

The teeth, in relation to beauty, voice and health. Being the result of twenty years' practical experience and assiduous study to produce the full development and regularity of those essential organs / by John Nicholles.

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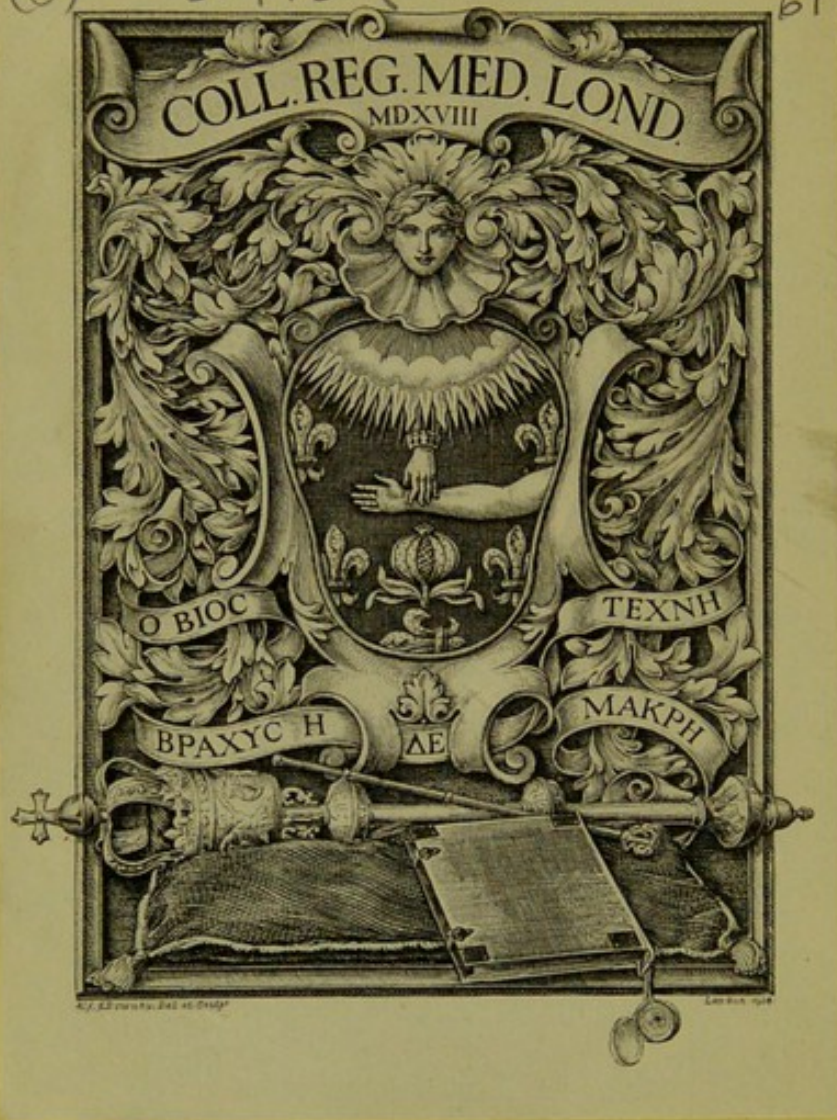
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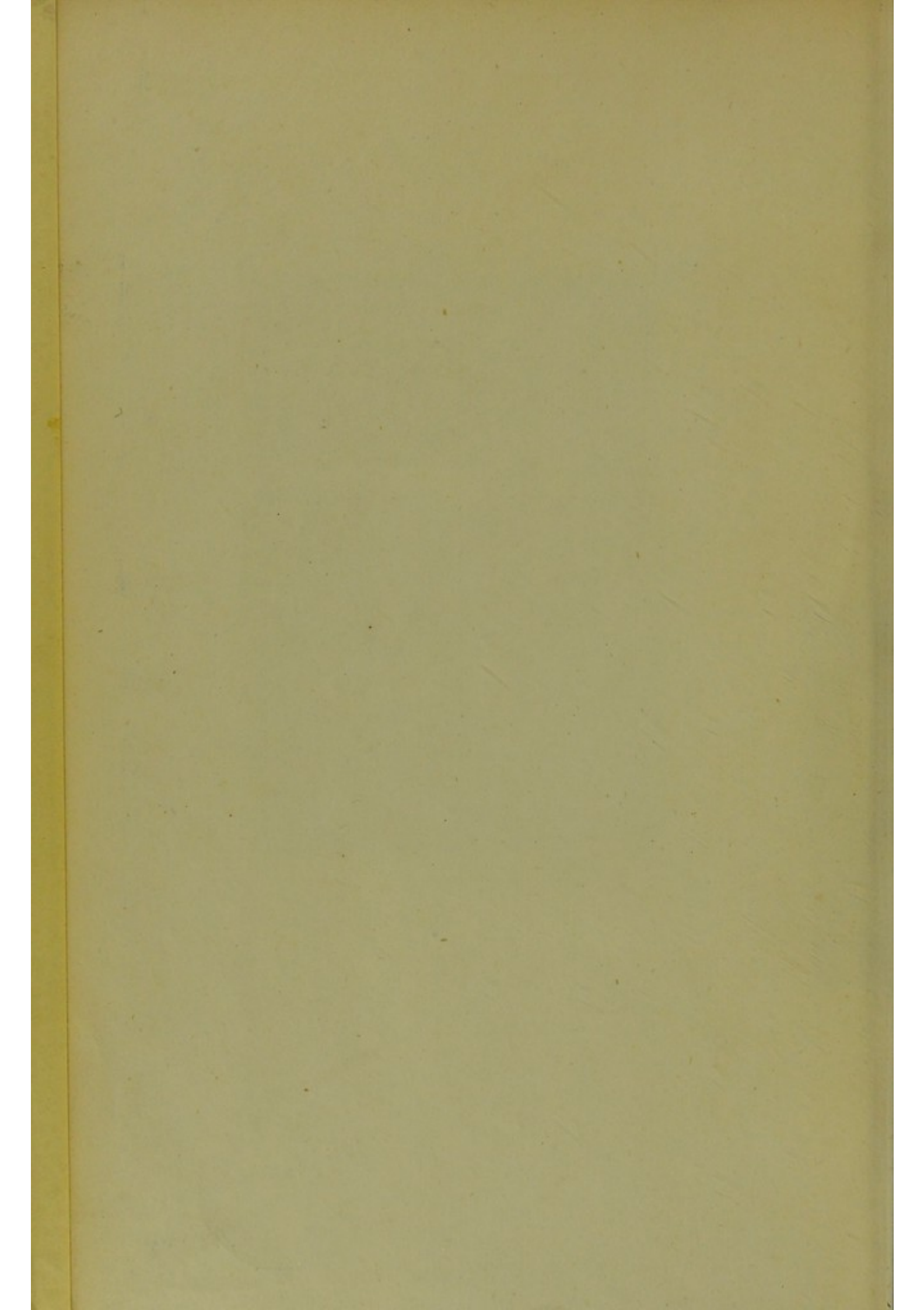
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THE TEETH

BY

BEAUTY, VOICE AND HEALTH

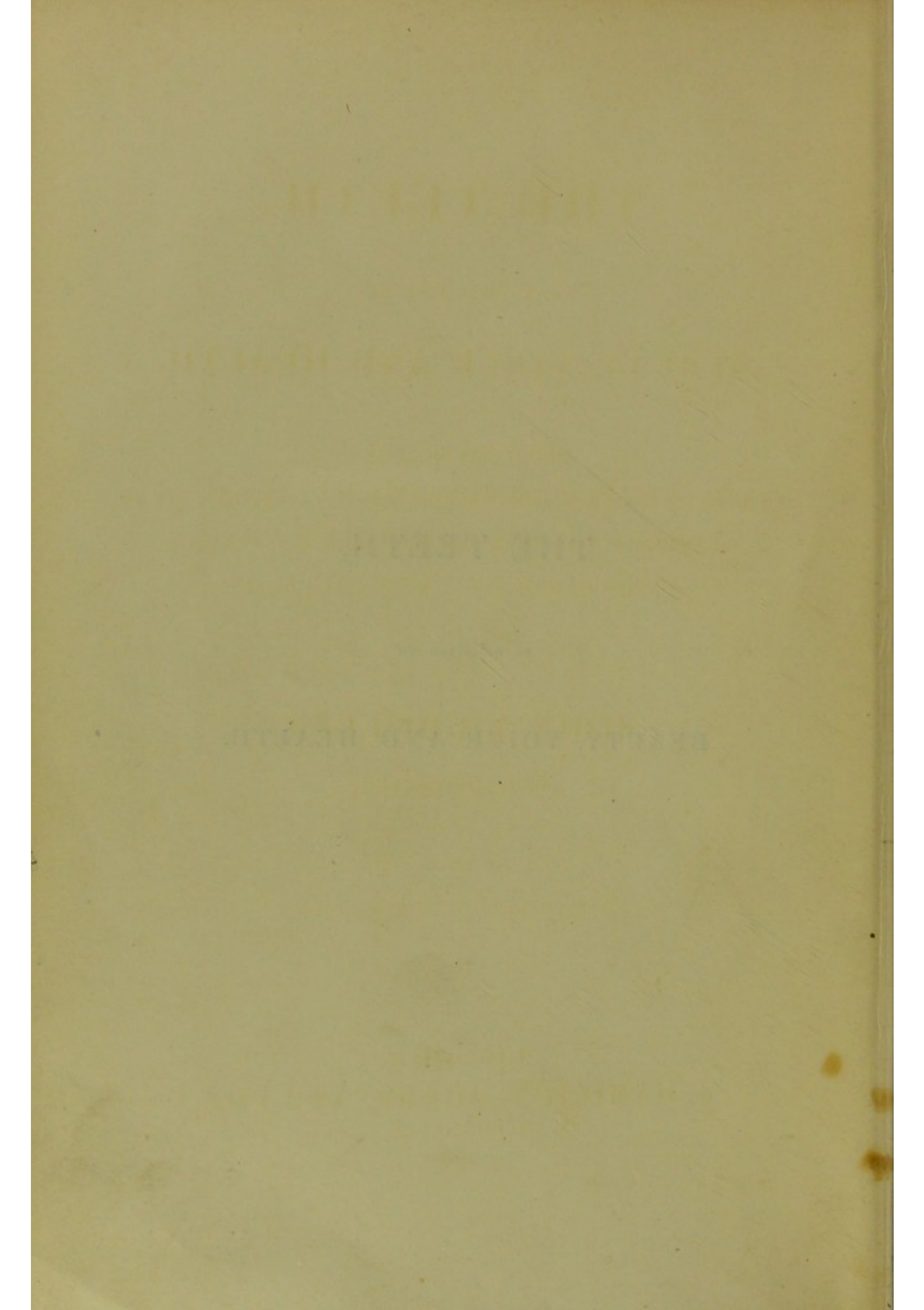
THE FIRST

OF THE HISTORY AND REFORMATION

THE TEETH,

IN RELATION TO

BEAUTY, VOICE AND HEALTH.



THE TEETH,

IN RELATION TO

BEAUTY, VOICE AND HEALTH,

BEING THE RESULT OF

TWENTY YEARS' PRACTICAL EXPERIENCE AND ASSIDUOUS STUDY

TO PRODUCE THE FULL DEVELOPMENT AND PERFECT

REGULARITY OF THOSE ESSENTIAL ORGANS,

BY

JOHN NICHOLLES,

SURGEON-DENTIST.

Cognitione naturæ et scientiâ beati sumus.

CICERO.

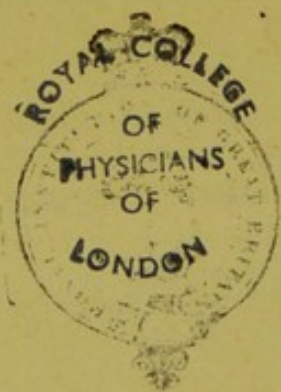
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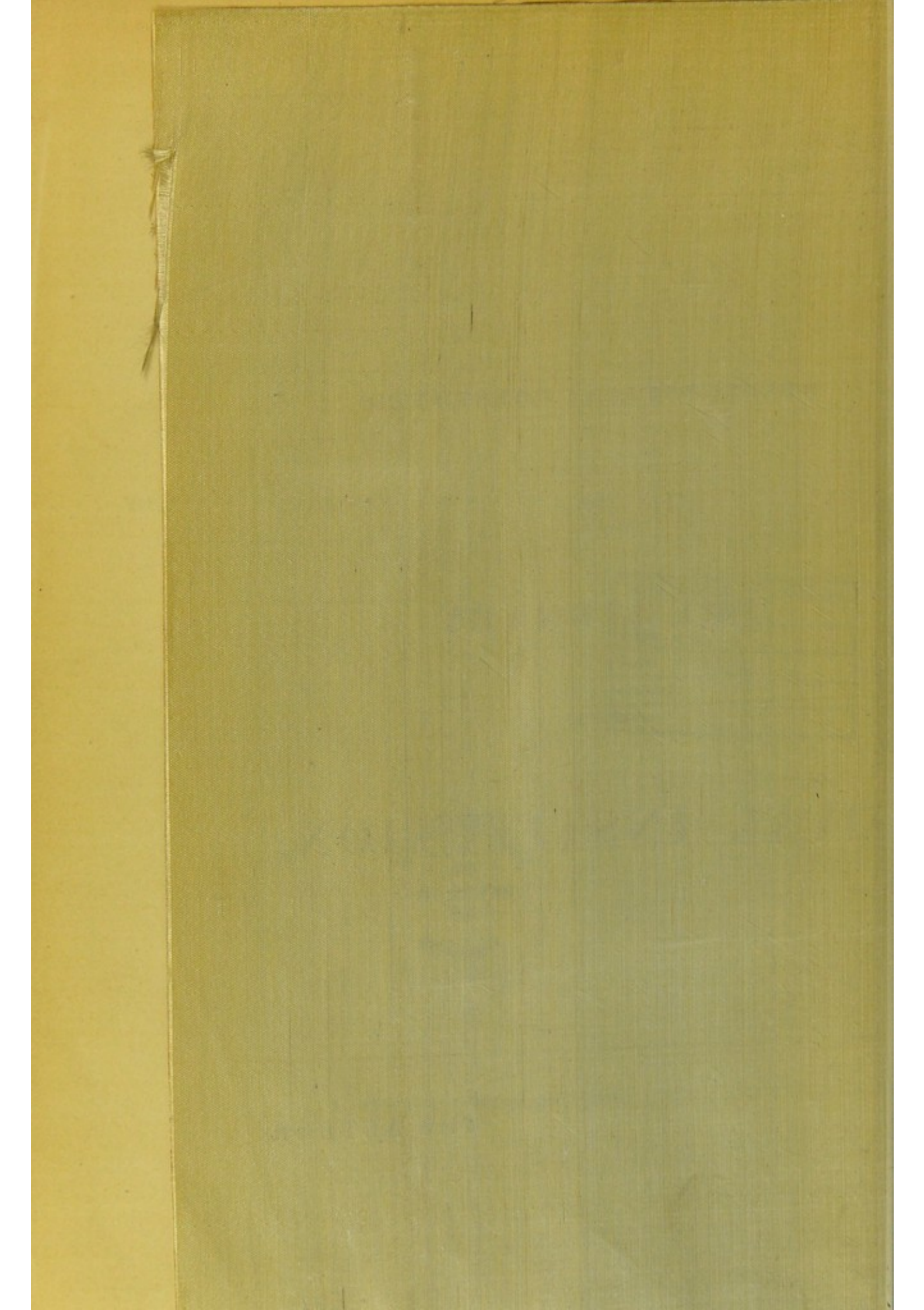
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OF THE

ROYAL INSTITUTION,

BY

THE AUTHOR.



DEDICATION.

THE object of this work being to inspire confidence in a system, resulting from long experience and mature consideration, by which the beauty and health of the mouth and teeth may be established for life, it is respectfully dedicated to the most valuable portion of society,

THE MOTHERS

OF

THE RISING GENERATION,

By their sincere Friend,

And Devoted Servant,

THE AUTHOR.

*April 10th, 1833,
35, Conduit Street, Bond Street.*

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The first part of the book is devoted to a general survey of the subject, and to a discussion of the various theories which have been advanced to explain the origin of life. The second part is devoted to a detailed description of the various forms of life which have been discovered, and to a discussion of the various theories which have been advanced to explain the origin of life.

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THE TEETH,
IN RELATION TO
BEAUTY, VOICE AND HEALTH.

PRELIMINARY REMARKS.

In tenui labor.

THERE is no branch of the animal economy so little understood, by individuals not belonging to the medical profession, as the teeth; and yet beauty, comfort, and health, depend as much upon these organs as upon any others of the human system.

It has, indeed, been said, that a little knowledge is a dangerous thing, and this dogma has ever been used as an excuse for wrapping up science in mystery, and making it a sealed volume to all except the initiated. There is however less truth than point in the maxim, and at all events utter ignorance is yet more mischievous. I should even be inclined to doubt this peril of little knowledge, except to persons of the very lowest order of intellect, who from vanity and weakness are apt to mistake their slender attainments for perfection. In the case before us,—and I confine myself to that,—it is certainly better to be aware of danger than to be ignorant of it, and there may be some use in the ability to avoid disease by acquaintance with its causes. Yet how small a part is this of the general theory and practice of medicine!

While, however, I would recommend this work to those who regard their personal appearance, their comfort, or their health, and more particularly to Mothers who are burthened with the sacred charge of their children's welfare, I by no means pretend that it will supersede all occasion for professional assistance. In many instances it may, and I trust will, prevent disease, by shewing the causes which infallibly lead to it; in others, which may with safety be trusted to the patient's own management, it will point out the most efficient remedies; and in all cases it will afford so much knowledge of the subject, that those, who consult it, will be able to judge for themselves when the aid of art is required, and whether it is properly applied. But this embodies only a portion of my design. It

has been my wish,—and the task was one of no slight difficulty,—so to arrange my work, that while it was sufficiently simple to be intelligible and useful to the general reader, it should also embody the result of twenty years' experience, for the benefit of the student, affording him a complete introduction to the exercise of his profession, and supplying those grounds of theory, without which the practice of any art must be no better than mere empiricism. How far I have effected this intention, or whether such a work was at all necessary, are points that must be left to the decision of the judicious and impartial.

CHAPTER

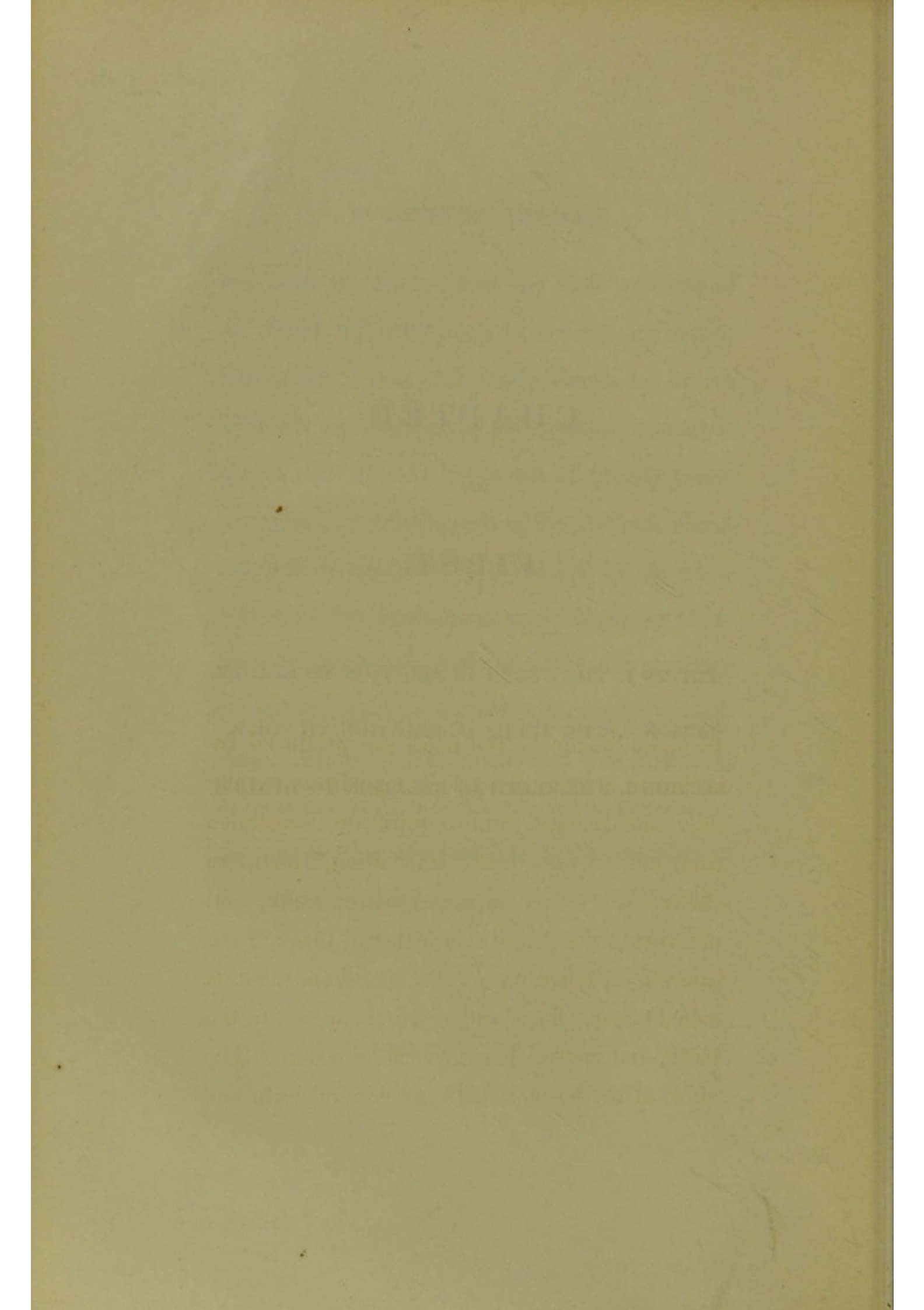
THE

FIRST.

SECTION 1. THE TEETH IN RELATION TO BEAUTY.

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SECTION I.

THE TEETH IN RELATION TO BEAUTY.

IN many instances the teeth are produced by nature in a state of perfect apposition, regularity, and beauty, and require no assistance from art. I have said "apposition," for mere closeness, if unaccompanied by pressure, and permitting the passage of a thread through the interstices, when these are free from what is called tartar, affords only mutual support to the teeth, and causes their general adhesion. The effect of the teeth, in giving a general form and

character to the face, is far greater than is commonly supposed, for the oval outline of the countenance depends not a little upon the conformation of the mouth and chin, the position and form of the latter are determined by that of the jaws, and these again depend on the regularity of the teeth. How much this oval outline is essential to beauty needs no discussion, it having been long allowed by artists, I believe, no less than by anatomists, to be the model of perfection, as far as that term can with propriety be applied at any time to the human structure. But the appearance of the teeth themselves, independently of any change they may produce on the face, is an item of no slight importance in the catalogue of female charms. If the mouth be ever so happily moulded, the effect of it is completely destroyed by disease or irregularity within, whereas any slight defect, such as excess of size, will pass unnoticed when the opening lips disclose organs equally beautiful in their

colour and their regularity. The smile of a mouth under such circumstances leaves us little desire to scrutinize minuter imperfections.

As, then, the beauty of the face is much injured by the bad arrangement, partial decay, or absence of the teeth, the process of nature which takes place in the removal of the original set, and which is often imperfectly performed, requires to be assisted in order to prevent such occurrences ; the mouth should be frequently inspected during the whole process of second dentition, for every derangement can then be easily rectified. This period, therefore, should be carefully observed by parents, especially in relation to females, if personal beauty is to be preserved.

The principal malformations, produced by irregular teeth, and causing a disagreeable change of the countenance, are the rabbit mouth and the prominent chin. The first is caused by the projection of the front teeth of

the upper jaw, frequently accompanied by individual irregularity in their position. The second is caused by the projection of the front teeth of the under jaw, the incisors of the upper jaw falling within those of the under, instead of ranging beyond them; and, in proportion as the teeth advance, the deformity becomes greater. Yet these defects may be prevented by timely attention; for teeth, which are prominent or irregular, can always by compression at an early period be brought into proper arrangement; if this be neglected, the fault is not in the want of remedies, but in the deficient care and skill of those whose duty it is to apply them.

Lavater, in his beautiful, but fanciful, theory of physiognomy, deduces the human character from the teeth,—their form, colour, and arrangement being, according to his system, sufficient indications of the mind. This, in the extent to which he carries the doctrine, is absurd, though it is beyond doubt that the ex-

pression of the face is powerfully affected by the good or bad arrangement and constitution of these organs. In the absence of the proper number of teeth the jaw contracts and assumes the appearance of old age, the cheeks hang down, and the face grows morose and wrinkled; if the upper teeth project too much, the mouth becomes deformed; if they fall within the circle of the lower jaw, the chin and nose approximate; if they be black or irregular, they give an expression to the face of so disagreeable a cast, that, though each feature be perfect in itself, the expression of the whole combined is even painfully ugly. The various expressions so produced must not be mistaken for character, for the two, though often confounded in idea, and almost always in speaking of them, are, notwithstanding, totally distinct from each other; the one varies with every impulse that affects the face, the other is unchangeable; the one is the reflex of the passions as they arise, the other is the result

of the form and general appearance of the features.

Without entering into any wild theories of human perfectibility, we know full well that the form of man is strongly affected and modified by the external circumstances of life, and that these to a certain degree are under our own control. We know also that his structure is susceptible of that proportion, which, from habit or from some latent and undefinable cause, is, at least to us, perfection, and that any very remarkable deviation from this idea becomes a deformity, offensive to the eye of others and painful to him who is the subject of it. However we may philosophize on this point, and endeavour to subdue feeling to the dictates of reason, men will form their partial judgments of each other from external appearances. It is therefore by no means an idle vanity, but sound sense and due deference to the opinion of our fellow beings, when we endeavour to obviate the defects, or improve the advantages, of na-

ture ; with parents in particular this is a sacred duty as respects their children, and in no part of the human structure is this of so easy or so certain attainment as with regard to the teeth, which yet affect the whole harmony of the features. The colour of the eyes cannot be altered ; the proportions of the limbs can scarcely be improved ; but the position and character of the teeth are capable of the most marked and decided amelioration. It may be observed here, that these organs are never, as the inexperienced may imagine, perfectly rigid in their sockets ; by a wise provision of nature the tooth, as connected with the gums, has a sort of elastic power, and yields to moderate pressure without its adhesive firmness being in the slightest degree affected. Were this not the case, and if it opposed a perfect resistance to the force of mastication, it would quickly be loosened from its socket.

But to return to Lavater, who, until he was superseded by the Craniologists, or as they are

termed in more modern parlance, the * Phrenologists, was universally read and not less universally admired. Amongst other strange things, this highly-gifted visionary tells us that long teeth are certain signs of pusillanimity and weakness that melancholy persons have seldom well arranged, clean, white teeth; that short, broad teeth, standing close to each other, show tranquil, firm strength; and that when foul, uneven, and ugly teeth occur in persons of good disposition, it is always either from sickness or some mental imperfection. He even fancies that he sees the character of the tiger and of the shark in their terrible fangs, and is peculiarly severe upon the hippopota-

* It is a singular fact, but not the less true, that Phrenology is not, what Gall and Spurzheim have imagined it to be, a new discovery. There is preserved in the British Museum, in the room dedicated to Engravings, an old plate of the human skull, mapped and marked out after the fashion of the speculative Germans. How far the old and new theories correspond in detail is more than I can call to mind, not having seen the original for some years. In principle they are the same, that is, they both pretend, from external appearances, to guess at what is passing within the brain.

mus, or river horse, whose teeth, it seems, are indicative of no small degree of ferocity. Such indeed was the belief at one time, and the poor animal was set down as a monster, and saddled with many savage propensities, particularly with an ugly appetite for human flesh, until modern naturalists and more accurate observation revoked the dictum, and pronounced him to be mild, timid and gentle. But the obvious fault of Lavater, as it is of the phrenologists, is, that he goes too far; that instead of confining himself to broad principles, and reading nature in her more marked and palpable forms, he must needs attempt to dive into mysteries too fine and too subtle to be fathomed by the human understanding, and thus exposes his whole system to the charge of fallacy. To examine minutely into his theory and sift out the few grains of truth from the heap of chaff in which it is hidden, though it might be amusing, perhaps even instructive, would yet be foreign to the purpose of this work; it is

enough for me to enquire how far his doctrines are borne out as they regard the teeth ; and here I must repeat, though I admire the talents of the benevolent enthusiast, I can by no means subscribe to his opinions ; too many cases have occurred to me, in which the application of artificial means has changed the irregular position of the teeth, and restored harmony to the features, even when the evil was of long standing. Sometimes the incisors have rested their cutting edges on each other, and were rapidly being ground down in the process of mastication ; at other times the upper teeth have fallen within the circle of the lower ; but in all such cases, and the varieties are both curious and extraordinary, the malformation has gradually given way to pressure skilfully applied and submitted to with patience. Now it would be too much, I apprehend, even for the warmest admirers of Lavater to argue that the character of such individuals had undergone a total alteration in three months—for the cure seldom re-

quired a longer period,—or one in any way commensurate with the improvement of these organs. Leaving, therefore, these visions of a heated imagination, and which, if even true, would lead to no useful or practical result, we need only look steadily at the fact, that the expression and beauty of the whole face depend much upon the health, colour, and arrangement of the teeth, and that art is competent to check disease, remove taint, and restore, or even create, regularity and proportion in those important organs. The following case will shew beyond any argument how much may be effected in the cure of deformity of the mouth by the combination of judicious treatment with docility on the part of the patient.

The young lady who is the subject of this notice was in her twenty-sixth year, and, I may add, of engaging manners. Her case was one which is usually expressed by the familiar and perhaps vulgar phrase, “*underhung*,”—that is, the circle of the lower teeth received

the circle of the upper within itself when the mouth was perfectly closed; at such times the nose and chin nearly met, and the face, though every feature, separately considered, was really beautiful, yet assumed the appearance of old age. Many professional gentlemen were consulted, but all declined interfering in a case, the attempt to remedy which was perfectly novel, and which certainly held out no great promise of eventual success. The anxiety and mortification of the mother had increased with the daughter's years, and had at last become excessive, the rather as, under the influence of these irritable feelings, she attributed the young lady's continued celibacy to this unhappy mal-formation. Regret too for her own neglect might probably have had its share in producing this excitement, for it was evident enough, without the confirming testimony of any practitioner, that all this misery might have been avoided by proper attention at an early period.

It was now, by the recommendation of a friend, that the young lady was brought to me. After some reflection on the case, I thought success, though far from being certain, was yet probable. My only fear was that, as the cure must necessarily be slow, the young lady herself might defeat my plans for her benefit by the want of sufficient patience. This difficulty was fairly pointed out, and met by promises of that perfect obedience, without which it would be utterly useless to attempt the removal of so extensive a deformity at such an age.

A machine was made and applied, inconvenient perhaps, but by no means painful, the object of which was, by gradual compression, to cause the lower teeth to incline inwards, and to give to the upper row their natural projection outwards. In a short time, less even than could be reasonably expected, a visible improvement took place, and this inspired the young lady and her mother with confidence in

my mode of treatment, and renewed patience to endure its continuance for the tedious period of nearly six months. At the end of this time, by unremitting attention, and by the careful adaptation of remedial pressure, according to the changing form of the mouth, I had the gratification of beholding her face restored to the most perfect symmetry.

SECTION II.

THE TEETH IN RELATION TO VOICE.

IT is probable, judging from analogy, that every organ in the human frame is calculated and required to perform a two-fold function, though in the present state of our anatomical knowledge it would be difficult to substantiate this theory in all cases. Thus the lungs are equally essential to the formation of blood and to respiration; the liver, while it is the emunc-tory of the venous system, as the kidneys are of the arterial, is also employed in the secre-tion of the bile; and many nerves are not only

capable of distinct sensation, each according to its assigned office, but also of volition. But yet more palpable is the double function of the teeth, which, it is scarcely requisite to observe, are alike necessary to speech and mastication.

The utterance of simple, vocalized, sound, and its subsequent division into notes or letters, are two very different things in themselves, and proceed also from different parts of the animal economy; the one is, properly speaking, *voice*, and the other is *speech*, and this important distinction ought constantly to be borne in mind. The dog, the horse, the ass, and other animals have voice,* though the phrase dumbness is in common parlance inaccurately applied to them.

* The particular disposition of the mouth, of the tongue, and lips, makes all pronunciation impossible to quadrupeds. The monkey, in whom those parts have the same conformation as in man, would speak like him, if the air, as it leaves the larynx, were not diffused into the hyo-thyroid cavities, which are membranous in some, cartilaginous, and even bony, in the howling monkey, whose cry is so hoarse and melancholy. Every time that the animal would utter his cry these sacs swell, then empty themselves, so that he is not able at will to supply to the different parts of his mouth the sounds they might articulate. In the ass an analogous structure is observed.—RICHERAND.

From what has been said it will be inferred that I have used the word *voice*, at the head of this section, in too unrestricted a sense, but I have done so in compliance with general usage, this being one of the many cases in which incorrectness, from being long established, is more readily understood than correctness. So inveterate is this error, that the word *voice* is universally applied to singing, as if that art were merely the result of vocalized sound, whereas every note in singing is as much articulated and divided as any letter of the alphabet in speech. But to make this portion of my subject intelligible to the general reader, it will be necessary to say a few words in explanation of the anatomy of these organs.

The trachea forms the anterior part of the throat, and, until the commencement of the last century, was supposed, from its flute-like form, to be the chief agent in producing the human voice. The larynx is a short cylindri-

cal canal, at the head of the trachea. The glottis is a small oval chink between two semi-circular membranes, extended horizontally from the entering side of the larynx. The chordæ vocales, or vocal chords, are its lower ligaments, by Ferrein and other writers compared to the strings of a violin; but, as they are neither insulated, nor dry, nor tense, which conditions are all requisite to the production of sound, the comparison does not seem to be a happy one. The pharynx embraces the last and highest portion.

When the air is expelled from the lungs by the process of volition, it passes into the trachea, and thence into the glottis, which being very narrow in comparison with the trachea, the air, in passing through it, acquires a considerable degree of velocity, according to the dilatation or contraction of that organ. In flowing onwards it receives a vibratory motion, and the air, thus vocalized, is now carried into the pharynx where, by the various reverberations, a har-

mony is created in the human voice, which no instrument can equal.

Here then is the first stage, or that in which inarticulate sound is produced. In the next we find the sound divided and articulated by the action of the tongue upon the teeth, lips, and palate, and, according to its direction upon any of these, it is termed dental, labial, or palatal. This division of the vocalized air is *speech*.

It may perhaps be asked, how does it happen that, in breathing, the air escapes from the lungs through the usual organs of speech, and yet produces no sound? The reason is sufficiently simple, though not obvious, without explanation, to those unacquainted with anatomy. To make this point as plain as possible, let us refer to a familiar comparison, taking the instance of the flute; you may blow through it, and even violently, without drawing out the slightest tone, because certain conditions are requisite to the production of those vibrations

on which tone depends; so with the glottis; in its natural state, which is its state when we only breathe, the air passes through it without any vibratory motion, and consequently is without sound; but when, by the act of volition, the glottis expands or contracts, the air vibrates and sound of course ensues, deep when it expands, and high when it becomes contracted.

Though much of the power of speech arise from the vibrations of the dilated or contracted glottis, and from the subsequent action of the pharynx, yet without the teeth speech must always be imperfect, a defect which is more sensibly felt in some letters than in others. In support of this obvious doctrine I will not quote the feeble voice either of age or infancy, for in the one case it will be said the assistant organs have decayed, and in the other that they are not yet formed, and to these circumstances the defect will be attributed; but I will take the instance of individuals losing the whole of their teeth in the very prime of life, an accident un-

fortunately of by no means rare occurrence. How stands the fact with them? Why, the false teeth, being placed in their mouths, they speak clearly and articulately, giving to each letter its full and perfect enunciation; but the moment they are taken out, their speech becomes thick and indistinct, and has all the imperfection of extreme old age.

There is one singular fact, connected with this point, to which I never remember to have met with an exception. When a patient, who has long been without teeth, has the artificial substitutes fixed in his mouth for the first time, he feels considerable difficulty in speaking; the reason is this; from the want of practice, he has lost the combined action of the organs of speech, and is placed in the state of an infant, but with this difference, that whereas the infant has to acquire new sounds, *he* has to recover the habit of those which he has known and forgotten, or rather the various muscles of the larynx and pharynx, having

been unaccustomed for a time to certain actions, do not at first readily come into play upon the excitement of the will. It is the same with any other muscles; let the leg or arm from any accident be long disused, and it resumes its usual functions slowly and with difficulty. This, however, wears off in a fortnight at the farthest, and in some cases a few days only are sufficient to the recovery of the perfect use of speech.

Even the loss of a single tooth affects the utterance, and invariably produces a sort of whistling sound, when the tongue, naturally endeavouring to fill up the vacuum, an unusual action takes place, and the sublingual glands, being violently compressed, throw out the saliva with such force as to eject it unpleasantly from the mouth. The cause of this whistling is sufficiently obvious if we again revert to the manner in which articulated sounds are produced. The vowels are the issue of the vocalized breath, modulated by the passages, and

variously directed, but not checked or interrupted; the consonants are the same sounds checked by the tongue, lips, or teeth: when, therefore, the air is thus partially checked, it escapes with rapidity through the opening occasioned by the loss of the single tooth, and produces the sibilation that I have just been mentioning.

Hence too we may learn why it is that the vowels are so easy of enunciation, and are always the first to be acquired by children. The vowels are the consequence of one simple action, while the consonants, so called from their binding the vowels together, result from a complication of actions, or, as it is beautifully expressed by Sir C. Bell, "the compression of the thorax, the adjustment of the larynx and glottis, the motions of the tongue and lips, and the actions of the pharynx and palate, must all consent before a word be uttered."

According to grammarians, the consonants or dentals, pronounced by the action of the

tongue upon the teeth, are five in number, *t, d, s, z,* and *j*. Certainly they are the letters which are the most imperfectly sounded when those organs are lost, and so far they may with no great impropriety be called dentals. But this must not lead us into the erroneous notion that any letter can be truly enunciated without the assistance of the teeth, the vowels alone excepted; for, independently of the facts already stated, it may be observed that the form of the mouth is modelled by those organs, and that upon such form the force and purity of utterance in a great measure depend. For this purpose the elliptical conformation is the best calculated, a beauty that will invariably be seen in foreign singers of any eminence, though with the individuals of our own country it is by no means of frequent occurrence. In saying this, I would be distinctly understood to speak only of the form, and not of the size, of the mouth, which latter has, comparatively speaking, but slight influence upon the point

in question. The "bocca overta" of the Italians depends not a little upon this oval conformation, and it is with a view to producing this effect, so essential in life to the singer, the orator, and even to the common intercourse of society, that I always recommend in youthful patients those teeth should be removed which prevent the elliptical expansion. So invariably has my theory been confirmed on this point by experience, that I never yet saw a mouth, of which I could not anticipate, from its form alone, the oral advantages or imperfections.

I have already noticed that the loss of a single tooth occasions a sort of whistling sound, something analogous to the hissing of the letter S, and also a spurting out of the saliva, but even the bad position of one of these organs is sufficient to alter and deteriorate the speech. Not to weary the reader by too minute a detail, I will cite a few instances only, and from these the rest may be inferred.

The two eye teeth,* when projecting beyond the proper oval, impede the action of the upper lip, and thus destroy the undulations of voice so essential to perfect harmony; the lip is thrown upwards, by which its motion is interrupted and does not correspond with the other organs, whose simultaneous action is requisite to perfect speech.

* Here again I use a phrase, though palpably incorrect, which from the abuse of the custom will be better understood by the generality of readers than the legitimate and technical word, *Cuspidati*. But this expression cannot be too soon abandoned, for it only serves to continue a foolish notion, which arose in the time when the use of the dissecting knife was much less frequent than at present. Then they supposed there was a connexion between the cuspidatus and the eye, and the phrase eye-tooth confirms and propagates the blunder in the minds of those who are not better taught by anatomy. Nor is this absurdity confined only to the unprofessional; there are many dentists, so happily ignorant of the human structure as to participate in the delusion, in consequence of which they have a peculiar respect for the eye-tooth, and never venture on its extraction without fear and trembling. These teeth have been called also *laniary*, from the Latin, *laniare*, to tear or rend, and it seems peculiarly apposite: "laniabant dentibus artus," is the expression of Virgil. Perhaps it would be better at once to anglicize all the technical names applied to the teeth, and call them incisors, cuspids, bicuspids, and molars.

If the whole circle of the upper teeth project too much, the same defect occurs, though in a less degree, as when the jaw is altogether destitute of teeth; the air, which should be checked to form the consonants, escapes too freely, and each letter is more or less imperfectly uttered, according as it requires the greater or less degree of appulse from these organs. Teeth, in either jaw, projecting inwards, or misplaced with a sidewise inclination, occasion uneasiness to the tongue, to avoid which it naturally contracts its sphere of action, and assumes a wrong position when attempting to divide the sound, in the same way that the tenderness of a single toe leads to an unequal pressure on the other joints of the foot in order to give relief to the affected part. In either case this action is involuntary, arising from the mere irritability of the nerves. As regards the tongue, this restriction of its natural movements inevitably occasions imperfect sounds; the voice becomes thickened,

and, in proportion to the restraint, a lisp ensues, which in general is attributed to any cause except the right.

It is very common to hear people talk of the tongue being too large for the mouth, by which is meant that the tongue is præternaturally enlarged; but this is a case that is not often met with, though there can be no doubt of its occasional existence. Generally speaking, the truth lies in the reverse position; it is the mouth, which, not being allowed to develop itself fully and naturally, from the crowded and false arrangement of the teeth, has become contracted and assumed decided mal-formation. The defect has been already noticed in the preceding section, and is not difficult of cure if attended to at an early period. Sometimes stammering will result from deficiency or bad arrangement of the teeth, a fact that has been noticed by the celebrated Richerand, in his "*Elements of Physiology*," and which is fully confirmed by more modern experience and observation.

The less or greater size of the teeth has no effect whatever on the speech, provided only they are placed in just positions,—that is, as I have already observed, elliptically arranged, and with a slight projection outwards.

I have thus remarked briefly, and, I trust, clearly, on the leading causes of defect and perfection of speech as connected with the teeth, pointing out how the one may be remedied and the other may be attained. There is much scattered information on the subject of the voice to be found in various works, more or less accessible to the general reader, but I am not acquainted with any author who has expressly considered it in relation to these organs. Richerand, to whom I have had occasion to allude before, has written well and largely on the topic; Haller too in his learned, though ponderous, *folios*, has also noticed it, and with his usual ability and eloquence; but by far the most complete and perfect treatise on the subject is one of modern date by Sir Charles

Bell, entitled "Observations on the Organs of the Human Voice." Of that portion of the subject, which has fallen peculiarly within the scope of my work, he has said little; on every other part he is no less minute than exact, and they, who wish to become thoroughly acquainted with the mysteries of the human voice, will do well to consult his treatise, a composition deserving of all praise both for originality of ideas and felicity of expression. It is to be found in the second part of the *Philosophical Transactions* for 1832.

SECTION III.

THE TEETH IN RELATION TO HEALTH.

IN regard to health, it is quite as clear, that a sound state of body cannot exist without due mastication of the food, as that mastication itself cannot go on without the help of these organs. From neglect and loss of the teeth, then, must arise imperfect mastication, and from that cause indigestion and its inseparable affections. Perfect digestion requires, moreover, that while the food is comminuted by the teeth it should be blended with the saliva, which renders its solution easier when it

reaches the stomach, and is there mixed with the gastric juice. But when the teeth are wanting this cannot be effected, and consequently such chyme, or imperfectly comminuted food, will not possess the qualities requisite for the formation of proper chyle.

This, however, is but a partial view of the teeth in relation to disease. The mere irregularity is attended with bad effects. Tartarous incrustations and particles of food lodge in their interstices and cause diseases both in them, and in the gums more especially, because, unlike other living parts, these are incapable of freeing themselves from extraneous matter and require the assistance of art.

The tendency of the tartar is to separate the teeth from the gums, to loosen them in their sockets, to irritate the contiguous parts, and to produce inflammation. The tendency of the accumulation of particles of food is to undergo the putrefactive process, to act upon the enamel, and to penetrate the bone, causing tooth-

ache and destroying the teeth. Nor does the evil rest here; diseases of these parts, like all other local affections, produce various derangements of the bodily functions. Simple caries of the teeth will sometimes give rise to what the French have called *tic douloureux*,* to disorders of the ear, of the stomach, and other organs; it has even been known to set up excruciating pain in the limbs analogous to rheumatism.

We cannot be surprised at the mischief which ensues, when we reflect that, through the mouth, wherein this injurious accumulation is made, are carried on the two great operations on which animal life depends, namely, that of mastication, from which nutriment is derived to the system, and that of respiration, which, by its two-fold function, throws out carbon, the deleterious principle, and receives oxygen, the essence of vitality. If the food be tainted

* This disease, though exceedingly painful, is nothing more than the irritation of certain nerves of the face, and in most cases proceeds originally from the teeth.

in mastication, the chyme and chyle may be equally so, and the passage of putrid matter into the system must sow the seeds of disease; bad breath also arises generally from unclean teeth, independent of the stomach or other parts; and, as the air we breathe necessarily passes through the mouth, it becomes tainted, not only in the act of exhaling, but in that of inhaling, and respiration, therefore, is carried on by means of foetid air, which, in affecting the lungs, affects the whole constitution.

A remarkable case fell under my care some time ago, which will serve to illustrate and confirm this observation. A lady had for a long time been in a precarious state of health, attended by that variety of symptoms, which, seeming to designate as many various causes of disease, too often perplex and baffle the most sagacious practitioner. Remedy after remedy was tried in vain, the draught of to-day being succeeded by the pill of to-morrow, till at length symptoms appeared of the last and most

dangerous character. Wherever the seat of the malady might be, one thing at least was plain, even to the most unskilful,—the patient was rapidly sinking. In this state she came to me, less, I believe, with any confidence of cure than in that restlessness of spirit which induces people in desperate cases to fly even to the most improbable sources for relief. But I had seen too many similar instances, in the course of a long and extensive practice, to hesitate as to the cause of her illness for a single moment, though I much doubted whether the constitution still retained vigour enough to rally from its effects. Her mouth was full of loose and decayed teeth, and it was at once evident to me that the general irritation, excited and kept up by them, was one cause of disease, while a second, yet more sufficient, was to be sought in the fact of these organs, by their foulness, destroying the wholesome and natural purity of the saliva; indeed this secretion had degenerated almost into a poison, and reaching the

stomach in this state had deranged its functions and produced all that train of suffering, which is the inevitable concomitant of impaired digestion. The patient, naturally enough, could see no connexion between a few decayed teeth and a malignant disease, that in defiance of medicine was rapidly consuming her; but I persisted in my theory, and at last, after some difficulty, was allowed to carry it into practice.

Accordingly the stumps were cautiously extracted at certain intervals, and, though the operation, with all my care, was necessarily severe to one in her enfeebled state, yet the result, from its wonderful rapidity, far exceeded my most sanguine expectations. In a few weeks only she was convalescent, and, as her health returned, the loose teeth, which, being sound, were allowed to remain, became as firmly fixed as ever in their sockets.

A second case of no less interest occurred to me a few years ago in the person of a lady, whose malady, upon the first view of it, seemed

rather to fall under the consideration of the surgeon than the dentist. It was an abscess under the left breast, which originally commenced at the time of her suffering from a violent tooth-ache, and, whenever the pain returned, as it did at frequent intervals, the abscess put on its worst appearance, but as constantly began to heal again with the abatement of the dental affection.

Upon examination I perceived a dark brown line extending along the surface of the skin from the wound below to the under jaw of the same side. This fact, coupled with the circumstance of the state of the abscess depending on the tooth-ache, left no doubt in my mind as to the cause and remedy of the mischief. The caries, which I now discovered in a single tooth, had evidently given rise to an abscess in the socket, the contents of which, finding no immediate outlet, had by their weight broken a way through the cellular membrane, sufficiently indicated by the discoloured line, till at

last they forced an opening below the mamma. There was some inflammation about the gums, but, seeing at once the necessity of extracting the tooth, I did not allow that circumstance to weigh with me in creating the slightest delay of the operation; nor would I ever hesitate to remove a tooth on account of inflammation of the gums, though the contrary practice is by far the most prevalent; many bad consequences may arise from delay, but never have I seen any serious injury occasioned by extraction even when these parts were violently inflamed.

The tooth being taken away, the cause of disease was removed, and the patient recovered with a rapidity surprising to herself and her friends, though to men of medical experience it would follow as a natural consequence.

A striking instance of the mischief resulting from delay in such cases is given in the *Medical Journal* for 1802, and, as one fact outweighs all abstract reasoning, I will here give the substance of it in as few words as possible.

“ A case occurred sometime since, in Monmouthshire, of a lady who fell a sacrifice to inflammation arising from the irritation of a tooth. Soon after she found it painful she sent for a surgeon to extract it, which, on account of the contiguous soft parts being much inflamed, he postponed till the next morning, recommending in the interim proper means to be taken for their relief.

“ In the course of the night the inflammation had unfortunately increased, which on the following morning rendered the operation still more objectionable. On the third morning the inflammation had extended to the œsophagus and neck, so as to prevent deglutition; and on the fifth it had spread to the breasts, which were amazingly tumefied. About the ninth a very extensive suppuration took place. About the eleventh, it assumed a gangrenous appearance, which soon terminated in mortification, and the victim was speedily released by death from all her sufferings.”

Such cases must not be considered rare, or as having been selected to exemplify and support a particular doctrine ; in all works on medicine they are common, and the inductions from them are perfectly familiar even to the tyros of the profession. Of the many similar examples that might be adduced, I will cite a few only, that the inexperienced may have something more than my own authority on which to base their conclusions ; but amongst them there is one which I would earnestly recommend to the serious consideration of my female readers. It is needless for me to be more particular on this subject, as it will be intelligible where it is required to be understood without any minuter explanation.

The two first cases, and I shall only refer to them as they require no particular detail, are given by Dr. Rush in a letter to Dr. Miller of New York ; the one is of epilepsy arising from the same cause, and finally cured by the removal of the decayed teeth and stumps ; the

other is of a lady who laboured under dyspepsia and tooth-ache, though there was no external appearance of decay in the affected organ. It was however drawn by his advice, and the result was immediate relief to the stomach and a rapid recovery of health.

In the *Bibliothèque Germanique Medico-chirurgicale* is the case of yet deeper interest. A young woman was affected with abscesses in her right upper and lower jaws at that particular period of the month when females are subject to complaints, and an irregularity in her usual habits succeeded. Upon inspecting the seat of the morbid affections, the doctor discovered several of the molares in both jaws to be decayed, and immediately ordered their extraction, in consequence of which the woman was relieved, and, the periodical collection of pus ceasing, the general health was perfectly restored.

Facts of this nature, though they may surprise the inexperienced in medicine, have yet

nothing in them out of the ordinary course. A small tumour, concealed in the fleshy part of the leg, has been known to bring on epilepsy; a trifling wound, with a nail or splinter, even after it has healed, has often induced a fatal tetanus; worms in the bowels have produced internal dropsy of the brain; and a stone in the kidneys has excited commotion in every part of the system. The influence therefore of bad teeth on the state of the general health must be very great, and some have even considered it as a cause of pulmonary consumption.

Connected with diseases of these organs there is one peculiar and important consideration. In other maladies the patient, if he be a person of common information, knows enough to be at least aware when the aid of the surgeon or physician is absolutely requisite; but this is far from being the case here; few, except the dentist, even think how caries is to be prevented, and just as little do they know how to treat it when it does actually appear; no-

thing short of a violent tooth-ache will persuade them that any thing is wrong, and then, for the most part, it is too late for any remedy but extraction.

Another, and no less serious, result of this general ignorance on the subject is, that it exposes the unwary multitude to quackery in all its forms and varieties. Sometimes this charlatanism exhibits itself in the shape of remedies for the toothe-ache,—as a lotion or tincture,—the effect of which is to destroy the nerve, and with the nerve the tooth itself as a matter of course,—or as anodyne cements, which, if crammed into a carious tooth, suffering from inflammation, naturally give rise to abscess in the jaw,—or as pastes, which are to prevent decay, and whiten the teeth, and which, if they do no harm, do no good, though it is seldom that the patient is fortunate enough to escape with the latter and better half of the alternative. There is no branch of the medical and surgical profession so replete with uneducated impos-

tors as that of the dentist. A little mechanical ingenuity, such as belongs to the turner in ivory, is frequently all the qualification possessed towards the fulfilment of duties which require a thorough knowledge of anatomy and a competent acquaintance with physiology and the general practice of medicine.

That empiricism should have prospered in remoter periods, before chemistry and anatomy had made any great advances, is not perhaps a matter for our wonder, but that such worn-out absurdities should find, as they do, both credence and admirers in the present enlightened day is indeed surprizing. It has, however, been well observed that mankind are fond of mystery, and it is more congenial with a sick man's mind to expect relief from the occult qualities of a medicine than from its sensible virtues. Hence arises the endless train of nostrums and impositions, which are a disgrace to the age and nation, and leave us little reason to exult in the progress of intellectual philosophy.

CHAPTER

THE

SECOND.

SECTION 1. THE STRUCTURE OF THE TEETH.

SECTION 2. THE TEMPORARY TEETH,
FIRST DENTITION.

SECTION 3. THE PERMANENT TEETH,
SECOND DENTITION.

CHAPTER

THE HISTORY OF

The history of the world is a vast and intricate web of events, stretching across centuries and continents. It is a tapestry woven from the threads of human experience, from the dawn of civilization to the modern age. The story is one of constant change, of triumph and tragedy, of hope and despair. It is a story that has shaped the course of human destiny, and one that continues to unfold before our eyes. The history of the world is a testament to the resilience of the human spirit, and a reminder of the power of our collective actions. It is a story that we must all know, for it is the story of us.

SECTION I.

THE STRUCTURE OF THE TEETH.

UNLIKE the other bones of the human structure, the teeth are formed from, and upon, a pulp, which gives its shape to the future tooth. This pulp throws out ossific matter from the extremities of its vessels upon its own surface, and immediately below the membrane, destined to secrete the enamel, by which membrane it is enveloped. I should observe, however, that the pulp itself has no roots until it has formed the crown of the tooth, by which time it has become sufficiently elongated to fulfil the rest

of its appointed office. In this process, according to some physiologists, it loses much of its own substance, and should continue to deposit layer after layer of bone till the cavity, in which it lies, is almost obliterated. Solid teeth, or such as are nearly so, are certainly found in persons of great physical strength.

In writing of the teeth it is usual to consider each organ as divided into three parts,—the crown or body, the neck, and the root. The crown or body is the whole of the part seen above the gums when they are in a healthy state; the neck is the line all round the tooth, where the enamel terminates, and to which the gum adheres; the root is the portion which is inserted into the socket in the alveolar edge, ridge, or process of the jaw, and comprises the remainder of the tooth.

The whole tooth consists of two distinct substances, — a bony substance, and enamel, the latter being in technical language called the *Cortex striatus*.

The bony substance does not very materially differ from the other bones of the body, being like them chiefly composed of gelatine or animal jelly, and phosphate of lime, an earthy neutral salt.* The principal difference between common bone and that of the teeth is not in their constituent materials, but in the proportions of them, the teeth being more compact than the other bones, owing to their containing a larger proportion of the phosphate of lime.

The enamel has no gelatine, and from its super-abundant quantity of phosphate, and

* For those who may be curious in such matters, I subjoin the exact analysis of the teeth by Berzelius as it appears in Nicholson's Journal, Vol. 8. p. 75.

<i>The Enamel.</i>		<i>The Bone.</i>	
Phosphate of Lime . . .	85,3	61,95
Carbonate.	8,0	5,50
Fluate ditto	3,2	2,10
Phosphate of Magnesia .	1,5	1,05
Soda, Animal matter, } and water. }	2,0	Soda with a little } muriate of soda }	1,40
		Gelatine, water, &c.	28,00
	100		100

carbonate, of lime is extremely brittle, and so hard that the best files are worn smooth in working on it. This hardness, however, does not take place till the tooth has risen above the gums ; for, while it remains below them, the enamel is nearly as soft as chalk.

According to Dr. Blake, and he has been followed by our first dentists, the enamel is secreted and deposited on the ossified part by the internal surface of the capsule, or membranous sac, which envelopes the pulp, and which subsequently perishes when the tooth appears. Notwithstanding the authority attached to high names, I do not hesitate to say, the whole of his theory is erroneous, and the proofs that it is so are sufficiently simple and conclusive.

In the first place, then, this doctrine is utterly destitute of the support of analogy, no other portion of the animal economy being formed by such means. Yet here is supposed an investing membrane throwing down on a bony surface that substance which ultimately

becomes so beautiful in its crystallization, and is of such primary importance that, in its absence, the tooth could not long exist.

In the next place, it is supposed, that this membrane, destined to such high functions, perishes the moment the tooth bursts through the gum, or even before, leaving the enamel to shift for itself during the whole period of life, without any chance of assistance from those reproductive powers so constantly at work throughout the rest of the human structure.

Again, to make this absurdity yet more glaring, the enamel, in its weaker state, is indeed little, if at all, better than chalk, at the very period when the secreting membrane is said to be destroyed.

In conclusion, even if we could believe this, it would only leave us in yet greater difficulties as to what follows. Throughout the whole of life, the enamel is constantly undergoing changes with the varying health of the body. Let the constitution suffer under illness, and it

immediately becomes clouded; let the health return, and it as rapidly resumes its brilliance. Under affections of the liver, in which the yellowness of the skin appears known by the name of jaundice, the teeth assume the same bilious tinge and discoloration. Could these phenomena exist if the enamel were a mere deposition of crystallized carbonate of lime upon a bony surface? Do they not show the existence of a membrane over the ossified part destined to secrete the enamel, and which continues in full and perfect action as long as the tooth retains vitality, always under the same influence that governs the rest of the system, and even more exposed, from its peculiar situation, to causes producing disease and death?

In support of this doctrine, which affords so easy a solution of every difficulty, the reader, who is at all acquainted with anatomy, will observe, that, between the structure of these superficial organs and that of the skin, a striking analogy exists. As the teeth consist

of two substances, the bone and the enamel, so also the skin consists of the true and the scarf skin, while between the component parts of either there exists a membrane; this, which in the latter case is called the *Rete Mucosum*, is known to be absolutely essential to the preservation of the epidermis, thus affording as strong a proof of a fact as can be induced from analogy.

This theory will at once explain all the mystery of caries or decay, which will be but indifferently accounted for upon any other principle. This disease assumes various appearances; sometimes it commences by discoloration on the external surface, and not unfrequently on the very edge of the enamel at the neck of the tooth; at other times it begins on the bony substance, which will decay while, to all outward seeming, the enamel remains untouched.

The external caries, it is unanimously agreed by the best writers on the subject, is

produced by pressure. But how? — according to my theory, by inflammation of the secreting membrane, which, under its peculiar circumstances, is much more liable to be excited than any other membrane, and will be acted upon by causes that, under other circumstances would have no influence. Not receiving red blood by its vessels, it cannot afford much resistance to disease, and, being from its situation, utterly incapable of expanding, it perishes after a comparatively slight degree of increased action. That the enamel should then die is a necessary consequence, for it only dies with that which supported it.

Caries is then at all times the result of inflammation of the membrane, which secretes the enamel. The most general cause of this inflammation, when caries appears on those sides of the teeth which are in juxta position, is the pressure of one tooth upon another. When the disease appears on the grinding surface, or any other part of the crown of the

teeth, the inflammation is frequently excited by the irritating properties of the saliva, that active fluid insinuating itself through a small crack left by the imperfect formation of the enamel. This will perhaps also explain the tendency to diseased teeth in ladies during the period of gestation, the saliva at such times becoming peculiarly acrid and irritating.

Assuming then the existence of this secreting membrane for the formation and support of the enamel as an indisputable fact, we immediately comprehend the cause of the singular character of the teeth of some children. It is by no means uncommon for the earliest formed permanent teeth to show themselves in an imperfect state,—of shrivelled appearance, pitted on the enamel, and frequently even indented through that surface. In many cases broad lines or bands appear of a brown colour and evidently where no enamel has ever existed. Wherever any of these defects occur, we may be sure there has been some early and perhaps

considerable, derangement of the constitutional powers, sufficient to interrupt the whole process of growth, arresting for a time the action of the secreting vessels, upon which depends that extraordinary creative power that in health is perpetually at work till it has completed the human structure. As this cause subsides, the part of the membrane which had not been called into action, and consequently had not suffered, now enters upon its functions; hence that portion of the enamel, which has been secreted subsequently, is perfect, while the earlier formation retains its blemishes to the last. This is a singular fact, and fully illustrates the extreme delicacy of the membrane in question, as contrasted with those vessels which perform the same office for other parts of the body, and continually renovate its substance by the deposition of fresh matter. Any disease in the latter vessels interrupts their *action only*; they do not perish, and consequently have the power of filling up any deficiency derangement may

have occasioned; but if once any portion of this membrane be affected, such portion actually dies; and, as it has no power of regenerating itself, the teeth must be imperfectly formed by the remaining fragments of the membrane, and thus these organs retain their defects through life.

This physiological fact is of importance in many points of view, and it has led to the foundation of my theory and practice. One principle of no slight consequence is to be deduced from it—that we should get rid of the imperfect teeth whenever an opportunity is afforded, and retain those, which, having been formed at a more healthy period, are without blemish; by the old system the latter were frequently removed, leaving the decayed and ill-formed teeth, to the entire destruction of comfort, health, and beauty.

From all these considerations will appear the folly of attempting to relieve pressure in the teeth of young people by filing the enamel. This is too often done, and what is the conse-

quence ? inflammation ensues, and the enamel perishes. In more mature age, this substance, being thicker and more crystallized throughout its texture, will bear a considerable degree of abrasion. After about twenty-five years of age you may use the file, yet with caution ; but, when the middle period of life is passed, little, or no injury is to be apprehended from this operation however boldly executed.

There is yet one point to be mentioned not perhaps strictly connected with the details of the present chapter, but, as it is too unimportant to claim a separate section, I will briefly notice it in this place. I allude to those teeth called *Supernumerary*, they are smaller and rounder than the regular teeth, and generally are seen in the upper jaw in the neighbourhood of the incisors ; sometimes they appear singly and at other times, but very rarely, in clusters. As they produce considerable deformity, whenever their character is apparent, they should be immediately extracted.

SECTION II.

THE TEMPORARY TEETH.—FIRST DENTITION.

IN the regular course of nature, every individual has two sets of teeth, the germs of which exist in the socket even previous to the birth of the infant. The first, which appears in infancy and continues for a few years only, is called TEMPORARY; the set, which succeeds it, and which is intended to last through life, is distinguished by the name of PERMANENT.

The temporary teeth, when complete, are twenty in number, and are named, according

to their shape or use, *Incisores*, or edged-teeth, *Cuspidati*, or pointed teeth, and *Molares*, or grinding teeth, popularly called grinders. The incisors or edged teeth are intended to cut, to act upon the principle of scissors, and of these there are four in each jaw. The cuspidati or pointed teeth have their name from their terminating in a single sharp point, the object of which is to hold and tear, and of these there are two in each jaw. The molares or grinders are so called from their being employed to grind, or rub down the food, that it may mix with the saliva, and these, on account of their great size, are sometimes called double teeth, of which there are four in each jaw.

These temporary teeth usually begin to show themselves in the sixth or seventh month after birth, but the time varies much in different children, their appearance being frequently delayed to a much later period. Nor does this at all depend, as might be imagined, on the strength and health of the child; for the weak

and sickly often obtain priority in this respect over the strong and healthy.

This is often a very troublesome and sometimes a very dangerous period with children; but the management belongs rather to the physician than to the dentist; for, though the disorders incident to it are local, at least in the first instance, yet the remedies must apply chiefly to the bowels and digestive organs.

The cause of the pain and danger, too frequently experienced at this period, has been variously explained. Doctor Hecker, a German physician of eminence, asserts that the saliva, becoming acrid and poisonous from the irritation of the nerves, deranges the entire system; and, though I by no means agree with this theory, I cannot say that it is deficient in probability. Arguing from analogy, he observes, that "an irritation of the liver will produce a sharp and corrupted gall; passions often render the milk venomous; and the mildest sa-

liva of an irritated and angry animal becomes very malignant and poisonous."

Dr. Brandis, of Brunswick, is of a contrary opinion, and imagines that "a suppression of salival secretion has the principal share in producing these symptoms." Now it being a well known law of the animal economy that all secretions are increased by a moderate degree of irritation, and suppressed when it becomes too vehement, no argument can be required to prove that the suppression of the salival secretion is the consequence, and not the cause, of disease.

Dr. Wickman, in his theory of difficult dentition, attempts to overthrow the existence of it as a morbid phenomenon altogether; he even goes so far as to deny sensibility to the gums, but as they are penetrated by nerves and blood vessels, and are, as a natural consequence, subject to inflammation, this opinion is manifestly an error; indeed one may be freely allowed to wonder how a doctrine, so decidedly

opposed to the first principles of physiology, could have ever obtained credence with any man of medical education.

All growing pains are occasioned by the vessels of the bones depositing ossific matter, and thereby stretching the periosteum, or vascular membrane, by which they are protected. This local irritation produces fever by deranging the bowels, and their diseased action in turn influences the various secretions, either rendering them unwholesome, or suppressing them entirely. Of such morbid secretion we have a familiar instance in the case of common catarrh, when the pituitary membrane, that lines the nares, instead of throwing out a viscid and healthy mucus, discharges a thin ichor, which, as the inflammation again ceases, gradually thickens till it re-assumes its original consistence. If the teeth are the peccant parts, the saliva is the secretion which is affected, and when it begins to flow freely again, instead of supposing that it is the return of the saliva

which produces ease, we should infer that the disorder itself is on the decline. But this perpetual mistaking of effect for cause is not less the source of vulgar error than it is the besetting sin of theorists and of many with whom the imagination is more active than the judgment.

With this view of the matter I repeat that, in difficult dentition, the first thing to be attended to is the digestive organs, though I will not deny that topical remedies may sometimes be used with advantage. Of these the principal is the lancet, but it is too often applied in the harshest manner, the operator slicing the gums through the whole circumference of the jaw, dipping into the body of it, wounding the germs of the second set of teeth, and breaking down the delicate bony partitions which are ultimately to form the alveoli, or sockets, the main supports of the teeth through the whole period of life. A more baneful practice than this cannot well be imagined, and, from its

frequency, this caution becomes peculiarly requisite.

When it is decided to use the lancet,—and this decision should not be hastily adopted or without the best advice,—but, when it is so resolved, the operation, trifling as it is, should be conducted with the greatest caution. Instead of employing the rough mode already described and reprobated, the operator should divide that portion of the gum, and only that portion, which is irritated by the tooth below, an irritation which, if long continued, produces inflammatory action, the process of absorption not going on fast enough to avoid the pressure of the rising tooth.

I am, however, of opinion, that the use of the lancet may, in most cases, be dispensed with, if proper attention be paid to the state of the *primæ viæ*, in the earlier stages of the disease.

In saying this it is necessary for me to guard against one error, which is unfortunately

too popular, and often leads to fatal results. I allude to the absurd idea that diarrhea is salutary at the period of dentition: so far from this being the case, at least as a general rule, it is often only a sign of weakness, and adds to the debility which it indicates, retarding the growth of the tooth and keeping up the irritability of the gums and through them of the whole system. The time and manner of checking it require the advice of the physician, this being a point of considerable delicacy and one which can not be safely trusted to the management of the inexperienced; generally speaking, those medicines, which correct acidity, and mild warm purgatives, should be administered to remove the causes of the derangement. Sedatives in unskilful hands are particularly dangerous.

When the child has attained the age of two years, or two years and a half, the first set of teeth is generally completed, and, unless its health be materially deranged, these for the

most part remain in perfect beauty until after the sixth year.

If, however, the child suffer much from indisposition, the mouth and teeth must be affected by it; the only means of alleviating the evil are cleanliness, and the use of friction on the gums, as well as on the teeth, by means of an elastic brush. Tooth-powder may, and indeed ought to, be occasionally used, for, during protracted indisposition, a viscid mucus will be sometimes deposited on the teeth in such abundance as to render the use of the brush alone insufficient.

But though the greatest attention be paid to cleanliness, there will be many cases in which premature decay will take place, and that to a considerable extent.

According to the opinion of most writers on this subject, it is prudent to leave the teeth of children to the unassisted care of nature. This is a doctrine not very agreeable to reason, though it is too frequently acted upon by

thoughtlessness or ignorance. In opposition to so manifest an absurdity I affirm that the sufferings of children at this period merit the very first consideration. At the same time, I would anxiously impress upon the minds of all who have the management of them, that the temporary molares of the first set should not be prematurely extracted, although they may labour under extensive caries and the child suffer considerably in consequence. Of the two evils, it is better the extraction of these teeth should be delayed beyond the proper period than that they should be taken out before the permanent bicuspidés are prepared to succeed them.

When caries exists to great extent in the temporary molares, and it is yet too early to proceed to extraction, the walls forming the cavities should be gently broken down, and as flat and smooth a surface as possible should be established, getting rid of all the sharp edges and angular points, which would otherwise

irritate the tongue and in many cases lead even to ulceration. By this simple remedy, which gives no pain, the general health will be materially increased, and all the functions requisite to the formation of the permanent teeth will go on uninterruptedly.

It is no doubt true, that, without any such care many hundreds of children pass through this critical period unharmed; but it is equally undeniable that many persons may pass through the wards of a fever hospital without the slightest precautions, and yet not receive the infection. The danger, in either case, is not the less certain, and I repeat, that neglect at this age is often attended with dreadful effects. From some peculiar irritability of the system, active inflammation will sometimes be set up in the roots of the temporary molares, and in spite of every care nature will endeavour to throw them off; when this happens, we must frequently submit to her dictates and assist her in the removal of them. Occasionally the evil

may be carried to a yet greater extent, and of this it has been my chance to see too many serious instances; where the constitution has suffered severely from the small-pox, or from any other febrile symptoms of peculiar violence, exfoliation will take place, destroying both sets of teeth and even large portions of the jaw, the result of which it is hardly necessary for me to dwell upon. It is sufficiently obvious that the face must, in these cases, be disfigured for the rest of life, beyond the power of art to afford the slightest remedy; and, though this is an evil which most affect to treat lightly, as it regards others, there are few, I believe, who do not think more seriously of it when the question is of themselves.

SECTION III.

THE PERMANENT TEETH.—SECOND DENTITION.

ABOUT the seventh year, but sometimes earlier, the temporary teeth, which have occasioned so much trouble, begin to be shed, and are succeeded by the permanent, which are thirty-two in number, or sixteen in each jaw. Beginning the enumeration of them from the space between the middle front teeth, they stand thus, on each side,—1st, the central incisores,—2nd, the lateral incisores,—3rd, the cuspidati,—4th and 5th, the first and second bicuspides,—6th

and 7th, the first and second molares,—8th, the third molares or dentes sapientiæ.

The rise of these teeth from the gums is called second dentition, and it is at this period that the assistance of the dentist becomes peculiarly requisite. The temporary teeth are seldom shed fast enough; and the consequence is that the permanent teeth, not finding their natural opening, shoot out in a false direction, when they are sure to deform the mouth, if not to become carious from pressure, which, as already stated, is the usual generating cause of that disease.

On such occasions the remedy of the ignorant and unskilful has often been to take out the intruder, and leave the handsome, well-placed, temporary tooth standing, without reflecting that, in a few months, the latter must inevitably fall out of itself in the common course of nature, when the jaw must contract in proportion to its loss, and, even if the cavity fill up, an unalterable deformity will be esta-

blished. But it is necessary to consider these teeth from their first appearance.

As the child advances through its seventh year, symptoms of the progress and development of the second set of teeth become manifest. The earliest indication of this change is usually the appearance of the first permanent molares at the back of the mouth, posterior to the last temporary molares, and, soon after they have appeared, the two central temporary incisors of the under jaw become loose. It is however, impossible to lay down any rule as to the precise time when this may be expected. I have seen much mischief take place, as early as at six years of age, by the new central incisors of the lower jaw making their appearance under the tongue, and within the regular range of the temporary teeth, before the latter have shewn the slightest disposition to fall. In such cases, to prevent a permanent irregularity, it is necessary to remove the four temporary teeth, as the expansion of the maxillary bone

at the symphysis, or chin, is not sufficient to allow space for the new teeth to advance if two only are extracted.

In most cases, it will be proper to remove the four temporary incisors, as the two central permanent teeth advance. When however the new incisors of the lower jaw appear, and indicate that the new set will be very small, the operation may be confined to the extraction of the central temporary incisors only. Where the new teeth on the contrary are large, I repeat, it is necessary to extract four, that thus, finding room for themselves, they may take, as they appear, a position to form a circle of sufficient scope to allow of their regular arrangement.

It has been asserted by many writers that by retaining the two lateral temporary incisors we shall contribute to the expansion of the jaw; this I deny; and, if ever I recommend that they should be retained, it is when the new set being small, expansion is not re-

quired because there is no danger of lateral pressure.

A recent author of considerable talents has mistakingly affirmed, that the temporary set should by no means be extracted until the new teeth are ready to take the places of the old. It is hardly necessary to shew the fallacy of such an opinion, when it is considered that the natural and proper circle, formed by the adult teeth, is many degrees more expanded than that which contained the temporary set.

Shortly afterwards a similar process goes on in the upper jaw ; the central temporary incisores become loose, giving token of the speedy appearance of the permanent teeth, and, as a general rule, the safest practice is to extract the four temporary incisores.

In a few months subsequently to the central permanent incisores having taking their proper place, it becomes of the utmost importance to attend to the forthcoming lateral incisores of the lower jaw ; shortly afterwards, and,

in many cases, at the same time, the lateral incisores of the upper jaw appear. To make room for their proper development, it is requisite to remove the fifth and sixth teeth,—that is, the two temporary cuspidati in each jaw, when the child, as far as the four permanent front teeth in each jaw are concerned, may be considered to be in a state of perfect safety. No deformity in their arrangement can now take place, unless arising from some malformation of the teeth or of the jaw, entirely beyond the previous control of the dentist.

The four permanent incisores having taken their range in a proper circle, uninterrupted by pressure from any of the temporary teeth, which latter have been duly removed according to the practice pointed out, they will now stand at some little distance from each other, and will gradually advance to perfection. The body of them will become consolidated by the deposition of layers of bone within itself, and the enamel, which I assert is undergoing a change during

the whole period of life, and particularly when the process of growth is in full activity, will become perfect in its crystallization; it will then be unstained by spots, which are the marks of disease, occasioned by pressure, and its natural consequence, inflammation.

It is now that the result of the past attention will make itself visible, and in the most pleasing and palpable form. The mouth, certainly not the least important feature of the face, will gradually mould itself into harmony; the teeth will be beautiful from their regularity; and the chin, though in a less degree, will be acted upon by the same influence. Indeed the change that takes place under these circumstances is so great, that I can hardly expect it will be credited in its whole extent, by those who have not witnessed it. With this conviction, I abstain from saying all that my own experience would warrant me in advancing, but I must be allowed to repeat that inattention to the teeth at this critical period may be de-

structive not only of beauty but even of the health itself.

We have now arrived at the period when twelve of the temporary teeth, six in each jaw, have been removed; and when eight of the permanent set, four in each jaw, have taken their proper places. Of the temporary teeth, there now remain eight molares or grinders, which, in a child of tolerable health, will not give symptoms of falling for twelve or fifteen months. Still, during this time, the mouth should be occasionally examined, lest any premature absorption should take place, and afford the new teeth an opportunity of protruding themselves in an improper direction.

After about the lapse of twelve or fifteen months, the first grinders become loose; this effort of nature usually commences in the lower jaw, and upon the side, on which the child is in the habit of sleeping, the pressure of the pillow being favourable to the excitement of the absorbents. Upon their removal, the first

small permanent double teeth, the bicuspidés, appear; the upper teeth follow the same course; the four permanent cuspidati also begin to produce a fulness of the jaws between the lateral front teeth and the recent bicuspidés; these prominences enlarge, and the teeth advance; at the same time, the posterior temporary grinders show symptoms of falling either by decay, by discoloration, or by becoming partially loose. It is now advisable to remove them, and, as they occupy a much greater space in the circle than the second permanent bicuspidés, which are to succeed them, their extraction will also make room for the development of the cuspidati, the proper situation of which is of the greatest importance, forming, as they do, an essential feature of expression in the human countenance.

The superior maxillary bones, which comprise what, in common language, is styled the upper jaw, do not generally display that ample development in the people of this country,

which they are found to have in other nations. The circle, therefore, in which the teeth stand, is sometimes very confined, and without considerable attention, deformity is apt to take place on the advancement of the upper cuspidati or eye teeth; room in such cases must of course be made for them at whatever expense, and, as there are no longer any temporary teeth to be removed, it becomes a matter of serious consideration what teeth ought to be extracted.

Where the physical powers of the child have not been of the first order, the permanent molar teeth, two in each jaw, which appear almost simultaneously, about the sixth or seventh year, are frequently found decayed; and, even when they shew no other signs of caries, the enamel is seen to be discolored, or pitted, both symptoms of great debility. Here then at once nature herself points out the means of relief; for, the removal of these molares will, in most cases, afford the room desired, and the

spaces, however large they may appear at the time of extraction, will become entirely obliterated, and no loss will be apparent save to the eye of the anatomist; but should this advantageous suggestion of nature be neglected, these ill-formed teeth will fall a prey to disease, and their extraction become inevitable at a period when the spaces are no longer capable of being filled up, maturer age having given an unalterable form and character to the jaw. Great as this mischief is, I have not unfrequently seen it increased by the absurd extraction of two healthy and well-formed bicuspides.

When these molar teeth happen to be perfect, or of such size that their extraction promises to give more space than is required, the matter then can only be left to the discretion of the dentist.

It should, however, be considered as an established rule, that the projecting cuspidati themselves should never be extracted, unless

when the deformity has been allowed to extend to their full development, and is consequently irremediable. In such cases we must, as the least of evils, consent to their extraction both on account of the hideous appearance, and in order to get rid of the pressure, which else would infallibly produce caries upon the other teeth.

The evils, however, attendant upon this decision, and it would be wrong to conceal them, are really great. The beauty and character of the countenance are materially affected by it. A rabbit narrowness of the mouth, if I may be allowed the phrase, is amongst its consequences, stamping the features with an expression of meanness and imbecility; while sometimes, and that by no means unfrequently, it occasions a lisping articulation.

This great defect, the untoward projection of the cuspidati, having fallen earlier under the remedial care of the dentist, and the molar teeth, just spoken of, being excellently formed

and of perfect health, it becomes a question meriting more consideration than in general appears to have been given to it—whether the anterior or posterior bicuspides should be extracted for the purpose of affording room to the advancing cuspidati. A rule has been laid down, by the best practical authors, to extract the anterior bicuspides in all cases where space is required; but, although this plan will considerably relieve any deformity in the position of the six upper front teeth, and may be adopted as a general rule of practice where there are not time and opportunity for a more scientific application of the art, yet it is attended with great disadvantages; the beauty and character of the countenance are deteriorated by it, the anterior bicuspides being bolder, and larger, and possessing more traits of expression than the posterior, or second, bicuspides. But every case requires considerable caution, and, above all, that tact which is the result only of long practice. Before giving an opinion on this

point, it will be proper to pay particular attention to the bite of the lower jaw, that is to say, to the manner in which the two jaws dovetail when brought into contact, or else, when the operator has removed the teeth decided on, he will find the under teeth forming an insurmountable obstacle to any improvement in the situation of those whose position is intended to be changed.

Sometimes, however, it is necessary to go farther in the extraction of the teeth that prevent the formation of the circle of beauty. I have seen instances in which it has been requisite to take out five posterior teeth to secure a proper and regular arrangement of the six anterior, but the minutiae of this practice can be taught by no other master than experience.

In about six years the process of Second Dentition is usually completed, with the exception of the Third Molares, or *Dentes Sapientes*. The appearance of these latter teeth is for the most part delayed to a remote and not very de-

finable time ; they may generally be expected to rise at the age of eighteen or twenty, but the rule is far from being universal ; sometimes they do not show themselves till the twenty-fourth year, and occasionally their perfect growth does not take place till a yet later period.

With regard to the correction of deformities, it is unnecessary to point out the numerous mechanical contrivances for this purpose, nor would they be understood without the help of plates. My readers, however, may rest satisfied that deformities of every kind are to be remedied, and that success is not confined to a very early age, as has been asserted by most writers on the subject. I speak positively, for I speak from experience, having succeeded with patients even after their twenty-fifth year, and that too in cases which had been previously pronounced beyond the power of art to remedy.

Before I conclude this division of my subject there is one point to which I am particu-

larly anxious to call the attention of my readers, the practice being so general, and the mischief consequent upon it so great and so inevitable; it regards the use of ligatures or wires—never on any account allow them to be fastened round the new teeth in the application of the mechanical means to correct deformity; let the operator say what he will, the result must be their destruction.

CHAPTER

THE

THIRD.

SECTION 1. TOOTH-ACHE, ITS CAUSE AND PROPER
TREATMENT.—ANODYNE CEMENTS.—REMOVAL
OF DECAY.—STOPPING THE TEETH.

SECTION 2. TOOTH-POWDERS.—BRUSHES.—CLEAN-
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SECTION I.

TOOTH - ACHE. — ITS CAUSE AND PROPER
TREATMENT—ANODYNE CEMENTS. — RE-
MOVAL OF DECAY—STOPPING THE TEETH.

THE cause of tooth-ache is always inflammation, either in the pulp of the tooth or in its periosteum. With a view to dividing and simplifying the subject, I shall distinguish this malady by the name of Primary, or Secondary, according to the part in which it is seated,—primary when it takes place in the pulp, and secondary when it exists in the periosteum.

Inflammation terminates in one of four different ways,—by resolution ; by the effusion

of lymph, which relieves the overcharged vessels; by the formation of pus, which act is called suppuration; or, lastly, by mortification, which is an entire destruction of the organization of the affected parts.

Primary inflammation may exist without caries, a fact that has frequently puzzled many dentists no less than their patients, neither party being able to comprehend how an apparently sound tooth should occasion any pain. Upon breaking off the crown of teeth so affected, the natural cavity in which the pulp rests, will often be found full of pus, a sufficient indication of the cause and seat of the disorder.

The cure of tooth-ache should be attempted on the same principles as the cure of all other inflammations,—that is to say, by local and general remedies, varying with the different stages of the malady. Cold applications, by abstracting a portion of the caloric, will frequently relieve the pain when only in its inci-

pient state. Topical bleeding will also be of benefit, the lancet, if dexterously applied, being more efficient than leeches to this purpose, and infinitely less troublesome.

If there be an effusion of lymph, which is shown by a slight swelling and thickening of the surrounding parts, cold applications would only augment the pain, and recourse must be had to gently stimulating embrocations, such for instance as the camphorated soap liniment, rubbed carefully over the face and with a light hand that the skin may not be broken.

Should the inflammation have approached the suppurative stage, other remedies again are distinctly indicated. It is now too late to use the lancet, as an instrument of depletion, but warm fomentations will generally be found to relieve the distended vessels, and to accelerate and complete the formation of the abscess. The moment this takes place, and herein is the difficult point of judgment, an opening should be made by the lancet to allow the es-

cape of the secreted fluid. If this be neglected, fresh matter will be continually deposited, the sac containing it will go on encreasing in size, the alveolar process and the gums will become absorbed, and the pus will open out a passage for itself, probably after having occasioned irreparable mischief. Pus, coming in contact with bone, produces the death of it, and considerable exfoliation takes place, the living matter invariably throwing off the dead. This danger is greater in the upper jaw than in the lower, because several of the upper teeth terminate in the sinus of the superior maxillary bone, commonly called the antrum, and I have seen cases where the largest portion of the upper jaw had exfoliated in consequence of the pus being pent up in that cavity. In such cases the tooth must be absolutely extracted, and if that do not create a passage sufficient to keep the sinus empty, a larger incision must be made into the antrum and retained open by the insertion of a pledget.

From these observations the reader will easily see the solution of a mystery, which may perhaps have puzzled him, as it has many others unacquainted with the theory of inflammation. A remedy for the tooth-ache is proposed by a friend, who in his own case has found it immediately effectual. Upon this strong recommendation it is tried, and produces not the slightest effect, or perhaps even aggravates the distress; and why? simply because the inflammation was in a different stage in the two cases, although neither of the parties knew enough of disease to be aware of the distinction. This important point ought never to be lost sight of by those who undertake to prescribe either for themselves or others.

But what are we to think when individuals, who ought to be better instructed, yet profess to cure the tooth-ache by filling up the cavities, resulting from decay, with mineral, or other preparations under the name of *Anodyne Cements*. The invariable result of such applica-

tions is precisely what any practitioner of moderate acquaintance with physiology would expect; if the pulp be not previously destroyed, but retains its vitality, the cement by pressing on it augments the pain already suffered; if the inflammatory process has gone so far as to produce suppuration and the pulp is in consequence destroyed, then the pus, which before escaped through its natural vent in the cavity of the tooth, being now pent up, begins to accumulate in the sac, till at last it occasions the absorption of the alveolus and forms for itself a fistulous opening through the gums, all matter pointing invariably to the surface.

I would not be understood to say that the pulp is always destroyed when suppuration occurs, but this is a natural and frequent consequence, and the reason why it does not invariably take place is that in some cases the abscess forms at the extremity of one root only; so far nature has cut off all communication between the pulp and the ge-

neral system, while the other roots still retain their sensibility and their connexion with the circulation.

Whenever nature has silently and invisibly restored a healthy action by either of the methods first mentioned, and the tooth happens to have been plugged with cement, this worse than useless composition of course bears away the credit of a cure, which it only tended to retard. Like the old rustic, who attributed the rise of Goodwin Sands to the building of Tenterden steeple, because the two events occurred at the same time, the deluded patient attributes his relief to the *Anodyne Cement*, for no better reason than that the appliance of the remedy and the cessation of pain may have followed close upon each other. I think, however, that the utter impossibility of any good, and the great probability of mischief, to be derived from such nostrums, have been sufficiently demonstrated to those, who are not wilfully blind upon the subject.

The composition of these cements is various. One, to which the term of Anodyne was originally applied, is a solution in alcohol of Gum Lac and Mastich, the latter of which is a resinous gum brought chiefly from the Island of Chios. The spirit evaporating, the mass partially hardens, but the whole, being diminished in bulk by the loss of the fluid, contracts and frequently falls out of the tooth, doing little good and perhaps not often occasioning much mischief.

Another, and truly pernicious cement is formed from minerals. All attempts at stopping the teeth with preparations, into which any metal except gold enters, must be injurious, and for this simple reason,—because no other metal is proof against external agency, but is more or less speedily decomposed by the breath from the lungs, the atmospheric air, or by the action of the saliva. Such was the result of a very noted nostrum that not long since promised to make the fortune of the

lucky inventor. It was an amalgam of silver with quicksilver which soon hardened, and for a time retained its original whiteness; but a change was not long in taking place; the combined agency of the breath, the air, and the salivary secretions decomposed the amalgam, turning it black, and the saliva, becoming impregnated with the discolouring matter, communicated the stain to all the other teeth. Such a result might easily have been foreseen; it is founded on one of the most simple and obvious principles of chemistry.

Another preparation has been recommended by some authors, consisting of bismuth, lead, and tin. This composition melts at 212 degrees of Fahrenheit,—that is at the temperature of boiling water,—in which state of fusion it is poured into the hollow of the tooth. I wish both the patient and the practitioner joy of this pleasant remedy. Not to speak of the torture thus unnecessarily inflicted at the time, the inevitable results of such an operation are

always painful and sometimes even perilous. It destroys the vitality of the tooth, excites violent inflammation of the periosteum, and produces all those sufferings I have described as incidental upon the formation of abscess, and which, it is probable, may end yet more fatally in mortification.

I would not willingly make reflections upon the practice of any of my cotemporaries, whatever may be their pretensions, but it is impossible for any individual, understanding his profession and possessed of common humanity, to witness the pain and mischief continually occasioned by these pranks of empiricism, and not endeavour to arrest their progress by exposing them. The misfortune is that nothing short of the strongest language will rouse fashion and folly from their dreams. If one absurdity is abandoned, it is only that another and newer may be adopted, the gloss of novelty being the chief condition of public favour, nor is there any system so irrational in theory or so cruel in

practice that it will not find both patrons and admirers. I remember, and it is not long since, that an individual actually put cold metal into the hollow of decayed teeth, and there brought it into a state of fusion by the application of red hot iron. It is scarcely credible, but it is not less the fact, that this man in one year realized some thousands by this ignorant and barbarous practice. After that period his system declined in favour till it was gradually lost in the fashion and patronage of other quackeries, not a whit less absurd than the charlatanism they had superseded.

About the same time a yet more fatal practice grew into fashion. Instead of extracting diseased teeth, certain practitioners broke off, or rather cut off, the crown of them,—*excising*, they called it, and the phrase was as barbarous as the operation. The idea of these very skilful physiologists was, that the vessels would throw out fresh bone upon the stump, and that the gum would then close over it and produce

a level surface; but what was the consequence? why, the pulp with its nerve, being thus exposed, was continually liable to be wounded and irritated by coming in contact with foreign substances; the tongue, the food, nay even the saliva or the air was sufficient to produce severe inflammation. A tooth under such circumstances must be perfectly useless, and lucky might the patient consider himself if this was the only and worst result. Instances often occurred where life itself was the sacrifice, and one case fell under my own observation, which had almost terminated fatally. The subject was a medical gentleman of eminence; he was laid up for six weeks in consequence of having submitted to this treatment, and after all escaped only by the greatest care and attention. The only matter for surprize in the whole business was that any individual, acquainted with anatomy, and an able physiologist, moreover, should have been the dupe of such impudent and palpable empiricism.

There is but one time, and one mode, in which teeth can be stopped with advantage or even with safety. Never except when the tooth is perfectly free from pain, should this operation be performed, and the rationale of the benefit to be derived from it is, that the saliva can no longer lodge and decompose the tooth, the food is deprived of a cavity wherein to rest and become offensive, and the nerve ceases to be subject to the action of the tongue. This organ is naturally inclined to suck the hollow tooth, by which action a vacuum is created, and the blood, rushing into the pulp, places it for the moment in a state of positive inflammation and a paroxysm ensues of pain, brief perhaps, but exceedingly severe.

Gold leaf is the only substance proper to be used in plugging teeth, and, if dexterously inserted, it will often retain its place for years. It should not be beaten too fine, as when it has been reduced beyond a certain degree of thinness, it loses its malleability, becomes brittle,

breaks down under the instrument, and is speedily frittered away by mastication. Previously to its introduction, the decayed parts should be lightly picked out, great care being taken that no injury is done to the pulp should any remain; nor ought the hollow to be so closely scraped as to leave the enamel without a sufficient portion of osseous matter for its support. If this caution be neglected, the enamel from its radiated structure will break down at no very distant period.

Sometimes the caries is not of such a nature as to form a convenient cavity for the reception of the gold leaf. In such cases the discolored part should be cut away, and though it may present externally no more than a small dark spot, yet when this speck of decay is removed, it will often happen that a large cavity is discovered, which should be carefully, yet thoroughly, cleansed out before the insertion of the gold. These are the cases, in which no tooth-ache has been experienced, and it is

in such that the operation of stopping is always most successful, excluding the chance of pain, and arresting the progress of decay. Trifling as the operation may seem in itself, yet its results are not amongst the least valuable to be derived from the skill of the dentist, and it affords a striking instance of how far art can triumph over the accidents of disease.

But many, deluded by the false pretensions of empiricism, often expect from art that which, from the very nature of things, it is utterly unable to accomplish; by a strange fallacy, they even go so far as to ask that new life should be infused into the perished bone, though a moment's reflection, one would think, might suffice to shew the illusiveness of so absurd a fancy. They might with equal reason pretend to the possession of Medea's kettle and attempt, like the Colchian Witch, to restore age to youth and vigour, by boiling its mangled fragments in a cauldron.

In cases where stopping is altogether impracticable, as it frequently is in the incisores, the caries should be skilfully excavated from the posterior surface of the tooth. If the patient do not suffer too severely from the operation, and it can be effectually executed, the tooth, though rendered thin by losing so much of its substance may yet be preserved for many years. The sensibility, which may be complained of at the time, and which exists in few cases only, gradually subsides, and this portion of the tooth may for the future be considered exempted from decay, for it is a curious fact that caries will often attack the other side of the tooth, whereas the excavated part retains its health and colour to the last.

Teeth of a yellowish hue are those best calculated to submit to this operation with success, as they possess a larger portion of osseous matter than those of a white and pearly character. These latter have little bone, and very large pulps, and consequently possess

less substance for the knife or file to work upon. A tooth of this kind is little more than a shell; like a too delicate constitution, it will not bear the severity of the remedies that are essential to its cure when deranged by disease, and should therefore be guarded with the greater caution against such attacks. Upon the nature of the dangers to be apprehended, and on the mode of avoiding them, I have already dilated, but such is the importance of the subject that I cannot refrain from calling the attention of my readers to it again, even at the chance of being tedious by repetition.

Beware then of allowing one tooth to press upon another on their first appearance, as it is the chief cause that produces this mischief, by exciting inflammation in the membrane secreting the enamel, and the evil may be avoided by proper care at the period of second dentition. Nature will sometimes do her part more kindly and will place the anterior permanent teeth at a sufficient distance from each

other ; if however she have neglected this duty, the assistance of art must be called in and room made for their full and perfect development, and let it be distinctly remembered that this is one of the many cases in which art may prevent, but cannot remedy, disease.

SECTION II.

TOOTH-POWDERS.—BRUSHES.—CLEANING THE TEETH.

So exemplary are the habits of our fair countrywomen as to cleanliness that it would be superfluous for me to enforce the necessity of observing it in regard to the teeth. Some errors, however, may be pointed out, and some instructions given, which, though extremely simple in themselves, may yet be followed with advantage.

There is an absurd notion very prevalent that tooth-powders are of no use, and that the

teeth require only to be washed with lotions composed of tincture of myrrh, or of spirits of wine, saturated with camphor; some even go so far as to deny the necessity of the tooth-brush and deem it sufficient to every purpose of cleanliness if the mouth be rinsed out with cold water. To the admirers of such absurdities, all argument being perfectly unavailing, I think I cannot do better than recommend the wonderful old recipe of rubbing the teeth with a sage leaf, which perhaps they may believe, as many simple folks before them have believed, will preserve those organs uninjured to the last.

All lotions are perfectly useless, as far as the gums are concerned, and for this simple reason,—it is impossible to preserve and pickle living matter. When lotions act upon the other portions of the body, it is upon the principle of evaporation, which principle cannot be brought to bear upon the parts in question. If the object of lotions be to stimu-

late, they are equally ineffective, friction, with an elastic brush, being the only way, by which a beneficial stimulus can be applied. It is not many years since that, in defiance of these obvious elements of pathology a very fashionable dentist, in the plenitude of his ignorance, actually proposed to tan the gums!—to tan living matter!—By way of explaining and justifying this admirable system to his dupes, it was his custom to compare the human gums to dogskin, and that there might be no mistake in the matter, he printed and published his opinions. Need I add that this charlatan amassed a fortune?

Upon the teeth themselves lotions can have no effect except as chemical agents, and as such they must act perniciously. The use even of diluted tincture of myrrh, pleasant as this gum undoubtedly is from its peculiar fragrance, and though it is incapable of any chemical agency, is yet attended with considerable

mischief. This tincture is a solution of the myrrh in spirits of wine, a tea-spoonful of which, being poured into a tumbler of water, renders the latter turbid, forming a fluid of a milky appearance; the change takes place in consequence of the decomposition of the spirituous solution, by which means the fine particles of the gum float in the water, and in rinsing the mouth they become deposited on the teeth. I have seen a whole set of teeth so incrustated with myrrh, from its long continued use, as to defy all attempts to remove it until re-dissolved by the application of alcohol. It must be evident that a nucleus thus formed must tend materially to the accumulation of the unsightly and offensive substance called tartar, and that it is utterly impossible to have clean and healthy teeth by the use of such a lotion.

Tooth-powder is absolutely essential to the perfect condition of the mouth, but, to be of any service, it must be used the first thing in the morning. The concretion, which is depo-

sited in the night upon the teeth, and which is the residuum of the evaporated saliva, hardens in the course of a few hours, and is irremovable by any dentrifice that would not at the same time destroy the teeth themselves.

All acid preparations, such as cream of tartar, and all powders which consist of hard angular particles, and therefore act by trituration, should be avoided. On this last account charcoal is particularly objectionable, in addition to which it lodges in the space formed by a fold of the gum and the neck of the tooth, where it presents a livid circle, destructive of that roseate hue, which is so characteristic of health and beauty.

I met with a case about two years ago, which, though it has no particular interest in its details, is yet useful as a warning and example, from its results. It was of a young lady, whose teeth were totally destitute of enamel. Upon enquiry I found she had been in the habit of using a fashionable paste, that for a

time had rendered her teeth remarkably white and beautiful, a fact which at once indicated the presence of some deleterious acid in the composition. Subsequent analysis showed that this disgraceful nostrum consisted of honey, rose-pink, and vitriol or sulphuric acid, and this last having a greater affinity for enamel than bone, had rapidly destroyed the former and stopped only at the tooth itself; but even the bone would not much longer have resisted the action of this powerful solvent. To restore the enamel was impossible, and not less so to afford any relief to the excessive and continued pain occasioned by the denuded teeth being exposed to the influence of the atmosphere. For a long time this state of suffering went on without abatement, till at last the nerves lost their vitality, and as a natural consequence, the sensibility of the surface subsided. The pain then ceased, but her beauty was gone for ever.

Teeth are not to be cleaned either by chemical agency, or, as many people imagine by the

process of mechanical abrasion; any attempt to act upon them in either way would be equally injurious. The rationale of the use of any dentrifice is, that it forms a paste with the deposition from the saliva already mentioned, and, thus combined, the whole is easily expelled by rinsing the mouth out carefully with water. Simple, however, as this operation is, I seldom see it perfectly performed even by the most fastidious; generally speaking, the water is thrown into the mouth, and as quickly ejected, without being of the slightest service, whereas the cheeks, lips, and tongue, should all be put in motion, so as to mix this newly-formed paste with the fluid, and propel the latter into every interstice for that purpose. The brush should then be washed, and again applied to the teeth to free them from whatever may remain of the powder, and the mouth a second time be well rinsed. It will be adviseable also to clean the tongue with a scraper, more particularly when

the papillæ are rough, and the stomach happens to be out of order. In all cases I should recommend the use of tepid water in preference to cold, as being more in consonance with our general feelings.

The following is a very good dentrifice; it is pleasant to the palate, free from all admixture of acid, and, when levigated with care, presents an almost impalpable powder, a point of the utmost importance in all such preparations, of whatever they may be compounded; it may be used with confidence, and will be found to clean the teeth thoroughly, rendering them as white as they ought to be made by any artificial process.

R

Bol. Armen :

P. Oss. Sepiæ.

P. Iridis Florent : $\overline{a} a \text{ } \overline{\text{z}} j$

P. G. Myrrhæ.

P. Casiæ. $\overline{a} a \text{ } \overline{\text{z}} \text{ fs.}$

M, fiat Pulvis Dentrif :

Where the teeth have been much filed, or any decayed parts excavated, or where the loss of these organs has been supplied by means of pivoted substitutes, I would advise the Armenian Bole to be omitted, as under such circumstances it might produce a slight discoloration, and would recommend the substitution of prepared chalk; the recipe will then be

R

Cretæ præpar :
 P. Oss. Sepiæ,
 P. Iridis Florent : $\overline{a a}$ ʒj
 P. G. Myrrhæ.
 P. Casiæ. $\overline{a a}$ ʒfs.

M, fiat Pulvis Dentrifica:

In regard to tooth-brushes, they should be elastic and moderately hard in texture, with the hairs somewhat apart, for if they are set too close, or are too soft, they form into a mass when used, and are unable to penetrate into the interstices. The tooth-brush should be employed freely, not only with a view to clean the teeth, but because nothing is more salutary

to the gums than friction ; it keeps up a healthy circulation in their vessels, checks their tendency to excessive vascularity, and helps them to throw off any morbid matter. Even stumps and tender teeth should be thoroughly brushed; however unpleasant the operation may be at the moment, the result cannot be other than beneficial.

Allowing then that proper attention is paid to the mouth on the part of the patient, that every morning it is put into the best condition, it may perhaps be asked what occasion is there for the dentist? Will not all this trouble and anxiety suffice to keep in due health organs, apparently so simple in their structure? I reply that the care of the individual will do much, and indeed is absolutely requisite to second the efforts of art, but it is insufficient to retain the teeth in their perfect state, and, unless the two be united, we shall in vain look for a favourable result. At stated intervals the mouth should be submitted to the

inspection of the dentist, the length of such intervals being made dependent upon the season and the general health of the individual. If the system have laboured under any particular or general disease, it will be requisite to have recourse to professional aid about once in three months, but where the health is good, and there has been no neglect, an interval of half a year may be suffered to elapse without much chance of injury.

The warm weather is, upon the whole, the season in which all dental operations may be most easily and advantageously performed, though this is by no means to be construed into an excuse for the neglect of the necessary remedies during any other period. Attention must never be remitted, for no organs are more easily disordered than the teeth; and the evil, when once incurred, is not always or even often, remediable. Unlike the other parts of the human structure, they have in themselves no powers of reproduction. All

other bones when broken will again unite ; lost portions of muscles, and even of nerves, may be re-created by their own inherent principles of vitality, but there can be no union, no reproduction of the teeth ; once fractured or decayed, there is not in themselves the power of restoring what has been destroyed, nor can art do more than palliate the mischief. Our only remedy is in substitutes, the nature and application of which will be explained and discussed in the following Section.

SECTION III.

ARTIFICIAL TEETH.

IN the course of these pages I have endeavoured to show the value of teeth in their threefold relation to beauty, voice, and health ; and have pointed out the means of preserving them till age has entirely broken down the constitution. Such rules, it is evident, can only advantage those who have not previously lost these organs, and it is now the last, perhaps the least, pleasing part of my task, to detail the contrivances by which all dental deficiencies may be supplied.

The use of false teeth is said to have originated with the Egyptians. It was the custom of that singular people to punish offenders in certain slight cases by the extraction of a tooth; to hide this defect naturally became an object of some importance with those who were marked out from society by such a stigma, and hence the adoption of foreign or artificial teeth, fastened, it may be presumed, by methods not very dissimilar to those in present use. On this point, however, we have no certain information.

In modern times various modes have been devised for supplying the loss of teeth, and amongst others that of *transplantation*. The sound tooth was drawn from the jaw of any one, who could be bribed to submit to the operation,—a cruel advantage taken of poverty by wealth,—and immediately introduced into the vacant socket in the mouth of the patient. Singular as this system may appear to be, it was defended by John Hunter, a man, whose

very errors must command respect, for they are the errors of a great mind, original in its conceptions, anxious for the truth, and unceasing in its enquiries. It was his opinion that union would take place and vitality be preserved, and in many cases it will be so, but, in about twelve months, nature, always consistent in her actions, absorbs the root of the introduced tooth on the same principle that she absorbs the roots of the temporary teeth; as a matter of course the fragment then drops out, being deprived of all connection with the socket. Nor was this found to be the only mischief incident upon transplantation; frequently the introduction of extraneous matter brought on inflammation and all its consequences, to so violent a degree, that the medical world with one accord attributed the mischief to the inoculation of poison from the mouth whence the sound tooth had been extracted; the common laws of inflammation seemed altogether insufficient to account for so much virulence. In

the present day this error is almost universally seen and acknowledged, and the inflammatory process is allowed, without any other cause, to be fully adequate to all these effects however formidable.

Artificial teeth are of various kinds, and of these the *Mineral*, as they are called, are the most objectionable. They are unnatural in their appearance, and, being glazed with lead or arsenic, soon lose their colour by the partial decomposition of the flux. It is even a question if the metal itself, thus deprived of its defence, be not subjected to the action of the saliva, which, in consequence of such chemical combination, becomes poisonous. Taking this for granted, we may easily understand the deranged health of many who are in the habit of wearing large portions of artificial teeth made of such materials.

Another earthy compound is called the *Terro-Metallic*, a strangely barbarous name, but even on that very account the better suited

to the invention. This is a silicious preparation highly vitrified, and so far not open to the objections just stated, being of course insoluble. But its badness of colour, liability to fracture, and great weight, make it altogether unfitted for the purpose for which it is intended. These teeth have also another defect, that of acting on the antagonist teeth by grinding them away with great rapidity, and this alone would be decisive against their use.

Human teeth, fixed in gold, or in the tusk of the Hippopotamus, or in both combined, are the best substitutes for the natural organs. I am aware that there is an ill-founded impression on the minds of some people against the use of them, but they never can be prejudicial except by the neglect or ignorance of the dentist. Danger may, and no doubt does, frequently arise from their being introduced without previous preparation, for they ought to be macerated with the greatest care till all the animal matter about them is decomposed, and

nothing remains save the pure osseous substance with its beautiful covering of enamel. In this state it is utterly impossible for them to do any mischief, though, if these precautions be neglected, the use of them will always be injurious, and sometimes even attended with results yet more fatal.

The choice of the material for a basis will depend upon the circumstances peculiar to each case—whether bulk is wanted to restore the contour of the countenance and give room for the action of the tongue, or whether there is no space to spare, and consequently the substance, to be introduced into the mouth, must be as small as possible, consistently with the degree of strength requisite for the support of the artificial teeth. Gold is the best base where it can be used, but where bulk is wanted, the tusk of the hippopotamus must be employed, the hardest and whitest of all bony substances. Of course the comfort of such contrivances, of whatever material they may be

made, must entirely depend upon their exactness : if formed, as they seldom are, by a perfect combination of mechanical ingenuity and anatomical science, they will supply the place of real teeth in all their functions—the utterance will be rendered perfect, the powers of mastication will be re-established, and the character of the face will not only be restored, but even its primal defects softened, for it will often happen that the natural beauty of the features has slept, as it were, in abeyance, from the deformity of the teeth. If art have not effected all this in the fullest extent for the patient, he may rest assured that he has fallen into injudicious hands ; for to this, and more than this, art is fully adequate when based upon knowledge, rendered practical by experience.

One of the earliest modes of fixing artificial substitutes was by pivoting or grafting the crowns of natural teeth upon the stumps remaining in the jaw. In cases, where the stump is healthy, and the operation is dexterously

performed, such substitutes may last for many years, and may be, not only ornamental, but useful, as regards speech, though they rarely afford much assistance in mastication. This operation is simple in efficient hands, but it requires great care and no slight portion of dexterity; if the drill be improperly applied, inflammation will ensue with all its usual consequences, for though you destroy the pulp you do not destroy the periosteum.

It is impossible to lay down any precise rule as to the mode of fixing artificial teeth; this must depend on circumstances, which can only be understood and appreciated by the dentist. Still there are two points I should wish to impress upon my readers; the one is, that the artificial teeth should be so contrived as to lend support to the remaining natural organs; the other is that all dental substitutes should be easily removable at the pleasure of the wearer, for if the saliva be allowed to remain in perpetual contact with the gums, the

latter will become excoriated and prove a source of suffering, if not of consequences yet more serious. I ought also to observe that no metal,—not even silver,—should be used in conjunction with the gold employed on these occasions, for, various metals being introduced, a galvanic action takes place, and from the metallic decomposition the saliva becomes poisonously affected.

I have now gone through the various divisions, marked out in the title page and preface to this volume. That the subject is not exhausted I am well aware, yet it does not occur to me that a single principle of any importance has been omitted. My theory on second dentition, or rather on the means by which the permanent teeth are to be rendered perfect, will, it is probable, meet with opponents, for what innovation in art or science has ever yet been received without cavils on its first announcement? Objections too, will no doubt be started against my doctrine in regard to the

formation of the enamel, but having given the grounds of all my conclusions, I submit the matter without farther argument to the judgment of my readers.

For the rest, I can only say that if I shall be found to have contributed by this work to the health and comfort of a single individual, I shall not think I have laboured in vain; and that, if I have spoken in no very measured terms of fashionable empiricism, it is because I am too much in the habit of seeing its fatal results in cases that cannot be witnessed without the deepest pain and indignation.

THE END.

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