

A practical treatise on the most frequent diseases of the mouth and teeth, and especially the accidents of the first dentition : with the means of remedying them, of preserving all the parts of the mouth in good condition, and an essay on the physical education of children: to which are added, considerations on the improvement of the instruments of a dentist; on a new instrument proposed by the author, and some proposed plans relative to artificial teeth, with an engraving / by J.C. Gerbaux.

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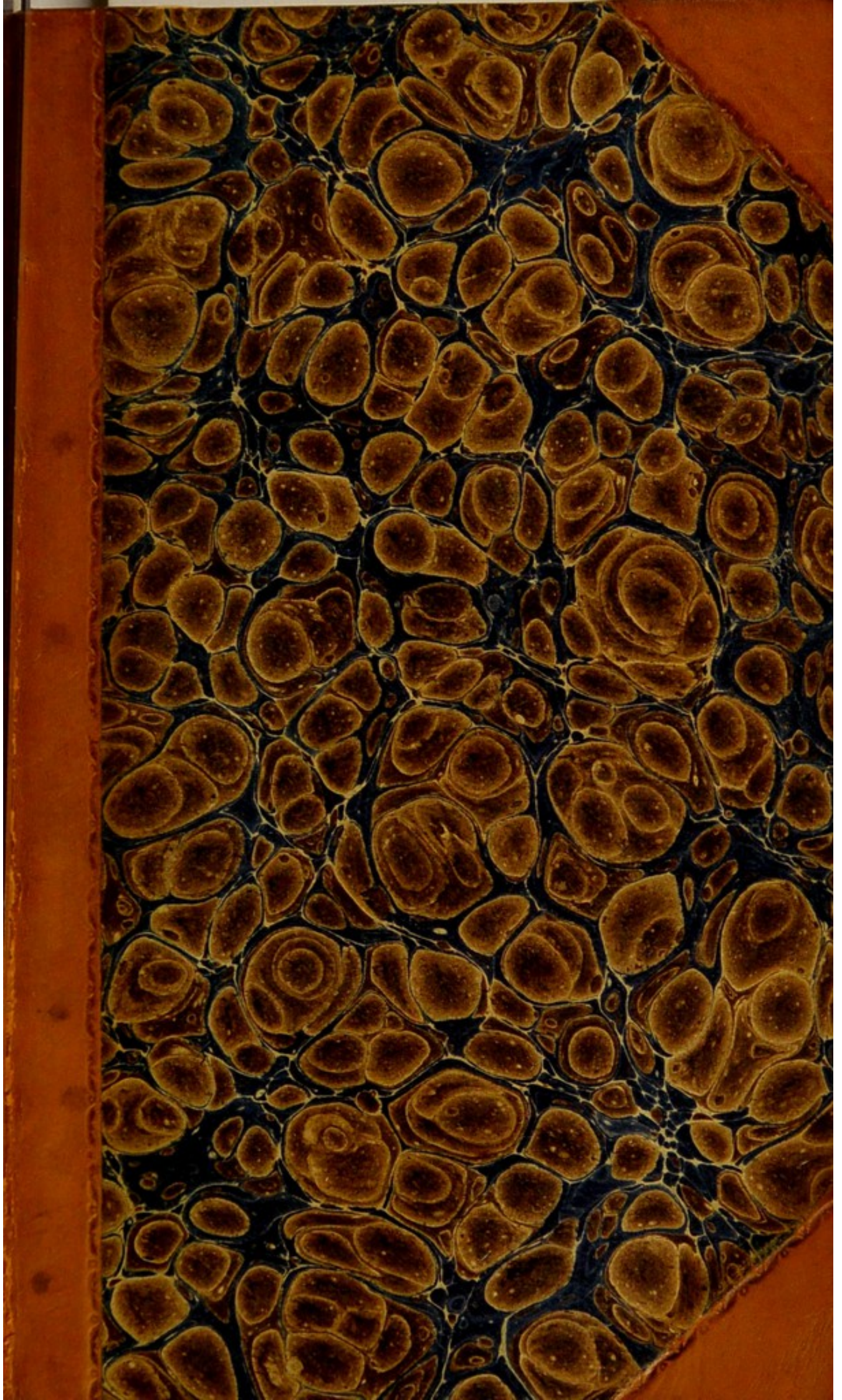
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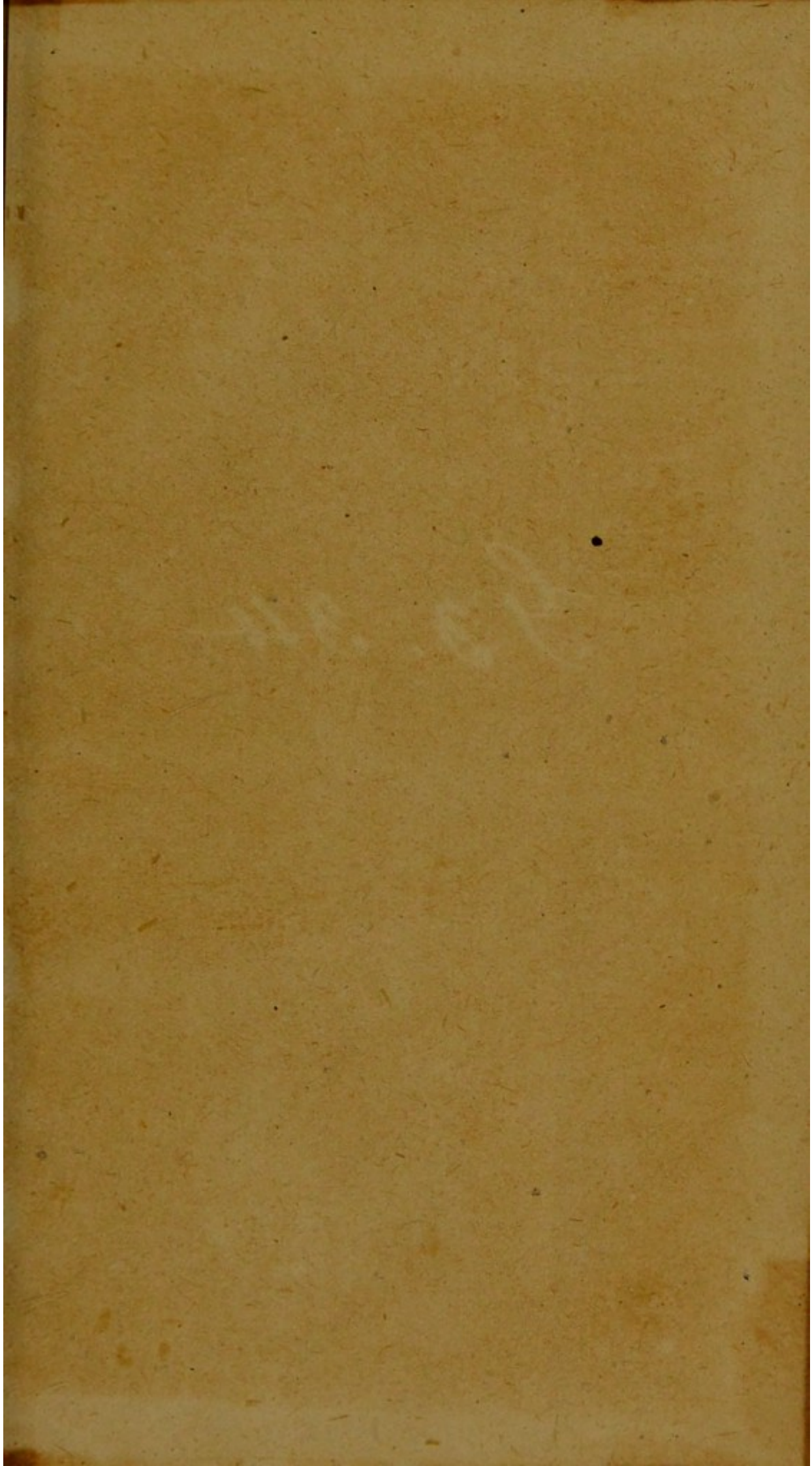
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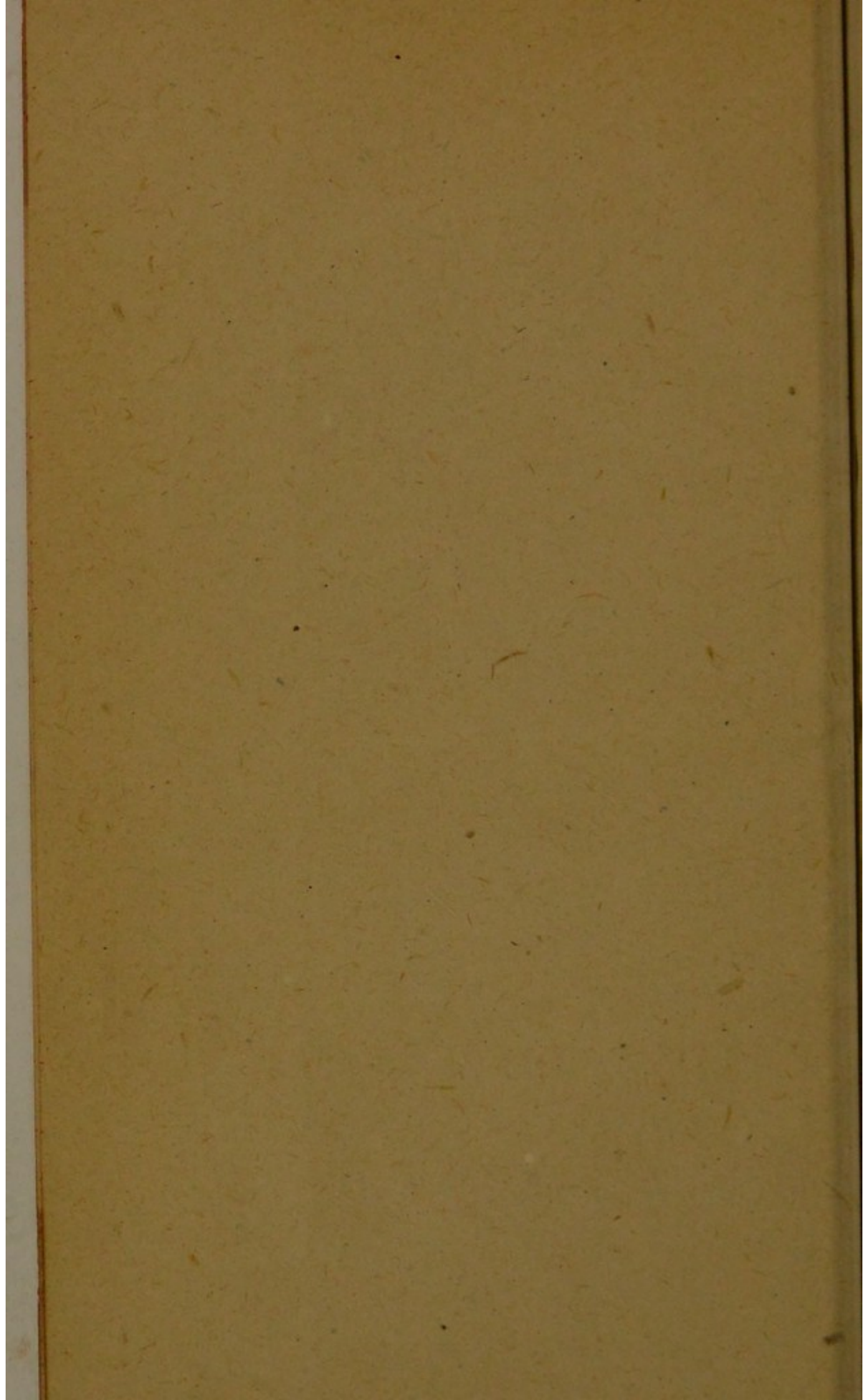
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PRACTICAL TREATISE
ON THE
MOUTH AND TEETH,
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MOUTH AND THROAT
PRACTICAL TREATISE
MOUTH AND THROAT

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A
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AND ESPECIALLY
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WITH THE
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OF PRESERVING ALL THE PARTS OF THE MOUTH IN GOOD
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TO WHICH ARE ADDED,
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ON A NEW INSTRUMENT PROPOSED BY THE AUTHOR, AND
SOME PROPOSED PLANS RELATIVE TO
ARTIFICIAL TEETH,
WITH AN ENGRAVING.

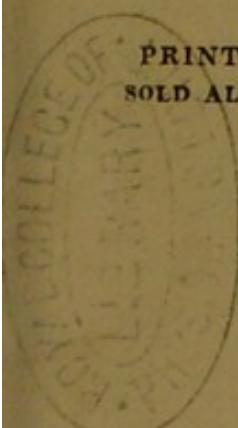
Etre utile sans prétention.

By J. C. GERBAUX, SURGEON-DENTIST,
Late Pensioned Surgeon to the Civil and Military Hospitals.

London:

PRINTED FOR J. ANDERSON, 40, WEST-SMITHFIELD,
SOLD ALSO BY BOSSANGE & CO. GREAT MARLBOROUGH-STREET,
AND J. SMITH, 163, STRAND.

1823.



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TO WHICH ARE ADDED,

Entered at Stationers' Hall.

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OF A NEW INSTRUMENT INVENTED BY THE AUTHOR, FOR
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Lanc. Physician Surgeon to the Civil and Military Hospitals.

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Advertisement.

The Author purposes receiving Pupils who are desirous of acquiring a Professional Education as *Surgeon-Dentists*. He will be found at home daily, from 12 till 5 o'clock, 29, Great Tichfield-street, Foley Place.

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PRELIMINARY DISCOURSE.

IN the year 1816, I published, in Belgium, a Treatise on the Diseases of the Mouth, under the following title: “*Advice to Ladies, on the Means of keeping the Mouth and Teeth in good Condition; with Preliminary useful Observations on the Nature of such Diseases as most frequently affect the Mouth and Teeth, and the Mode of Curing them.*”

The Work was favourably received at the time by the Public; it was also highly spoken of by several periodical publications. I nevertheless had almost lost

sight of it, when, a twelvemonth after, I received a copy of an English translation of my book, by a Member of the Faculty of Edinburgh. The translator, who, through modesty, no doubt, wished to remain unknown, thought himself bound to alter the title; because, in his opinion, that which I had selected was not sufficiently expressive of the merit he found in the Work, especially with regard to the advantage which young practitioners might derive from its perusal. It is with infinite pleasure that I pay homage to my learned and esteemed translator, and return him my best thanks for the manner in which he has interpreted my efforts. His translation does him great honour in every respect; and was accordingly very soon out of print.

His preface, however, I must beg leave to abstain from publishing, on account of the encomiums he has therein lavished upon me; for he has presumed to place my weak production on a level with that of JOHN HUNTER, whom he justly calls the luminary of the Surgery of Great Britain; and whose name is held in high veneration by every learned man, all over the globe.

Now that, through choice, I am come to settle in London, there to pursue exclusively the profession of a Dentist, I have determined, pursuant to the advice of many individuals of high respectability, to publish my Work in English. I have neglected nothing to prove deserving of that confidence and patronage which I solicit from the British Public, and have accordingly

introduced, in the present Edition numerous modifications and additional topics, that I may not be deemed totally unworthy of the praise bestowed upon me by my anonymous translator, concerning whatever related to the science and practice of a Dentist. I have redoubled my exertions, that I might, by means of those additions, obtain the suffrages of professional men.

Far from me the idea of pretending to give lessons to those eminent Artists, from whom I should feel happy to receive instructions; I address myself to those youthful Dentists only who may stand in need of advice. That which I presume to offer them rests on a foundation of fifteen years' experience. In the whole course of the Work I have treated at full length, of the mode of

operating on the Teeth and Gums. I have expatiated on the different sorts of *fluxions* in the mouth, *catarrhal* affections, and have indicated as much as possible, the limits between those diseases and the *scurvy*, properly so called, which latter subject I have exerted my utmost endeavours to elucidate, so as to require no further explanation. I have treated minutely of the *spongy excrescences* in the gums, of the *fistulous ulcers* in those same organs, and of the suppuration of the *maxillary sinus*. I have paid particular attention to whatever related either to the *suppuration* of the gums, or to the dissolution produced on the *alveolar membrane*, and the *loosening* of the teeth, which is the result thereof. Lastly, I have spoken of the *fracture* of those

organs, of their *luxation*, and of their fall in consequence of blows, &c.

I have endeavoured to assign limits between the part to be performed by the Dentist, who treats the diseases of the mouth, and that which is the province of a Physician, from a persuasion that for the progress of the art, and for the advantage of the practitioner, it is requisite each of them should attend specially to that branch of the medical science which he professes. In various parts of my work I insist upon the necessity of this mode of proceeding.

When treating of the *Extraction* of the Teeth, and of the operation, rather too much neglected, called *luxation*, I have examined the most useful instruments that are used, and hinted at the *Improvement* they were suscep-

tible of. I have pointed out an *alteration*, equally remarkable and beneficial, which I have devised in the *Key of Garengéot*, generally called the *English Key*; I propose a new instrument for extraction, which would operate on the inside of the mouth in a like manner to the Pelican, with much less violence than the Key on the outside. When speaking of *artificial* teeth, or *Protise Buccale*. I have communicated some ideas relative to that mechanical branch: neither have I forgotten to speak of the *obturators* of the palate; and have concluded with an enumeration of the qualities required of a Surgeon-Dentist, and of the duties he has to discharge.

I have just mentioned the principal augmentations I have introduced

in my work ; I have revised every part of it, and have altered it almost *in toto*, so that it may be said to be a new publication, " A Practical Treatise on the Science," which has induced me to change the former title. A mere glance over the Index will suffice to give a summary idea of the different parts of the composition. I have rectified the prescriptions relative to the teeth and gums, and have been very particular in describing the various means of preserving the mouth and teeth sound. With regard to the means of treating the different diseases of the mouth, properly so called, I have given none but very simple prescriptions, which may easily be applied, either by the professional man, or by the patient, who in many circumstances, might not

wish to claim the assistance of a dentist. In this latter case, however, I have, in conformity with the dictates of prudence, avoided entrusting to the zeal, occasionally indiscreet, of individuals totally unacquainted with the nature of rather serious complaints, the remedies that should be administered by professional men alone. All judicious readers I imagine will be thankful for this cautious omission, and applaud my unwillingness to add to the number, already too great, of those popular treatises, which are more hurtful than beneficial to those for whom they are intended.

I nevertheless have thought it incumbent upon me to deviate a little from the above manner of viewing the question, both for the utility of mo-

thers, and to justify the praise of my former translator respecting my endeavours in their favour in the course of that Work. I thought myself bound to do something still more agreeable to them, and, in consequence, have treated specially of those accidents which will occur when children cut their teeth, of the mode of remedying them, of the means of procuring to those infants a robust constitution, which will be a preventive against those accidents, and of what is proper to facilitate and ensure the regularity of the second dentition. Professional men, in general, must be convinced that the means of deserving the confidence and esteem of a sex to whom we are indebted for the perfectioning our education and manners, consists in attend-

ing to them, and to what they hold dearest and most interesting, What stronger proof of zeal can we afford them than by our exertions to remove part of those ailments to which nature has subjected two helpless beings, so truly deserving of the affectionate attendance of the philanthropic character who practises any branch of the medical art? How many gratifications will not the laborious man of feeling derive from this happy disposition, when crowned with success? How happy will he be to deserve the esteem of a sex endowed by nature with exquisite sensibility and benevolence, since it is the most precious recompense he is anxious of obtaining.

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INTRODUCTION.*

It is the particular business of a professional man to study without interruption, and constantly to meditate on those branches of the medical science which he deems of the greatest utility to the human species. No occupation whatever is to be found preferable to that of attending, even mentally, on his fellow creatures, who seem entitled to

*. This is nearly the same as that which is at the head of my first publication, I perhaps should have omitted it entirely, or have embodied it in the Preliminary Discourse but I could not resist the temptation of producing it here separately.

claim his chief attention in a most special manner. Men, on account of their more robust constitution, masculine rearing, and bodily exertions in general, are rendered more capable of encountering the hardships and infirmities to which they seem to be condemned by nature. If, however, we consider *man's* two extremities of existence, he will be found in a situation particularly interesting to the philanthropic medical practitioner. To relieve the infirmities of old age, to prevent or remove the maladies that besiege childhood, must undoubtedly entitle the medical adviser to the esteem and gratitude of his fellow citizens. The care and assistance that are requisite at these two periods of human life, are the peculiar province of the medical and surgical practitioner.

This latter requires from the practitioner not only science, dexterity, a light hand, and exquisite judgment, but also a particular moral disposition, which nature alone can gift him with. To this same nature the surgeon is indebted for being capacitated to identify himself in some measure with his patients, to comfort them, and to bestow upon them those affectionate assiduities which influence the removal of the disease.

But it is chiefly to the fair sex that this moral disposition can be beneficial in an eminent degree. Is there in fact, in the whole community a being more deserving of, and that calls more aloud than a female for the care and attention of such as profess the most useful art, the preservative art above all others, the art in fine of maintaining a good

constitution and of restoring health, the most valuable of all treasures, which is never duly appreciated, but when lost, and without which the wealthy man has it not in his power to enjoy his riches, the absence whereof disenables the poor from procuring the means of subsistence. Let us not wait till old age has frozen our hearts; let us labour without relaxation; let our zeal keep pace with the tribute of respect and gratitude due to a sex who devote themselves with such unbounded solicitude and manifold dangers, to the care of our infant years. Let us not forget that, at a future period, should we make any progress in the paths of virtue and of civilization, to them we are indebted for the attainment.

The above considerations, founded

upon fifteen years observation and practice, have induced me to redouble my efforts for the benefit of young artists, of the Nobility, Gentry and others, but more especially still of the Ladies, whose indulgence and patronage I chiefly solicit in favour of this Essay.

That part of the science which I am about to treat is more deserving of attention than is generally thought; the truth of this assertion, I believe, my reader will be convinced of after having perused the Work. If I am so happy as to succeed in my twofold attempt, I shall congratulate myself upon having evinced that professional men should never neglect their duty; and that their sole aim both in their attendance and their writings should be to speak nothing but the truth, and to render themselves useful.

GENERAL OBSERVATIONS.

THE mouth is unquestionably that part of the human body which ought to fix our particular attention, and is the most deserving of being kept in good order with uninterrupted care*. This part, wherein nature has established the seat of the graces and of beauty, contains likewise several organs chiefly requisite for the preservation of life. Cleanliness is indispensably required for the good of the teeth and gums, and of

* A celebrated Author has judiciously called the teeth "The Mill of Human Life".

such advantages as result therefrom ; a more easy utterance in general, besides, the absence of those nauseous smells that, when exhaled, are insupportable to all around. I shall presume to assert even that the bad condition of the mouth, has a much greater influence than is thought upon the functions of the digestive apparatus, nor do I fear being contradicted by the most learned physiologists. In fact, if the main instruments of mastication are diseased, if the gums, swoln on account of the fur, are become painful, the consequence will be that the alimentary bolus, not being properly triturated, for want of a sufficient quantity of saliva, the digestion will become more laborious, and will produce a chyle less qualified to restore strength. On the other hand,

if the saliva be vitiated in consequence of the bad condition of the mouth, that humour, so essential to a good digestion, will impart its injurious qualities to the chyle. This opinion is founded upon facts. The veteran, whose teeth continues sound, is much less weak than he who has lost them at an early period; whereas the youth who in every respect is gifted with a good constitution bids fair to enjoy more lasting and vigorous health than such as have not good teeth. In order to avoid repetitions, I shall explain in Chapter IV, when enumerating the internal causes which may injure the enamel, the influence of the gastric system* on that of the mouth.

* The collected parts of the digestive apparatus, the centre whereof is confined by the stomach.

It is at the time of the second dentition, when children are between six, seven, or eight years of age, that it will often become useful to consult a Dentist, that he may attend to the situation of the mouth, remove such first teeth, as being decayed, are liable to injure the second, and to impede their shooting, that he may also give a proper direction to these latter, by aiding nature in the operation. At that tender age, and even at every period of life, some advice, some occasional assistance, and the cleansing of the mouth, would suffice to prevent those real ills and fatal accidents which, through unpardonable negligence, will occur in that part. Among many, are to be reckoned the irregular growth of the teeth, their getting hollow, their shak-

ing, their falling, the divers diseases in the gums *, their spongy tumours, the suppuration of the alveolar membrane, the dentric fistulas, various sorts of ulcers, some of which resting on the tongue, are most frequently prevented healing by the friction of a tooth either ill-placed or broken. These cruel tortures, the common consequence of decay, which in its progress has left bare the tender membrane that lines the internal cavity of the tooth, and which seems to be formed by the expansion of the nerve, might frequently be prevented. Of all the pains which

* I shall observe here, that most of the complaints of the teeth originate in impaired gums. I intend to speak of and to indicate the method of remedying them, at the article *Gums*, Chap. iii. and iv. of the Second Part.

man is subject to, no one perhaps is more acute and insupportable.

If we were to consider those ravages with regard to their disagreeable consequences we would say that nothing can be more disgusting than a mouth in which are seen discoloured teeth, ill shaped, heaped up in irregular groups, and that exhale a fœtid smell; that nothing is more disagreeable than a person whose articulation is not free, and who sprinkles one's face over with saliva, whenever he attempts to speak. Nothing on the reverse is so pleasing as a mouth that articulates with facility, which, when it smiles, gracefully exhibits two rows of teeth of exquisite whiteness, most regularly drawn up, and which bespeak the possessor to enjoy unimpaired health.

It will be urged, perhaps, that many persons who have a fine set of teeth and a good mouth pay very little or no attention to those parts; whilst others, who set a high value upon similar benefits, and take the greatest care of them, are at great pains to keep their teeth in good condition. It were no hard task for me to answer to such arguments, by comparing the offspring born in the country, of healthy parents, with the children that are born in a city, and whose physical rearing not being properly understood, is the forerunner of a weak organization, which the condition of their teeth alone will often evince. I shall answer those observations in a more particular manner, when I treat of the physical education of children, in Chapter III of this First Part, or of the

best method calculated for procuring them a robust constitution, capable of resisting the attacks of a laborious dentition. This is the proper place to have it noticed that bad teeth, in many individuals, are an organic disposition which may be transmitted from the parents to their offspring: I shall, moreover, say, that as I most particularly address those who endure real ills, it rests with them to appreciate in their own minds, all the advantages that attend a set of sound teeth: the value of such a gift is seldom duly appreciated before it is lost.

I cannot resist the temptation of introducing, from a most celebrated author, a paragraph which deserves to

be known *. “ The teeth are the greatest ornament of the human countenance; their regularity, their whiteness constitute their beauty : these qualities please the sight, and add new attractions to the face. Should the mouth exceed in magnitude its common size, a fine set of teeth will disguise the defective conformation, frequently even, such is the prepossession which results from a fine set of teeth, that the same mouth would appear defective if it were smaller. Were you to see a woman laugh, whose wide mouth discovers thirty-two dazzling pearls, you would feel no temptation to scrutinize the extent of the diameter of her mouth;

* Art. *Tooth*. (Pathology) composed by M. Fournier, in *Dictionnaire des Sciences Medicales*.

your whole attention will be directed towards the beauty of her teeth, and the graceful smile that exhibits them. This ornament is equally becoming to both sexes; it attracts attention when found in a man, and spreads a kind of amiableness over his countenance, by softening his features: those of the black African cease to frighten the timid beauty when he displays his dazzling white teeth. But it is chiefly to women that fine teeth are necessary, since they are intended to please our eyes prior to captivating our hearts. What justifies the pre-eminence I give to the teeth over the charms of the face, is the influence which they exercise over beauty: let a female be possessed of fine eyes, a pretty mouth, a pretty nose, a fine forehead, beautiful hair, and a charming

complexion ; if she has ugly teeth, vitiated, broken, covered over with thick fur, or with a slimy covering, if, in short, they send forth a corrupt smell, (which her neighbours find out before she does herself) she cannot be thought handsome from the moment she opens her mouth ; she herself, conscious of the sad effect of her smiles, acts with constraint, and has recourse to grimace, with a view of concealing the injury which her teeth have endured. If, on the contrary, she should have a large nose, small eyes, if even she were ugly, provided her teeth be regularly placed, that they be white, and especially that she retains her full number, or at least all that can be seen ; unless, indeed, that woman was a true fright, her face will appear agreeable as soon as a smile

comes to her assistance; and you will hear these observations so consoling to her vanity: "she has fine teeth." When Nature, sparing of her gifts, has not bestowed them upon the teeth, that they are defective in shape, or of a faded colour, great attention and extreme cleanliness are required to supply these imperfections, and conceal the bad conformation. In this case, even if the teeth are not pleasing they, at least, are not offensive to our eyes.

It is impossible to present at once a more faithful and a more graceful picture of the advantages and inconveniences inseparable from the different conditions in which the teeth may occasionally be. The learned Author, who treated that subject, has neither omitted

nor exaggerated any circumstance. We have all felt the agreeable impression that is experienced at the sight of a mouth decorated with fine teeth, the gums and other parts whereof are of a vermilion hue; it is with deep concern that I am obliged to say, also, that I have too frequent opportunities of undergoing a very different impression at the sight of a mouth that is not taken proper care of*.

My readers probably will like to find a description of the teeth, of their germination, and of the period of their shooting.

* Benserade said once of a young Lady whom he had heard sing, and who had a strong breath, "That is a very fine voice, the words are also very fine, but the *Air* is not agreeable."

not exaggerated any circumstance. We have all felt the atrocious impression that is experienced at the sight of a mouth decorated with fine teeth, the gums and other parts, which are of a vermilion hue; it is with deep concern that I am obliged to say, also, that I have too frequent opportunities of undergoing a very different impression at the sight of a mouth that is not taken proper care of.*

My readers probably will like to find a description of the teeth of their generation, and of the period of their shooting.

* Boscovich said once of a young Lady whom he had heard sing, and who had a strong beauty, that is a very fine voice, the words are also very fine, but the air is not exquisite.

38

PART THE FIRST.

CHAP. I.

DESCRIPTION OF THE TEETH, THEIR GROWTH OR
GERMINATION.

THE Teeth are very small hard bodies that grow regularly in the jaw-bones, which are provided with little cavities called *alveoles*, in the border of those bones. There are to be observed in them a *crown* or *body* which is the external part: the *roots* and a *collar* that separates those two parts; the teeth are composed of two distinct substances—the one, which forms the internal part called *bone* or *ivory*, constitutes nearly the whole of them the other, viz the external part, which is a thin crust, covers the whole of the visible part of the

tooth as far as the commencement of the roots, is called *enamel* *.

We have three sorts of teeth; namely, eight *incisive* or *cunéiforme*, (two central and two lateral,) four whereof occupy the front of the upper and lower jaws; four *canine*, *angular*, or *conoïdal* are placed on each side of the former: these twelve teeth have but one single root. Twenty *grinders*, or *masticating* teeth, occupy the back part of the jaws, five on each side both at top and bottom. The two foremost of those five teeth are called *little grinders*, or *bicupedes*, and have most frequently two roots close to each other: the three others, placed more backward, have two, three, or four very distinct roots, which are never replaced at the period of the second dentition.

* Teeth are a composition of phosphate of lime and of gelatine: the gelatinous part being less abundant in the enamel, the calcareous phosphate is of course purer; so that this shining covering is almost entirely dissolved in acids, and without leaving any kind of sediment. I purposely mention in this place the effect which acids produce upon those organs.

At the extremity of each root there is a little aperture, through which the sanguinary vessels and a nervous ligament, intended to give it life and support, penetrate into the tooth. This nerve and these vessels run into a narrow channel that joins the root, and form in the interior of the tooth a pulpous knob, composed of a gelatinous substance, wrapped up in a very thin muculeous membrane, formed by the expansion of the nerve and of the vessels. It is, as will presently be seen, by means of this membrane that the tooth is formed, nourished, and increased.

The jaws of an embryo, in the sixth month, and even earlier, already contain at the bottom of the alveoles the seeds which, at a later period, are to constitute the pulpous knob. These seeds appear at first like a couple of gelatinous vesicles, adhering at one or two points to the bottom of each cavity in the alveole; these are, if I may use the expression, the origin of the first and second teeth. They finally become partly or totally insulated

on account of the formation, not unfrequently irregular, of a bony partition, which proceeds from the gradual increase of the jaw-bone. It is round these seeds, and towards the above mentioned period, that by means of transudation are successively deposited the stratum that are to form the ivory of the teeth : each stratum immediately gets hard, and if owing to some accident the ivory happens to be broken or damaged, it is never to be repaired ; this part when once organized enjoying life only in a weak degree *. This absence of vitality will further explain the cause of the insensibility, properly so called, of that osseous body. The mechanism, by means of which the tooth at its formation is directed from the bottom of the alveole towards the gums, at the time of its eruption, may be

* It is to be observed that the ossification of the teeth is operated in a contrary manner to that of all other hollow bones. It is the result of concentric shoots, which in time tend to obstruct the cavity of the tooth, beginning at that part that approximates most the edge of the alveole.

easily conceived, since it is towards that part that the resistance is least powerful * : It is also by a similar mode that nature, when forming the second seed, towards the sixth year, successively pushes out in the order of their growth, the twenty teeth of the first dentition, and replaces them with such as are intended to remain.

Many imagine that the second teeth grow from the roots of the first set, because these first teeth, when they fall, most frequently appear in part broken at their collar. This breaking may likewise have suggested an idea of the first teeth growing without roots. These first teeth, in their origin, had very large and extremely solid roots, which, however, are worn out by the pressure of the second set, at the time of its growth. The learned Professor SABATIER, after quoting instances

* At the moment of the birth, the crown of the first twenty teeth is nearly formed in the alveoles, and the roots begin to grow.

of wasted roots, demands how the contact of two bodies equally hard can constantly produce the destruction of one of them, and finally concludes, *that there is a something as yet unknown* in the case. The progress of the science in the present time will allow me to explain in some measure that physiological phenomenon. Nature, ever wonderful in her most minute operations, bestows upon the second seed, towards the sixth year, an increase of activity which develops all its parts in a very energetic manner. On account of the growth of the new tooth, the root of the first is endangered, the nerves and the vessels of the pulpous knob are obliterated, and leave it destitute of life. In such a circumstance, that root being deprived of the vital powers, which efficaciously resist destruction, it insensibly becomes soft, and the particles are absorbed by the sole operation of nature: or the whole tooth, being no longer fastened in its alveole, will fall and make room for its successor.

CHAP. II.

SHOOTING OF THE FIRST AND SECOND TEETH ;
CONSECUTIVE CARE TO BE TAKEN, AND MEANS
OF HAVING THEM PLACED IN REGULAR ORDER.

WITH very few exceptions, the first teeth shoot in the following order : Between the sixth and the fourteenth month after the birth of the child, the central incisive teeth of the lower jaw successively make their appearance first, and are soon followed by two corresponding in the upper jaw : next are seen the lateral incisive at bottom and top. After these eight come the four canine, always successively at bottom and top. The first four little grinders appear when the child is two years old ; the second shoot between the age of four and six, or often a little sooner. Towards

seven, nay, sometimes as early as five, the third grinders, or first double teeth, are to be seen; and that which follows, shoots also towards the ninth or tenth year of the child's age. Finally, the teeth called Wisdom Teeth, come last of all, do not shoot until the age of eighteen to twenty-five, and sometimes much later. It is to be supposed that the canine teeth do not always shoot before the little grinders, since some authors assert that they sometimes appear after these latter. It is probable that the shooting of the canine teeth has been preceded in some cases, at least, by that of the little grinders at the period of the second dentition, since some people have those former out of their rank and bent forward, which must oftentimes proceed from the little grinders being out before them, and having taken previous possession of the vacuum that was intended to receive them.

Such is the order in which the phenomenon of the first dentition is generally operated.

That of the second, which commences between the sixth and seventh year, follows the same march, and is accomplished in the space of two years or more*. I shall now treat of these latter, and indicate the care which is requisite for their preservation, and the mode of rectifying their irregularity.

The attention that is to be paid to the teeth of children should begin as soon as they leave the breast. Every morning, after the infant's breakfast, those small bones should undergo a light friction with a short soft brush and some lukewarm water. The mouth is frequently to be examined to ascertain whether any of the teeth are injured, or whether those of the second dentition take a right direction †.

* These teeth in general, are never replaced when they happen to fall, except in some very rare cases, even in a very advanced age. This proceeds from the seeds being more numerous than in ordinary cases.

† These new teeth, in consequence of a faulty disposition, may shoot behind the first teeth which then do not fall so soon. These last mentioned are almost always found in front of

Those teeth that are troublesome, damaged, or that shake, should be extracted immediately, because otherwise they might turn aside those that are to replace them, or be productive of a bad breath by spoiling such as are in contact with them. They might also cause an irritation in the gums, inflame them, and provoke a suppuration, which would counteract an easy mastication, which is necessary to procure a good digestion. These early daily

those intended to replace them, and are called *extra teeth*. The teeth will show themselves occasionally in a most arbitrary manner, either on several rows, or in some remote part of the jaw-bone. In this case the front row is generally composed partly of some of the remaining first teeth. Some months back I extracted one for a young lady twenty years of age; it had grown in the middle part of the roof of the palate, at about an inch from the incisive teeth. It was of the same shape as these latter, but longer and larger, and held very fast to the bone; as it happened to be placed in a direction from top to bottom, and from back to front, the extremity of its root was crooked.

cares would become insufficient a little later if the teeth were to be covered with fur, and began to be of a black colour. Then it is that the attendance of a skilful and prudent Dentist becomes necessary, either to give proper directions, or to ascertain that harmless substances alone are administered or used. The parents will be aware of the importance of this advice, if they do but reflect how easily the teeth and the other parts of the mouth are susceptible of getting injured by using inconsiderately some too active substances praised by quack itinerants. It will be of the highest importance, therefore, to procure a powder judiciously composed and suited to the delicate mouth of the child : it is not without a particular motive that I prefer a powder to an elixir or an opiate. I impart my reasons for so doing in the first Chapter of the second Part. This simple method will also frequently be used whenever required to keep the second teeth in a good condition. If they should happen to be placed in an ir-

regular position, it were proper, before it is rectified to wait till those organs have acquired sufficient consistence to remedy the defect without running any risk.

If, in consequence of having neglected some of the means which I have recommended to facilitate the shooting of the second teeth, or if, owing to some impediment occasioned by the tongue, fingers, or some hard body, those teeth happen to be irregularly placed, we should endeavour, towards the age of eleven to fourteen, and not sooner, to give the whole of them the best appearance possible. Recourse then must be had to a skilful judicious Dentist, to use such means as will assist nature in the operation. In some cases he need not apprehend using the file in preference to extraction. He will take out all the supernumerary or superfluous teeth. He will avoid all violent measures; yet in order to straighten some teeth, which nature alone never could, he may employ gentle means, as a simple ligature, or with the addition of

sheets of metal properly disposed so as not to check mastication. The performance of these operations must be directed by skill, and always gradually. The Dentist, in general, should abstain from applying the file to nervous individuals whose teeth are easily set on edge, and sensible to the action of heat and cold. He will also avoid filing the teeth at their extremity, and if in some cases he should be compelled to have recourse to that measure, let him act by degrees in an imperceptible manner, so as to imitate as much as possible the operation of nature, when she effects a waste in the teeth at a more advanced age*. The lateral part of the teeth do not require the same precautions; nothing more is required than to use files of a fine grain, and to preserve in front, as much as possible, the enamelled part of that organ.

* I would advise this operation to be performed in two sittings at least, at about a week's interval, and not to take off, in all, above the sixteenth part of an inch, or very little more, that the bony part may not be left unprotected.

With a view of rendering my work more useful, and that I may the better direct mothers of families in the attendance required to children at the time of their first dentition, always more or less trying on account of the weak state and irritability of the infant, I have collected in the following chapter whatever is requisite to be known relative to the importance of a physical education, calculated to secure to children a robust constitution, capable of resisting the dangers which sometimes accompany the shooting of the first teeth; or rather it will be the means of guarding them against those dangers. I shall subsequently give an enumeration of the accidents that may happen, and point out the relief to be administered according to circumstances.

CHAP. III.

OPERATION OF THE FIRST DENTITION ; MODE OF
PREVENTING AND OPPOSING THE DANGERS THERE-
OF : PHYSICAL EDUCATION OF CHILDREN.

I HAVE just said above, that the operation of the first dentition was so much the more difficult and attended with more danger, on account of the child being weaker and more nervous. It therefore will not be improper to begin with a statement of the situation, more or less favourable, of children, to enable them to endure the pain which is inseparable from that operation of nature, and to mark out a proper diet and regimen that will procure them a strong constitution. The first rule to be observed is that which is conducive to the enjoyment of a good state of health, which is the result of a well directed phy-

sical education. It is in the country especially, that children strongly constituted are to be met with, who undergo hardly any of the accidents of a painful dentition. This good state of health is owing to the plain diet observed by the mother or the nurse, to the wholesome food she takes, to her rustic habits, in the strict observation of those laws that are prescribed by nature in the use of necessaries, and in the abstaining from whatever is proscribed. Her infant being under a similar influence, will, in conformity to two very simple reasons, enjoy a state of health most propitious to resist the infirmities to which nature seems to have condemned it from its birth. Are we desirous of obtaining sound minds? we must begin by framing robust bodies by means of a good physical rearing. What I advance here is no paradox, especially since the Author of "Emile" has so eloquently refuted former prejudices against the masculine education so anxiously recommended by the sages who have written on the first age of life. The results of

which I speak were remarkable among the most ancient people, even the most polished, provided they enjoyed a liberal government. I shall only quote the Greeks. They are not less so in the present time among those nations that have been in nearly similar circumstances, as, for instance, the English and the French.

Thus, the more we imitate the simplicity of nature, the more peaceably will her laws be accomplished, and the more will the improvement of our species be advanced ; in short, the nearer physical and moral man will reach a high degree of perfection, the greater will be that quantum of happiness it is in his power to attain. Let parents therefore attend with affectionate solicitude to the physical education of their children. Nature, which is never ungrateful, will repay them for their trouble, and amply remunerate them for having helped her to form men at once more useful to themselves, to society, and more capable of enduring and resisting the miseries of human life. Let those parents, who can afford it, frequently call to their aid the advice

of a respectable, medical man, and by paying a due regard, give him a place among their best friends. That friend will recommend their giving their children only such wholesome food as may strengthen them, without fatiguing the organs of digestion, which are yet weak; he will not fail to pay more attention to the quality than to the quantity, for sobriety is, without contradiction, the parent of health. He will proscribe cakes, all sorts of sugar-plumbs, or too highly seasoned, and heating made dishes; such fruit as is unripe and acid, and which so often impedes in its source the digestion of children. He will advise, in addition, to use none but temperate drink, neither too warm nor too cold. He finally will consider, as an essential thing, the free use, in the open air, of their little limbs, yet in a feeble state. The happy state of health that will result from this regimen will render the parents secure because the cutting of the teeth will take place sooner, and without occasioning any remarkable irregularity in the organization. The case will be quite different with weak and

delicate children born of debilitated parents, or of a weak constitution.

My present object appears to me of very high importance, since it consists in providing for the preservation and welfare of our succeeding generation. I have consequently thought it incumbent upon me to revert to the entering of children into this life, experience having convinced me that it is of the highest importance to commence their physical education at that period, because the errors which may be committed then, have a most powerful and durable influence on their constitution. I have observed, with sorrow, that immediately after their birth children are often left entirely at the disposal and to the care of a capricious nurse, or of a stubborn attendant, each of whom have imbibed the most ridiculous prejudices. The father will trust to the affection and to the zeal, often inconsiderate, of the mother, who is forgetful of every thing else, to think only of her dear babe; whereas this kind of maternal delirium, if I may use the expression, disposes her to

commit many acts of weakness, and she listens thoughtlessly to whatever she may be advised. Though the Accoucheur should give good and salutary advice, it is not always followed by the infallible nurse, who glories in rejecting what she has not proposed herself, and in causing her own prescriptions to be adopted. It is truly grievous to see a passive being, in a state of almost uninterrupted suffering produced by a faulty regimen, forsaken by every rational creature, exactly at the period when it stands most in need of assistance. At that very time it is of great importance, (I repeat it) that they who attend on children should promptly contract the habit of treating them in a right manner.

As soon as the new born infant is washed, you must abstain from gorging it, as is too commonly practised, with all kinds of alimentary, strong and heating beverage, but merely give it its mother's milk, which is then relaxing, or some weak barley water, to which, in some very rare cases, one half of wine may be added. It is an indisputable truth, of which my readers

will soon be convinced, that the child does not want food so long as the meconium is not evacuated: aliments, on the reverse, would only prove injurious by checking the efforts of nature, which are often insufficient to discharge it. That excrementitious, acrimonious, blackish, greasy, and glutinous matter is withheld in the channels of digestion, whence it is necessary to dislodge it, at latest during the first twenty-four hours after the birth; the mother's milk seldom suffices to procure its evacuation in that space of time. This matter is then soon absorbed in the mass of the blood, which becomes manifest by the saffron colour spread all over the body of the infant*. It is this

* This colour of the skin is attributed by some to the absorption of the bile only, owing to the secreting vessels being in a state of irritation, which prevents its flowing into the duodenum; we may presume the combination of both these causes.— To remedy this, tepid baths, with a little soap are to be administered; also some gentle laxative, or a few spoonful of the mixture, which I shall point out.

absorption which it is important to prevent, for otherwise it might contribute to the development of some diseases, or at least aggravate those of the infant age; besides, its presence disorders the abdomen and gripes the child. It will therefore be necessary to administer a gentle purge if the infant has not had a copious evacuation during the first twelve hours after its birth, and to continue the same till such time as the stools are seen to be of a natural colour. There can be no danger in giving one or two tea spoonsful, every half hour, of the following mixture until it has produced a sensible effect; that evacuation is to be continued by means of additional doses at more distant intervals.

℞ Syrup of Rhubarb 1 oz.

Plain Water half oz.

Jalap Powder from 8 to 12 gr.

Gum Arabic from 12 to 15 gr.

Properly mixed.

N. B. The phial to be shaken every time it is used.

As it may happen that the mother has not enough milk, it is useful moreover to procure a substitute in a case of emergency, and to encrease it in proportion as the infant grows. The aliment the most analogous to its situation is a decoction of barley water, with one third or one half of cow's milk cold and not boiled, to which will be added a little sugar. In proportion as the child acquires strength, the consistence of the barley water must be increased. You then may also give it a little soup, not too thick, made of that same decoction, with a little bread well baked or dried in the oven. This artificial feeding, to which it will always be advantageous to accustom children from their earliest age, will also have the effect of facilitating the weaning of them, which should never be operated but gradually, in order to prevent the accidental ills which the sudden privation of the breast might occasion; creams and pap of any kind to be proscribed*.

* In general the weaning of children should be at the end of eight or ten months; or at the utmost twelve months.

One of the most essential precepts to keep children in good health, is never to give them the breast or any other food till they have digested what they have eaten. Pursuant to this rule, at first, an hour and a half, or two hours interval, and later, three or four hours must elapse between each meal. If the child should be subject to the heart-burn, or acrimony on the stomach, which will seldom happen if the above regimen is adhered to, you then must dissolve in his soup a lump of Alicant soap, or of Apothecaries' soap, the size of a large nut. Another most necessary precaution is to avoid giving the breast to the child immediately after the nurse has taken her meal, or any exercise that has brought on perspiration; but chiefly after a fit of anger, or any kind of vexation*. Nurses should avoid violent agitation, and court whatever may tend to tranquilize the

* There have been instances of children having convulsions, or fits of epilepsy after taking the breast in such a situation of the nurse.

mind : she must be guarded against all sort of acid or crude aliments, also against spirituous liquors.

Care must be taken to have the child's cloathing sufficiently wide for it to be at full liberty : this should be light, except in cold and damp weather. The child must be accustomed almost from its birth, but gradually, to lotions, repeated daily from head to foot, in chilled water, during the winter season, and cold in summer : these lotions are to be made quick, with a sponge, and immediately wiped with a very dry cloth. If excessive cold may become offensive to children, habitual heat would prove still more injurious to them. Greater advantage therefore, is to be reaped from keeping them rather cool than too warm, and from familiarizing them at an early period with the different temperatures of the atmosphere.

The above mode of feeding and of attending children, essentially regulates the digestive functions, the derangement whereof is to be considered as the source of most of the diseases

infants are afflicted with. Those little beings, if taken proper care of, are habitually lively and gay, they enjoy peaceful, sound, and long sleep, and occasion much less trouble to their nurse.

The symptoms which generally succeed each other during a more or less difficult dentition, are as follows : In the first place, want of sleep, restlessness; the secretion of the saliva increases, the gums redden, swell, itch, and occasion pain; the digestion is disturbed, the appetite is lost, a loose or bound state of the bowels, cough, vomiting, burning thirst; and finally, the child wastes, utters piercing cries, and has convulsions.

The treatment is to be considered under two points of view, the one as preventive, the other as curative. What I have been saying above concerning the necessity of the regimen, and of whatever can procure to children a strong constitution, expresses nearly all that relates to the preservative : there are, however, some further means which may be used if requisite, and be considered as preparatory. According as the child manifests greater irritability, and on the

first symptoms of the dentition, tepid baths are to be repeated daily during about half an hour. Both the child and the mother or nurse are to observe a gentle diet; the latter besides, must use sweet emollient draughts made with barley, or rather with dog grass *infused*. If the restlessness of the child should increase, if he be disposed to nervous affections, if his bowels are not open, if he has not, finally, been treated according to the means I have recommended, to procure good and strong health, you must give him some syrup of rhubarb, in sufficient quantity to open the bowels*, and some lukewarm emollient drink with honey: his feet must frequently be put into warm water, and tepid baths are to be repeated in the course of the day; he

* The dose is to be from half an ounce to an ounce and a half, all at once, according to the age. I nevertheless prefer the use of the mixture indicated above, given with the same precautions, if the doses be augmented, from two to four teaspoonsful at a time, or by a table spoonful in proportion to the age. Purgative glisters will be still preferable if the child is bound, or if there are symptoms of irritation in the stomach.

must also be given some figs to chew, or, which would be still better, crust of bread rubbed over with honey or butter. No hard body is to be allowed to approach the gums, as it would harden them, and consequently retard the shooting of the teeth. These means will be sufficient in ordinary cases, and comprehend all that relates to the preventive or preparatory treatment.

If, notwithstanding these means, any alarming symptoms are discovered, either towards the abdomen or the nervous system, during the progress of the dentition, it would then be expedient to calm the irritation, and to forward the shooting of the teeth. A crucial incision made in the gum with a lancet, may considerably diminish the inflammation, and put an end to it. Should the irritation of the teeth extend to the eyes, and produce a painful ophthalmia, you must, several times a day, bathe the face over, beginning at the *forehead*, *temples*, and *eyes*, with a strong infusion of mallow flowers. After repeating this fomentation, you will apply immediately, the warm pulp of a roasted golden

rennet, between two pieces of fine linen, take care, however, not to keep this topic on above a quarter of an hour or twenty minutes at a time, and not to bind the eye too tight, so that the child may be at liberty to close and open his eyelids at pleasure, and thereby derive more direct advantage from the influence of the remedy. The state of the bowels and digestion claim particular attention in the present case. If the looseness of the bowels is only moderate, the stools of a yellowish colour, and not over fetid, nature then must be left to take its course : if, on the contrary, the purging is violent, and accompanied with cholic, the stools fetid, oily, frothy, and of a greenish colour, if the child begins to have convulsions* you must promptly apply to the skilful professional adviser.

* This convulsive state is less owing to the nervous irritation proceeding from the pain in the teeth, than to that of the nerves in the stomach and intestines, irritated either by the continuity or the presence of the matter which is become acid. Hence, anti-spasmodics are completely useless to children in general that have convulsions.

I shall here cease offering such advice as is the province of a science which I no longer profess, from a thorough persuasion that the most certain method of contributing to the progress of the healing art in general, and to be deserving of the confidence of the Public, is for every practitioner to attend to that particular branch only which he proposes to exercise: even then, the time for doing good will be found very short. I believe, however, that I have fulfilled my promise, since I have indicated to parents the certain means of disposing the constitution of their children, so as to enable them to resist the crisis of the first dentition; and that I have taught mothers that easy mode of treatment which will suffice in ordinary cases. I am even convinced, that it would be an act of temerity to entrust to the inconsiderate zeal of parents, the mode of treating serious cases, which can never be managed with safety, but under the guidance of a medical man of known abilities.

May those individuals whom, I had more particularly in view when I composed this Chapter,

be sensible, as I am, of all the importance of its object, and follow with scrupulous exactness the regimen that I have prescribed. I shall then be amply rewarded for my labour, since I shall have contributed to rescue interesting beings, not only from most of the dangers which accompany the first dentition, but from the perils attending the manifold diseases of infancy.

CHAP. IV.

OF THE ENAMEL ; ITS FORMATION ; CAUSES OF
THE DISEASES WHICH INJURE IT.

THE enamel* is the external part of the tooth : towards the extremity of the bone, it is, at most, one twelfth part of an inch thick,

* *Vide* its Chemical Composition, in the Note, page 36.

and still thinner on the sides ; it lines that part which projects from the alveoles, and runs as far as the beginning of the roots, and grows thinner in its progress. This polished and shining body, whose colour varies from a bluish to a yellowish white, is much harder than ivory. It is formed, like this latter, by transudation, by means of the membrane which lines the internal sides of the alveole : this operation of nature is accomplished successively, and ceases only when the enamelled part is no longer in contact with the membrane that has produced it, which never takes place till after the complete formation of the tooth.

The enamel of the tooth is susceptible of being injured by various causes, either external or internal : this injury may even end in its complete disorganization. The internal causes, which can only be rightly understood by professional men, may be referred to the period of gestation, to that of the suckling, and to the early diseases at the precise time of the development of the seeds of the second dentition.

The *rickets* and *scurvy*, diseases to which infants are subject, especially the first, which has its seat in the bony system, may carry its ravages on the teeth to the period I have just mentioned, because then, these organs are still tender and not yet formed. The result of the disorder may be discovered by the inspection of the teeth, by the little cavities of the yellowish or blackish spots that are observed upon the enamel, and which penetrate as far as the bony part of the tooth. Thus it is, that by merely looking at the teeth you may know whether the mother has been seriously ill during the time of her pregnancy, or of her suckling; or if the child itself has been ill towards the time of the formation of its second teeth: it is easy to comprehend to what degree this state of the enamel may be more or less productive of caries. Laborious digestion occasions the explosion of fetid fumes, which may also affect that substance in such individuals as are weakly constituted, and subject to an habitual bad state of the gastric organs. There are other internal causes

which I shall not enumerate, and that contribute much to the injuring of that substance: they may be the consequence of some diseases become constitutional, or of hereditary dispositions. I shall say a few words concerning the external causes which every one may be a judge of, though no physician. The disagreeable sensation which acids produce on the teeth, and which is called *setting the teeth on edge*, is universally known. That nervous sensation would seem to prove, contrary to the opinion of some authors, that the enamel is in some degree possessed of vital action, and of indisputable organic powers, a learned practitioner was right when he styled this sensation the first degree of the toothache*.

* The effect of the file upon the teeth of certain individuals, would seem to come in support of this proposition. I have observed that this effect does not take place either upon every one, nor upon every tooth of the same individual. Meanwhile, how are we to account for the action of those two so widely different, stimulating powers, the *file* and *acids*, upon a part that may be thought destitute of organs? I shall pro-

Experiments have made it evident that acids will soften, split, and even dissolve the enamel. In fact I have observed those splits in the teeth of quite healthy individuals, and whose gums were in the best condition, in consequence of their using acid powders or elixirs. I have thought I could ascribe those little splits, or

ceed to deliver my opinion, which I believe coincides with that of several authors of the present time.

* By means of a chemical power, acids will soften enamel, penetrate it as far as the bony substance, and probably will exercise their action as far as the very delicate membrane of the pulpous knob. According to my opinion, the effect of the file might be elucidated by the sympathetic irritation which its action produces upon the nerves of that membrane; the diminution, more or less considerable of the border of the tooth, and the degree of irritability of the individual, will perhaps account sufficiently for the sympathetic effect of the file taking place only upon certain individuals.

In order to remove that irritation, chalky or absorbing powders are to be applied on the tooth; this is the most rational remedy, especially when that irritation proceeds from eating acid fruit. The application of a warm napkin upon the affected parts, may also carry off the nervous irritation.

fissures, to the constant use of those too acid substances; could they not by their drying effect, and a primary action, compress the texture of the enamel? The filth which gathers between the gum and the collar of the tooth may also raise the enamel. Blows, falls, violent exertions, and the extreme inability of the Dentist, are additional causes of the injuring of that precious substance.

The inhabitants of marshy, damp, or cold countries seldom have fine teeth. If to that local disadvantage is added the habit of smoking and chewing tobacco, the teeth then are generally of a dark yellow colour, deformed or loose, the gums in a bad condition, and the whole of the mouth offers a disagreeable aspect.

CHAP. V.

OF THE WEARING OUT OF THE TEETH ; USE OF THE
FILE UPON THOSE ORGANS : THEIR BREAKING,
LUXATION, AND FALL.

The wearing of the teeth, so easily discovered in almost every full grown person, is chiefly occasioned by the friction of those little bones against each other*. The ivory part, although divested of its covering, remains sound and resists the contact of air the same as the enamel of which it acquires the

* A very learned author, Mr. Gariot, says that the teeth wear out at both ends, and even more towards the opposite extremities ; so that in aged people the part of the root thus wasted would be replaced, in his opinion, by the increase of the bottom of the alveoli, which is insensibly obliterated. This opinion seems far from being confirmed by experience.

polish. This imperceptible natural waste, seemed to authorize the bold attempt of those who first ventured to apply the file to the teeth; and experience has evinced, long since, that there is no danger to incur in applying the file to those bones to take off a part of them, provided, however, the Dentist proceeds with the utmost precaution, and copies as closely as possible the process of nature*. In order to prove with how little danger the application of the file upon the teeth is attended, I shall quote the habit of some uncivilized people, my own practical experience, and likewise that of all the Dentists who have treated that subject.

Divers uncivilized people, in all ages, have divested their teeth of their enamel that they might form them into all sorts of figures; for two thousand years back, Dentists have used the

* These general precautions can only be recommended for the extremity of the teeth; which practical experience renders manifest. With regard to individuals too easily or too strongly irritable, it will be most prudent to abstain from using the file.

file; in short I have seen teeth, great part of the bony substance of which had been taken away for upwards of twenty years, without the least inconvenience resulting to those organs; my practical experience further comes in support of those observations.

The Surgeon-Dentist should ever be mindful that individuals of a certain particular constitution cannot endure the approach of the file in contact with their teeth; which however can scarcely be ascertained if the effect of that instrument should remain untried. I nevertheless have remarked that such individuals as bear most impatiently the application of the file, are those whose teeth are the most easily irritated at the approach of heat or cold, of acids, and many other causes. In no circumstance whatever is that instrument to be used without necessity; neither is it ever to be applied to the teeth of any under the age of adolescence. The Author quoted (p. xxix.) positively says that recourse must be had to the file to separate those teeth that are too close to each other, be-

tween which alimentary particles will get in, and which the tooth-pick cannot easily remove. This separation besides, says he, gives an additional beauty to the teeth, and can be attended by no inconvenience, when operated by an experienced practitioner*. The incisive teeth most particularly demand being separated and equalized, to facilitate mastication, and not to be offensive to the eye †.

The separation of the teeth is undoubtedly a means of preventing the caries which very often attaches to the lateral parts of the incisors, and which owing to the contiguity of the parts speedily spreads from one tooth to another,

* I admit the possibility of performing that operation without danger only upon individuals that are not afflicted as above described.

† I am far from admitting this last consideration. I do not think it is advisable, at all times, to abide by the will of those who like to have their teeth separated. It is the province and duty of the dentist to decide whether the separation is practicable, and to explain to the individual the danger resulting, if the operation be performed at certain times, and in certain cases.

before it can be noticed. In fact, as soon as it is discovered, or suspected even, that one of the incisives begins to be affected, it is an indication that without loss of time the injured tooth is to be separated from its neighbour, and to take off the decayed part. But it will seldom occur that those frequent caries are discovered before they have been communicated from one tooth to another; a circumstance which justifies the advice of having those organs separated when they are too close to each other. I shall again treat of the file at the article caries.

Violent efforts, blows and falls, may break or cause a luxation of the teeth. Notwithstanding the broken pieces should be detached, the remainder of the tooth may nevertheless continue sound, especially when those organs are not threatened with previous caries; but the inequalities must be removed with the file. If the fragments should still hold to the soft parts, they must be resumed, kept stationary for a sufficient time; the patient must be prohibited for

some time the using of that tooth, likewise touching it with either his fingers or tongue. It will become equally callous as another bone, if the fragments are well kept together the time requisite for their junction. It is probably because these precautions have not been attended to, that some people have imagined fractured teeth were not susceptible of being joined again. I have been taught by experience that they are, at least in cases of longitudinal fractures; however, those organs possessing but a small degree of vitality, the time requisite for the formation of the callosity and its consolidation will be longer than in other bones.

If a concussion should have produced an incomplete luxation of one or of several teeth, it will suffice to replace them and to keep them steady by the usual means. If both the dentist and his patient use each the necessary precautions, those teeth will get as solid as they were before, though even the borders of the alveoles should be fractured and considerably extended; it would be proper in such a case to favor the

the re-union and consolidation of the fractured parts, and to keep them close together for a sufficient time.

If in consequence of such an accident as I have noted above, the teeth were completely fallen from the alveoles, they only require being put again exactly and without delay in their respective places : in less than a month or six weeks' time they will stand as solid as ever*. I do not think it is necessary to observe that the probability of this consolidation will be less in favour of the teeth of the upper than of the lower jaw ; and that this probability will be more particularly in favour of young people.

* If it was necessary to replace a large tooth that had got out of its socket, so as to make it appear that the sanguinary vessels are broken, you should use the precaution indicated in cases of *luxation*, chap. vi. part ii.

CHAP. VI.

OF DENTAL TARTAR OR FUR. HOW IT IS TO BE TAKEN
OFF; AND HOW INOFFENSIVE THE OPERATION.

Tartar*, a concretion originally soft and pul-
pous, is always *secreted* by the saliva during sleep,
and by degrees becomes thick, more or less, of a
yellowish brown, oftentimes black colour, and
sometimes very hard. This substance will ad-
here more particularly to the teeth of debilitated
individuals who have had a bad stomach, or are

* It is an earthy calcareous salt. The chemical analysis
will prove that it is a real phosphate of lime, mixed with a
portion of mucous and slimy substances. It is not, as ge-
nerally thought, the produce of the residue of the aliments-
Mr. Foncroy thinks that the juice in the mouth which con-
tinually moistens the teeth and remains under the edge of
the gums, deposits there in course of time, by a cystalliza-
tion, particles of that terrous salt.

of a relaxed constitution, and are subject to catarhal affections; it is also to be observed in persons whose saliva is abundant and viscous, whose gums are pale, soft, and frequently bleeding. With them the secretion of the fur, is copious and rapid. This concretion at first, gathers by degrees in the intervals between the teeth, especially behind the lower incisives, where the saliva will most particularly dwell; it encircles their crown, next reaches the bottom of the gums, which it raises and forces up; hence follows their swelling and their bluish colour. This concretion soon forms a hard mastic, that destroys the flesh and reaches the very roots of the teeth in the cavities of their sockets, it then loosens those little bones, puts them out of place, and sometimes envelopes the whole of the teeth in a scaly adhesive covering, very thick, and which may even disfigure the cheek externally. Deep holes of the teeth or gums may still add to the disorder, produce fistulas and purulent ulcerations of an insupportable fetidity.

It is at this very particular period of the formation of the tartar, that daily care and attention become necessary, either to prevent its formation and increase, or to have it removed before it has produced its ravages, the least effects whereof are a bad smell and disagreeable appearance. The method of which I speak, not being of a nature to carry off the tartar, grown hard, and commonly adherent between the gum and the collar of the tooth, it can be of no advantage unless the instrument has been applied to it. I shall now speak of that operation.

Many persons, young ladies especially, imagine that the operation of taking off the fur is attended with great pain, and may be injurious to the teeth and gums. They are widely mistaken, it is not in the least painful, provided the artist understands his business: the operation moreover is salutary when it becomes requisite. The small quantity of blood which is seen, when the fur is detached from under the edge of the gums, and which, sometimes, even

is not perceptible, does by no means proceed from being hurt ; those, in proportion as they bleed, will spread more perfectly over the tooth ; they resume a more rosy colour subsequent to the operation, leave an impression of freshness in the mouth, and the teeth will then fasten. Although these latter should seem to hold only by a thread, there would be nothing to fear, as it is easy to turn round them with the instrument, while one supports them with the fingers.

This operation of removing the tartar, requires great expedition, and a light hand, with instruments of various forms, but not sharp enough to injure the enamel. The bad habit which some dentists have contracted, of thrusting their fingers into the mouths of ladies or of children, must prove disagreeable, and even inconvenient for the operator. Whenever the tartar has accumulated in thick masses, and very hard, greater efforts are wanted ; but if the artist is in full exercise, the patient has nothing to apprehend, the operation is not dangerous in the least, as the ac-

tion of the instruments bears only upon the teeth. In this case, or if the individual is threatened with catarrhs of the *mucous buccale*, the operation should then be performed at two sittings, for some inconvenience might occur in taking off completely the whole of the concretion at once. If, moreover, the teeth and gums are delicate, the operation should be postponed until the very cold and damp weather is over, unless the invalid has it performed at his own home. Immediately after the tartar is taken off the proper time to apply frictions on the teeth is with a tolerably hard brush and some well made powder. For a day or two afterwards, the gums should not be touched, that they may have time to fasten to the collar of the tooth: nothing more will be wanted than the use of a toothpick, and to wash the mouth with some lukewarm water.

CHAP. VII.

OF ODONTALGY, OR THE TOOTHACHE. FLUXIONS
THAT OCCASION IT, AND GENERAL MODES OF
CURING THE SAME.

THE Toothachè, or Odontalgia properly so called, is considered by netologists as a nervous affection. All kinds of fluxions and irritation may produce or stimulate the odontalgia; the dentist, therefore, stands in need of great sagacity to establish his diagnostic, and to avoid committing blunders, which must infallibly ruin his character. In order to be well acquainted with the causes of odontalgia, the reader will recollect my having said in Chap. I. that the membrane which lines the interior of the cavity of the tooth, belongs to the mucous system, and

that the vessels and nerves that compose it, give it an exquisite sensibility. These elementary parts are the natural channel by means of which the pain is communicated from one tooth to another. The sensibility and nature of that membrane elucidate wherefore it is frequently exposed to the sudden changes in the temperature, produced by the immediate application of heat and cold, the ordinary and general cause of catarrhal fluxions. These fluxions affect the mucous membranes, and are also a consequence of the variety in the seasons, as well as the sudden changes in the temperature of the atmosphere; persons of a weak constitution are the most subject to them. Rheumatic and gouty pain, which, in general, is produced by the same causes, may, by moving from its usual seat, affect the jaws, and occasion a toothache, whilst the sufferer is not always capable to ascertain exactly which particular part is affected: this removal of the disease from one place to another, must be ascribed to the continuity of the white

fibrous tissues in the human body, which are the most usual seat of arthritic affections. It is, therefore, most evidently to the vital incitement I am speaking of, that are to be ascribed most frequently the toothache, and probably those nervous anomalies which cannot be accounted for*. Fluxions which affect the teeth, may also originate in the fur, or any kind of local irritation; as the difficult, and sometimes very tardy shooting of one of the lower *wisdom teeth*, which happens to be too much compressed between the jaw bone and the tooth already out.

Upon those particular occasions it is that a Dentist must put into practice his knowledge in Medicine and Physiology, and exert his utmost sagacity to distinguish the true causes of the pain that is fixed upon the teeth. He is not to mistake that which is produced by a catarrhal affection, or the retropulsion of the rheumatism, gout &c. with a toothache, properly so called, these

* Anomaly signifies irregularity of the disease; inequality of the fits, and periods at which they take place.

causes not only demand a different sort of treatment, but it is of essential importance not to sacrifice teeth that may be preserved. In these cases the extraction of an afflicted tooth, that even which is thought to give pain, may augment the intensity of the malady, which only is to be subdued by more rational means. If, on the contrary, the fluxion is manifestly owing to the decay of a tooth, the extraction of that tooth will put an end to it, provided however the swelling does not impede the approach of the instrument; for notwithstanding the opinion of many Dentists, it is the supreme remedy to cure a fluxion occasioned by a defect or rottenness of the tooth.

What I have been saying concerning the cause of odontalgia in general, may also be applied to the state of pregnancy. Every professional man knows that during, the time of gestation, and even at the approach of certain periods, women are much more susceptible than at any other time: the Dentist

therefore should on such occasions have recourse to the assistance of the profession. How many women are there who at every pregnancy have lost, by having it extracted, a sound tooth that might have been preserved, by using means more suitable to their situation? I cannot repeat it too often, the most important and exquisite part of our art is that which has for its object to preserve organs so precious as the teeth are, and to prevent or divert those diseases of the mouth which are conducive to their ruin.

In general, when the fluxion is formed, regardless of whatever cause it proceeds from, the application of essences, spirits, or any kind of irritating substances must be abstained from. According as the disease is more or less intense, I should prescribe general and local tepid baths; local, and even general bleeding, emollient vapours, gargles, and drink of the same nature, gentle sudorifics, and mild laxatives: in more particular circumstances

prepared foot baths, synopisms, blisters, either revulsive or derivative, relaxing or anodyne cataplasms. The patient, in short, will call to his assistance professional men: he must be sensible that each malady has periods which demand the application of medicines, frequently of a totally opposite effect. I shall treat in the next chapter of the toothache, or odontalgia, properly so called.

CHAP. VIII.

OF CARIES. ITS CAUSES ; MODE OF SUPPRESSING IT, OF CHECKING ITS PROGRESS ; OF RELIEVING ODONTALGIC-PAIN. OF THE PLUGGING OF TEETH.

The caries which attacks the teeth is not preceded by the same phenomena as that which assails the other bones; which un-

doubtedly is occasioned by the difference in their organization. The internal causes of caries, are partly similar to those that injure the enamel, which I have enumerated above. Other causes proceed from the catarrhal disposition of the individual; a disposition that determines the fluxions, aphtes, and frequent pain in the teeth; the habitual bad state of the gums, their swelling and suppuration, the presence of the fur, and the teeth being too close or often laying across each other; the frequently sudden changes in the temperature from hot to cold, and the application of acid substances that enter into the composition of the powders and elixirs that are used. I must not forget to expose the pernicious habit of using metal toothpicks, but more particularly pins.

When the pain in the teeth seems to proceed from a *caries*, which after having destroyed the enamel and the ivory, opens the cavity of the teeth, and leaves the nerve bare

and unprotected, extraction is almost always the only remedy. If however the nerve can be destroyed or paralysed, by means of applying either a red hot iron, or any other caustic, or even by tearing it out; if the cavity can hold the plug, in such favourable circumstances, the Dentist will often succeed in removing the pain for ever, and in stopping the progress of the caries. The contact of lead, or any other metal when placed under such favourable circumstances, will close the little opening which, from the lower extremity of the caries communicates with the aperture of the root. When the nerve is no longer in point of contact with the air or with the food, the pain then subsides never to return, and no bad smell issues from the tooth. Whenever the caries only commences, and is accessible to the red hot iron this method will put a stop to its progress.

Caries of a long standing, as well as those of a recent date may occasion no pain :

teeth have been seen to decay by degrees without causing the least ; nevertheless that injury is one of the most frequent causes of odontalgia, proceeding, equally from the fortuitous excitement of a morbid cause. In such cases the experienced practitioner will avail himself of the resources of his art to destroy or remove that cause, and to preserve a tooth which seemed to require extraction as the only remedy. Odontalgia is said to proceed from another cause also, namely the consumption or decay of the extremity of the roots of the teeth, which malady admits of no other cure than extraction. This affection not showing itself outwardly, it requires great sagacity in the practitioner to find it out, and no small share of patience and determination on the part of the patient.

I shall now speak of the use of the file to carry off the fur ; when it is accessible, it is the most safe, certain and rational mode. It is chiefly upon the fore teeth, and as far as the first large grinder

that that instrument may be used. The Dentist need not be afraid of taking off the whole of the caries provided he sees a possibility of preserving enough of the anterior part of the organ; it is better to have the fore teeth very narrow than to be without; he will separate the rest though sound, that all such as are exposed to sight should be as regular as possible. If any portion of the fur could not be completely taken off with a flat file, and that the injury was out of sight, a kind of channel should be formed in the afflicted part, in order that all the fur may be got clear off; there will be likewise in this case the resource of cauterising *, for this remedy is always useful to check the caries at least, if only part of it can be carried away with the file.

The general modes of allaying the pain

* Timorous persons need not feel any apprehension, as this application rests entirely upon the tooth, and occasions no pain whatever.

produced by a caries, consist in those that have been indicated to relieve the pain occasioned by fluxions, at the end of the preceding chapter. If there is no fluxion in the case, external stimulating or calming applications may be added, which are at the disposal of the Dentist as particular means. He will dip a little cotton in some of my odontalgic elixir*, or some other equally good, which he will apply in the aperture of the caries. He will employ the same means to be applied, at the same time in the ear, with the precaution of adding a drop of fine oil. He may also administer some of the specific internally, to aid the action of his external applications. According to the age of the patient, the dose must be from 15

*This elixir is described in No. 2, of the second chapter of the second part. There are other preparations still more efficacious, but which can be used with security by the individual only who is well acquainted with their effects both internally and externally.

to 40 drops, upon a small lump of sugar : two or three doses at most are to be taken at intervals of a quarter of an hour, or twenty minutes ; prudence will not admit of taking more, as that remedy can only be given internally with entire safety by the experienced practitioner. In general, these means and such as may be added without danger, can only procure a momentary relief, especially if some of the general means indicated, and duly composed, to procure a diversion, are not used. I nevertheless have pretty frequently seen these remedies remove the pain effectually. Let all invalids repose no confidence in those infallible elixirs highly praised by quacks, and think themselves very happy, if when using those remedies, they have not the misfortune to meet with some that produce upon the gums and teeth ravages similar to those I have had occasion to observe.

END OF PART THE FIRST.

PART THE SECOND.

CHAP. I.

REFLECTIONS ON THE USE OF POWDERS, OPIATES,
ELIXIRS, &c.; DANGER, AND CHOICE, OF THEM.

My readers will perhaps think that I have entered into long details concerning the most frequent diseases of the teeth, which are the province of the Surgeon-Dentist. I nevertheless am far from having spoken of all those which affect that part of those connected with it. I shall treat of some others and of the mode of curing them. These details have appeared to me necessary to indicate the exact period at which a professional man should be consulted, and the better to enable

my readers to appreciate what I am going to say concerning "the means of keeping the mouth and teeth in a good state" with their assistance. When I have completed this task, I shall have in part fulfilled my engagement. I will use my best endeavours to neglect nothing essential. Previously to entering into the details, I deem it indispensable to devote this chapter to an examination of the substances that are generally used with an intent of obtaining that salutary result; and to show how grossly one may be mistaken in the choice of those objects. I shall think I have done much for the benefit of my readers, if I can succeed in guarding them against injurious substances, or practices, and if I am so happy as to enlighten them on the choice of such as are of real utility.

From what I have said in the fourth chapter on the facility with which the enamel may be injured, I must have been previously convinced that too acid *powders*, *elixirs* and *opiates* are danger-

ous specifics, which never make the teeth look white but at the expense of that delicate substance. I believe many of my readers may have been so situated as to be able to ascertain that I do not exaggerate, and that I have facts in support of my assertion ; for I might quote frequent instances, not only of the enamel being destroyed, but of the teeth falling within a few days, in consequence of those too acid substances having been used. Elixirs, on account of their being liquids, and of the quantity of acids that enter into their composition, are more dangerous than all the other substances. By means of their expansion they soon penetrate between the gum and the tooth, reach the alveole the membrane whereof becomes inflamed, suppuration soon follows, the teeth fall, or at least are much loosened, and continue so. It will sometimes happen that those elixirs praised by quacks blacken the teeth instead of whitening them.

Opiates, not to mention the difficulty of their

chemical qualities for whitening the teeth, are not an eligible means, owing to the syrup of which they are composed. In short, experience has evinced that, in general, the best of all ingredients to keep the teeth clean and to whiten them, is a well made powder, with a little plain water, in which may be mixed a small quantity of the balsamic elixir, the composition whereof I shall give in the following chapter. It will be very advantageous therefore to use only well known powders, but it would be safer still to procure that which may be recommended by a Dentist deserving of confidence.

Such powders as are not sufficiently porphyrised, or those into the composition of which only hard substances enter, are equally injurious to the enamel: those which are too hard, insensibly wear it out; the other destroys its polish, and lodge under the gums. It will be advisable in consequence to consult, as often as possible, a professional man on the choice

of elixirs, powders and opiates, as these specifics are to be applied not only as necessary to keep the mouth clean, but moreover to remedy several diseases it is subject to ; amongst which are caries, scorbutic affections, catarrhs, ulcerations of different sorts, &c. &c.

Too hard *brushes* are no less injurious ; they loosen the teeth, and render the gums callous. I cannot insist too much upon that point, for I have observed that in England the brushes which are used are generally much too hard. If it may prove advantageous in some cases to use a hard brush, it should only be at distant periods, and not daily. A brush, at most should be firm without being too strong, and cut short. A Dentist should also be consulted upon this subject ; he will know how to make a proper choice of an instrument, according to the age, the disease, and the more or less delicate texture of the internal membrane of the mouth.

Many people, in some countries, will rub

their teeth with *snuff*, *coffee grounds*, *burnt paper*, *bread*, &c. These ingredients are at least insufficient, and may colour the teeth instead of making them white : they are also capable of detaching the gums by being introduced between them and the collar of the tooth.

Metal toothpicks should never be used : quills are the best, yet they are to be used with particular precaution, and not too often.

To eat too *hot* food, and especially afterwards to use cold drink, is equally hurtful ; every sudden transition from one extreme of temperature to another, when frequently repeated, must finally have a material effect upon the teeth, particularly when the individual is of an irritable habit.

Many persons who have contracted the habit of using what I have proscribed in this chapter as being injurious, persist in the belief that they derive benefit from them, or are not sensible of the inconveniences which I point out, and unceasingly recommend their ac-

quaintance to use the same means. Others maintain that the more precautions are used to keep the teeth in good order, the sooner those organs are lost. Those assertions, which proceed from ignorance or error, do not merit much consideration. I shall first observe that prejudice may induce many to conceal the bad effects of this treatment, or that they are too slight to be observed by any but a Dentist, and which injuries may be followed by effects of a more or less serious consequence. I shall further observe that some individuals have sets of teeth of so good a quality, and so well disposed, that those organs resist such injurious treatment as would prove irretrievably pernicious to others; sometimes their teeth are kept in good order by the effect of mastication alone. With regard to the decay or the destruction, more or less rapid, of the teeth, notwithstanding the extreme care that is taken of them, it may proceed from the bad quality of those organs, or from the bad state

of the gums, or to improper management, which hastens that destruction. If the art of the Dentist may be unnecessary to the small number of privileged individuals whom I have hinted at, it must be owned that it is eminently serviceable to the great majority, and chiefly to those whose teeth and gums are naturally bad.

CHAP. II.

PROPER MEANS OF KEEPING THE MOUTH AND TEETH IN GOOD ORDER.

PRESCRIPTIONS.

Medical means, properly so called, either internal or external, being intended to operate an actual change in the organs to which they are applied, the judicious reader will be sensi-

ble that a professional man alone can determine the exact cases in which they become necessary. I have summarily indicated above the general means that may be used: with regard to those local means that may be resorted to, the following are those I deem most salutary and beneficial: very fine bark in powder of the best quality, charcoal, cachoe, alum, armeniac bole, cinnamon, cochlearia, &c. either by themselves, or compound, according to the case of the patient; they will produce the best effects, especially if they are used at the same time as the internal medicines prescribed upon the occasion. I shall now give some simple formulas of such powders and elixirs as will be found most useful.

DENTIFRIC POWDERS.

℞. White Magnesia, carbonated. 2 dr.

Magnesian

Pumice Stone

No 1.

Fine carmine

Fine sugar.

} of each one drachm.

Mixed.

DENTIFRIC POWDER.

℞. Red Coral.	} of each
of Coral composed.	
N ^o . 2.	} two
Acidulous tartarid potash.	
	} drachms.
(cremor tartar.)	
Gambo-gum, or Dragons	} of each
blood.	
Orange peel.	
Fine carmine.	} one
Mixed.	
	} drachm.

These powders being properly porphyrised, should be well mixed. Both are equally good to keep the teeth clean. The first being less acid will be more properly used for children, and all such young people whose mouth is of a very delicate texture. The second is rather tonic, and consequently is better suited for adults: it will consolidate the gums when become too soft.

There are a great number of compositions, that may be good; each Dentist has his favourite powder, which he imagines the best. In my opinion that which answers the purpose best, without damaging in the least either the teeth,

or gums is that which, in reality, is preferable. It is highly important that those substances should be well prepared, and that nothing injurious is introduced into the composition, so that it may be used daily, if wanted. It is necessary therefore that a **Dentist** should have some knowledge of chemistry, that he may avoid those irregular compositions of substances, the effects whereof are contradictory to each other. For such individuals, whose gums are relaxed, with a tendency to the scurvy, I use a black powder, of which bark is the basis. It strengthens those parts that are soft, fortifies the teeth after the tartar has been removed, and absorbs the bad smell of the mouth, by drying up the suppuration of the gums, &c. &c. *

* The author can, with confidence, recommend his pink and black vegetable powders, and also his elixirs, as productive of the best effects; and he warrants the perfect innocence of the ingredients which enter into their composition.

ELIXIR FOR THE MOUTH.

℞. Alcohol of guaiacum two ounces.

Alcohol of composed lavender, one ounce.

Anti-septic	Tincture of alcoholized cinnamon.	} of each 2 drachms.
Balsamic	Tincture of myrrh and of aloes.	

No. 1.	Essence of London Mint	} of each four drops.
	Peruvian Balsam.	

Mixed.

℞. Alcoholized vulnerary water, two ounces.

Anti-spasmodic Liquid laudanum, half an ounce.

Odontalgic Sulphureous ether, two drachms.

No. 2.	Essence of cloves.	} of each ten drops.
	Essence of London mint.	

Mixed.

The first liquid is intended to keep the mouth fresh, and the flesh firm: a tea-spoonful, or a little more, is to be mixed with a glass of rain or river water. This mixture will serve to wash the mouth, either with a brush or sponge, whether the powders, of which I have given the composition, be used or not. The second will answer the purpose of relieving the nervous pain occasioned by caries, of which

I have spoken in the eighth chapter of Part I. The purpose and mode of using it have been sufficiently elucidated, I therefore shall say no more upon the subject.

In general, those whose teeth are most frequently covered with tartar, should take daily care of them : it is the only means of removing the most frequent causes of the caries. They consequently must clean their mouth every morning, or at least every other day, with such good powder, as they may have adopted. They should add the use of the elixir No. 1, as indicated above, with a proper brush. The remainder of the day, that is after every meal, simple lotions, with the use of the brush or sponge will suffice. I shall most expressly recommend not to weary the gums without necessity. This trifling operation, repeated every day, will be found irksome at first but habit will render it easy.

It will often happen, also, that notwithstanding all the means indicated to prevent the for-

mation of tartar, that substance will collect, either about the double teeth, or inside the incisive, where it cannot be easily come at. Then it is, as I have said before, that it becomes expedient to take it off with the instrument. Persons in good circumstances should have their mouth examined every now and then, although their teeth were not subject to the accumulation of tartar, mentioned above ; that would be the means of discovering the injury which may occur to the teeth in its origin, and of checking its progress. It is a fact that a caries may begin to take place (even though the teeth are fine, and habitually clean) without occasioning the least pain in the lateral and posterior parts of the double teeth or of the incisives ; the experienced Dentist alone can discover and remedy the damage. How many people are there who have lost their teeth after suffering excruciating pain, and who, by means of a timely operation, might have been spared those tortures, and would have preserved their teeth ? But most frequently

we are not aware of being afflicted with a caries until it has considerably damaged one, or several adjoining teeth.

CHAP. III.

OF THE GUMS. CATARRHAL SWELLING OF THE GUMS ; APHTES OR ULCERS IN THE MOUTH ; CURATIVE AND PREVENTIVE TREATMENT.

It has been said above that the good state of the teeth very often depended upon that of the gums ; particular care therefore should be taken to ascertain whether these latter become soft and bleed easily ; whether they swell and assume a blue colour ; if they feel sore, hard, and callous. This last state generally provokes suppuration on the adherent surface which becomes detached ; the teeth will shake,

the mouth have a fetid smell, and mastication is rendered difficult and accompanied with pain. This state of the gums may proceed from the debilitated constitution of the individual, from a bad regimen, whether he is not well fed or that he eats such viands as are too heating ; finally, from the mouth not being kept clean, and chiefly from the presence of tartar. In this last case, the first thing to be done is to take off the concretion and to clean the mouth : this will generally prove to be the only remedy to be applied.

This simple catarrhal state of the mouth, which the majority of Dentists ascribe to scurvy, often without the least cause for so doing, must present two different indications, according as it may be accompanied with pain and heat. In a state of erethismus mere punctures, made with a lancet, are often requisite, and afterwards a *detersive gargarism* will produce a disgorgement.

DETERSIVE GARGARISM *.

Put to a pint of water half an ounce of pearl barley, and a small handful of agrimony; boil it for about twenty minutes and then strain it; add to it one ounce of syrup of mulberries or honey of roses; likewise twenty or forty drops of sulphureous elixir, so as to make it pleasingly acid.

This gargarism, made lukewarm, is to be used frequently during the first twenty-four hours subsequent to the operation, which time will be nearly sufficient for the removal of the swelling and irritation. If subsequent to this disgorgement being produced, the gums are

* I must beg permission of professional men to use the term *gargarism*, of which my Readers will easily comprehend the meaning. I am not ignorant that it is reserved to express a liquid remedy, which by means of the action of the tongue and of the air is intended to operate upon the guttural mucous of the back part of the mouth, and that the name *collatory* is given to that intended to remove the affections of the *buccale mucous*

still in a state of relaxation, it would be proper, in order to restore their former solidity, to mix a table-spoonful of the following mixture into half a glass of the cold detersive gargarism, and to wash the mouth with it several times in the course of the day.

Tonic Mixture. ℞ Alcohol of Guaiacum, 2 ounces.

Alcoholic tincture of Huxham, 1 ounce.

It is useless to observe that this tonic treatment become necessary at the second stage of the disease, must be the same in the second indication; that is to say, when the affection is accompanied with neither a fixed heat or pain. I say fixed heat or pain, for it may so happen that the gums, although in such a state, may occasion very little pain, which is the case when people are weak, ill fed, exposed to the damp, or who labour under strong agitation and depression of spirits. In similar circumstances it will be proper to use at once, and without delay, the means that have been re-

commended for the stage of relaxation*. If the state of debility became more and more manifest, it would be a symptom of approaching scurvy.

These means will be found sufficient in the mere catarrhal state of the gums. In the following chapter I shall treat of those organs under the head of their putrid absorption, or scorbutic state properly so called.

What I have been saying of the gums leads me naturally to speak of the *aphtes*, a kind of superficial ulcers, which are also the consequence of the catarrhal disposition of the mouth †. They lodge in the mucous buccale

* The antiscorbutic Gargarism, No. 1, described in the following chapter, will be productive of great success. The remedies designated under that denomination are not exclusively reserved to check the scurvy; on account of their tonic and very stimulating qualities, they are also of almost general use in the chronical stage, or at that of relaxation of every catarrhal affection of the mucous buccale.

† I only speak here of the veritable *aphtes* of that cavity,

membrane that lines the internal part of the cheeks, lips, and gums. These little ulcers are most frequently found amongst the inhabitants of low and damp situations, of a relaxed constitution, subject to catarrhal affections, and whose saliva easily contracts a certain degree of tartness. They occur chiefly during rainy winters and cold weather: I have likewise observed that those individuals were subject to them during very hot rainy summers, after taking violent exercise, or subsequent to the use of heating diet. They are likewise occasioned or will continue on account of the fur or decay of the teeth, and the bad state of the mouth.

These ulcers, generally insulated, commence by whitish pustules scarcely visible, which announce their presence by an irritation, rather acute, in the interior of the mouth; they are

and not of those which are the symptoms of other particular catarrhal diseases, and which may extend over the whole length of the *œsophagus*, as far as the stomach, &c.

not larger than the point of a pin ; are generally round, their edges perpendicular, their bottom of a dirty white, and they are encircled by a slight tumefaction, hard and callous, which exhibits a somewhat darker colour than the other parts of the buccal membrane. The contact of such aliments as are a little acrid will soon produce an irritation ; as will also such as are too highly seasoned ; and if the cause from which they proceed should not subside, they extend both in width and in depth. Under those circumstances they may assume an *atonic* character, continue a long while, and occasion great uneasiness to young people.

As to the treatment which I have deemed the most rational : at first, the causes that have determined the local affection are as much as possible to be removed. If the irritation is acute, I would recommend the use of the detersive gargarism, mentioned page 111, until the irritation has ceased, or at least is much diminished. Next is to be used that same liquid,

cold, with an equal quantity of the balsamic elixir, (page 106). Such individuals as are troubled with those ulcers in consequence of relaxation alone, as that affection, not very acute in the origin, will soon assume the *atonic* character which I have spoken of above, it will be advisable to attack it immediately with the balsamic elixir alone, without any mixture; to apply a little cotton dipped into that liquid, and to repeat the application several times in the course of the day. It will produce a salutary irritation, which must create no apprehension.

To those local means directed against the two catarrhal affections of the mouth, which I treat of in this chapter; to correct and remove as much as possible that morbid disposition, must be added those which are relative to the regimen and diet; namely, the mouth is to be kept very clean, to take good exercise and amusement in the open air, to occupy salubrious, elevated, and dry situations; to eat plenty of wholesome and strengthening food; finally, the

use of some bitter tonics, that of *cruciferous* plants, and every method of preventing gloomy affections. These means, if duly combined, will, in the course of time, remedy that unhealthy constitution, and restore to the whole organization the energy requisite to discharge the functions of life. I must not omit to recommend daily care to be taken of the mouth and teeth, by using a powder appropriate to the circumstances, and a fortifying elixir, such as that described at page 106. It is unnecessary to prescribe having the tartar previously removed, since without that precaution, all the other means would be abortive, when the bad state of the mouth may be owing to the presence of that injurious substance upon the teeth.

CHAP. IV.

**OF THE GUMS. OF THEIR SUPPURATION, AND OF
THE PUTRID DISSOLUTION OF THE ALVEOLARY
MEMBRANES, OR SCORBUTIC STATE; OF THE
SHAKING AND FALL OF THE TEETH: GENERAL
AND LOCAL MODE OF TREATMENT.**

The condition of the gums, such as I have stated it in the preceding chapter, is only a catarrhal affection; in some cases, however, this may be considered as the first degree of a much more serious malady, but most fortunately very rare in these regions. If this first condition of the mouth is aggravated by debilitating causes, such chiefly, as cold and damp, want, or a bad quality of food, long fits of illness, excessive fatigue, gloomy propensities, and being deprived of

light; the patient, in such cases, can scarcely move without feeling lassitude and pain; he is pale, or has a deathly complexion, his face is puffed up, his skin checkered with spots of a bluish red colour, is liable to have hemorrhages at the mucous membranes of different parts of his body; his extremities are swoln: the gums, besides being swoln, are also ulcerated and spongy; they are of a violet or livid hue, painful, and will easily bleed; they exhibit a very fetid suppuration, and are, as well as the alveolar membranes, in a kind of putrid dissolution which is soon followed by the fall of the teeth.

Such are the causes and succession of the principal symptoms, both general and local, that constitute scurvy, but only in the second degree of the disease. This affection does not attack seafaring men exclusively, since the circumstances from which it proceeds may take place upon land: it is only more frequent on board ship, because the individuals are there con-

stantly exposed to the influence of the chief causes, which are, dampness and bad food. This is the reason why in damp, marshy, and cold situations, such as are found in Holland, Sweden, Denmark, Russia, Ireland, Scotland, and elsewhere, that disease is more frequently met with. It is also common in large cities where the streets are damp and the houses confined, the inhabitants poor, not cleanly, and are badly fed. They were wrong who thought it contagious; for, as the essential causes of it must show, its character can only be endemic, or local.

Thus then, the scurvy is a disease well characterised, which attacks in a more particular manner the whole of the muscular system, and deeply affects all the functions of life; the fluids moreover are decomposed, and the change in the condition of the gums is only one of the symptoms of the disease.

I shall now explain the most proper means, both internal and external of opposing this

distressing complaint. The first thing to be done, the best calculated to stop the progress of the scurvy, and to secure the efficacy of the treatment, is speedily to remove the invalid from the influence of the causes that have produced the affection: a medical man should be called in, to direct the internal treatment. That treatment will consist less in medicines properly said, than in means drawn from the *Hygian*, that branch of medicine which, remedies excepted, embraces all such natural means as may concur to the restoration of health; as, for instance, extreme cleanliness, inhabiting a dry situation, open to the rays of the sun; moderate exercise in the open air, dry friction, agreeable company, the use of fresh meat of a good quality, that of herbs of every description, the abundant use of cruciferous vegetables, either as aliment or remedies; ripe fruit, possessing a moderate degree of acidity, good wine and some sorts of spirits. Remedies, sparingly administered, should be chosen from the class of bitter tonics,

and antiscorbutic stimulants *. I shall here give the formula of an anti-scorbutic tonic beer.

℞. Fresh leaves of scurvy grass, one ounce
and a half.

Tonic Fresh roots of black radishes, 2 ounces.
Anti-scorbutic Buds of fir, one ounce.
tonic beer. Sage and wormwood, a handful of each.
Small beer, six or eight pints

These substances, after being pounded in a mortar, are to be macerated in the beer for several days. From half a pint to a pint may be taken every twenty-four hours, in two or four doses.

The local treatment is as follows : The first care of the Surgeon-Dentist must be to remove the tartar and to clean the mouth. If the

* If the disease should be associated with especially that which affects the digestive canal, every stimulating substance would be injurious ; softening substances, in that case, must be immediately had recourse to, either as food or medicament ; or the application of leeches to the epigastric region, (or pit of the stomach.)

gums are sore, swoln, and still firm, he must at first apply to them four or six leeches ; which he may repeat if wanted. He immediately after will use the lukewarm gargarism, indicated page 111, to facilitate the discharge of the blood from the diseased part. He will not insist upon this remedy being used longer than is necessary to produce a diminution of the irritation, and the sensible reduction of the swelling of the gums, and will then have recourse to other measures. He will prescribe the chewing of some fresh pot herbs, mixed with cruciferous plants, the most efficacious and the best appropriated to this mode of treatment, as for instance, sorrel, cochlearia, &c. He will use the tonic, antiscorbutic, or astringent gargarism, as the case requires, such as follows :

	℞. Water of roses, four ounces.
Antiscorbutic	Spirit of Scurvy grass, half an oz.
gargarism.	Honey of Roses, one ounce.
	Mixed.

Antiscorbutic ℞. Pounded roots of ratanhia, one ounce.
astringent and Juice of cachoe, half an ounce.
tonic gargarism. Strong Vinegar, four ounces.
 Common water, three pints.

Boil the whole on a slow fire until reduced to half the quantity, then strain it and add

Sugar, or honey of roses, a sufficient quantity.

Spirit of scurvy grass, one ounce and a half.

And frequently wash the mouth with the mixture.

The Dentist may also have recourse to some tonics, either liquid or in powder, of the same nature, aromatic or absorbent, and antiseptic to dry up the suppuration, and to hasten the cicatrization of the ulcers*.

Thus, under proper forms duly appropriated to the particular circumstances of the case, and of the progress of the cure, he will use wine, alcohol, and vinegar, simple or compound, muri-

* As for instance, the black powder, indicated page 106, where I have explained its good effects in similar cases. An astringent powder may be added to it.

atic and sulphuric acid, camphire, divers aromatics, bitter plants, cachoe, charcoal; muriate of amoniac, acid sulphate of alumine and potashes, and boracic acid, &c. &c. which will be found very serviceable.

Such are the means which the Hygian and Therapeutic, place at the disposal of professional men. My readers will be sensible that I could not make more particular applications of them and that moreover it would be imprudent and even dangerous to trust, for the treatment of so serious a disease, to the zeal of individuals unacquainted with the difficult study of the healing art.

With regard to what relates to the loss of part of the gums, neither nature, nor art can remedy that misfortune. By means of the internal and external treatment however, the teeth, though very loose, will fasten again by degrees, and more or less completely so according to the condition of the gum.

All that I have been saying relative to the

internal and external treatment of the scurvy, was under a supposition that the disease had not attained its third period, for then the mouth and some other parts of the body are in such a state of disease and the organic functions so deeply affected, that they are nearly beyond the reach of medical resource. In order to give every information that may be wished for relative to the local affection of the scurvy, I shall treat in the following chapter of the *fungus* on the gums, and of the *fistulous ulcers* of those same organs : I shall conclude with the supuration of the *maxillary sinuses*.

CHAP. V.

OF THE FUNGUS ON THE GUMS, OR EPULIA ; OF
 FISTULOUS ULCERS ON THOSE ORGANS ; OF THE
 SUPPURATION OF THE MAXILLARY SINUSES :
 GENERAL AND PARTICULAR TREATMENT.

A catarrhal constitution eminently disposes to the flesh excrescences of the gums, which are of a fungous nature called *epulia*. This local affection therefore is often the consequence of a bad constitution which will require the use of some internal remedies, and a regimen suited to the circumstances. These fungous tumours are sometimes so large as to disfigure the individual afflicted with them, and even project outside of the mouth. This increase is generally slow in its progress, and assumes different shapes. At times they appear like round tu-

mours, either flat or in fragments, as if lacerated; they are fixed upon either a wide basis, or a narrow pedicle; are of a hard or tender substance, whitish or of a livid colour, insensible, and generally occasion no pain. Such however as are hard and schirrous, may sometimes create great suffering, become inflamed and suppurate. This announces the cancerous state, which is almost always the consequence of a more or less impaired constitution, and which is easily discovered. This fatal termination may also be the result of the inconsiderate application of caustics.

I have stated that those funguses were most frequently the consequence of a bad constitution, but it may be supposed that some people in good health will not be exempt from the disorder. In either case they are always to be considered as a local distemper, with regard to the external treatment, to which must be added the necessary internal remedies and a proper regimen in complicated cases and a vitiated constitution.

Notwithstanding the funguses exhibit a very

remarkable difference either in their size, colour, or consistence &c. they will almost always demand a speedy removal, but by different means, which it is of great importance to employ in a proper manner. It will be after these general views and the state of health of the individual, that the practitioner will class, in a very simple manner, the species of the tumour that he is to remove ; and that he will fix upon one mode of treatment in preference to another. I shall now speak of the cure.

Two modes of operation are applicable to these tumours; the removal by means of the knife, and their extirpation by the application of mitigated liquid caustic (catheretic.) The instrument must be used against all those that have some consistence, that show a more or less natural colour, and the pedicle or basis of which may be come at, provided however this latter is of some extent. The caustic is never to be used, it would only irritate the humour, and might be conducive to cancer. The use

of a solid catheritic will nevertheless become requisite either to stop the hemorrhage subsequent to the operation, and to destroy the remains of the fungus which the knife has not reached, or finally, to burn such as might subsequently appear. These kind of tumours bespeak the distemper to be merely local, since they commonly shew themselves in persons who enjoy good health. Any internal treatment whatever would then be useless.

The liquid caustic, on the contrary, will be used with success against all soft fungous tumours of a dark or livid colour, not very large, and which are generally seen upon the gums of people either afflicted with scurvy or threatened with that complaint. The muriatic acid, mixed with water is to be frequently applied to those tumours, by means of a small piece of wood covered over with a rag dipped into that liquid. I have said, (page 118,) that the condition of the gums of the individuals I spoke of was only a symptom of a more serious malady. That disease

must be treated as I have prescribed in the two preceding chapters. With regard to tumours of a cancerous nature, of an enormous size, or with a wide basis, I advise them to be left untouched.

The *fistulous ulcers* of the gums originate, more or less, in the general bad state of the mouth, and continue in consequence of a caries of the root of a tooth or the jaw-bone. In the former case the cure is easily operated by the extraction of the tooth, or of the decayed root; being cautious however, to ascertain which is the damaged tooth, by means of a very fine instrument being introduced into the ulcer.

Such as are the effect of the jaw-bone being decayed oppose much greater difficulty. Their termination depends on the exfoliation of the part of the decayed bone, an operation that nature always performs, and which is occasionally more or less tardy. Till such time as it takes place, in order to hasten that natural operation we may, by means of a small syringe,

inject into the wound some balsamic elixir mixed with water. This operation must be performed several times at the moment, and repeated in the course of the day. When nature has detached the decayed part of the bone, it is to be extracted with great precaution, after having made a sufficient incision in the part of the gums that covers that bony fragment.

There is another sort of fistula on the gums, which proceeds from the suppuration of the membrane that lines the *maxillary sinuses*. This malady is the consequence of the inflammation of that membrane, which inflammation is occasioned by a blow, a fall, a fluxion, or by other causes that are not to be ascertained. It is of great importance not to confound the pain felt in that part, at the commencement of the malady, with a real toothache. These fluxions are cured by the ordinary means, and carried off by being resolved; otherwise its duration will exceed the time requisite to this termination, and will end in suppuration.

It may then occur that the accumulation of the pus will distend the bony partition which it softens, and swell the cheek to such a degree as to endanger the eye or to work its passage through the natural aperture of the nostrils, or finally in the mouth, through the alveoles, or the bony partition and the gums. If the pus should issue through the nose, the contact of the air, when introduced into the sinus, would soon alter that liquid, and its fetid running would constitute the disease called *ozæna*, or stench in the nostrils. If the pus should have found its way through a fistulous opening in the mouth, then a fine instrument introduced into that aperture will penetrate as far as the maxillary cavity. It will be necessary to open a prompt and easy passage for the pus, in order to prevent the caries, which its acrimonious quality may produce, or the injuring of the membrane of the sinus.

It is towards the lower part of the tumour that it will be proper to open a free passage to

the pus it contains. If the teeth, planted in that part of the sinus, are sound and in good condition, it will be advantageous to preserve them. Then an aperture is to be made in the lower part of the external side of the sinus at the bottom of the canine fossa; it may occasionally suffice to widen that which has produced the fistula.

If one or several teeth are decayed, or if they are loose and that the pus should escape along their roots, they must be drawn. The vacancy which they will leave will supply a passage for the whole of a greyish purulent matter, void of consistence, fetid or inodorous. In whatever manner the sinus may have been opened, it will be proper to widen the aperture, and to prevent its closing again before a complete cure has taken place. Frequent injections are to be made with a small syringe containing a lukewarm detersive liquid, like that indicated page 109, and towards the end of the disease, to the aforesaid liquid, cold, is to be added a

small quantity of balsamic elixir : the aperture will close of itself, if the sinus supplies no more purulent matter. I shall abstain treating of the polypuses of the membrane of those same sinuses, it would carry me beyond the limits I have prescribed to myself in this work ; besides they are a malady which more particularly belongs to the province of surgery properly so called.

CHAP. VI.

OF THE EXTRACTION OF TEETH, AND OF THEIR LUXATION. OF THE INSTRUMENTS SUITABLE FOR THOSE OPERATIONS ; IMPROVEMENT ON THE KEY OF GARENGEOT ; A NEW INSTRUMENT FOR EXTRACTION PROPOSED BY THE AUTHOR.

We are now arrived at the disagreeable part of the practice of a Dentist, since I am going to treat of an operation which is sometimes

effected with difficulty to insure complete success: there are also many obstacles to surmount, to prevail upon the patient to undergo the operation. I repeat that the means of preservation are not to be neglected, and that it is only after they are exhausted, or when the *extraction* of the tooth is the only resource left that the operation is to be determined upon. It may so happen that one of the fore teeth, the little grinders included, are but slightly damaged by the caries; it rests with the Dentist to ascertain whether there is no possibility of preserving that tooth; or effect the cessation of the pain. Independent of the means I have mentioned, there is one, that consists in an operation which is rather too much neglected, namely the *luxation* of the tooth. This operation, which is only an incomplete extraction, can be attended with no bad consequences if performed upon a person in good health, and whose teeth and gums are not much injured: It cannot be performed with the same

advantage upon all the fore teeth, but from mine own experience, it will principally succeed on the little grinders, next on the canine, and afterwards on the incisives; sometimes on the grinders of the lower jaw, but more generally on the teeth of that jaw. All that depends upon several circumstances that can be ascertained only by an inspection of the mouth, or during the performance of the operation. Subsequently it rests with the Dentist to regulate his movements so as to break only the nerve and the principal vessels which entertain the means of communication between the tooth and the bottom of the alveole; and to preserve as much as possible its adhesion with part of the gums. He will afterwards use the most suitable means of opposing the inflammation, and of fixing the tooth until it is quite fast. The absorption of the fluids in the alveolar cavities of the lower double teeth might be incomplete, which would produce a purulent gathering, which must be evacuated; a

detersive gargarism is to be used next : subsequent to the healing of the gathering the tooth will fasten of itself *.

When a Surgeon-Dentist is sent for to extract a tooth, he ought not, in certain cases, to abide by the declaration of the person who consults him, and who may be mistaken with regard to the real seat of the pain ; it is incumbent upon him, by means of an exact exploration, to ascertain which tooth is damaged. If he entertains any hopes of preserving it he will candidly give information of the result ; in a contrary case he will hasten to comply with the wish of the individual who consults him, and extract the tooth †.

* The luxation is requisite in some cases of adhesion of the tooth to the jaw-bone, chiefly that of the lower jaw, and when the tooth is partially extracted. In that case, which is pretty frequent, it may be an act of prudence not to complete the proposed extraction, but to replace the tooth after having ascertained the rupture of the nerves and vessels.

† I shall refer my readers to what is said in Chap. vii. of

Some people take pleasure in praising the dexterity and subtilty of a Dentist who only needs to look at a tooth, and merely to touch it to have it out, without their having seen the instrument, it being mysteriously concealed in the coat sleeve of the operator. I shall be satisfied with observing that a tooth so fastened in the jaw is not to be taken out so easily; and that the Dentist who would act with so little circumspection, might frequently expose himself to grievous results for not having taken the trouble of ascertaining which is the damaged tooth; which indeed at times is not easily done: or if that tooth holds fast in the jaw, or if it adheres to that bone, or if it is crossed or linked to the adjoining ones, as in similar cases that are rather frequent, and that call for a combination of strength and skill in the Dentist. I shall ask

Part i. concerning the different fluxions that may settle on the teeth and occasion pain, which the operation could only render more violent.

how great will be his embarrassment if he should meet with obstacles so much the more difficult to surmount, that they were unforeseen? The patient, moreover, who had too much confidence in his promises, will not be easily prevailed upon to deliver himself up again to the imprudent discretion of a man who has so grossly deceived him? Does he think to meet frequently with people so destitute of common sense as to believe that a tooth can always be extracted without causing some pain? The Artist truly well informed, and who is sensible of the duty he has to perform, will leave those conjurors tricks to mountebanks, and will behave in such a manner as not to render his skill problematical, or to expose the art he exercises. I confess it is of inexpressible advantage to conform as much as possible to the terms prescribed by masters in every Surgical operation, that it should be performed *tutò, citò, et Jucundè*, and it is exactly that the operation which I am treating of should be executed with

safety and *expedition*, that I advise to take every necessary precaution before it is undertaken. These preliminary precautions will take but a very short time, if the Dentist is in constant practice.

The operation once decided upon, he will choose a proper instrument, place it in a proper position, cover it with a piece of soft linen, and next detach the gums from the neck of the tooth. This indispensable preliminary operation is performed expeditiously and occasions little pain ; this pain is not to be compared to that which must result from a piece of the gum being torn, an accident always to be avoided, because that part is never regenerated, and that it is indispensibly requisite that the jaw bone should be completely covered. The Dentist therefore should be cautious not to give a sudden jerk that might break the tooth : he would act with much greater security by means of a steady uninterrupted motion, directed by his eye and hand ; the operation will not last above

a *second*. By this method he will avoid, not only the inconvenience of breaking the tooth, but that, much greater still, of carrying off a part of the jaw more or less adherent, and of allowing time to the alveole to open, and to the adhering parts successively to get loose. The Dentist must not lose sight of the following principle in *Physics*, which is never to be deviated from, namely : that when a body is distended too suddenly, and more rapidly than it can yield, it must break : in this case it is the alveole, which in consequence of the elasticity of its edges, must yield to the action of the instrument. The tooth partially extracted, or completely luxated will sometimes hold to the gums or to the bone of the jaw ; the Dentist must keep one or several bent pincers in readiness to detach the tooth with due care ; which is to perform the extraction at twice. If a fragment of bone was completely detached from the jaw and the flesh, it is a foreign substance which must unavoidably be extracted ; as it

would never fasten again, but would in the sequel produce a purulent gathering, or retard the cicatrization ; if, on the contrary, it should still hold a little, or that its adherence to the soft part was very evident, it must be replaced, provided however it can be completely covered by the gum. If, owing to an unpardonable mistake, a Dentist had drawn a sound tooth, he must not hesitate replacing it immediately, after it had ceased bleeding ; it then might resume its former solidity. The consequences of the inflammation are to be attended to, as prescribed after the *luxation*.

The operation being concluded it will be proper to recommend to the patient to keep his mouth shut, and to breathe through his nostrils, especially if the weather is cold, or that he is exposed to a current of air. As it will be advisable not to stop the blood immediately, especially if there is a fluxion, I would advise, till such time as the irritation is over, to hold in the mouth, at different times, a mixture

of milk and water, or of any analogous liquid, made lukewarm. It will afterwards suffice to rinse the mouth with some vinegar and water.

The key of *Garengéot*, generally called the *English key*, is the instrument the most in use to extract the grinders, except, perhaps, in France, where, in fact, it originated. I shall say nothing of its advantages, or inconveniences, which are best known to the Dentist. I shall only mention two of its disadvantages, which most authors have not dwelt upon in a manner sufficiently clear to be well understood. The first, and most serious, is the impossibility of preventing its action towards the point on which it rests, and which commonly takes place, as if by a crush, so that it carries off with the tooth, in that direction, the alveolar part which happens to be on the side of that point of support. To be made well acquainted with that action, it must be observed, if possible, at the very moment of its greatest effect, but with a mind entirely divested of

prejudice. If it is said that this point of support may be placed higher, I shall answer, that it is then almost null, at least, with regard to the extraction which requires great efforts, and that it endangers the breaking of the tooth in its collar. This is an essential and inherent defect of the key of Garengéot, and which it is impossible to remove. I imagine it has been partly to remedy that defect, that the author of the modifications of that key, such as it is seen engraved in Bell's work, has represented as very thick, the part in which the moveable pivot of the hook is placed. Were it not that it is too massy when a tooth is to be bent outwards, it is, nevertheless, an improvement rather serviceable, which has been adopted in France, with some modifications. The spring that holds at pleasure the moveable pivot, has been suppressed lately, because, in fact, it was more detrimental than useful.

Now for the other defect, which I believe

I have remedied completely, and with great success. That key has been given a double bend, in order that when passing above the dental arcade, the hook might seize the tooth perpendicularly, and lay it down inside the mouth. This bend, such as it may be, does not allow the lower teeth at the bottom of the mouth, the last of which rather frequently takes a direction towards the front, as well as inwards, to be seized perpendicularly. That tooth, therefore, could not be perpendicularly within the reach of the bent key, unless you should imagine that the direction of its axis goes under the chin. This impossibility of seizing that tooth, proceeds from the axis of its hook falling perpendicularly upon that of the branch, and forming a straight angle, or of 90 degrees*. In order to remedy this defect, I have given to the axis of the hook a slope of about 45 degrees over that of the

* See the plan at the end of the work

top, and I have obtained a modification which allows that key to be applied to the whole interior of the mouth, since its top is always above the dental arcade; the action of this instrument has a double movement, which may easily be noticed, and which it suffices not to lose sight of; nay, if necessary, it adds still to the power of the action. For upwards of two years I have used this instrument, in every case when the use of the key of Garengéot is indispensable. I wonder that so simple and so beneficial an improvement has not been executed long since, at least to the best of my knowledge it has not, for the author of the Dictionary of Medical Sciences makes no mention of it at the article *tooth*, although he gives at full length all the alterations that have been made in Garengéot's key. Perhaps the artist, who might have had a like idea, has thought proper to keep it a secret. As for me, I have been satisfied with ascertaining how beneficial my instrument was, and with

having an opportunity of making it known to the public. We should, I think, always act in a similar manner, for the improvement of arts, and the good of the public. It might, at least, suggest the idea of finding out means to ameliorate that which may not yet have been brought to a state of perfection. The idea of thus altering the *character*, occurred to me, in endeavouring to find out a *New Instrument* to bend down the teeth in the interior of the mouth, exactly in like manner to what the *pelican* does at the exterior. I think I have succeeded, but I have not hitherto had it in my power to have it executed, so difficult it is to meet with a workman sufficiently intelligent. The mechanism by which the tooth is to be extracted, will be simple, but the instrument itself will be complicated. As soon as I shall have it executed, and if it answers my expectation, I shall feel extreme pleasure, and shall think it a duty to make it known.

The key of Garengot, in its improved state, is generally adopted in France, and is, next to the *pelican*, the best instrument for the extraction of teeth; this latter cannot act as a substitute, when a tooth is to be laid down in the interior of the mouth. The English Dentists would derive great advantage from preferring it to the old fashioned key of Garengot, which they now use; and notwithstanding it has been modified, that with a moveable pivot, and no spring, and with a knob in the shape of an olive and plain, yet thin enough to be applied to the outside, and nevertheless thick enough to contain the axis of the moveable pivot. This mobility of the pivot allows me to apply the key, which I have modified, to the fore teeth, which I lay down from the out to the inside with ease, even when I have operated on children. It is also upon either of my keys, with a moveable pivot, that I fix hooks of various forms for the extraction of roots sunk deep in the alveoles.

The *pelican*, an instrument which is not by any means so easily conducted as the key of Garengot, is nevertheless far preferable; but it is of no use to lay down the teeth inwardly. Its extracting mechanism operates by means of two combined motions, one of which lowers the tooth in a direct position, whilst the other, when it is held fast, tends to lift it out of the socket or alveole, which cannot be effected with the key. It bears upon the adjacent teeth, or *ad libitum*, upon the edge of the jaw, and does not oppose the dilatation of the alveole; it therefore occasions less pain, is much safer when the teeth hold fast, and is not liable to break them. All these advantages, however, do not lessen the difficulty its management is attended with, for which reason very few dentists will use it: yet they who finally get familiarized to the use of it, will soon adopt it as their favourite instrument.

The other instruments for the extraction of the teeth, which are known to Dentists, answer

the purpose, but in an imperfect manner, if we except the straight pincers for the fore teeth. They are of service only as accessories, or to carry off such teeth, or roots, as do not hold fast.

CHAP. VII.

OF ARTIFICIAL TEETH, OR THE PROTHESIS BUCCALE :
OF THE OBTURATORS OF THE PALATE.

The art which remedies the various damages of the teeth, also the loss of those organs, is most useful, and is now brought to a degree of perfection, to which it would be difficult to make any additions; I therefore do not propose to expatiate upon a subject which has been treated with so much success by the most skilful dentists of all the great capitals :

in Paris chiefly have been published the best works ever written upon that interesting subject: all such individuals, therefore, as, from their situation in life, are obliged to appear and to speak in public, will find in the *prothesis buccale*, all the necessary and numerous resources, to remedy the loss of organs so essential to the articulation of the voice, and a correct pronunciation; the ladies, especially, ever anxious to preserve and prolong the attributes of beauty, will find in that enchanting art the means of disguising or concealing the progress of age, and of restoring to their more or less disfigured mouths, the graces which they possessed in their youthful days. Every class of individuals, in short, will avail themselves of the advantage of remedying a destruction that so powerfully influences the constitution, and will have recourse to an art that can replace the organs necessary to digestion, to the integrity of the voice, and to the restoration of the features.

The loss of teeth influences digestion, because the aliments not being properly bruised, they are but imperfectly impregnated with saliva, and consequently the alimentary bole will not possess at once all the qualities requisite for the formation of a good chyle. It has an influence on the voice, by lessening its strength and extent; the pronunciation becomes guttural, nasal, feminine, and fluted; the articulation of words is more or less altered, singing is rendered troublesome, there is a kind of whistling in the delivery, and frequently the motion of the tongue will force the saliva outside the mouth. In consequence of the complete, or even partial ruin of the teeth, both at top and bottom, the face shrinks, the voice loses its harmony, becomes shrill, or is lowered, and the pronunciation, of course, very imperfect. The countenance assumes a different expression, is harsh, or morose; the flesh of the cheeks will flag and hang down, wrinkles will prematurely furrow the face, the

dimensions whereof are no longer the same as they were; the mouth and nose also change, the chin seems to be longer, and in reality approaches nearer to the latter organ: in short, every part of the face is discomposed in a more or less offensive degree, and present the anticipated sight of painful destruction.

The *prothesis buccale* has made real progress only since several men of genius have been made sensible of the necessity of combining, with the very extensive knowledge the Dentist must have acquired, a further knowledge of *mechanism*, of *medical*, and of physiological science. I wish by no means to insinuate that a Dentist should practice medicine: his department is already sufficiently extensive; but he must not, at least, be a total stranger to the above sciences, without a knowledge of which he will find it difficult to exercise his own profession, with all the advantages which the public has a right to expect. The privileged men whom I have just hinted at, were

not totally unacquainted with the arts of the *watch-maker, gold-smith, brass-founder, sculptor, cutler, potter, porcelaine manufacturer, and chymist*. Notwithstanding what has been said by the learned Delabarre, from whom I have just been borrowing some passages, the prodigious extent of knowledge that he requires, can but very seldom fall to the share of one single individual: I even think it would be advantageous to the progress of the art, if the mechanical part was executed by such artists alone whose profession it is, and always under the guidance of the skilful Dentist, who alone could direct the construction of the instruments for the *prothesis*, and apply them himself*. I would insist the more willingly upon the necessity of this division, as these machines can only be adjusted

* I shall observe, in addition, that in order to excel in this branch of art, the mechanic should be familiarized, from a very early age, to the use of the tools necessary to be employed in those different professions.

to the mouth by the individual who understands its structure, and is in the habit of performing operations. On the other hand, the public, women and children especially, would be great gainers by it, in more than one respect. In fact, as it is of great importance to keep the hand at once in that state of steadiness and lightness so necessary in the daily practice of the operations on the mouth, I can hardly conceive that he who frequently handles the tools of a *cutler, goldsmith, or carver, &c. &c.*, could retain that lightness so necessary in the application of the Dentist's instruments to the mouth. In short, this distribution appears to me to rest upon so much the better foundation, as it would afford greater security to the public, who would find equally combined in the same individual all the resources of the art, since the Dentist would bring to his aid the dexterity of the mechanic, whilst he himself would make a much better use of the time he had at his

disposal, in studying those numerous affections of the mouth, which all contribute, in some degree, to the destruction of those organs, the preservation whereof is so essential. I shall beg leave to repeat it, the main part of the art of a Dentist is not always that which has for its object to remedy the loss of the teeth, but that which is conducive to the preservation of those organs, the value whereof is seldom duly appreciated till they are gone.

Some essential improvements have contributed to the success of the art of Dentists. First; by dint of following scrupulously all the inequalities of the gums, artificial teeth, placed upon a basis, meet with a much more suitable and steady support upon the gums; the more exact method of casting the moulds procures this advantage*. The substances that

* It would appear that we are indebted to Mr. De Chemant for these advantages, for he is the first who cast

are used give a better imitation of nature, and the different methods of fastening them are such, that, in most cases, it is impossible to find out that they are artificial teeth. These means of placing the pieces of the *prothesis buccale* have been much improved; besides their great variety, they are so disposed, that the great majority of those pieces may easily be taken out, and replaced by those who make use of them; which gives them the additional advantage of having it in their power to keep them clean. With regard to the ligatures, next to the *Pite of Florence**, is white or coloured silk, but which must not be tied too

wax moulds, has obtained exact models, and has published the manner this was to be executed.

* This substance, which is produced from animals, is impenetrable to moisture, and owing to its whitish transparency, is scarcely visible; it neither wastes to threads, nor slackens, but lasts a long while.

fast; they may last several months, and are preferable to thread of wire, which will get loose, occasion pain in the teeth and gums which they injure, and destroy the holes through which they pass to fasten the artificial pieces. The *compressors*, with a spring so ingeniously diversified, offer likewise some inconveniences, if they are too massive, and not sufficiently elastic. But an important improvement, in so much as it enriches the resources of the *prothesis buccale*, is that of teeth composed of mineral paste. Great merit is due to the artist who first invented this composition, and to those who have since brought it to perfection. Care was taken to keep the discovery secret, but it has finally been made public. Some Dentists who understood chemistry, were stimulated by the desire of bringing those compositions to a high degree of perfection, and to give them, as much as possible, the same colour and polish as natural

teeth. It would seem as if this latter difficulty has not been surmounted completely, since the enamel of those artificial teeth has not yet received that shining glossy polish, that osseous consistence, which speak life in the enamel of natural teeth. That happy result probably would soon be attained if artists were more communicative, but a spirit of selfishness seems to keep them at variance from each other, and almost renders them enemies. I have observed that, in general, this haughtiness, which is often allied to quackery, was pretty commonly a symptom of their ignorance, even of those branches of the art which it is most essential to be acquainted with, and those which they daily practice. How deserving of public gratitude have those eminent learned men been, who were generous enough to consider that the main interest of every man must be that of the human species. This kind of expansive liberality is to be met with only in such men

as are truly learned, and rises superior above all the contemptible speculations of sordid interest, the constant appendage of mediocrity.

All these different compositions, more or less beneficial, drawn from the mineral class, have been published in all their details, so as to leave nothing more to be wished for; and every intelligent Dentist may make those artificial teeth. Teeth made from some animal substances, well selected, are, nevertheless, by no means inferior to those we have just been speaking of. We have seen exhibited by some Dentists, full rows made from the teeth of the hippopotamus, extremely well mounted, and that were a perfect imitation of nature; they were superior to those of mineral paste, the enamelled part whereof is not of a fine polish: besides the pieces composed of animal substances have the advantage of being lighter. Those that are most commonly used are the teeth of the hippopotamus, well chosen; improperly, in commerce, called sea-horse teeth;

oxen's, horse's, or stag's teeth. The femoral bones of these herbaceous animals being well prepared, says Mr. Delabarre, are of a fine white, and oppose more resistance to the action of the saliva than the common *hippopotamus*, to form the base of the rows of teeth*.

Human teeth might be a great resource, if

* I mean that which has not the enamel. This latter, much more compact, and very fine, is used for the teeth. In general, sets made of the teeth of the *hippopotamus* will last from fifteen to twenty years, without undergoing any change in persons who enjoy a good constitution: in others, that substance may get damaged in less time. It is the duty of the well-informed Dentist, in those cases, to give disinterested advice, after having well studied the constitution of his patient. It will, therefore, be productive of great advantage to such persons as have sets of artificial teeth, to take them out when they go to bed, for it is during sleep that they are most exposed to the influence of the saliva. The artificial pieces are to be cleaned every day with a soft brush, and some aromatic soap and water: subsequent to this little operation, it would not be improper, from time to time, to use a tooth-powder of a good sort, to clean those pieces made of animal substances.

they could be easily procured ; but other different substances are so numerous in the present day, that perhaps it would be preferable to avoid using the former, for those persons at least who might feel a repugnance at the idea *. I shall say nothing of the transplantation of teeth from one mouth into another : that proceeding, equally barbarous as it is of uncertain success, should be proscribed amongst the means adopted for the exercise of a beneficent and restoring art.

The roof of the palate may be damaged in consequence of a musket or pistol shot, of a wound by pointed or edged instruments, of caries or decay, occasioned by an ulcerous suppuration of the adjacent parts ; in short,

* Whatever may be the opinion of prejudiced Dentists, natural teeth are superior and preferable to artificial teeth of any description, and they are rendered perfectly safe from the preparation which they undergo previously to their being used.

it may be laid open on account of an original imperfect conformation. The mastication then is more or less difficult, and the aliments are forced into the nostrils ; the tone of the voice is no longer the same, and sometimes there is an impediment in the speech.

These solutions of continuities are remedied by the application of instruments called *obturators*, the shape and mechanism of which are various. Two most essential things are to be observed in the construction of those instruments ; they must close tight the opening to which they are applied, and be constructed in such a manner as not to check the imperceptible operation of nature, which, in most cases, is conducive to the complete closing of that opening. The most perfect therefore will be such as will bear on the teeth ; and those with moveable wings, to answer the same purpose, in case the teeth that were to serve as a support should be missing. This part of the buccale mechanism

is at present brought to such a degree of perfection that obturators are to be seen which replace at once the whole of the palate, the teeth of the upper jaw, the voile du palais and uvula, organs so essential to deglutition, and the integrity of the voice. The Surgeon-Dentist should, with some wax, take an exact mould of the conformation of the whole palate, and from that same mould take an exact pattern of the obturator to be executed by a skilful workman.

CHAP. VIII.

QUALIFICATIONS AND DUTIES OF A SURGEON-DENTIST : OF THE INSTRUCTION OF PUPILS.

I believe it will not be improper at the conclusion of this work to treat of the qualifications and *duties* of a Surgeon-Dentist, who

proposes to exercise that branch of medicine exclusively. I shall speak no more of what relates to the *mechanical* part of the art, after having expatiated in the preceding chapter on the necessity of a Dentist being able to determine the most advantageous means of remedying the inconvenience resulting from the loss of teeth ; namely, to take an impression of the mouth, and to have executed, by able collaborators, whatever relates to the *prothesis buccale*, work at it himself, if required, and place those pieces that have been prepared under his direction. I keep more particularly in view the practitioner capable of exercising the most important part of the art, and which is most frequently necessary, that of remedying the numberless affections that besiege the mouth and teeth, either by applying judiciously, remedies extracted from the *Materia Medica*, or by daily operations which he should practice upon every part of the mouth, that claims his attendance ; the man, in short, who loves his art,

who particularly, and from inclination, has embraced that branch of medical science, and who, moreover, zealous to please the enlightened part of the public, will neglect nothing to be deserving the confidence of that same public.

It will therefore be very proper for a Surgeon-Dentist to be initiated at least in all the branches of the *healing art*; to be well acquainted, above all things, with the *anatomy* of the mouth and of the depending parts, that he may perform with security every operation upon that cavity. He should also be no stranger to *physiology*, that he may form a right opinion of the phenomena which the human body offers when in a state either of good health or of malady, and know the divers functions of the viscera. It can only be, therefore, with the assistance of physiology that he can become able to know the intimate composition of the teeth, and appreciate the sublime works of nature in the developement

of their germination, their mode of growing, nutrition, &c.

Independently of the knowledge I have just been mentioning, some advantage would further accrue if the Dentist was acquainted with *internal medicine* properly so called, the part of that science which treats of medicaments and of their application to the human body, *Materia Medica*, and *Therapeutic*; that he might oppose with greater safety all the affections of the mouth depending on internal causes: subsequent to the operations performed on that part, a fever or some nervous affection may intervene that will create uneasiness in the mind of the patient. There have been instances of the extraction of certain teeth having occasioned to persons of an irritable disposition fainting, convulsions, fits of hysterics or of epilepsy, and even very serious accidents to women who are pregnant. A Surgeon-Dentist should be familiarized with the resources of medicine, either to quiet his

patient, to administer necessary relief, or to have recourse in due time to a physician, if the case required it. It were also to be wished he were no stranger to *Midwifery*, that he might ascertain the very particular situation of the woman during the time of her pregnancy, and not hazard operations that he may have it in his power to dispense with or to postpone, if he knows how to make a timely application of some specific proper to remove the effect of such pain as, in her situation, is attended with danger. In the chapter in which I have treated of the first dentition, I have pointed out the necessity of knowing at least the *diseases to which children were most subject*: in the seventh and eighth chapter of the first part, the necessity of knowing how to remove, or to treat a fluxion originating in a *caries* or any other cause: finally, in the first five chapters of Part II., I have maintained the advantage resulting from a knowledge of the precepts of the *Hygian*, namely that of being

capacitated to compose those *substances* that were proper to keep the teeth in good order, and to prescribe such *remedies* as were necessary for the cure of the diseases of the mouth.

I am not afraid of affirming that it is indispensibly necessary that a Surgeon-Dentist should be conversant at least with the *elements* of the different branches of the *healing art* which I have been enumerating, since for want of that knowledge he will not be qualified to discover and properly distinguish the diseases of the mouth, and apply to them the proper remedies: he will not, in short, command confidence, or prevail upon such individuals as may stand in need of his attendance, to entrust him willingly with the charge of remedying the affections on their teeth, which organs are in every respect so valuable. I shall beg leave here, in support of what I have advanced upon this head, to quote a passage from Mr. Delabarre.

“It is necessary,” he says, “that the Dentist

should have received a medical education, that he may be enabled to make a judicious application of the rules of physiology in the case of artificial teeth, &c. It is necessary that he should understand the advantages and disadvantages of the protheses, which he may be called upon to put in use; for sometimes he is required to apply an artificial palate, which requires scientific knowledge of the form and functions of the part it is to replace, and the most proper means of avoiding the inconveniences that in some cases might result from it. Sometimes, by the assistance of the protheses, he is required to restore to the wrinkled mouth of the aged, a portion of its youthful appearance; to the voice, its sonorous tone; and to the stomach, the instruments which nature had granted to aid its functions."

If I insist that those who wish to exercise the art of a Dentist should be possessed of such extensive knowledge, it is no less for their own interest, than for the security of the

public. They would be amply rewarded for their trouble, by reaping the precious advantage of not being confounded among those Dentists who have usurped the title: it would procure them, moreover, the certain means of fixing the attention of the learned, and to gain that regard and esteem which are due to the man who devotes himself entirely to the practice of an art highly honourable, and eminently useful. Let young beginners, therefore, not be disheartened, but exert themselves to triumph over primary difficulties; for every new acquirement is connected with the former, in the various parts of science, and with common abilities, students will soon get possessed of sufficient instruction to be made sensible how valuable learning is. Then it is that they will become more and more conscious of the Dentist's art being a conservative art, much more precious, no doubt, under that point of view, than under that of repairing the losses frequently occasioned by mere want of proper care.

It would, therefore, be an act of bounty from Government, (I only mean that of France) to insist, that the medical schools should exact from a Surgeon-Dentist, to be acquainted with sufficient medical knowledge, before he were allowed to exercise an art, too much in discredit, on account of the great number of those who profess it, although ignorant of the very elements of the science. It is with great pleasure that I shall add some reasonings, that rest upon fifteen years' experience, to the philanthropic wishes of Mr. Delabarre, respecting the practice of the Dentist's art in France. In order to form subjects more capable of exercising that art in England, with honour to themselves, the best method would be for them to take lessons from the most experienced Dentists, sufficiently versed in the knowledge of the various branches of medical science, that are indispensable, who are capacitated to teach and to guide their pupils in the theory of whatever relates to the Dentist's art. A few months only

would be required to become possessed of this theoretical knowledge, and from that period the pupils might, under the inspection of the master, follow a practical course of lectures, relative to what chiefly concerns the operations on the mouth and teeth.

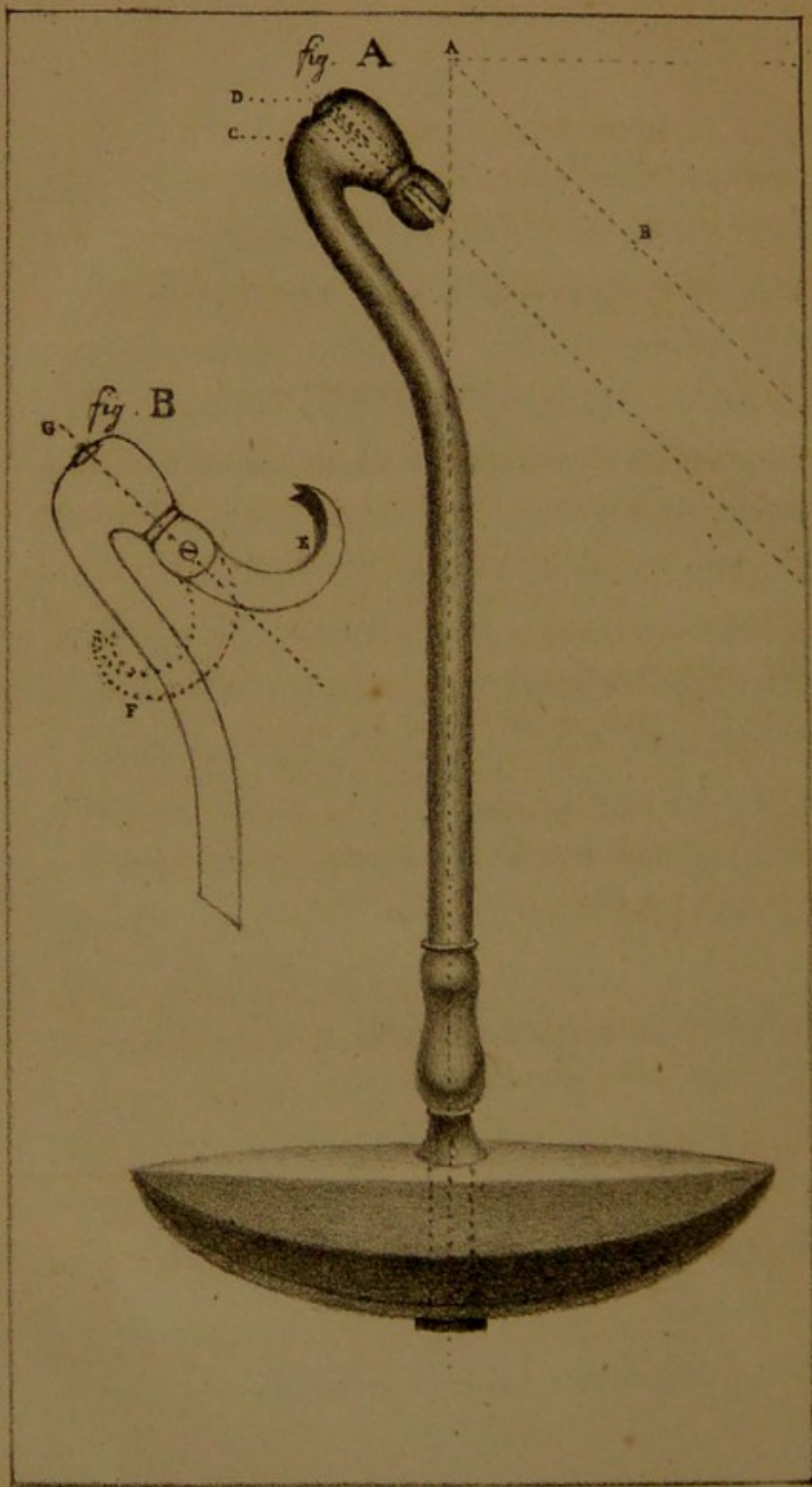
It is incumbent upon a Surgeon-Dentist to be endowed with a sound and quick judgment, a light and very steady hand, a most necessary qualification, which he can retain only by abstaining, as I have stated in the preceding chapter, from all manner of laborious manual occupation, &c. &c. Some of the daily operations performed upon the teeth, require great sagacity, precision, and composure. His instruments and various implements must be got ready as expeditiously as possible. He must be found zealous, discreet, and attentive; also, possessed of a great share of patience, especially with children. Finally, he should show himself generous towards the indigent of good morals, who are to be reproached with

no other fault but their misfortune, which should always render them respectable in the eyes of every friend of the human species.

The most familiar operations performed by a Surgeon-Dentist will consist in extracting with dexterity a decayed tooth, or roots that occasion pain, or a bad smell: it will rest with him, by means of using gold or lead, of applying cauteries, or the file, to preserve a tooth that begins to be damaged; he will often be called to remove the incrustations of tartar which stick to the teeth, or to give them regularity: he will also be frequently consulted with regard to the first and second dentition of children, &c. &c. There is one thing which every body has a right to exact from him, and to which ladies especially, and very justly, attach great importance, and that is his instruments, which must be numerous, and necessarily of many forms, always to be kept extremely clean.

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 kept extremely clean.

Verban



DESCRIPTION OF THE PLATE

REPRESENTING

GARENGEOT'S KEY IMPROVED.

Figure A.—This figure represents the Instrument reduced to two thirds of its real size, without its hook.

A ... is a right angle, or of 90 degrees, formed by the prolongation of the axis of the Key, and the line falling perpendicularly on the axis; which line shews the direction of the hook of the Instrument, such as it is known.

B ... is a line forming an angle of 45 degrees with the stem or shank of the Instrument. This line indicates the new direction given to the axis of the hook, and of its pivot.

c ... Pivot, moveable in every way.

D ... a retreating screw, which serves to confine the moveable pivot within the nut, without obstructing its motion.

Figure B.—This figure represents the extremity of the Instrument, with its hook.

E ... Hook, fixed on the Instrument by means of a screw.

F ... shews the position to be given to the hook when

DESCRIPTION OF THE PLATE.

it is intended to turn inwardly one of the lower incisive teeth, or the next to them, if broken, or too close.

G ... This dotted line represents the inclination of the axis of the hook in the new Key.

N. B.—The nut of the Instrument must not be much thicker than its stem; nor should its whole breadth exceed the extent of two diameters and a half of the stem. Its basis ought to be as well polished as every other part of the Instrument.

This Key must have various additional hooks, of two or three different dimensions; also others with a single lip, which ought to be thin, and more or less narrow, fitted to lay hold of the roots of the teeth when broken even with the sockets.

ERRATA.

- Page 88, line 1, *for* synopisms, *read* synapisms.
103, line 10, *for* compound, *read* mixed.
112, par. 2, line 10, *instead of* who labour, *read* labour.
114, line 4, *read* who are, *before* of relaxed.
119, line 3, *read* death-like *instead of* deathly.
121, line 10, *read* hygien, *instead of* hygian.
Same page, line 17, *instead of* herbs, *read* vegetables.
Page 130, line 1, *read* catheretic, *instead of* catheritic.
163, line 2, *read* masticated, *instead of* bruised.
169, line 1, *read* tight, *instead of* fast.

ERRATA

Page 88, line 1, 'the' should be 'the'.

Page 107, line 10, 'for' should be 'for'.

Page 112, par. 2, line 10, 'and' should be 'and'.

Page 114, line 4, 'and' should be 'and'.

Page 119, line 3, 'and' should be 'and'.

Page 121, line 10, 'and' should be 'and'.

Page 127, line 17, 'and' should be 'and'.

Page 130, line 1, 'and' should be 'and'.

Page 137, line 2, 'and' should be 'and'.

Page 139, line 1, 'and' should be 'and'.

ERRATA

Page 88, line 1, 'the' should be 'the'.

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Page 112, par. 2, line 10, 'and' should be 'and'.

Page 114, line 4, 'and' should be 'and'.

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