly observed. If this substance is applied as a dentifrice in its recently prepared state, in a finely levigated and dry condition, it no doubt will subserve a highly beneficial purpose, provided it is thoroughly removed again from the mouth, or from about the teeth, after having parted with its antiseptic qualities. But, if it be applied to these organs, and allowed to remain between and about them for any considerable time, it loses its antiputrefactive powers, and serves only, by its affinity for putrid substances, to retain them in the position best calculated to develop and exert their deleterious energies.

Many, perhaps most persons, who make use of a dentifrice for the preservation of their teeth, suppose that by bringing and retaining it in contact with them, it will therefore better effect its object. Indeed, I have known individuals who were in the habit of using charcoal in powder once or twice a week, being careful to abstain from the use of the

brush, that the dentifrice might have the opportunity to accomplish its purpose. In all such and similar cases, I have always found a swollen and livid appearance of the gums; but where this substance has been used with the free use of a proper brush—for there are a few such cases—these organs have exhibited a more healthy appearance.

It is therefore not the simple use of charcoal as a dentifrice, but the improper use or abuse of it, that is to be deprecated: for observation and experience plainly show that this substance, used as it may be for the purpose above stated, becomes the instrument by which to effect considerable good; but used as it commonly is, it becomes the source of a great and increasing evil. For the last eight or ten years my attention has been directed particularly to this subject; and from the observations I have been enabled to make, I am thoroughly convinced that the improper use of this substance as a dentifrice prematurely destroys multitudes of teeth annually. When charcoal is thus used, the gums put on a peculiar diseased appearance, an exhibition which is seldom seen except where this substance is used. It is far better, therefore,

never to use this article upon the dental organs at all, than to allow it to remain about them to serve as a nucleus to attract and retain the seeds of disease.

#### FILING THE TEETH INJURIOUS.

It is a remarkable fact, that the teeth, when, from any cause, whether natural or otherwise, are so placed in their sockets as not to be in contact with each other, having an interstice between what is commonly their contact surfaces, are not so liable to become diseased or carious, as where, as is generally the case, their juxtaposition places them in actual contact. This fact being matter of frequent observation, it probably suggested the operation of filing a space between these organs where nature had placed their opposing surfaces in contact. This was practiced very extensively by dentists a few years ago, and is by many, to some extent, at the present time. This operation is always more or less unpleasant, and sometimes very painful. But I refer now to filing teeth in a sound and healthy state, in order to prevent disease.

When they have become carious on their contact surfaces, it is necessary to separate them by filing in order to perform the operation of plugging; but in this case the sensibility of the teeth is generally rendered so obtuse by the cause producing the disease, that but little or no pain is experienced in the operation. Under such circumstances, therefore, it is admissible, for there is no other alternative. They can not be filled without it. But this necessity does not obtain where there is no disease. But many persons, desirous to preserve their front or incisor teeth, submit to have them separated in this manner by dental advisement, without having any definite idea of the effect generally produced.

The manifest object to be obtained by this operation—for there can be no other—is to place the teeth asunder so as to prevent the lodgment between them of articles of food, and thereby prevent the action of corroding substances. Now, if this object could be obtained by the operation, and no other injurious effects be produced, there could be no objection to it; but, unhappily, this has seldom been the case. The effect generally produced by passing a file between sound teeth, is

to increase the opposing surface area, to induce an undue excitement, and, in many cases, an active inflammation in the teeth filed. The teeth are usually of such a form, that unless the filing is more extensive than what the irritation commonly produced will allow of, they will soon approximate to actual contact again. This is the case frequently when teeth are filed apart for the purpose of plugging. If especial care is not taken to file them in such a manner as to prevent the coming in contact of the increased surfaces, they are certain to decay again in a very short time. This is one reason why so many plugs fall out from decay of the teeth after filling. But sound teeth are so much more sensitive on being filed than carious ones—for caries usually obtunds the sensibility—that commonly it is very difficult so to file them as to prevent this result. The separation of the surfaces, therefore, is generally only temporary. When, therefore, after being separated, they have approximated each other to contact, the same causes to which they were exposed previously now operate with increased energy. The filing having produced a more perfect coaptation of the opposing

surfaces, together with the irritation excited, decay is almost certain immediately to follow. Reason indicates this result; experience confirms it. And yet dentists, for a few shillings, recommend and practice this operation, rather than honestly to say to those who consult them in regard to the best means to preserve the teeth—Nature has performed her office well; do thine. It is an old adage, “Let well enough alone.” When, therefore, the dental organs are free from disease, and in the condition in which Nature formed them, discretion, and prudence, and sound sense would seem to say, that the invention of man would not be very likely to improve upon this condition. Certainly the filing away a portion of the enamel, which evidently was intended to serve as a protection to the more sensitive bone beneath it, can in no wise render a tooth less liable to be destroyed by those causes which usually operate upon it.

Having briefly referred to the principal causes, and their modes of operation, which tend to engender disease of and destroy the dental organs, and endeavored to point out some of the evil results which arise from the improper use and the use of

improper remedies, it now remains to state the true treatment which the various conditions and circumstances which involve these organs, both in health and disease, require, in order to protect or recover them from the common calamity to which, through ignorance, misapprehension, and cupidity, they are subject.

#### CLEANLINESS, AS A REMEDY.

It has been already stated, that certain structures which compose the physical organization imbibe disease far less frequently than others. The osseous structure is one of these. The common causes which induce disease of other parts of the body, seldom affect the bones. Indeed, this structure is seldom the location of disease, except from accidental causes, or a general depraved habit. The teeth, being a portion of the bony structure, are therefore seldom attacked by diseases which depend upon general causes. A diseased tooth, aside from that produced by local causes acting upon that part of it covered with enamel, or from excessive disease of the contiguous gum previously

induced, is a very rare occurrence. The disease called caries, or gangrene, is entirely of a local nature, and is usually produced by local causes only. Generally, disease of the teeth does not depend at all upon the condition of other organs, aside from the gums. These organs may decay, and be entirely destroyed, and frequently are, while the other constituents of the organization remain in a state of unimpaired health—and *vice versa*. These facts are striking evidence of the local character of the causes which induce dental diseases. Hence it is, that, in the adaptation of remedies to the prevention or cure of dental diseases, those only which are local in their operation are found by experience to accomplish the end desired. All the dental remedies, such as brushing, scaling, filing, and plugging, are resorted to for the purpose of removing active local causes.

It will no doubt be readily conceded, that the teeth come from the hand of Nature, ordinarily, endowed with the same degree of perfection as the other constituents which make up the human physical organization. It will also be admitted, that if the various special agents which affect these

organs can, by any means, be prevented from the exercise of their powers, they will remain subject only to the same general causes which influence the whole system, and that, therefore, they will continue coextensive with other members of the body.

Now if the causes which have been discussed in the foregoing pages are those only which usually act upon and destroy the teeth, and acting locally as they do—and it is believed that the subject has been made sufficiently plain—then it follows that the remedy which prevents or removes these effective causes will have accomplished the desirable object, the preservation of the teeth. Such a remedy will apply equally to the deciduous or temporary teeth, as to the secondary or permanent ones. When all the circumstances involving this subject, therefore, are taken into consideration, it becomes self-evident that perfect and constant cleanliness of the parts involved will effectually secure them against all the evils which commonly befall them. Provided, always, that the means adopted to secure this result do not, like the brush which has been referred to, assist to establish what they are intended to cure. With the contiguous gums in a healthful

condition, the teeth, by the timely and continual application of means suited to their thorough cleansing, can be as completely protected from disease as other organs. But the means used must be suitable, and properly and thoroughly administered. Let the mother, while engaged in the performance of her daily ablutions to her child, after the commencement of the first dentition, not forget to cleanse thoroughly from all impurities its teeth and gums; let this be done with a soft, unirritating brush, and let that child be instructed, as its years accumulate, to use the instrument itself, and let it be required to make a thorough cleansing of these organs one of its daily duties, and this continued till puberty—let this become the general practice of mothers and nurses, then, seldom indeed will the necessity arise for those tedious and distressing pains and aches of the teeth and ear which so frequently afflict the period of childhood and youth, and in after life for incurring the expensive dental operations which are now so common; and, above all, the loss of those organs designed to contribute so largely to man's health and comfort.

Childhood and youth is the most important season

for receiving instruction. It is especially so in regard to habits of cleanliness. The youth who has been trained to consider dental cleanliness as essential to his comfort and health of his teeth, will rarely neglect them in subsequent life. But this habit must be adopted early, in order to be effectual. Perfect immunity from the causes which have been referred to can only insure success. The prophylactic must therefore be administered previous to the first impressions of disease being made. The principle of action, however, is the same, whatever circumstances may predominate. If these organs have been neglected—if the gums have become diseased, the tartar deposit become considerable, and even numbers of the teeth more or less carious, still the practical principle has in view the accomplishment of the same object, the removal and prevention of the effective causes. Cleanliness, therefore, under all circumstances and conditions, is the great and important remedy. This remedy, thoroughly and constantly applied, after all dental operations, is absolutely essential to their success. Preparation of the teeth and gums, or, rather, a condition of them, is necessary,

which, if cleanliness is observed, places them beyond the reach of the destructive agents, and which can only render any other means efficient to preserve them. That condition must be a convalescent one, at least so far as disease of the parts contiguous to the teeth are concerned. To place them in such a state, cleanliness must always be strictly observed, auxiliary to which a properly constituted dentifrice becomes an important adjunct.

The first great object, then, to be obtained, whatever the circumstances of the case may be, is, to remove and prevent the further operation of the efficient cause, by cleanliness. If the teeth and gums have become irritable and inflamed by the calcarious deposit, this is to be removed by suitable instruments, and the diseased gums restored by appropriate applications, which will be referred to hereafter. If the teeth have become carious, they, too, are to be treated as their condition demands. To these, also, I shall refer again. The first and most important object, however, to be attained in the dental treatment, is cleanliness.

THE TOOTH-BRUSH, A MEANS  
TO OBTAIN IT.

To remove all impurities from about the teeth and gums being the first in order of dental treatment, the means by which it can best be accomplished demands attention. It is of very little importance what instrumentalities are adopted, only so they are efficient. The use of the tooth-brush for this purpose, so far as any means are used, has become almost universal; and there probably can not be, at all events there never has been, an instrument superior to it in all respects. But it must be properly constructed, and of suitable material. It should be what may be termed a soft stiff brush. It should be soft and unirritating to the gums, and at the same time sufficiently stiff to enable one to cleanse thoroughly his teeth by obtaining access to every recess. Such instruments are manufactured, and may be obtained; but they are rarely found in the markets, owing to the fact that a cheaper article usually has the most ready sale. But of the common brush, and its pernicious qualities, sufficient has already been stated.

The use of plegets of cotton, or floss silk, is sometimes resorted to for the purpose of more perfectly cleansing the teeth. This practice is a beneficial one; but the brush, if properly constituted, and assiduously and perseveringly applied, will meet the necessities of every case. But care should always be taken not to irritate the gums, whatever remedies may be resorted to; and it is better for the welfare of the teeth that they be entirely left to all natural influences, than to be subjected to the harsh applications so frequently made use of.

#### THE DENTIFRICE, AS A REMEDY.

I have already referred to various compounds used upon the teeth as sources of evil. As a remedy, however, the dentifrice, when properly constituted, is of great importance, and may render essential service in the treatment of dental diseases.

In the preparation of a remedy of this nature, its design is the first object of consideration; and the second is, what combination of ingredients will best accomplish the end in view.

The gums, it will be remembered, are affected by the same agents which corrode and destroy the teeth. In most cases, therefore, where these causes are allowed to exert their influence, the gums become more or less excited in an undue degree. They frequently become spongy and swollen, and when the excitement is intense and long continued, scorbutic. To overcome this diseased condition, medicine may be of essential importance, and is sometimes very necessary. To restore and preserve the gums in a healthful condition, therefore, is the first object to be attained by remedies of this kind.

There are various compounds prepared by dentists and others, and sold in the markets, which propose to prevent as well as remedy the diseased conditions to which the teeth and gums are subject.

Some of the nostrums which are vended for this purpose, are prepared with a view to the immediate effect which they produce on application. These contain properties which act chemically, and, although they may render the teeth of a pure white for a time, in the event serve only to destroy them. As the ordinary condition of the teeth and gums,

however, particularly the latter, require the frequent application of a proper dentifrice, it is of importance that the virtues of these preparations, and their mode of operation, should be well understood.

As I have already stated, to remedy diseases to which all are liable, the world have gone in pursuit of specifics. It is particularly so in relation to remedies for preserving the teeth. Without any idea of the specific effect to be produced, having but a general apprehension that virtue is wrapped up in the mysterious preparation, individuals purchase nostrums of this sort, and apply them, without even knowing their reputation for good or evil. When injurious results follow their application, they are commonly attributed to any other cause than the true one. People generally are not willing to believe, that a nostrum obtained as an expensive remedy, promising miraculous benefits, is but a mere deception, or destroying evil. But where experience produces unmistakable evidence of the injury it has accomplished, the whole list of remedies are usually condemned, and equally denounced. Hence, the only safe course in regard to nostrums

of this kind, is to reject them altogether, where their virtues are not authenticated.

As a general rule, very little benefit may be anticipated from any remedy of this sort, while the teeth are incrustated with tartar, and general cleanliness of them and the gums is neglected. There are also certain conditions of these organs, for which no general remedy, applicable to all other cases, can be with propriety prescribed. There are cases in which a strong solution of lunar caustic is indicated, and others where other specific and potent remedies are required. Of these it is not my design to speak. They require the immediate attention of the physician or surgeon. But there is a condition of these organs which presents a general sameness in all cases, and to which remedies of the same class, having a similar specific operation, will generally apply. This is the ordinary condition which usually presents to the dentist's notice.

The diseased condition of the gums referred to is not induced suddenly, nor by causes which produce violent effects, but is established gradually, as the force of the causes increases. The diseased

condition of the gums, therefore, is what is termed chronic. This is especially true of the cases of adult persons as they commonly come under the notice of the dentist. When once established, this condition will continue so long as there is tartar upon the teeth, or the product of putrefaction is allowed to exert its influence. As a means, therefore, to assist in the preservation or restoration of health of diseased gums, the legitimate operation of a properly constituted dentifrice is, to neutralize the product of putrefaction, to prevent the accumulation of tartar, and stimulate the vascular substance of the gums to a changed and healthy action.

In the selection of medicinal substances for the composition of such a compound, reference should be had to the specific effect necessary to be produced. As there is commonly a want of energy, a lax condition of the gum, the remedy should be such as to impart strength, and give tone to its fibre. If the product of putrefaction be an acid, then an alkali becomes necessary to neutralize its deleterious qualities. But theory, in order to be a safe and efficient guide, must harmonize with

practical demonstration. Experience is not to be discarded in practical medicine. Among the articles of the materia medica, there are those which, from their known peculiar qualities, are used for specific purposes. For example—opium, by experience, is known to possess what are termed narcotic properties. It allays nervous excitement, subdues pain, and induces sleep. The indications of a diseased body, therefore, determine the necessity for its application. Peruvian bark imparts a tonic power; nutgalls, or alum, applied to the muscular fibre, produce an astringent effect, which also gives tone to the vital energy. Some substances combine several distinct qualities within themselves, although, may be, in less degree.

It is ascertained by observation, that certain active properties, when existing in combination with others, as exhibited in certain articles of medicine, have a more beneficial effect upon particular structures of the body than when they are applied under other circumstances, or when exhibited alone, or in other combinations. Thus it is that certain compounds, containing a variety of particular medicinal properties, have obtained a

reputation for virtues imparted in particular cases. For instance—compounds into which myrrh enters as an ingredient, have become justly celebrated in many local diseases where astringent and tonic properties were indicated. Hence the extensive employment of this drug as a dentifrice, for experience demonstrates its utility in the ordinary diseases of the gums. But a dentifrice should contain other powers than those possessed by myrrh alone. To meet fully the indications of the dental organs as presented under all circumstances, except in extreme cases of disease, a dentifrice should combine gently stimulant and astringent tonic powers, together with antacid properties, or such principles as will neutralize the corroding agents resulting from putrefaction, and render them harmless. A compound combining all these qualities, operating in harmony with each other, for general use, has long been a desideratum.

For the last twelve years this subject has occupied a considerable portion of my time and attention. With a view to the preparation of a dentifrice answering these ends, I have made

various experiments in the combination of substances, observing closely their practical effects.

The *Compound Tooth-paste*, a recipe for the preparation of which is appended to this work, is the result of those years of labor. I believe it to comprise all that can be anticipated from remedies of this nature. I have prescribed it for the last eight years as a dentifrice, and have had the satisfaction to witness its beneficial effects in numerous instances, as well as the gradual extension of its use beyond the limits of an extensive dental practice. Those who have once used a box of it are never after willing to be deprived of its benefits. When care is taken in its preparation, and selecting the ingredients of which it is composed, it is a very pleasant, mild, safe, and agreeable dentifrice. It must not be forgotten, however, that a properly constituted tooth-brush is a necessary prerequisite to its application, and development of its peculiar virtues.

I have also appended other recipes for compounds, which have been very serviceable in particular cases. The one numbered 7 has been found very beneficial when applied in cases where the

teeth have become loosened, and gums spongy and irritable from mercurial influences.

That numbered 3 is a very elegant wash for the teeth and gums. A few drops in half a wine-glass of water makes a very agreeable wash for the mouth for common use.

In reference to the remedial powers of agents of this sort, it is no more than truth to say, that generally individuals anticipate too much. A compound, the constituent elements of which are not known to the public, is invested with extraordinary virtues by the imagination, simply because its composition is shrouded in mysterious secrecy. It is so in all departments of practical medicine. Individuals, therefore, should not trust too much to remedies of this kind, but only employ them as auxiliary to those of more importance, which have been referred to.

#### SCALING THE TEETH.

The calcareous substance, or tartar, held in solution by the saliva, when deposited upon the teeth, and suffered to accumulate, becomes a serious

evil. Its evil effects have already been briefly adverted to. Its remedy remains to be stated. It will be remembered that this deposit is very seldom noticed during the period of childhood. It appears earlier in some cases than in others, but is rarely seen in any considerable degree until the period of advanced adolescence. This substance, when first deposited upon the teeth, is of a soft and cheese-like consistence. It is therefore very readily removed by the use of the tooth-brush already described. And it may be observed here, that one of the essential virtues of a properly constituted brush is, that this deposit of tartar can be reached by it in all the interstices into which it may insinuate itself.

If, then, the means which have been described as important to the preservation of the dental organs were applied as they always should be, there would never arise the necessity for the adoption of any others for the purpose of remedying this evil. But the accumulation and induration of tartar upon the teeth of adults is almost universal. Rarely, indeed, does the practical dentist meet with an individual who does not require the assistance of other

means than those merely prophylactic, to correct the evil arising from this substance.

When the tartar has been allowed to accumulate and harden upon the teeth, the tooth-brush, whatever its qualities may be, is entirely inefficient to remove it. There is no chemical agent sufficiently energetic for its removal without endangering the teeth themselves. Hence it becomes necessary to resort to the use of instruments of steel or other hard metal for the purpose. The removal of tartar from the teeth in this manner is usually denominated *scaling* them.

Scaling instruments, formed and adapted to this particular purpose, are therefore always a component part of a dentist's case. The tartar usually insinuates itself between the teeth and the free edge of the gum. In order to remove it, therefore, the instrument has to be passed below it and drawn up. If the instrument is sufficiently sharp, there is commonly no difficulty in scaling it off, which sometimes occurs in large masses. Care should always be taken when this operation is performed, that none be left to serve as nuclei for its reformation, which is very likely to happen where

this is the case, whatever means may be adopted to prevent its reaccumulation. Many persons entertain a prejudice against this operation. They suppose that by scraping the teeth with a sharp instrument in order to remove the tartar, that the teeth themselves receive more or less injury. To the practical dentist the reason for this prejudice will at once appear obvious. Individuals neglect all the means by which the various causes may be prevented from injuriously affecting their teeth, they become incrustated with tartar, the gums become more or less swollen and spongy—at least diseased to some extent—and the teeth themselves, although perhaps unknown to them, being obscured by the tartar and condition of the gums, are become carious. In this condition application is made to the dentist. He proceeds to apply the remedy. The operation of scaling is performed. With many dentists nothing further is prescribed, there being no other mechanical operation necessary. Under the impression that removing the tartar is all that is required, the same condition continues which previously existed, with this difference—the teeth are more exposed and easily

examined, and thus the fact is made manifest that they are decaying, the immediate cause of which is attributed to the scraping they have received. The judicious and conscientious dentist will therefore always decline the performance of this operation, except he has good reason to believe that his patient will adopt the recuperative means necessary to render this operation beneficial to him.

Although this operation is a very important and necessary one, and one which requires no very great skill on the part of the dentist, yet there is frequently great fault in its performance. In cases where tartar has been suffered to accumulate to much extent, especially if the gums are much diseased and bleed, it is not a very agreeable task on the part of the operator; and sometimes, to fulfill what the circumstances of the case demand, requires a self-sacrificing spirit, even more than commonly falls to the lot of men engaged in this pursuit. Hence it is that this manner of removing the tartar from the teeth is so frequently inefficiently performed.

But this substance may be removed by the individual himself on whose teeth it accumulates.

With an instrument suitably constructed, he can remove small particles which might not readily be found by a dentist. When the teeth are perfectly free from this substance, the scaling instrument, however sharp it may be, will pass smoothly over them. Persons may be assured, therefore, that when it catches, or when any obstacle presents to prevent it, that the tooth upon which the instrument catches has indurated tartar upon it, or is affected with caries at the particular point. It sometimes requires considerable force to dislodge it. The sharper the instrument the more easily and perfectly it can be detached.

As this calcareous substance is deposited and hardens upon the teeth whenever the use of the common detergent means above referred to are neglected, and as its accumulation is an immediate source of irritation to the gums, every person disposed to pay all due attention to these organs should be provided with scaling instruments, for the purpose of removing it for himself. The expense of a few shillings in the purchase of instruments of this sort, if applied whenever occasion rendered it necessary, would save dollars to an in-

dividual of what he would otherwise pay to the dentist, and, above all, prolong the existence and usefulness of these, while the necessities of other organs require their assistance.

Since the commencement of this article on scaling the teeth, I have been called to examine the mouth of a lady some fifty-five or sixty years of age for the purpose of inserting a set of artificial teeth, who has but four teeth remaining, one in the upper and three in the lower jaw. The others had fallen out within the last two years, all of which were exhibited on the occasion. No disease nor blemish was to be observed on any one of them, except that they were all more or less incrustated with the tartar deposit. They seemed to have been perfectly protected from the effect of other deleterious influences by this indurated deposit; but which, with other agents, had so excited the gums and the bony sockets of the teeth to diseased action, that they had been entirely removed by the process of absorption. The teeth, therefore, having been deprived of their support, had fallen out, while in other respects perfectly sound. Had this individual timely re-

sorted to the scaling operation, and had the teeth entirely freed from tartar, subsequent cleanliness no doubt would have been all-sufficient to have made the duration of these organs commensurate with the other constituent members of the body.

This is not an isolated case. They are of very frequent occurrence, although commonly the teeth become more or less carious previous to falling out.

It becomes those individuals, therefore, whose teeth have this indurated calcareous deposit upon them, and are becoming loosened from inflammation and sponginess of the gums, and consequent absorption of their osseous support, to see to it that this condition be remedied by the means which have been pointed out; or else, as in the case of the lady referred to, they may reasonably expect that the fate of their teeth will be similar to hers. But let no one flatter himself that this condition can be remedied by the simple application of any mysterious compound or pretending nostrum, although its name be far fetched, and there be claimed for it the power of magic.

PLUGGING OR FILLING CARIOUS  
TEETH.

When the prophylactic means which have been pointed out as necessary for the preservation of the teeth have been neglected, and they become carious, other remedies than those already considered become necessary. To remove the causes which have induced disease and decay of the teeth, and subdue the irritation of the parts contiguous to them, is not sufficient when caries or mortification of their substance has commenced. It may, perhaps, answer, so far as the organs are concerned which are not immediately affected; but the affected ones require another remedy. This is called plugging. It consists in the removal of the decayed or mortified matter of the diseased tooth, and stopping the cavity from which it is taken with a substance at once indestructible and not liable to chemical change.

This is an important operation. It is an expensive remedy, as the most costly material is generally made use of for the purpose. It also

acquires a degree of interest from the fact that, if it fails to arrest the progress of disease, all hope of prolonging the usefulness of the affected member fails with it. It is the last remedy, so far as the natural organs are concerned.

This branch of the dental art is practiced with various degrees of success. There are many who avail themselves of it, and who suppose they have thoroughly tested its remedial benefits by their own experience; nevertheless conclude that but little or no reliance can be placed upon its healing virtues. They view the operation of plugging the teeth as an experiment of very uncertain tendency. Others, again, have full faith and confidence in its preserving power; and they, too, appeal to experience as the basis upon which their opinions rest. These diverse opinions will probably continue to exist so long as the general principles which control the operation for good or for evil, of all dental remedies, are so little understood, and their practical application neglected.

There are a variety of circumstances involving this subject which are necessary to be considered, in order to estimate correctly the value of this

operation. To calculate its success, the observance of three prominent particulars is necessary.

The first particular to be considered is, the condition of the organs to be filled, and the parts in close proximity to them; the second is the manner in which the operation is performed; and, thirdly, the treatment which the dental organs receive after the plugging operation is accomplished.

In regard to the first proposition, it has already been stated that the health of the teeth depended upon the removal of the destructive causes, which have also been pointed out. This is necessary in cases where caries has not yet commenced. When mortification of the teeth has taken place, however, it is still more necessary, if possible, that means should be adopted to remove all deleterious agents, and restore the organs to their naturally healthy condition. The removal of the decayed substance of a tooth, and filling the cavity from which it is taken, is one means by which this condition is established. But this operation can not be effective without the previous use of means, when such means are required. Very little benefit can be expected from the operation of plugging the

teeth while the gums are diseased and sensitive, or they themselves are irritable. Here is one of the main reasons, the secret of success in the practice of certain dental operators. The mechanical skill and practical experience will avail but very little, if due attention is not paid to the general condition of the organs operated upon. Hence those dentists who merit and obtain a reputation for professional skill, especially in this particular branch of it, are always particular to note the existing condition of all the parts involved, and adopt such means as the case demands. This is one of the main objections to the employment of the itinerant dentist. It sometimes consumes considerable time in the proper preparation of the organs previous to filling, and this preparation may be absolutely essential to success in the particular case, and yet time, so far as the dentist is concerned, will not allow of this, and consequently the teeth are filled without it. The final result is, the plugging is not successful, the disease continues, the plugs fall out, and the teeth are lost.

Many dentists, and especially that class to whom I have referred, the itinerant portion, practice upon

the principle that "a bird in the hand is worth two in the bush;" and therefore they invariably advise the filling of every tooth which is susceptible of being plugged, without regard to the circumstances which involve it. The prospect of a few ready shillings is sufficient to bias the better judgment, and set aside all conscientious scruples. This may be thought rather severe upon the profession, but the result of the practice of quite a large portion of its members authorizes the assertion.

The condition of a carious tooth, then, in order that it may be filled with a fair prospect of removing the disease, must be freedom from general irritation of its own structure, and that of other organs in close proximity to it. Unless this condition does exist in fact, or a convalescent state tending to it, any increase of excitement—which the operation of plugging always produces in a greater or less degree—will, instead of being a benefit, only serve to hasten its destruction. Indeed, such is frequently the result of premature filling carious teeth, and hence the want of confidence in the dental profession which so extensively prevails.

The second proposition, the manner of filling carious teeth, is a matter of much general interest.

When the general condition of the teeth and gums has received the attention demanded in a given case when a tooth has become carious, the operation of removing the diseased matter, and filling the cavity from which it is taken, is to be accomplished as the next step in the remedial course. The rationale of this operation is simply this: The efficient cause of the caries being of a local character, the disease consequently is more or less circumscribed in its action. If, therefore, the diseased portion of a tooth can be perfectly removed, leaving no traces of inflammation to operate upon its vitality, and if the surface of its cavity thus produced is made perfectly dry and free from the deleterious agents which induce caries, and if in this condition the cavity be perfectly filled, and with a material which shall effectually prevent all further contact of such agents with the cavity, the subsequent treatment being properly attended to, the disease may be arrested, and with perfect assurance pronounced cured.

The cavities produced by the removal of carious

matter are of all variety of forms, the surfaces of which are very irregular. The material, therefore, used for stopping, should be of such a nature as to be easily moulded to their unevenness, and rendered so compact as to exclude all fluid, as well as solid substances. The cavity should be perfectly filled, and the stopping polished down even with its margin, so as to leave no projecting points for the lodgment of offensive particles. When a tooth has become so extensively decayed, or the carious portion of such a form, or in such a place, that these conditions can not be fulfilled, there is very little reliance to be placed upon the plugging operation.

This particular branch of dental surgery, as I have already stated, is of more importance than any other. The dental operator more frequently fails in this than any other part he has to perform. Unless he is actuated by some higher motive than that of gain, he is very apt to slight his work; and although he may be qualified in every other respect for the practice of his profession, if he lack integrity the fact will manifest itself in this department of his practice, if in no

other. There are a variety of ways in which this may be done. Some have a practice of rolling up some base metal, as tin, in a covering of gold foil, or inserting the base metal at the bottom of the cavity and capping it over with gold. In these cases, of course, a golden price is always charged. A tooth may be filled with less than one half the amount of material necessary to the accomplishment of the operation as it should be, and yet the wrong can not be detected by any ocular examination, and one, or even two years may elapse before the fraud manifests itself, and then not to the understanding of the individual subjected to the imposition. The cause of the failure is more frequently attributed to the inefficiency of the art itself than the true source, the deception of the dentist.

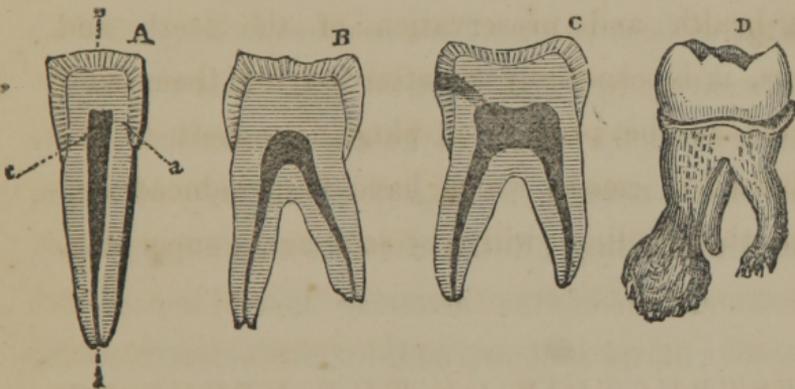
When the teeth are filled under the circumstances which have been described as necessary to success, it remains only for the individual possessing them to exercise a due degree of care to preserve them from the further encroachments of disease; and this is the third proposition. The means necessary to be adopted for the preservation

of these organs after plugging, have already been described. They are the ordinary measures of cleanliness, etc., and need not be repeated. But many persons suppose that, having obtained the assistance of the profession which the circumstances indicate as immediately necessary, nothing further is required. In this there is a great mistake. If cleanliness is ever necessary for the health and preservation of the teeth and gums, it is especially so after having them subjected to the process of plugging. Left to the influence of causes which have first induced disease, this condition will very soon again supervene.

#### DESTRUCTION OF THE NERVE IN ORDER TO PLUG TEETH.

What has been stated above has reference to teeth which are comparatively but little decayed. When they become so much diseased that caries penetrates the internal cavity and exposes the nervous pulp, to avoid the pain which is liable to supervene, it usually becomes necessary either to extract the diseased organ, or adopt some method

by which its cavity can be filled and its usefulness prolonged. Most persons have a great dread of having teeth extracted. Any other remedy which the dentist may propose will be entertained before this. And yet, as a general rule, where a tooth has become so diseased as to be painful from exposure of its nerve, much suffering and trouble will be spared the individual by having it promptly



SECTIONS OF TEETH, EXHIBITING THEIR STRUCTURE AND DISEASE

A represents an incisor, divided through its centre; a, the bony part; b, the enamel; the dark central line, c; the cavity of the nerve, which passes in at the extremity, d. B shows the lessening of the cavity as age advances, which in youth and early manhood has the form of C; C also represents caries penetrating the nervous cavity; D exhibits a diseased tooth become ulcerous.

and at once extracted. Owing, however, to the repugnance which is commonly manifested to this operation, the dental profession have endeavored to devise some means in order to save its necessity.

Destruction of the nervous pulp—the only sensitive portion of a tooth in a state of health—is the most common method attempted to effect this purpose. This is accomplished by exposing the nervous pulp by removing the dead matter, and applying some escharotic substance directly upon it, and thus by a chemical process destroying its vitality. When this is effected, the tooth can be filled without pain. This practice is adopted very extensively by some practitioners. But this operation can only be viewed as an experiment of very uncertain tendency. In a great majority of cases, notwithstanding all the care which may be used, inflammation of the investing membrane of the tooth will take place, and induce ulceration—for which there is but one remedy, and that is extraction of the diseased member. Many persons labor under a misapprehension in regard to the benefits to be derived from this practice. They suppose that, as pain is the result of nervous injury, therefore when the nerve of a tooth is by any means destroyed, or rendered permanently insensible, all pain will necessarily be removed, and without the danger of its recurrence. And this

idea is held out to the public by many practitioners. But this is mere pretension. So far as the tooth itself which is affected is concerned, this may be true; for when the nerve of the tooth is destroyed, its vitality is also destroyed, and where there is no vitality there can be no sensibility. But it will be remembered that the teeth are set in bony sockets, lined with vascular membranes, possessed of vitality, and endowed with nervous sensibility; and when this membrane becomes inflamed, it also becomes extremely sensitive. A tooth, therefore, deprived of its nerve and blood-vessels, and consequently of its vitality, becomes as any other extraneous or foreign substance, with this exception—it is perfectly fitted to the place it occupies. Sometimes a tooth in this condition may remain for years without exciting any appreciable amount of irritation; but in a large majority of cases irritation and ulceration are the result of such a condition. There are cases recorded of foreign substances, as a leaden bullet for instance, having penetrated different structures of the body, becoming imbedded in them, the organized parts healing around them. In this condition, years

have passed without any particular manifestation of excitement from the extraneous substance; but on the accession of any new exciting cause, inflammation and its consequences are always liable to supervene. Precisely so with a tooth deprived of its vitality or life by the destruction of its nerve and blood-vessels. In its natural position, it becomes like the imbedded bullet. The cavity produced by the disease, through which the nerve has been exposed and destroyed, may be filled so as to arrest the process of decay, and, like the bullet, the tooth may remain in this condition for years, without producing any manifest disturbance; and yet a little exposure, a cold, any interruption of the general health, may at any time excite inflammation and all its train of unpleasant results in its bony socket. This, as I have already stated, is the result in a large majority of cases. Such, indeed, is the uncertainty of this operation, that no dentist who values his reputation will venture any absolute assurance of its success, in any given case; and yet the public are greeted from almost every newspaper in the country, by the flaming pretensions of members of the profession, claiming to

save teeth by this process, and restore their usefulness, and prevent the painful consequences which otherwise would occur. And it must be admitted that the public, to a great extent, are deluded into the adoption of this pernicious practice of filling diseased teeth irrespective of circumstances.

As I have before stated, most persons are willing to adopt almost any method to avoid the necessity for having their teeth extracted. Dentists are well aware of this, and it is to be regretted that so many of them are disposed to pander to this general predilection. In many cases health is sacrificed, a long train of nervous affections is induced, and years of suffering endured, which, had the surgeon dentist advised in accordance with his better judgment, would have been entirely avoided.

It is remarkable that teeth which are very much diseased, the nerves of which are destroyed, and their cavities filled, are far less liable to the common form of toothache than when not filled. They may be diseased to such an extent as to produce constant ill health of the individual, and yet no particular local pain manifest itself, sufficient

to convince him that these organs are the source of the difficulty. Those individuals who have had several teeth of this description filled with the cement or amalgam so extensively used, are especially liable to neuralgic affections. This no doubt is one of the main reasons why nervous diseases are so much more prevalent now than formerly. Teeth become carious, the disease is allowed to progress until their nerves become affected, and, may be, destroyed; and in this condition application is made to the dentist. Many members of the dental profession seem to think it detracting from their dignity, at least from their ability as dental practitioners, to acknowledge the necessity for losing a tooth which has any substance left, sufficient to be pasted up. Notwithstanding all experience would indicate the better course as generally that of extraction at once, plugging is more often resorted to. And many there are, who, although they may remain ignorant, and willingly so, of the real source of the ill health which they experience, still have abundant reason to regret ever having submitted to this, under other circumstances, important remedial operation. But recently, a lady called upon me to

obtain professional advice, whose case is a fair representation of numerous others, which are daily occurring.

Some four or five years since, this lady, then residing in a western city, having suffered considerably from disease of the teeth, applied to a prominent dentist for relief. Nearly all her molar or grinding teeth were more or less decayed, and some of them very much so. The recommendations of the dentist accorded with her own wishes, and they were all filled with metallic paste. They had never given much trouble, except when articles of food accidentally found access to the sensitive part exposed by the disease, and any pain thus produced had always been relieved by removing the offending agent. But from the time they were filled, all difficulty of this sort ceased.

After an interval of several months, as the circumstances were related to me, she began to feel occasional transient pains, some of which were very acute and lancinating—about the face, neck, and head, although there was no local or fixed pain. Neither had these wandering pains any particular reference to any one of the teeth. At first, but

very little inconvenience was felt, but, as time passed, symptoms similar to those mentioned gradually increased in frequency and intensity, until the general health, which formerly had been good, began to decline, and a state of general nervous excitement, or neuralgia, pervaded the system. At times, this general nervousness would become very intense, causing constant restlessness and wakefulness, at others less so, depending apparently upon atmospheric vicissitudes. Finally, these difficulties gradually increased in intensity, until they assumed the character of a formidable, and afflicting disease. During all this time, the teeth had remained comparatively quiet, and not even a suspicion being excited against them as the origin of the trouble. Various remedies were resorted to, but with little or at most a temporary benefit. At length, however, the attending physician, having exhausted his stock of nervine remedies, and still finding his patient declining, very sagely came to the conclusion, that if the teeth did not produce the difficulty, he could not divine its cause, although he had previously given a contrary opinion.

Under these circumstances, I was consulted. On examination of the mouth, I found seven molar teeth filled with an amalgam or metallic paste. Most of them, previous to being filled, were decayed, so that at least one-half the crown of the tooth was gone. All of them were decayed very much. But having been faithfully attended since being plugged, they had been perfectly preserved from further decay. They had evidently been filled by a skillful and practiced hand, and assiduously cared for since this operation. To the cursory observer there were no indications of disease about these organs, more than those presented at the time of their being filled. There was but very little apparent excitement about the gums, no unusual tenderness of the teeth, and no pain produced by pressure on them. Even the lady herself was not willing to believe that her sufferings were occasioned by her teeth, although she had noticed that certain acute erratic pains, seemed to originate in the neighborhood of a particular tooth, which was filled in the manner referred to. But her sufferings had become so intense and constant, that she was willing to submit to the operation of having her teeth extracted, if perchance

there was but a probability that by so doing she could obtain relief.

Having become acquainted with all the circumstances of the case, I unhesitatingly gave it as my opinion, that the whole difficulty arose from dental disease, and therefore advised the immediate extraction of all the seven teeth to which I have already adverted. I therefore proceeded to remove them. At the first sitting I removed three, which had the effect to change very much the character of the neuralgic affection, and lessen its intensity to some extent for a time. But it soon reacquired its former severity, and in about two weeks from the time of extracting the first three, I removed the other four. From that time to the present, which has been some months, no symptoms of nervous disorder have manifested themselves, and the general health has become entirely restored to its former state previous to the teeth becoming diseased.

This case, I repeat, is but a single instance, but it represents, in some degree, the thousands which are annually occurring in the land, and which is the result of a practice founded in error, its tendency being only to evil. The idea of destroy-

ing the nerve and blood-vessels of a tooth so diseased, as to expose them to the action of caustic substances, and which, when destroyed, take away the very essential principles without which there can be no organic animal life, for the purpose of preserving the usefulness of these organs, is perfectly preposterous. Experience in this matter, as in all others, is the best of teachers. Although, as in the case referred to, individuals may not be aware from whence their afflictions come, at least nine cases of every ten where the teeth are attempted to be remedied by this process, result in far more injury and inconvenience than would be realized by submitting at once to their removal. And even the tenth case is always more or less problematical. As a general practice, therefore, in all ordinary cases of diseased teeth, when they have become painful from exposure of their nervous pulp, or when disease of the membrane lining the dental socket especially has taken place, entire removal is the only proper course, and the one which experience sanctions, as contributing most to health and happiness; the end desired by all.

## THE EXTRACTION OF TEETH.

The extraction of the dental organs has become so common, and is generally considered so simple an operation, that any remarks which may be made in relation to it, may perhaps be considered entirely superfluous. But simple as this operation is considered, being frequently consigned to persons who can lay no just claims to professional knowledge, it is one nevertheless which requires for its judicious and safe performance as much care and firmness, and as correct an acquaintance with the anatomy of the parts concerned in it, as many of the operations of surgery, to which a much higher degree of importance is usually attached. It may perhaps be granted that, in by far the majority of instances, this operation is performed by mere mechanical force, without any very serious consequences occurring; but it is no less true, that in the most simple cases, the pain of the operation may be greatly diminished by a judicious choice and application of the instruments used; while the frightful results which sometimes accrue from the employment of ill-directed violence forcibly point out the necessity

for some degree of surgical skill to render it at once safe and successful. Every country village has its legends of the loss of portions of broken jaw-bones—the extraction of sound teeth in mistake for the decayed ones—and various diseases which are attributed with greater or less truth to this cause, and for which some ignorant pretender has to atone. It is not, however, to such characters that the censure of the ignorant performance of the operation in question is exclusively due. The ill effects of that inattention, with which medical men in general view the treatment of the teeth, are in no case more conspicuous than in this. It may not, therefore, be amiss, to point out the errors into which practitioners have fallen, and lay down a few general rules as guides, as to under what circumstances, and in what manner, this important operation should be performed.

When a tooth has become so far diseased as that its nervous pulp filling its internal cavity has become exposed to external influences, and thus rendered painful and troublesome, any effort that ingenuity and skill may attempt to restore it to health and usefulness will, as I have shown, in a

great majority of instances prove abortive. In cases of this kind, which are partially successful—and in all such cases success can only be partial—the improved condition which is restored is usually of short continuance. And attempts of this kind frequently produce a thousand times more suffering than their removal, and in most cases the necessity for extraction becomes absolute after all that can be done to avert it. It may be laid down, therefore, as a safe and judicious rule, of general applicability, that a tooth when from exposure by disease of its internal cavity is rendered useless for the purpose for which it was designed, or even partially so, should be at once extracted. Were this adopted as a general practice, the amount of suffering which would be thus averted is beyond calculation. But there may be, and frequently are, exceptions to this rule. Cases occur in which it may be necessary to adopt the less of two evils; and the removal of the diseased member may be the greater. But these do not affect the correctness of the rule, which requires that every tooth, root, or part of a root, which has been deprived of its vitality by disease, should, for the well being of its possessor, be en-

tirely removed from their connection with the mouth.

The fact should always be borne in mind also, that the extraction of a tooth produces, comparatively, but little pain when this operation is effected previous to inflammation being excited in the more vascular parts in close proximity to it. To avoid the extreme pain of this operation, then, it is of considerable importance to select the proper time for its performance.

#### CUTTING THE GUM.

As auxiliary to the operation of extracting teeth, cutting the gum, as it is termed, is considered by most practitioners in this department of surgery a prerequisite.

It is generally supposed to facilitate the removal of the tooth, to first make an incision in the gum around it, previous to applying the extracting instrument; and it has long since passed into a proverb, that "a tooth to be drawn must be cut to the bone." It is the practice, therefore, with most dentists and physicians—and, indeed, various tradesmen, for the accommodation of their neighborhood,

engage in this department of Dental Surgery—"to cut the tooth loose" by passing a gum lancet constructed of a peculiar form for the particular purpose, or a pocket knife down deep into the gum around the doomed tooth. This, as performed by many, is a very formidable operation. It is indeed, in most instances, a very painful one. I have heard many persons, who have submitted to have teeth extracted, speak of this part of the operation as far more dreadful than the removal of the tooth afterward. I have frequently known individuals who have applied to me to extract a tooth, hesitate to undergo the operation, until I assured them that the cutting was unnecessary, when they would readily yield, stating this to be the only part which inspired them with dread.

But what is to be gained by this operation? If it is painful, there should be some commensurate good growing out of it, or else the practice should be at once abandoned. The loss of these useful organs is painful enough at best, and it becomes the dental profession to see to it that it is not unnecessarily increased. What benefit, then, I ask again, is to be derived from this operation? I have

shown that the root of each tooth is set in a bony socket which invests it perfectly; that the margin of the socket terminates in the gum, which is of a yielding structure; that the gum, although surrounding the neck of the tooth, still has no attachment to it, its margin being free and loose. I have shown, also, that there is no vasuclar connection between the tooth and its socket, except at the extremity of its root, and also a small ligament which stretches from one side of it at its neck, and attaches to the margin of its bony socket. That this ligament is the only resistance offered to the removal of a tooth so far as its attachments by adhesions are concerned. It is perfectly plain, therefore, that unless the ligament referred to (*Ligamentum Dentis*) can be severed by the cutting operation, no possible benefit can arise from it. But this ligament lies entirely beyond the reach of instruments commonly used for the incision of the gums. As this operation is usually performed, this ligament is not molested at all, once in a thousand times. Indeed, it is next to impossible to reach it, in any case, even when the instrument is designed expressly for the purpose, and the atten-

tion of the operator directed particularly to that object. This ligament, however, as I have stated, offers but very little resistance to the removal of a tooth, none which is manifest in the operation; hence, it is plain, that to incise the gum, previous to the extraction of the tooth surrounded by it, is, to say the least of it, superfluous.

But aside from the pain commonly produced by this operation, and the dread which it inspires, it is in many instances, decidedly injurious in other respects. In cases where cutting the gum is observed, lacerations of this fleshy substance are much more liable to occur on extracting the tooth. It is especially so where the common key instrument is used. The individual who has had to sit patiently with a tooth removed from its socket, but fast to a portion of the lacerated gum by a fractured fragment of intermediate bone, to allow the operator to prepare his excising instrument and cut it loose, can alone appreciate fully the evils of this pernicious and reprehensible practice.

## MATERIALS FOR FILLING TEETH.

It has already been stated that the material for stopping the cavities of decayed teeth, in order to accomplish the end desired, must be indestructible, and not liable to chemical change. But it is equally essential also, that it be of such a nature as to be easily moulded to the exact form of each specific cavity, and of sufficient hardness to withstand the friction usually produced during mastication.

## GOLD.

There are a variety of substances used for this purpose, but of them all there is only one which combines all these essential qualities—*pure gold, in the form of foil or thin sheets*. This is the only known substance which can be said to possess, in any degree of perfection, the necessary properties to effect the end desired. When of sufficient purity, and by the annealing process is rendered as malleable as it is susceptible of being made, this substance may be so disposed in a properly prepared tooth, as to perfectly fill its cavity to the exclusion of all substances, both solid and fluid, and

subserve in a very high degree all other essential purposes. But because of the expensiveness of this material, others have been introduced into use.

## TIN.

Next to gold, tin subserves best the purposes for stopping the cavities of teeth from which carious matter has been removed. It is not as malleable as gold, nor does it resist the corroding influences of the salivary fluids so well. It can not, therefore, be rendered as compact and solid, and, consequently, the protection which it affords can not be depended upon with the same degree of certainty. A tin plug, under ordinary circumstances, will answer a very good purpose, when used for medium size and large cavities, from four to six years. It sometimes will last much longer, and in some instances a much shorter time. It is also objectionable when used for the incisor teeth on account of its color being dark, and when its surface becomes chemically affected, is entirely black. It is used in the same manner and form as gold—in thin sheets manufactured for the purpose called tin foil. Much imposition has been and is, practiced

with this article. Tin foil is used for various purposes which do not require that degree of purity necessary for dental use. Care is not taken, therefore, to render it as malleable or pliable as it should and can be made for this purpose. Thus an inferior article is manufactured which possesses more brilliancy, and resembles much more nearly silver metal, than a pure article of tin. This spurious article of tin is frequently passed off for silver foil, as very few persons, comparatively, are sufficiently informed as to comprehend the imposition. No evil can result, however, from this deception, except the loss of the amount paid above the price for tin plugs, as even this inferior article of tin is better for the purpose of filling teeth than silver. But when it is known that silver in the form of foil or sheets is never used for this purpose, there will be no danger of this deception being imposed upon any one.

#### SILVER.

This substance is never used for filling teeth except in amalgamation with mercury. Many persons suppose that silver, from its relative value and similar properties to gold, and as is stated by

dentists frequently, must hold the next position to this metal in point of utility. But it is not so. Owing to the effect which sulphurous vapor has upon this metal, it does not withstand the corroding influences exerted upon it when used for the purposes of filling teeth as well as tin, and therefore is never used, as it is also much more expensive.

#### METALLIC PASTE.

Various compounds have been introduced into notice from time to time, for the purpose of stopping the teeth. Each has had its advocates and its brief hour to flourish, but of them all, they can only be used with any degree of propriety where cavities are large, and the teeth from being sensitive, or amount of disease, will not bear the pressure necessary to allow the insertion of tin or gold.

It is sometimes advisable to use something of this nature, but it is much more frequently demanded by individuals of the profession than their health and comfort require. There is no compound or substance of this nature but what is more or less objectionable. Any article of this kind must necessarily be of a soft, pliable nature, in order to

fill all forms of cavities; it must therefore possess the property of becoming hard after insertion. Invention has sought out a variety of compounds of this sort. I have experimented quite extensively myself, in attempting to find out some substance that would serve as a substitute for gold, without its expensiveness. But this I am satisfied can never be accomplished. Of all the great variety of substances which I have been able to obtain, and have used as stopping, there are but two which can be said to be of any value. These I have used to some extent, and they have been extensively used by others. One of these, however, at the present time, has, I believe, pretty much gone into disuse.

The one is a fusible alloy—composed of tin, lead, and bismuth in certain proportions. It is used by putting a piece of the compound upon the tooth containing the cavity to be filled, and then with a heated brass or copper ball melted into the cavity. But this substance has gone into disuse owing to the difficulty of its application.

The other is an amalgam of silver and mercury, or quicksilver. This substance, so far as any article of this sort is required, is commonly used,

and is probably preferable in some respects to any cement or metallic compound now in use for the purpose for which it is designed. It is prepared into a soft paste, and in that state inserted into the cavity of a tooth. In a short time it hardens sufficiently to prevent it from coming out, and in the course of from two to five hours becomes perfectly hard, and serves very well in this respect the purpose of mastication.

As it may be of service to individuals sometimes to prepare this compound for themselves, I have appended to this work a recipe for its preparation.

It may be well to state that all metallic compounds, when used for this purpose in any considerable amount in a single tooth, but more especially when several teeth in the same mouth are filled with it, are liable to induce unpleasant effects upon the individual by the galvanic, magnetic, or other mysterious influence which they are capable of exerting upon the nervous sympathies of the physical system.

Thus in the case of the lady referred to, and whose case is described above; from the time her teeth were filled, she felt, as she stated, an un-

pleasant indescribable uneasiness throughout her system.\*

In what manner this influence is exerted, whether by the establishment of an electro-magnetic current connecting the metals with the vital organs, or by some other mysterious mode of operation, it is sufficient for us to know the fact, to enable us to avoid the evils which may result from it.

#### ARTIFICIAL TEETH.

That individual who has been so unfortunate as to suffer the loss of his natural teeth, can alone fully appreciate their usefulness and convenience.

Most persons, who have not been taught by experience, set too high an estimate upon the advantages to be derived by artificial means, where

\* Teeth placed in juxtaposition, having cavities upon their contact surfaces filled with materials diverse in their nature: as for example, one filled with a metallic compound, and the other with one of the metals—as gold or tin—are very liable to attacks of neuralgia. I have known numerous instances of this kind. Teeth in this position, the one filled with gold, the other with tin, will so affect each other as to induce neuralgic symptoms, and even destroy, by oxydation, the two metals.

such loss has been sustained. Neglect to apply the necessary means to protect the natural organs from the ravages of disease is frequently the result of this false estimate.

The remark, "Let them go; when they are gone I will have some new ones," is a very familiar one to the dentist; but the individual who has been subjected to the alternative of artificial teeth, would gladly accept his primitive organs again, were it possible they could be restored. When the sad reality comes, it always brings its regrets, of opportunities neglected, and duties unperformed. There is most always disappointment more or less in the realization of benefits anticipated from artificial means. This is a subject on which the unfortunate ones are usually not very much disposed to communicate their experience, and hence the difficulty in obtaining correct information, until learned by personal application, for it must be admitted that the utility of artificial teeth, by dentists, is generally over-stated.

Science and art, however, in the hands of inventive genius, have done much to relieve, in this respect, the necessities of human life, and con-

tribute largely to lessen the ills to which it would otherwise be subject.

Such has been the improvement in the construction and inserting of artificial teeth, that they can generally be made to answer, in a good degree, most purposes which the natural organs were designed to subserve.

For personal appearance, to assist in the articulation of words, and also, to some extent in the comminution of the food preparatory to digestion, they answer a very good substitute, and the individual who has once enjoyed the benefits which they confer, is not willing to relinquish them afterward; but let no one flatter himself, that by the adoption of these as a substitute, he becomes the recipient of an unalloyed good. Far from it. It may not be asserting too much to say, that in some degree they are generally the source of constant vexation and trouble. They are, indeed, the less of two evils: artificial teeth, or no teeth at all.

But there is a very great difference in the amount of benefit derived by different individuals from this source. There are a great variety of circumstances which bear directly upon individual cases, and con-

tribute to render them more or less vexatious. These circumstances need not be explained here, but it should always be borne in mind, that the benefits to be obtained from artificial teeth in any given case, depend altogether upon the specific circumstances which involve it. But even where the circumstances are the most favorable, much and constant care is necessary to be observed in order to render them durable, and prevent them from becoming offensive, as, without unremitting attention, they soon would be. Let no one be deceived, therefore, and allow the opportunity to pass unimproved, by which the health of the natural organs may be secured, and rendered permanent.

There are several methods of inserting artificial teeth, which dentists employ. The one which is the least expensive, and which was formerly the most common, is that usually termed—

#### INSERTING ON PIVOTS.

This method of inserting teeth was formerly much more extensively employed than at present, although many dentists, especially itinerants, still

continue to recommend and practice it to a greater or less extent.

The operation is accomplished by cutting off the natural tooth at its neck, or at the point on the same level with the margin of the gum, enlarging the orifice through which the vessels and nerve pass, and attaching an artificial tooth constructed for the purpose to it, by a wooden pivot inserted into both the root and artificial crown or body.

The natural tooth, when attacked by disease, usually decays and breaks of itself so much, that the cavity containing the nervous pulp is exposed, and the nerve destroyed, from exposure to external influences, in a gradual manner. During this process, the membrane covering the external surface of the root, as well as the soft tissues immediately at the extremity of it, become inflamed, and frequently ulcerous; so that alveolar abscess, or what are commonly termed gum biles, appear upon the gum opposite the root of the affected tooth. When once a tooth takes on this condition, it usually continues to keep up a discharge from the gum, with occasional intermissions, until the root is removed from its socket. But the vitality of a tooth fre-

quently becomes destroyed without ulceration and the abscess referred to. Teeth which have become thus diseased, both with and without ulceration, are frequently filed down level with the gum, and thus prepared for the reception of an artificial crown or body. A large majority of pivot teeth are inserted upon roots like those described above, and not unfrequently are they so decayed as to render it difficult to fasten a tooth even for a few months.

When teeth are thus treated, which have never induced ulceration previously, they now are very liable, from the excitement induced by this operation, to become inflamed and ulcerous, and produce more or less swelling of the soft parts contiguous to them.

But there is another condition of the teeth which frequently becomes the subject of consideration. They frequently decay, so that the crown becomes so far diseased as to destroy their polished surfaces, and render them uncomely, and a source of mortification to the feelings of their possessors, while yet their vitality remains, and the nervous sensibility is unimpaired. This is the case with front teeth,

or those which are exposed to observation. It will be recollected that none but those which have but one root are ever subjected to the operation of excision. To subject a tooth in this condition to the operation of excision, and preparation to receive an artificial body, must necessarily excite considerable pain. But notwithstanding that such is the case, it is frequently done.

To accomplish this operation under such circumstances with the least possible pain, the operator, with a pair of cutting pliers, or what are called bone forceps, cuts the tooth square across at its neck, sufficiently far up to expose the nervous pulp contained in its cavity. This operation of excision produces by its concussion, for the time, a partial paralysis of the nervous sensibility of the root, and while in this palsied state, a small instrument is thrust into its cavity, and by a dexterous twirl the nerve, which has the appearance of a small white filament or thread, can usually be extracted from the whole length of the root.

To destroy the nervous pulp of a tooth in this manner is always more or less painful; but as it sometimes happens, circumstances prevent its im-

mediate destruction, and when this is the case, the pain is generally very intense

When the sensitive nervous substance which fills the cavity of a tooth is paralyzed by disease or otherwise, there is no further pain of any account during the operation of inserting a pivot tooth.

So far as the appearance of teeth inserted in this manner is considered, when inserted as they may be, there can be no objection urged; but the important question to be decided in relation to pivot teeth, is, does the benefit to be derived from them justify the exposure of the health, and in many cases even the life, to the dangers to which every one is subjected who submits to this operation?

In many instances teeth inserted in this manner seem to do very well. They retain their position, and answer every purpose that the natural ones could accomplish so long as they thus remain, and in some cases they have been retained for a long number of years. But although they subserve a very good purpose in some cases, they are liable to induce serious consequences in all instances. Indeed, there are no appreciable circumstances, however favorable, that will enable an individual

to calculate with any degree of certainty upon a favorable issue in any particular case. The excitement produced by the excision, by filing down the stump, and drilling the orifice into it, especially where there is disease at the extremity of the root in its first stage of development, in a majority of cases, results in very unpleasant consequences. Inflammation of the parts liable to such a condition, swelling and ulceration of them, with intense pain, and, in many cases, general irritative fever supervenes. These may be said to be extreme cases, but they are not unfrequent.

If, after the first excitement of inserting was past, the certainty of future exemption from similar paroxysms could be calculated upon, this method of inserting teeth would not be so objectionable; but the first excitement may pass without any serious occurrence, and yet, on the accession of any undue excitement from exposure, to the common causes of disease to which all are more or less subjected, the same difficulty may even arise, and the individual always be liable to all the affections which have been referred to as resulting from diseased teeth, or roots remaining in their sockets.

This operation of inserting teeth on pivots, as I have already stated, is practiced to some extent by all dentists, and yet its propriety under any circumstances is very questionable. Some of the most eminent of the dental profession in our country have testified decidedly against it.

Formerly, my own practice was to adopt this method in all cases where roots were found of sufficient firmness to warrant it, for this was the instruction I had received.

But from the observations which I have been enabled to make, I am satisfied that in all cases it is an operation of very doubtful propriety. I have not, therefore, for some years past, practiced it, except in some particular cases, and then with the greatest caution. Having stated to the individual making application the probable results, and also those which may arise, and all the precautionary measures necessary to be observed, I sometimes, in cases of circumstances the most favorable, venture upon it.

But it will be remembered that the evils to be apprehended from this operation do not always consist in violent manifestations of disease. This

is frequently the case, but as often they are insidious in their approach, giving no convincing evidence to the afflicted one, that the teeth are the source from whence they originate. I have known many instances where the health of individuals had been rendered miserable for years, disease manifesting itself under the various forms which neuralgia assumes, and all arising from this source, and not even a thought had ever suggested the true cause. Whenever, therefore, neuralgic affections arise, and there is any reason to apprehend that diseased roots of teeth are concerned in their production—and the simple fact of their presence is always sufficient to excite suspicion—they should be immediately removed. This is the only safe course, and would be found much more frequently an efficient remedy than many are willing to believe.

If this method of inserting teeth is beset with so many difficulties and dangers, why, it may be asked, when there are other methods by which the loss of these organs can be supplied, should it be resorted to in any case? I know of but two reasons which may be urged in its favor. The one is, the unwillingness which many persons cherish, through

fear, of having decayed teeth extracted. They will suffer with the toothache a thousand times more than the pain of having them removed, and yet in the event, be compelled to submit to the dreaded operation. The roots of teeth, where artificial bodies are inserted upon them, after the first excitement or that produced by inserting is past, are generally not more liable to be troublesome than they would be under other circumstances; and, therefore, if individuals will not have them removed, it is well, perhaps, under such circumstances, that this mode, so far as it can be made efficient in repairing a loss, which, as before stated, no one can appreciate but he who has learned in the school of experience, should be adopted.

The second reason is, teeth are less expensive inserted in this manner than in any other, if merely the cost of the one operation—placing the artificial crown upon the root is taken into the account. But I apprehend, that if a just estimate of the depreciated condition of the physical energies could be obtained, it would be found in a great majority of cases to be far more expensive than any other.

INSERTING TEETH ON PLATE.

This method of repairing by artificial means the loss of the natural organs, differs essentially from that described above. Instead of using the roots of the teeth as supports, they are removed entirely from their sockets, and the wound produced by this operation allowed to heal. A metallic plate is then fitted to the gum, upon which the artificial teeth are fastened. The manner of attaching the teeth to the plate is essentially the same under all circumstances in which plates are used; but the way by which plates are sustained in such a position as to exhibit the teeth so as to represent nature, depends entirely upon the circumstances involving each individual case. There are three methods, however, of fastening or sustaining plates in their position, which differ in principle, by one or the other of which all are operated.

By the one method plates are sustained by clasping to the natural teeth. It will be observed, therefore, that this method can only be applied to the insertion of parts of sets, as there necessarily

must be more or less natural teeth remaining for this purpose.

By another method, they are retained in their position by atmospheric pressure, or what is commonly called suction. In this manner they can be inserted without reference to the natural teeth, and, therefore, the number of teeth to be supplied is not material, as it is applicable to a single tooth as to an entire set.

For inserting whole sets, or half sets, this mode is now commonly employed; indeed, a case seldom, if ever occurs, where a whole or half set is required, but this is found to be the best manner of supplying them.

There is another method, however, which was formerly used altogether for sustaining whole sets, and is employed by some dentists at the present day, but will probably go entirely into disuse as the way referred to above comes to be practiced. By this method plates are sustained in their position by double springs, or rather by springs bent upon themselves, one or the other end of which being attached to either plate, operating between them, in a direction to press them from each other.

The force thus exerted, tending to separate the upper from the lower plate, serves to keep them in contact with the gum to which they are fitted.

The first of these three methods mentioned above, of preparing plates, is much more frequently employed than the others, as there are few half or whole sets, comparatively, to be inserted, and as any number of teeth less than half a set is seldom prepared in any other manner, although, as already stated, a suction plate is applicable to one tooth or more. Plates attached to the natural teeth can generally be rendered more firm than by any other mode of inserting, and while the teeth remain sound to which they fasten, they usually are of important service. There is an objection, however, to plates sustained in their position in this manner.

The teeth to which the clasps are attached, frequently very soon decay, owing to the irritation produced, and thus they are rendered useless by the excitement which they themselves have induced. In this particular, the skill of the dentist manifests itself in a greater or less degree. The exercise of practical good sense on his part, in the form and adjustment of the plate, in most cases makes a

material difference in the service and durability of these artificial organs. But no specific directions can be given in their preparation; this must be left to the judgment and skill of the practitioner, who should always consult the interests of his employer in this matter.

The objection to a suction plate is its expensiveness. To prepare a plate of this kind, a large amount of material is necessary, as the more extensive the surface the more firmly the plate will be retained in its position; and as they are commonly of a costly material, the expensiveness is frequently an important item to be considered. It requires nearly as much plate to insert a single tooth in this manner, as half a dozen. This method is much more frequently employed now, however, than formerly; and as the preparation of plates formed upon this principle become improved, they will finally, probably, supersede the employment of all others.

I have stated that a very serious obstacle in the way of the general adoption of this method of inserting artificial teeth is its expensiveness. To obviate this objection to some extent, dentists, or some of them,

are in the habit of using much less material in quantity than is necessary to make them substantial and useful as artificial teeth may be made. But it is not always that a liberal or even an exorbitant price secures the proper quality or amount of material for this purpose. It is to be regretted that so many dental practitioners yield to temptations which this department of mechanical dentistry places before them.

As was stated in regard to plugging teeth, that a cavity could be filled with at least one half the amount of material which the necessity of the case required, and yet the individual most interested be entirely ignorant of its real condition, so in respect to plates used for the purpose of sustaining artificial teeth; they are frequently made so thin, that they do not last but a very short time. Plates are sometimes alloyed, and rendered so impure as to be objectionable; but they are much more frequently made so thin as to spoil them, and yet the fraud may not be detected. A plate made very thin, when moulded to the form of the gum from a correct impression, will set easier and seem to fit better when first applied, than in cases where they are

made more thick and firm ; and generally individuals with such a plate are for the time better satisfied than under other circumstances they would be ; and it may be a year or two perhaps before the paucity of material manifests itself by the giving way of the plate. The dentist, by a little management, may, and frequently does, retain at least fifty per cent. of the material which should enter into the construction of plates ; and yet for the want of the necessary information, few individuals are qualified to determine, except by the test which time and application afford, their constitution, whether they are properly arranged and substantially constructed or not. I have seen plates upon which teeth were placed which could not be mended with solder of ordinary purity, because of their being so thin. Heat from the blow-pipe, sufficient to melt the solder, would burn or melt the plate through as paper. The quality of the plate, however, usually contributes very much to this result. A plate reduced in quality to sixteen or fourteen carats fine, requires to be made more thin than when it is purer, as the more gold is alloyed the more hard and unyielding it becomes ; and a plate thus reduced

is rendered very difficult to be impressed with the exact form of the gum which is necessary, if made of the same thickness of plate when alloyed, as it should be.

There is a practice which many dentists adopt, but more particularly the itinerant class, of filing the decaying roots of teeth down to the gum, and fitting plates over them. This is a very pernicious practice, and admits of no excuse. Teeth can not be inserted immediately, without allowing time for the gums to heal after the operation of extracting, and the dentist may thus, perhaps, secure a job which he might otherwise lose; but for a dental practitioner at all acquainted with his profession, to recommend such a course, and practice it, is assuming responsibilities which can but weigh heavily upon his moral sensibilities; for there is added to the continual trouble arising from the constant change which takes place in the roots of the teeth and gums, and consequent displacement of the plate, all the long catalogue of evils commonly arising from the diseased roots of teeth, increased by the excitement which the pressure of the plate under such circumstances always produces. This

practice is, indeed, the most reprehensible of any one which the cupidity of individuals engaged in this business has tempted them to adopt. Language can not adequately describe the filthiness of such a condition as is thus produced, and yet many professed dentists practice it whenever the circumstances will admit. One very important objection to teeth inserted upon pivots, is the putrid exhalations which they engender, and which renders them very offensive; but teeth sustained in this manner, with the roots remaining *in situ*, are as much worse as can well be imagined.

Individuals, therefore, who are unfortunate in the loss of their teeth, and have recourse to artificial means to repair the want, will do well to see to it, that all decaying teeth which can not be improved by plugging, and all roots of teeth, be entirely removed, and the gums healed perfectly, before a plate is prepared for the sustaining of the artificial teeth.

To avoid all unnecessary weight, plates should be made, as a general rule, as thin as they can be, and possess the requisite strength and firmness to prevent them from yielding to the

pressure to which the circumstances in which they are placed would subject them. But plate had better be unnecessarily heavy, than to be too light and yielding.

## COMPOSITION OF PLATES.

Of the various metallic substances which have been used for the manufacture of dentists' plate, there are but three which claim particular notice. They are gold, platina, and silver. Of these, gold is more commonly made use of, and, indeed, is the only metal which is not to considerable extent exceptionable. Other metallic substances have been used to some extent, as cadmium, palladium, etc.; but they possess no qualities which invest them with any superiority over the three referred to, and in many respects are decidedly inferior. They are, therefore, but little used, and need not be discussed here.

It is of considerable consequence, however, that the relative importance of the three substances referred to should be well understood. There is a great difference in value of these metals, and it is of importance to know why the cheaper will not

subserve the same purpose as the more valuable. The expensiveness of teeth upon plate limits very much the extent of their employment. By the employment of silver, this objection could be in a great measure removed.

The inquiry is frequently made, therefore, of the dental practitioner, "Why will not silver answer as well as gold?" Knowing the properties possessed by the various metals used for this purpose, it is only necessary to ascertain the various causes which are brought to act upon them, in order to determine their relative fitness for plates to be worn in the mouth.

#### SILVER FOR PLATE.

It has been stated on a former page, that the fluids of the mouth produced by the salivary glands hold in solution, in greater or less quantity, in all cases varying according to circumstances, the sulphate of lime. It is also stated, that during the process of the putrefactive fermentation, sulphureted hydrogen, or sulphurous vapor is disengaged. It is evident, therefore, that in all cases of a plate

worn in the mouth, it would come in contact with sulphurous vapor from these sources. Now it is well known that silver is readily affected by the fumes of sulphur, that it will soon tarnish, and when exposed for any considerable length of time to its influence, it will become perfectly black. This effect, then, is just what we should expect to take place on the exposure of a plate of silver to the continued operation of the salivary fluids, and this is just what we do find to some extent in all cases where a silver plate is used for sustaining artificial teeth. There is a great difference, it is true, in the effect produced upon plates when worn by different individuals. With some, it is but slightly affected, and if frequently polished, a plate of this metal answers a very good purpose; but with others, a few hours is sufficient to tarnish and even blacken it. A very unpleasant taste in the mouth is also generally produced when this is the case; and frequently so much excitement is produced, that constant soreness of the parts is kept up which come in contact with the metal. I have known instances where, in the course of three or four years, thick substantial silver plates were so affected

by chemical action, as to be rendered perfectly useless. These influences vary also in the same individual, according to circumstances. A plate of this kind may at one time be worn without any inconvenience, and a change in the condition of health may render it very obnoxious at another.

But silver plates are never employed, except to avoid expense; and it can never be determined by any ordinary means whether a plate of this sort can be worn with any degree of comfort or not, except by actual experiment.

Whoever, therefore, to economize, resorts to silver plate for this purpose, risks not only the pecuniary cost to which he is subjected, but the comforts which these artificial organs under other circumstances might afford him.

#### P L A T I N A .

This metal is not liable to the same objections which have been referred to as pertaining to silver. It resists the chemical action of the salivary fluids equally as well as gold; but there are objections to its common use which this metal has not, and it possesses no qualities except in one particular but what it has.

Platina is the heaviest known substance. It is much heavier than gold, and in its unalloyed state, when rolled into plate, is softer, and requires to be thicker than that metal, and it is equally as expensive. It possesses one characteristic, however, which renders it preferable to all other metals for sustaining teeth set in blocks. It does not melt or change under the most intense heat of the blow-pipe or furnace. Artificial teeth, when set in blocks, are commonly moulded to a plate of platina forged to the shape of the gum, upon which it is to rest in supporting the blocks. These blocks of artificial teeth are necessarily subjected to an intense heat in their preparation, which would melt gold, and spoil its form. As an intense degree of heat, therefore, is necessary in the manufacture of sets of block teeth, platina is always used for this purpose. It is also used for pivots in the manufacture of single teeth.

In no other respect than the one referred to above, is this metal equal for any purpose for which the metals are applied in the manufacture of artificial dental organs, to gold. It is heavier, softer when unalloyed and therefore is more easily dis-

placed, and, owing to its being so difficult of fusion, is not readily alloyed with other metals; but when thus alloyed with gold, a hard elastic compound is produced, which when rolled into plate does not receive impressions as easily as alloys of gold and other metals which are cheaper and equally as good.

## GOLD.

The objections which have been urged against silver, and other metals, as plates for sustaining artificial teeth, can not be said to be entirely inapplicable to any extent to this one. Pure gold, or gold of twenty-four carats fine, under all ordinary circumstances, will not tarnish when worn in the mouth, if there is any attention at all paid to cleanliness; but gold, when pure, like platina, is too soft, and unless made very heavy, yields too readily to the necessary pressure it commonly is required to sustain.

It also wears very fast when thus pure, to obviate which it is usually alloyed with other metals. It also readily amalgamates with quicksilver; and instances occur (I have known several such) in

which the system has become so impregnated with mercury, that plates of gold, worn for dental purposes, have become very much affected by it. With these exceptions—the first of which, by properly alloying with other metals, can be remedied—every object may be fulfilled, which is attainable by artificial means, in the employment of gold plates. It is of all others far the best, and is most commonly used for dental purposes.

Gold, however, is a costly material, and is an item of important consideration to the dentist. It has become very common, therefore, in these latter days, for him, or at least some of them, to prepare material for plates purporting to be of gold, but which is of an inferior quality, and frequently of so base a quality as to be entirely unfit for the purpose under any circumstances whatever. Plates of other metal than gold are galvanized to represent this metal, and palmed off upon individuals as genuine material, with the design to convey the impression that they are only afforded at a cheaper rate.

This statement may be confirmed; and perhaps it can not be better illustrated than by inserting

here an advertisement from the Semi-Annual Dental Expositor, for November 1, 1852, published in the city of New York, and sent to all dentists in the United States. It is as follows:

“GALVANIZING.

“Dentists wishing their work in any other metal than gold, or in *gold of inferior quality*, galvanized with pure gold, are invited to forward the same by express or otherwise.

Charges for whole upper or lower set.....	\$1 50
“ “ a double set.....	2 50.”

The process of galvanizing, it will be understood, consists in precipitating upon a metallic plate, upon which artificial teeth are placed, whether of silver, or an inferior quality of gold, immersed in a solution of gold, in nitro-muriatic acid, by electro-galvanism. Metallic plates thus circumstanced in a solution of gold, soon receive a perfect coating of pure gold. Watches with silver and copper cases, it is said, are thus prepared for the mock auction. Silver plates thus gilded, by two or three weeks' wear in the mouth, will discover the

deception; but plates of gold of inferior quality prepared in this manner, if the alloy contains a considerable amount of copper, will wear some months without detection, except from the unpleasant taste which this metal creates. The object in view, in the performance of this galvanizing process, can hardly be designed but to deceive, for it can be of no possible benefit to the material or the workmanship, and gilding produced in this way by precipitation can not be durable. Although plate-work prepared in this manner may add to its beauty a temporary lustre, yet its value is not in the least augmented.

But gold for dentists' use is commonly alloyed with other metals. The quality usually regarded as the standard for dentists' plate is plate alloyed to eighteen carats fine, or plate containing eighteen parts of pure gold in every twenty-four parts of gold and alloy. The reducing alloy commonly used is equal parts of copper and silver. Therefore a pwt. of dentists' gold, most commonly used for sustaining artificial teeth, consists of eighteen grs. pure gold, and six grs. of copper and silver. This composition answers very well in all ordinary cases.

It makes a plate sufficiently hard and elastic to prevent wearing rapidly, and yielding too much to pressure, without requiring a thickness so heavy and clumsy as to render it inconvenient.

There is an objection, however, to this proportion of gold and alloy.

In order to prepare a solder sufficiently easy of fusion, to be used on plate of the composition stated above, it becomes necessary to reduce it so low, that in cases where much is used in soldering on teeth, etc., it forms a very serious objection. In cases where a base solder is employed, artificial teeth are frequently rendered very unpleasant to wear by it.

To obviate this difficulty, I have been in the habit, for a number of years past, of preparing my own plates in the following manner, which I find to accomplish the desired object. It allows the preparation and use of a solder sufficiently pure to prevent all the disagreeable effects which otherwise would be liable to arise.

I compose my plate of twenty parts gold and four parts silver, using the common silver coin. A solder for this plate, composed of eighty parts of

gold coin of the United States, twenty parts silver, and twenty parts copper, is much finer than is commonly employed by other dentists. But it melts sufficiently easy, and does not tarnish, or produce the disagreeable taste which so frequently occurs with other solders of a baser kind.

#### ARTIFICIAL TEETH: THEIR COM- POSITION.

Formerly, human and animal teeth were artificially prepared, and altogether used to repair the loss of the natural organs. But these were subject to decay, and cases are recorded of fatal diseases being contracted by their influence. In the progress of general improvement, however, this subject has not been forgotten

Invention and improvement in the dental art have kept pace with those of all the other arts and sciences; and porcelain teeth have now, within a very few years, succeeded, to the entire exclusion of all others. They have gradually improved, until, at the present time, art and science have far outstripped nature in this respect, and the works

of art can now only be distinguished by their superior beauty and grace.

The composition and process of manufacturing artificial teeth are very similar to that of porcelain or common china ware. The main body or portion of teeth consists of a kind of clay, called kaolin, prepared and pressed into moulds, in form like the teeth. It is then taken from the moulds and dried. In this state it is colorless. The particular tinge or shade of color is now applied, and then a transparent enameling, composed of silicious and other substances, is applied upon that part of the tooth designed to be exposed to view. The teeth are then placed upon platina racks, and subjected to an intense heat of a furnace sufficient to flux the enameling. This produces a smooth surface, and protects the coloring matter from the action of all chemical agents which may subsequently be brought in contact with the teeth.

What are called plate teeth, when moulded, have two platina pins or pivots imbedded in their substance, one end of each of which projects from their inner surface, and serves to attach them to the plate which is to sustain them. Those which are

designed for pivot teeth, instead of platina pivots, have an orifice for receiving a wooden pivot. Sets of teeth made in blocks are made in the same manner, except they are joined together, or are carved in blocks of several teeth each.

Artificial teeth, manufactured as stated above, are prepared to endure an intense degree of heat, and in the process of attaching them to plate they are always subjected to a sufficient degree to melt gold, which they endure without change in any respect. Great care is required, however, in the performance of this heating process, to prevent breaking the teeth in pieces. This is especially necessary in heating them after they have previously been attached to a plate, as is sometimes the case in mending, etc.

# R E C I P E S .

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## Recipe—No. 1.

### COMPOUND TOOTH PASTE.

Precipitated Chalk.....	1 lb.
Rose Pink .....	$\frac{1}{2}$ "
Ground Orris Root.....	$\frac{1}{2}$ "
Pulverized Myrrh—Gum.....	1 oz.
"    Gum Arabic.....	2 "
"    Calcined Alum.....	1 "
Castile Soap .....	2 "
Tincture of Cochineal.....	1 "
Clarified Honey.....	2 lbs

In the preparation of this compound, the honey is first to be made hot, in a pan sufficiently large to mix all the ingredients, over a sand bath; the other articles in powder well mixed together—except the tincture of Cochineal—are then to be gradually

stirred into it, the tincture being added during the process, and also—

Of the Oil of Bergamot.....1 dram.

or any other essential oil as shall suit the taste of the individual. All of which is then to be kneaded into a hard paste and placed in boxes, sealed air-tight.

This preparation may be perfumed without detracting from its virtues, and thus rendered more congenial perhaps to the senses of some individuals; but for general use as a dental remedy, in the ordinary condition in which the organs treated of in the foregoing pages commonly appear, I believe there has never been any combination of remedies for this purpose introduced to the public which equals it. Such, indeed, is the testimony of those who have resorted to the daily use of it for the last six or eight years.

In its preparation, the directions should be strictly followed.

I subjoin a recipe for the preparation of tincture of cochineal, which enters into the above compound. This of itself alone I have frequently found very efficacious in relieving pain when applied to an aching tooth.

## Recipe—No. 2.

## TINCTURE OF COCHINEAL.

Cochineal.....	1 oz.
Diluted Alcohol.....	8 oz.

Macerate the cochineal in the proof spirit twelve hours, and it is ready for use.

## Recipe—No. 3.

The following will be found an elegant tincture for the teeth :

Bruised Orris Root .....	4 oz.
Cloves.....	$\frac{1}{2}$ oz.
Essence of Ambergris .....	1 oz.
Gum Myrrh .....	$\frac{1}{2}$ oz.
Alcohol.....	1 pt.

Digest two weeks in a warm place, being occasionally shook up. It should then be filtered, and the liquid placed in a bottle, and kept closely corked for use.

Ten or fifteen drops of this preparation in half a wine-glass of water, makes a very pleasant, agreeable, and useful wash for the mouth, when used with a tooth-brush of a proper quality, such as has

been heretofore described. I have prescribed it very extensively for several years, in cases of slight derangement of the gums, or where there was a want of tone in these parts, and always to the satisfaction of my patient.

**Recipe—No. 4.**

Nitrate of Silver, or Lunar Caustic .....	5 grs.
Distilled, or rain water .....	1 oz.

The caustic to be dissolved in the water, and applied to the diseased gums and teeth with a camel's-hair pencil.

This preparation will be found to be a most excellent remedy when applied to the swollen, irritable, and highly sensitive gums of children, so common during the second dentition. I have prescribed this remedy also in many cases where, from the effect of tartar and other causes, the gums had become swollen and excessively irritable, after having removed the tartar with the scaling instrument. Frequently, in cases of this kind, the necks of the teeth are inflamed, and very sensitive. In such instances, this solution may sometimes be in-

creased in strength, with benefit, to ten grains to the ounce; and may be applied as a gargle, by adults. Two or three applications of this remedy, however, are all that are generally advisable, and if other means, as the compound paste, etc., are thoroughly applied afterward, these will in most cases be sufficient to effect all that may be obtained from remedies.

Care should always be exercised in using this article, as it produces an indelible stain upon the skin or linen with which it comes in contact.

#### Recipe—No. 5.

The following preparation I have used for the purpose of deadening and destroying the nerve and sensibility of diseased teeth.

Arsenic (Arsenious Acid) .....3 grs.

Morphine (Sulphate of Morphia) .....1 gr.

They are to be intimately rubbed together, and applied directly to the exposed nerve, on a little moistened lint or cotton. A little cotton saturated with water, rolled into a little pellet the size of a wheat-corn, placed upon a pointed instrument, may

be made to take up as much of this mixture as will adhere to one side of its wet surface, and applied to a nerve, without any danger from these two powerful drugs. It indeed requires care in using them, but with the above directions impressed upon the mind, no difficulty need ever be apprehended should the pellet be received into the stomach.

Two or three applications of this preparation will, when it can be made immediately to the sensitive portion of the affected tooth, accomplish all that articles of this nature can effect.

Arsenic in some form is what is commonly made use of for this purpose. It produces generally as little pain as any thing, and in the combination here given is as efficient and as free from danger.

### Recipe—No. 6.

#### METALLIC CEMENT, OR AMALGAM.

Precipitated Silver, or fine Silver filings.

Crude Mercury, or Quicksilver.

Take of precipitated silver, or when this can not be readily obtained, the filings of silver, as much as is supposed sufficient to fill the cavity of the

decayed tooth; place it in the palm of the hand, or, what is better, at least more convenient, a small glass mortar with pestle, and add a small quantity of mercury. Rub them together until they are well united. If the mixture is too soft or liquid, press out the surplus mercury with the finger, until what remains is sufficiently hard or paste-like and adhesive to allow of its being held between the thumb and finger, and placed in the cavity which it is intended to stop. A small pair of forceps is best for this purpose. When the cavity is filled, the amalgam should be pressed down with the finger, and made even with its margin. This stopping should be used immediately on its preparation, and must not be disturbed for two or three hours, as it requires some time to become quite hard.

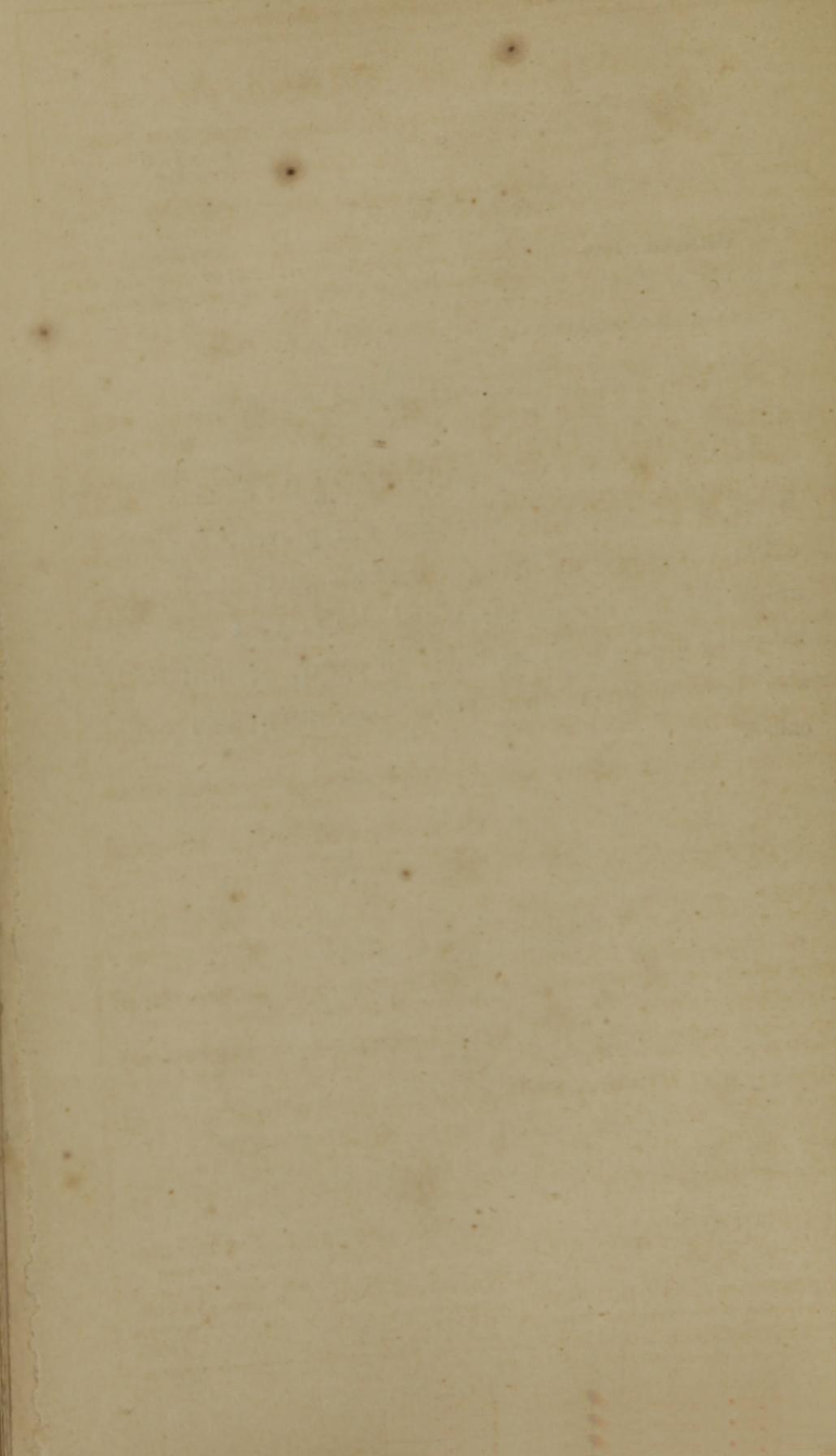
This preparation is an excellent stopping for the temporary teeth of children. If resorted to before the teeth become painful, they may generally be preserved and rendered useful, until they are removed by the natural process, and the pain and trouble which usually follow the decay of these organs be entirely avoided.

**Recipe—No. 7.**

Calcined Alum, pulverized .....	2 oz.
Yellow Bark.....	1 oz.
Flowers of Sulphur .....	1 oz.

To be rubbed together and applied to the parts directly in substance.

The use of this preparation during the administration of mercurial remedies will prevent the extreme soreness and sponginess of the gums which are so common in such cases, and also prevent the loosening of the teeth so liable to occur. It will also tighten them when made loose from this cause.



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