

Practical observations on the physiology and diseases of the teeth.

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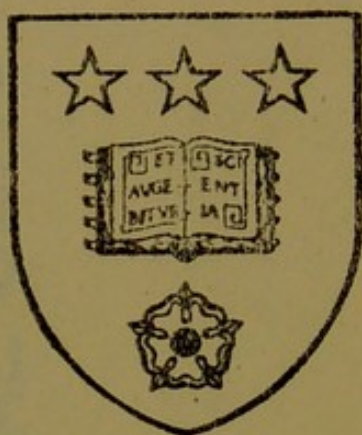
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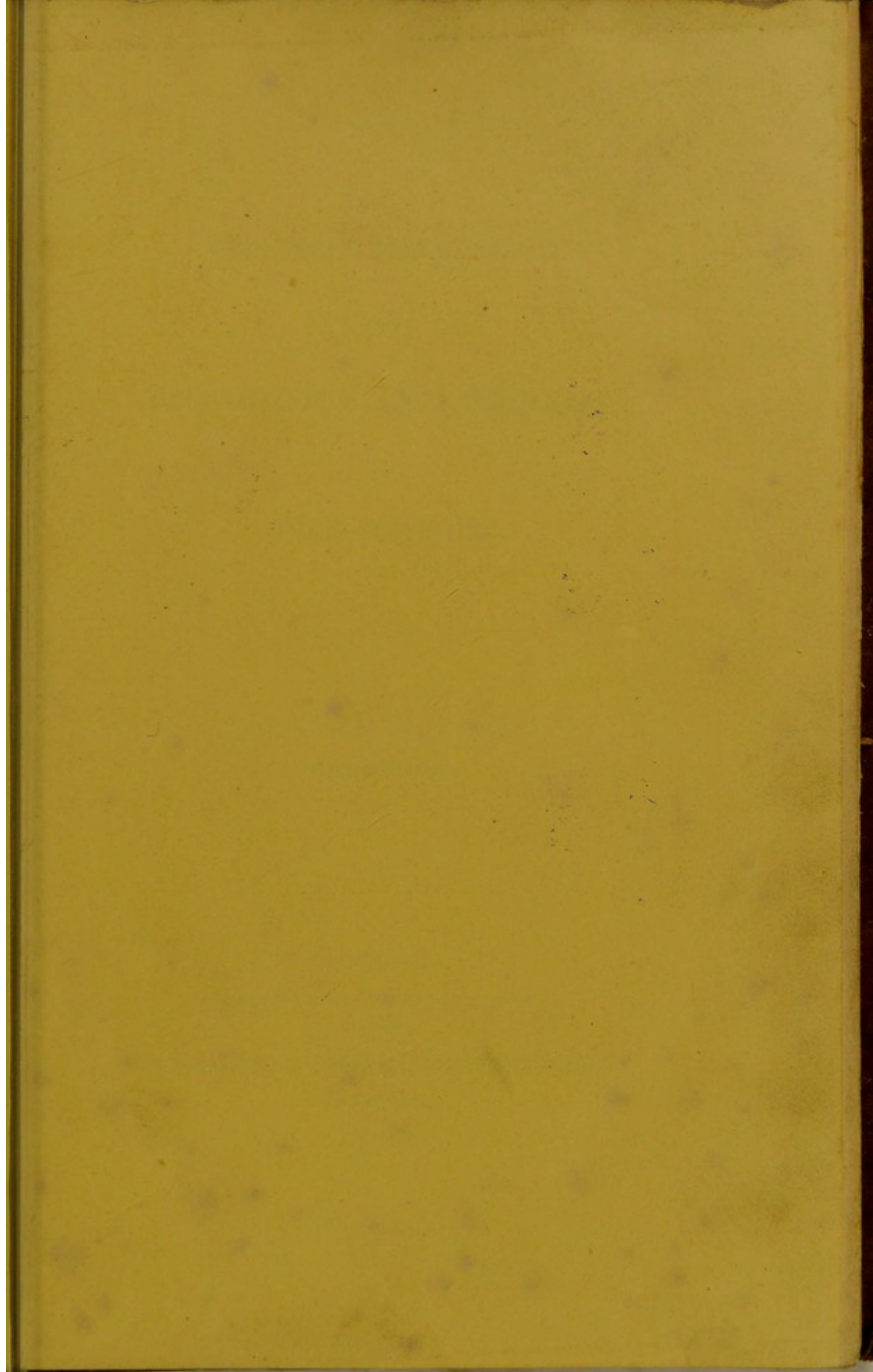
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PRACTICAL OBSERVATIONS
ON THE
PHYSIOLOGY AND DISEASES
OF
THE TEETH.

BY JOHN MALLAN.
Surgeon Dentist.

LONDON:

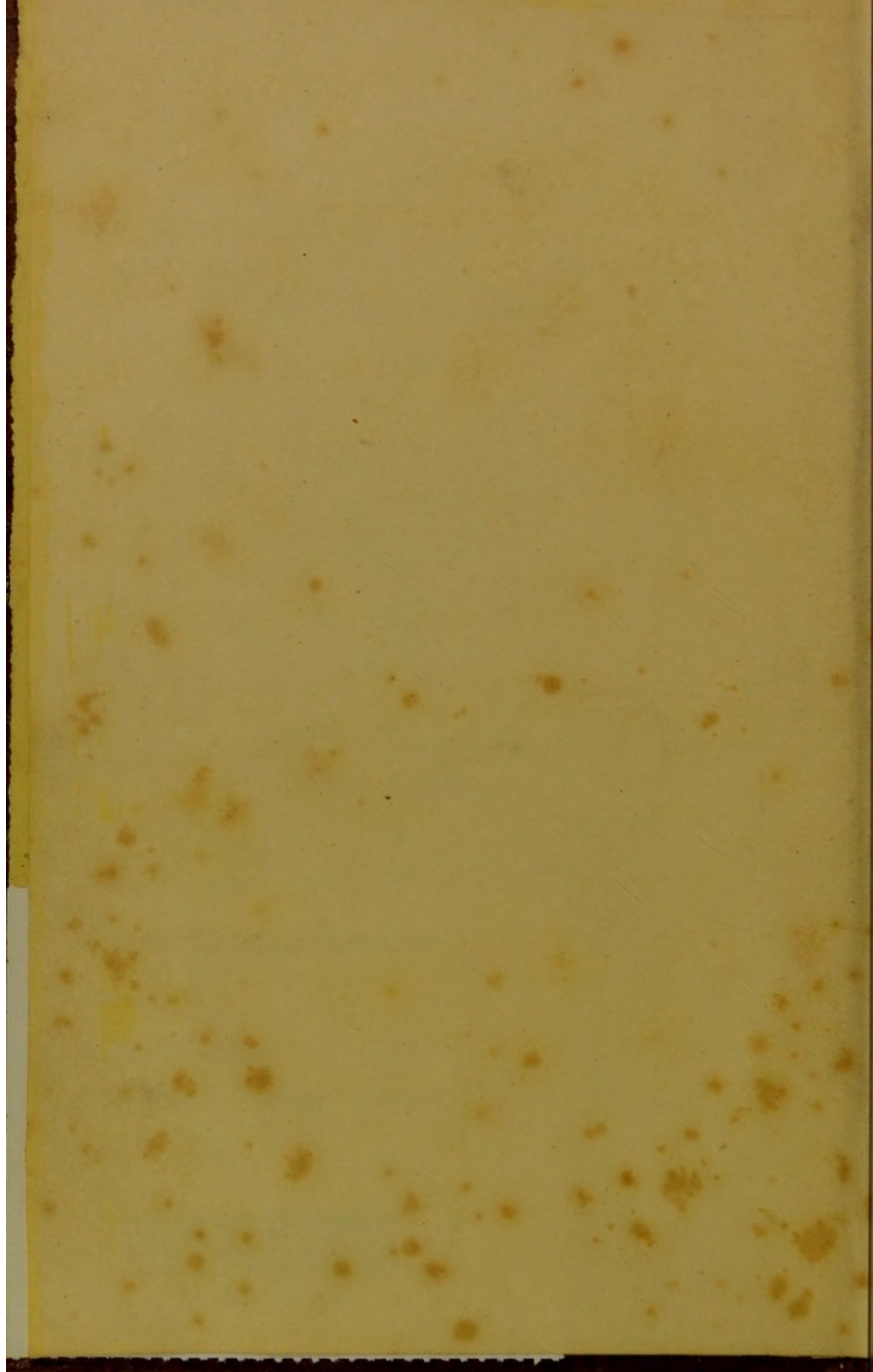
PRINTED FOR THE AUTHOR, 9, HALF-MOON STREET, PICCADILLY,

AND SOLD BY

A. SCHLOSS, 2, GREAT RUSSELL STREET.

MDCCCXXXV.

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PHYSIOLOGICAL AND PATHOLOGICAL

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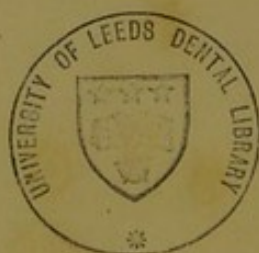
THE TERTIUM

BY JOHN WALKER

Author of 'The Tertiary' &c.

LONDON:

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TO
MY DEAR FATHER,

AS
A TESTIMONY OF FILIAL
ATTACHMENT,

AND
GRATEFUL RECOLLECTION OF HIS VALUABLE
INSTRUCTION AND UNVARYING
KINDNESS,

THIS VOLUME

IS INSCRIBED

BY HIS AFFECTIONATE SON,

J. M.

TO
MY DEAR FATHER

A TESTAMENT OF FAITH

AND

CHARITY RECOLLECTED OF THE FATHER

IN THE HEAVENS

AND

THIS VOLUME

IS PRESENTED

BY THE AUTHOR

TO

PREFACE.

IT is matter of surprise, that in an age like the present, when a taste for grave reading is almost universal; when, to satisfy the general thirst for knowledge, the driest and least inviting departments of science have been explored, that a subject at once so curious, so interesting, and so important as the teeth, should have received so little attention.

But neglect has ever been the fate of this branch of surgery. "Treated," as a foreign writer expresses it, "with only a step-mother's care" by the professors of the healing art themselves, the public of all

nations have looked upon it with indifference, and been content to see it entrusted to the hands of illiterate persons, possessing no pretensions whatever to surgical knowledge.

Happily, however, of late years its importance has been more generally recognised, both by the profession and the public; and the present state of Dental Surgery affords a striking instance of the advantages derived from a subdivision of the chirurgical art.

Until a very recent period, one of the most painful and delicate operations in surgery, and yet one of daily and hourly necessity, was confided either to a barber, entirely ignorant of the structure of the teeth, and, consequently, of the mischief that might result from his awkwardness; or, to a medical practitioner, who, though better informed on these points, could not possibly possess that share of skill and adroitness which is acquired only by constant and exclusive practice.

The only mode of obviating these inconveniences, is that which, in most civilized countries, is now resorted to: Dental Surgery is made a distinct profession, for which students are as regularly educated as for any other.

The qualifications for a Surgeon-Dentist, and which the public are entitled to look for in every professor of the dental art, are: first, a competent knowledge of the anatomy, physiology, and diseases of the teeth, gums, and mouth in general; secondly, a thorough acquaintance with the mechanical resources of the art; and, lastly, great manual dexterity in the performance of all the operations connected with the teeth.

It is not sufficient, however, that this provision is made,—that the public have at command all the advantages resulting from the exclusive study of a single branch of surgery; they must be rendered sensible of those advantages, and induced to avail themselves of them.

To effect this, I conceive nothing more is requisite than to direct the public attention to the subject; a subject highly curious in an anatomical point of view, and one that most deeply interests every individual who values his health, his comfort, or his personal appearance.

Under this impression, and with a view more especially to the service of my own patients, I have been induced to pen the following sheets, in which I have entered concisely, and in a popular manner, into all the subjects which strictly come within the province of the Surgeon-Dentist.

To the professional reader, I do not hope to offer anything new, unless it be in fixing, rather more accurately, the origin of some inventions and modes of practice, hitherto commonly ascribed to persons who have no just claim to the merit of them; but I feel assured, at the same time, that my work will be equally far from misleading the young student, or general reader. If it be

found to awaken interest and excite curiosity in the public mind, so as to lead, ultimately, to a better knowledge of the diseases of the teeth, and a more ready resort to proper means for their prevention and cure, my object will be fully attained.

J. M.

9, Half Moon Street, Piccadilly,
March, 1835.

found the most interesting and exciting
 point in the public mind, as to the
 intensity, to a better knowledge of the
 history of the world, and a more ready
 access to proper means for their education
 and this my object will be fully attained.

It is not the least of my objects to
 show that the history of the world is
 not only a record of the past, but a
 guide to the future, and that the
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PHYSIOLOGY OF THE TEETH,

&c.

A CURSORY VIEW OF THE PROGRESS OF DENTAL SURGERY.

ALTHOUGH it has been justly stated that this branch of the healing art was, for a long period, consigned to neglect, and probably did not, until the commencement of the last century, at all keep pace with the other departments of surgery and medicine; yet there are clear traces of a very early attention to diseases of the teeth, and of a knowledge of some of the remedies and mechanical aids still in use.

Æsculapius the third is said to be the first who extracted teeth; and a description of the leaden instrument (*Odontagogon*) which he employed in the operation, is preserved in Cælius Aurelianus.

Hippocrates, his successor, who lived four hundred and fifty years before the Christian era, and who,

by his close investigations, threw so much light upon medical science generally, did not fail to direct his attention to the maladies of the teeth and gums. His writings evince that he watched the progress of the teeth, from their first appearance in the infant to their final decay or extraction. He remarked, that dentition proceeded more easily during the winter than in the other seasons; that children whose bowels were in a relaxed state, were less subject to convulsions than those of a contrary habit, and such as slept much during dentition. He noticed that diseased teeth were the proximate cause of other disorders, which could be cured by no other means than extraction of the former. He ascribed a malign influence to certain states of the weather, and considered very cold drinks as extremely hurtful to the teeth. He was aware that ulcerations of the tongue were frequently occasioned by the rough edges and points of fractured and decayed teeth; and swellings of the gums he attributed to caries.

Loose teeth, that were at the same time carious and painful, he extracted: such as were merely loose, he tied to those adjoining with thread of gold

or silk: when the painful tooth was firm in its socket, he employed the cautery.

That the expedient of tying loosened teeth was practised prior to the time of Hippocrates, is proved by one of the laws of the Twelve Tables, which permitted the gold that might be attached to the teeth of a corpse, to be buried with it*. Nor can we deny to the ancient Greeks and Romans the merit of supplying artificial teeth, which it appears were made of bone or ivory, and the use of which being probably confined, in those times, to the affected of the fair sex, and the effeminate and luxurious of the other, became a favorite subject of ridicule among the poets and satirists of the day†.

Celsus, who flourished three hundred years after Hippocrates, paid, like the latter, great attention to the diseases of the teeth, and enriched, by his experience and intelligence, the meagre stock of knowledge of that period. He has left numerous

* "Neve aurum adito, cui auro dentes juncti essent, ast imo cum illo sepelietur et ne se fraudi esto." *Lex. XII. tabularum* 10, *Cap. De Auro*.

† Dentibus atque comis, nec te pudet, uteris emptis ;

Quid facies oculo, Laelia?—Non emitur.

Martial Epig. XXIII. Lib. 12.

recipes for odontalgia, which he justly regarded as one of the greatest of human afflictions. His method of treating this complaint was to restrict his patients to a very low diet, and to employ emollient applications in the form of vapour, to the teeth and gums; wrapping up the head and placing blisters on the shoulders, when the affected tooth was situated in the upper jaw; on the breast, when it was in the lower. From his remedies, he expected not only present relief, but a gradual crumbling away of the defective tooth. He was averse to extraction, and resorted to it only as a last resource. Loosened teeth he fastened by cauterising the gum, and afterwards anointing it with honey. To rough, pointed, or discolored portions of carious teeth, he employed the file*.

* Some authors are of opinion, that Celsus never himself practised the healing art (which at that period was not divided into the distinct branches of medicine and surgery), although he wrote upon the subject with such perspicuity and elegance as to acquire the highest reputation in the schools. Dr. Carabelli, of Vienna, whose researches are characterised by the indefatigable assiduity of a German, seems to think otherwise. Be this, as it may, if Celsus did not practise physic, he recorded all the improvements which had taken place during the long interval from Hippocrates to his own times, and the advantage to science was, therefore, equally great. He wrote at Rome, where he resided during the reigns of Augustus, Tiberius, and Caligula; but his practice (or his science) was that of the Greeks, who were then the only professors of medicine in the Imperial City.

Scribonius was persuaded of the presence of worms in the teeth, and prescribed fumigations to destroy them. This writer also makes the first mention of the tooth-pick, and Dioscorides (A.D. 50), directs this little instrument to be made of mastic wood or quills: Pliny, Martial, and others allude to its use. Archigenes, a Roman surgeon, is reported to have invented a small trepan for boring the teeth, in cases where medical applications failed to give relief, and the extraction of the tooth seemed contra-indicated by its healthy appearance.

Passing on to Galen, we find the art of the dentist considerably advanced by the researches of this celebrated physician. From his personal sensations, when suffering from odontalgia, he learned that the disease is sometimes seated in the tooth itself, sometimes in the gum. On one occasion, a dentist was unable to extract one of Galen's teeth which pained him, but, in his efforts, he *raised it*, when the pain immediately ceased; and the tooth performed its office for four or five years longer. This writer gives us an elaborate description of the jaw-bones and the teeth; and he first broaches the doctrine of a constant nourishment of the latter,

proportioned to their waste from use. This nourishment may be either deficient or excessive. In the former case, the teeth become weak, thin, and friable; in the latter, a species of inflammation ensues, similar to that which takes place in the fleshy parts. Deficiency of nourishment he considers a defect incident to old age, and susceptible of little assistance from art; excess, in this particular, is more commonly observed in the young. A favorite remedy with Galen for toothache was the root of purslane masticated, or a decoction of it employed as a lotion for the mouth. For inflammation of the gums he used *oleum lentiscinum recens* made warm; he had also several applications to cause the teeth to fall out without pain. In some cases of caries he had recourse to the actual cautery.

Paulus of Ægina* (A. D. 636) took an enlarged view of the subject: he cautioned his patients against indigestion and obstipation, as causes of decay of the teeth, and recommended rinsing the mouth after every meal; he forbade the eating of dried

* Sometimes called Paulus Ægineta, from the place of his birth. He practised both in Rome and Alexandria.

figs or of anything very cold, and noticed the injury frequently occasioned to the enamel by biting hard substances. He distinguished the *epulis*, which he describes as a tumor rising above the teeth, from the *parulis*, which is a small abscess of the gum.

The expedient of stopping hollow teeth with gold, lead, and other substances, is an invention of antiquity, although it is not very well ascertained at what period it was first resorted to. An Arabian dentist, Mohammed Arrasi, filled the hollows of carious teeth with a composition of mastic and alum, rubbing the teeth afterwards with pepper and pulverised gall-nuts. For fixing loose teeth, he recommended various astringent applications. In obstinate cases of odontalgia, when the ordinary remedies, such as oil of roses, pellitory root, opium, scarifications, leeches to the gums, &c., failed to afford relief, he touched the roots of the tooth with the cauter, and then endeavoured to eradicate it by means of certain specifics.

Another remedy employed by the Arabian surgeons of this period, was the destruction of the nerve by the aid of red-hot needles, conducted into the tooth through small metallic tubes.

The doctrine of the constant growth of the teeth was supported by Avicenna, a celebrated practitioner of the tenth century, who published a work on the anatomy and physiology of the teeth. Many valuable hints are given in this work on the use of tooth-powders, and of narcotics as odontalgic remedies. He notices worms as one cause of tooth-ache. He recommends boring the carious teeth, as well to relieve a supposed accumulation of humours, as to apply the eradicating specifics with greater efficacy.

To fistulous swellings of the gums, the surgeons of this period commonly applied the actual cautery, and they were not sparing of the lancet in cases of fleshy excrescences of the gums and lips. The mode of eradicating a tooth was as follows: the gum was first scarified, and the specific then applied so cautiously to the root of the defective tooth as not to injure the others, which it was necessary to cover up and protect until the former became completely loosened.

In general we find, that the practice of dental surgery of this epoch, was mixed up with much of

absurdity, and of that superstitious veneration for charms and nostrums which characterised the middle ages. Thus Gaddesden gives the following sapient recipe: "Take the grease of a green frog, rub the tooth with it, and it will soon fall out." And again, Arculanus, who is the first writer by whom any mention is made of the use of gold leaf in stopping carious teeth, gravely asserts, that in performing this operation, regard must be had to the complexion of the patient, warm ingredients being employed for those of a cold constitution, and *vice versa*.

The effect of mercury on the teeth, was noticed early in the sixteenth century.

About the same period, the laborious investigations of the celebrated Vesalius gave birth to anatomy, and a new era in surgery began. Antonio Beneveni, a Florentine physician, had previously insisted on the expediency of discarding the theories of the ancients and Arabians, and applying, exclusively, to the study of nature. The eminent men of the period hailed the suggestion with enthusiasm, and much new light was, in

consequence soon shed on every branch of surgery. The teeth and gums received their share of attention; and, accordingly, we find Vesalius became sensible, that in cases of difficult dentition, Nature might be much assisted by making incisions in the gums. It appears that he cut quite down to the tooth. The operation was performed on himself in his six-and-twentieth year. Friction of the jaw with turpentine was also recommended to facilitate the protrusion of the teeth, in lieu of the disgusting remedies before in use, such as oils, the fat of various animals, hare's brains, dog's milk, &c. The curious reader may find in this author, many very interesting particulars regarding the terminology of the teeth in use in his time*.

The interesting anatomical discoveries of Vesalius were followed up by the illustrious Ambroise Paré, of whom the French writers are so justly proud, and who has immortalized his name by transmitting to posterity the results of his own experience. His works also contain some valuable remarks on the teeth; and among other matters of

* *Andreas Vesalii, De Humani Corporis Fabrica, libri septem.—Venetiis. 1567.*

interest, he relates the case of a lady, who, having had a tooth extracted, caused it to be replaced by one taken fresh from the mouth of her waiting-maid. This practitioner sought to preserve hollow teeth by applications of the *ol. de calcantho*, the *aqua chymistarum*, and the cautery. He was so tenacious of injuring the adjoining teeth in an operation, that it was his practice to file away the defective tooth so much as to insulate it entirely. Some instruments of his invention are said to bear a near resemblance to those in present use, and he gives a grave caution to such as may handle them, not to extract three teeth instead of one*.

Fabricius ab Aquapendente was not ignorant of the means of remedying a defective palate: when the palate-bone is eaten through by caries, he recommends stopping or plugging it with a piece of sponge, or cotton, or a silver plate.

Dupont (A.D.1633) was of opinion that the most

* Paré was surgeon to four French monarchs in succession; and so great was his reputation, that (being a Protestant) he owed his life to it at the massacre of the Huguenots. Charles the Ninth himself protected him; and the historians of the period have preserved the remembrance of an exception so honorable to his talents.

effectual mode of relieving severe and incessant tooth-ache, was to extract the affected tooth, and immediately replace it. He maintained that the tooth so treated grew as firm as before, and was never afterwards painful. Pomaret confirmed this observation.

Riverius and others applied their remedies to the ear. These were, the oil of almonds, warm vinegar, a decoction of sandarac in wine and vinegar, the steam arising from a decoction of origanum in the latter only, and, when the complaint proved obstinate, narcotics. In cases of caries, the nerve was destroyed by means of aquafortis, oil of vitriol, or the cautery, the repeated application of which caused the tooth to crumble away. Worms were expelled by the mastication of bitter drugs. For cleansing the teeth, when very much discoloured, a *spiritus vitrioli* was employed. For ordinary use, as a dentifrice, the ashes of tobacco were recommended, as likewise salt, and powders, of which alum formed the principal ingredient.

About the middle of the seventeenth century, Nathaniel Highmore, of Oxford, published the first

accurate description of the *maxillary sinus**, which, as is well known, was called in honor of his name, the *antrum Highmori*. This discovery, as perhaps it may be considered in reference to the then existing state of dental surgery, was highly important to the art, and gave a clue to many affections *apparently* of the teeth, which had hitherto baffled the skill of the practitioner. Highmore himself relates the case of a lady who suffered excruciating pains for many years, and had almost all her teeth extracted: no relief, however, was obtained, until at last the canine tooth on the left side was removed; and the *antrum* being accidentally opened by an injury to the *lamella*, which separates it from the *alveoli*, a constant discharge ensued. Ruysch mentions some cases of polypi in this cavity: but it was to Cowper that the profession was indebted for a more perfect account of its disorders. He recommended making a perforation into it through the *alveolus* of the first *molaris*†, in preference to the operation of trepanning, which had been suggested and resorted to by Molinetti.

* A large cavity in the centre of each superior maxillary bone, extending from the orbit of the eye to the roof of the mouth.

† Meibomius was the first, however, to suggest the extraction of a tooth, in order to form an outlet for the collected pus.

Ruysch noticed that when the teeth were extracted or fell out, the alveoli were soon obliterated and entirely disappeared. This obliteration of the sockets, he says, sometimes occurs before the removal of the teeth, which are then retained in a loose connection with the jaw by the gum and their periosteum. This is commonly regarded as the effect of scurvy, and astringents are had recourse to, but in vain. Another cause is tartar.

Peter Dionis, a French surgeon, published, in 1696 and 1716, some works on anatomy and surgical operations, which evince that the practitioners of that period began to take a more lively interest in dental surgery. This writer enters at some length into the detail of those operations which now belong exclusively to the province of the dentist; and his observations are extremely pertinent and valuable. He censures the practice, too common in the present day, of running to the dentist on every occasion of the slightest pain, to have the tooth extracted, and enumerates every legitimate cause for that operation. This writer gives us also a description of the various dental instruments in use in his time.

The foregoing details may suffice to convey a tolerably accurate notion of dental surgery, from the earliest times to the commencement of the eighteenth century. As we now approach a period better known, and in which our art has made such vast strides as to assume a place in the foremost rank of medical science, it is neither practicable nor essential to notice so much at length the numerous elaborate and scientific productions of the last and present centuries, and I must content myself with a cursory glance at a few of the most celebrated.

It cannot be denied that to the industry, ingenuity, and perseverance of the dentists and surgeons of France, the merit of most of the modern improvements is due; and Pierre Fauchard of Paris, who published his "SURGEON-DENTIST" in 1728, holds the first place among the talented writers and eminent practitioners of his country. He censured the custom of causing the patient to sit on the floor to be operated upon, and recommended an arm-chair, a couch, or a bed. He instructs us that the milk-teeth should never be extracted unless they have become loose or diseased, which latter condition calls for their immediate removal; because the

maxillary bone, from its tender structure in childhood, is particularly susceptible of injury; and besides, the germ of the second tooth might suffer, or, indeed, be destroyed. Fauchard removed *epulides* with instruments especially suited to that purpose. If, after their extirpation, a fresh growth was perceptible, he destroyed it by repeated applications of caustic. Excrescences in the mouth, which changed into a bony consistence, and were connected with the bones, he removed with a saw, a chisel, or the forceps.

This writer treated many cases of caries by replacing the teeth immediately after extraction, tying them with wire to those adjoining, and deferring the operation of plugging until they had become firmly fixed. These teeth proved afterwards as serviceable as the others. He also successfully employed an instrument called the pelican, much in use at that time, to reduce to regularity two misplaced front teeth, which he then retained in their position by means of wire. This operation he performed frequently with the like success.

Fauchard noticed many instances of symptomatic head-ache relieved by the removal of carious teeth. He arranged the disorders incident to, and connected with, the teeth, in three classes: namely, *First*, those arising from external causes; *Secondly*, those which attack that portion of the tooth which is enclosed in the socket and the gum; *Thirdly*, those which are occasioned sympathetically by the teeth.

For stopping decayed teeth, this writer preferred fine pewter to either gold or lead. For artificial teeth, he considered those of the hippopotamus the best material, *when human teeth were not to be had*. He employed also the teeth of oxen, horses, and mules*.

At the period of which I am now writing, a good deal of speculation existed among anatomists, respecting that curious and interesting process of nature by which the temporary teeth are removed,

* See "*Le Chirurgien Dentiste*," (2 Vols. Paris, 1728, 1746, 1786) where the reader may find a description of several single and double sets of artificial teeth, ingeniously contrived, as also of the author's *obturators*, or palate of gold and silver.

and the permanent ones made to occupy their places. Some writers maintained, that the milk teeth had no roots: indeed, that seems to have been the prevalent opinion; and it is not surprising, since they were ignorant of their removal by absorption, and must frequently, on dissection or extraction, have found them without fangs.

Fauchard, however, combated this theory. He maintained, too, that the germs of the adult set were placed under the temporary teeth; that these were sometimes found under the large grinders, and that the second growth of the latter was by no means uncommon. He noticed teeth which seemed to have grown out of several germs at once, as marks of division could be traced through their entire length. He was sensible that the alveolar cavities collapse in age; and to this circumstance he ascribed the apparent lengthening of teeth which had no "antagonists," to counteract the pressure thus caused from below.

Gerauldy assumed, that the germ of the second tooth extruded the milk tooth.

Bunon asserted, that the gradual wearing away of the roots of the first teeth was the cause of their being shed. Others sought the necessity for this process in the extension of the jaws, which naturally takes place as the body advances in growth.

Lecluse, in his "TRAITE UTILE AU PUBLIC," (*Nancy*, 1750), describes the germ of every tooth as enclosed in a bladder-like membrane, which is tender, porous, and extremely vascular. This germ generates, in the upper and outer surfaces of the membrane, a fluid which hardens and forms the enamel. This process is repeated again and again as the tooth grows; the membranous bag diminishing in volume in an equal proportion, until at length there is no more space left than just sufficient for the nerve and blood vessels of the tooth.

In opposition to the opinions of Martin, Gerauldy, Bunon, and Fauchard, this writer maintains, upon the strength of repeated anatomical investigations, that a tender bony lamella is situated between the fangs of the milk teeth and the gums of the permanent set, which he considers, by its gradual

thickening, to occasion, first, the loss of vitality, and ultimately, the expulsion of the temporary teeth. He thinks also, that the friction occasioned by the loosening of the latter, may contribute to these effects.

The excellent works of Pfaff*, Bourdet, Jourdain and others, which my space will permit me merely to name, contributed very largely to the stock of knowledge on this interesting topic.

Bunon describes an affection of the teeth, which he claims the merit of having discovered, and which he calls *erosion*. By this complaint the enamel is destroyed, even before the teeth appear above the gum, whereas corrosion and caries take place after they have protruded. He regards it as a consequence of the scarlet fever, small-pox, scurvy, and inflammatory fevers occurring during dentition. Erosion not only occasions caries, but may be

* This writer informs us, that artificial teeth were first made of silver and of mother-o'-pearl; subsequently of ivory and neat's horn; in more recent times, of *copper* covered with a delicate enamel, but more commonly of the teeth of the hippopotamus. Philip Pfaff, *Abhandlung von den Zähnen des menschlichen Körpers und deren Krankheiten*. Berlin, 1786.

regarded as the source of most of the affections of the teeth.

About this period the magnet was first employed by Teske as an odontalgic remedy. Its efficacy was admitted by some; but they found the pains return with increased violence after its use. Pasch ascribed its effect to its coldness, and found it inert when warmed in the hand. On this principle he considers that both its good and bad effects may be accounted for.

The opinions of the celebrated Hunter, respecting the absence of circulation in the osseous portion of the teeth, as well as the enamel, are too well known, especially in England, to require particular notice. They were soon combated by Simmons and other writers, and are now demonstrated to be erroneous.

In 1778 appeared Jourdain's larger work on the diseases of the mouth*, which contains much interesting and important matter as well on the subject of diseases of the *Antrum Highmori*, as on fistulæ,

* *Traité des Maladies et des Opérations réellement chirurgicales de la Bouche.* Paris, 1778, 8vo.

epulides, parulides, spongy excrescences, &c. Some of his opinions, however, were opposed by the classical Richter, who canvasses all the modes of operation for opening the antrum or passing injections into it; and he finds Jourdain's method of throwing them in through the natural opening too difficult, and, at the same time, seldom effectual. Serré also disputed some of his notions on other topics.

The light thrown by Drs. Fothergill and Pujol on the *tic douloureux**, was of essential service to the dentist. The latter writer asserts, that this extremely painful affection is a *spasmus flatulentus*, the predisposing cause of which is an *erethismus* of the nerves, and the proximate an acerbity of the fluids, which may be either of a gouty, scorbutic, or catarrhal nature. He places more reliance on electricity and other remedies, than on a division of the nerve, which he found very uncertain in its effect.

Willich has recorded a very remarkable case of a lady, who, up to her fortieth year, had never men-

* This disorder is said to have been known to Andrée, a Parisian surgeon, so early as 1756, and to have received from him this designation.

struated, and yet had been twice a mother. About this age she had a carious tooth extracted, from the socket of which blood flowed for a whole hour, and so continued to do, monthly, for a period of eight years. Instances of hæmorrhage from the teeth which seemed to be a substitute for menstruation, had been noticed much earlier by Professor Huer-nius, Rhodius, Joh. Hollerius, and others.

Leidenfrost mentions a no less singular case of a female, eighty years of age, whose teeth had become quite soft, and grew so fast that it was necessary to cut them repeatedly.

The eighteenth century was not without its charms and nostrums, any more than those periods of acknowledged ignorance and superstition before alluded to.

So late as 1794, Raneiri Gerbi recommended as a specific in the severest cases of odontalgia, the *Curculio anti-odontalgicus* which is found on the blossoms of the *Carduus spinosissimus*. Fourteen or fifteen larvæ are to be taken in succession, and crushed between the forefinger and thumb, and

the friction continued until all the expressed moisture be absorbed. The painful tooth is then to be touched with the thumb and finger, when if the remedy be at all efficacious in any given case, its operation will be almost instantly felt, and the pain entirely removed in a few minutes. Gerbi proved the success of this application in six hundred and nine cases. The finger and thumb so charged with the specific, retain, by some miraculous agency, their healing power for a whole twelve-month! Other insects have been stated to possess a similar control over odontalgia, as for instance, the *Curculio Iaceae*, the *Carabus chrysocephalus*, the *Curculio Bacchus*, the *Cynips rosarum*, and several others*.

* Speaking of these remedies, Dr. Carabelli, remarks that, "it happened, in this instance, as it has ever done with every thing advanced as new, that is, it was proved to be already known. The proof consisted of the following passage from Dom. Parnetty's "Histoire d'un Voyage aux Iles Malouines, fait en 1763 et 1764," where among some recipes given to the author by the Guardian of the Cordeliers of Monte Video is this—"Tirez de la tête d'un chardon à bonnetier, ou de cardeur (*Dipsacus fullonum*), un ver que l'on y trouve presque toujours quand il est mur. Roulez ce ver entre le pouce et l'index, en le serrant tout doucement, jusqu'à ce qu'il soit mort de langueur. L'un ou l'autre de ces deux doigts appliqués sur la dent, auront, au moins pendant toute l'année, la propriété de guérir la douleur."

In 1797, we find Dubois de Chemant announcing the invention of a mineral paste for making artificial teeth, which he deemed preferable to those of all animals, not excepting the human teeth. The secret of its composition he kept to himself. However, the merit of this invention was claimed by Duchateau, a French apothecary. In 1808, Fonzi, a Parisian dentist, obtained a medal for his indestructible terro-metallic teeth, to which he gave the semi-transparency of nature, and in securing which he employed platina. Maury improved upon this plan, and brought the metallic paste to great perfection, coloring the enamel so as to imitate accurately the natural gums. He published a detailed account of the whole process, and also made known various improvements in the instruments of dental* surgery. His "MANUEL DE DENTISTE," together with the works of Audibran and Delabarre, may be consulted with advantage by any of my readers who may desire to penetrate into the arcana of the art.

* The works above alluded to are: Maury, *Manuel de Dentiste pour l'Application des Dents Artificielles, &c., Paris, 1820*;— I. Audibran, *Traité Hist. et Prat. sur les Dents Artificielles, Paris, 1821*;— Delabarre, *Traité de la Partie Mechanique, &c., Paris, 1820*.

In this brief outline, it was scarcely practicable to notice the invention and progressive improvement of the instruments appertaining to our art, and which may now boast so high a degree of perfection; nor did it seem appropriate to mention, *in this place*, the opinions of modern standard writers, which, in a great measure, must be identified with the practice of the day.

ON THE GENERAL STRUCTURE OF THE TEETH,
ALVEOLI AND GUMS.

IN pursuance of the design hinted at in the preface, of rendering this little treatise serviceable to the general reader, I proceed to give a concise account of the teeth, their sockets, and the gums.

As regards its position, a tooth consists of two parts, viz. the body, or crown, which appears above the gums, and the root, fangs, or prongs, fixed in the socket. The line between these two, which is marked by a circular indentation, is denominated the neck of the tooth.

As regards its structure, it is composed of two substances; *First*, the enamel, called also the cortex or vitreous portion; *Secondly*, the bony part, comprising the body, within the enamel, and the fangs.

The enamel is an extremely hard and compact substance, peculiar to the teeth; it is not spread equally over the crown, but exhibits, in its distribution, a good instance of the economy of nature in supplying exactly what is requisite and no more; for it is thickest on the parts most exposed to friction, as the cutting edges and grinding surfaces, and diminishes gradually in substance, until it reaches the neck, where it terminates almost imperceptibly, and is met by the gum. When fractured and closely examined, the enamel is found to be composed of minute fibres, *striae*, or, as Mr. Bell calls them, crystals, which are so arranged as to form radii round the tooth, the inner extremities resting against the bony substance, and the outer uniting to compose the surface. Their sides are consequently parallel, and they acquire, by this distribution, a degree of strength which it would be impossible to impart to them by a less admirable arrangement.

The bony portion of a tooth resembles other bones in its structure, but is considerably harder and more dense, and possesses, in consequence, a lower degree of vitality. It is now ascertained

beyond a doubt that this part of the tooth is furnished with arteries, veins, and nerves; and there is abundant reason for believing that it is not destitute of lymphatics. The vessels enter by a small orifice at the point of the fang, which widens into a cavity or canal, occupying the centre of the tooth*: in teeth with two or more fangs, this canal extends through the whole of them, so that the cavity of every tooth bears some resemblance to its outward figure. It is lined or filled by a pulpy substance in which the vessels ramify, and from whence they supply the bony substance with nutriment and with sensibility.

The fangs of the teeth are covered with the membrane common to all bones, called the periosteum.

All bones owe their solidity and their characteristic distinction from the fleshy parts, to the presence of phosphate of lime, which ingredient enters

* In aged persons this orifice is sometimes obliterated and the tooth loses its vitality. A similar effect is commonly produced by rupturing the vessels, in a total or partial extraction of the tooth

very largely into the composition of both the enamel and the bone of the teeth. These substances have been analysed by various chemists of note, and although there is no inconsiderable discrepancy in the results obtained, still they all agree in this particular. I subjoin the analysis of Bergelius, as quoted by Mr. Thomas Bell, and that of the enamel, by Morichini, I give at foot as I found it quoted in a German work*.

Analysis of the Enamel.

Phosphate of lime	85 . 3
Fluate of lime	3 . 2
Carbonate of lime	8 . 0
Phosphate of magnesia.....	1 . 5
Soda and muriate of soda	1 . 0
Animal matter and water.....	1 . 0
	<hr/> 100 <hr/>

** Morichini's Analysis of the Enamel.—*

Animal matter	0 . 30
Calcareous earth	0 . 33
Talc (<i>Talkerde</i>)	0 . 09
Clayey earth	0 . 05
Fluoric and phosphoric acid	0 . 22
Carbonic acid.....	0 . 01
	<hr/> 1 . 00 <hr/>

Bucholtz, Journal für die Chemie und Physik. 11 Bänd. 1802, 2 Heft. 7.

Analysis of the Bone of Teeth.

Phosphate of lime	62 . 0
Fluate of lime.....	2 . 0
Carbonate of lime	5 . 6
Phosphate of magnesia.....	1 . 0
Soda and muriate of soda	1 . 4
Gelatine and water	28 . 0
	<hr/> 100 <hr/>

The sockets, or cells which contain the teeth, are termed *alveoli*. They consist of a series of cavities in the alveolar processes of the maxillary bones, which processes are formed of two plates of common bone, with transverse laminae of the same substance. They are lined with a periosteum of their own, and at the bottom of each are one or more minute foramina through which the vessels and nerves of the respective teeth are transmitted. In these sockets the teeth are fixed by that species of articulation called gomphosis; that is, they are placed at right angles with the maxillary bones, and appear like nails driven into a board, the fang or fangs of each tooth being fitted into sockets precisely similar in figure, embracing the former so strictly as to admit of no motion, or change of position, without the application of great force.

The gums are considerably vascular, of a semi-cartilaginous consistence, and possess, in a healthy state, but little sensibility. They are firmly attached to the necks of the teeth, which they surround, covering both sides of the alveolar processes.

The gums of infants, which perform the functions of teeth until the latter are evolved, have a hard ridge extending through the entire length; and it is well known that sometimes, in age, when all the teeth are gone, the gums acquire such a hardness as to become very serviceable in mastication.

NUMBER AND FORMATION OF THE
TEMPORARY TEETH.

THE temporary, or milk teeth, are twenty in number, and are divided into three classes: viz. first, the *incisores* or cutting teeth; secondly, the *canini* or *cuspidati*, so called from their resemblance to a dog's tooth; thirdly, the *molaes*, or grinders. In each jaw in front, are situated four incisores; these are flanked by two canini, one on either side, and the latter again by two molaes on each side. Thus the teeth are ranged in pairs, and one side of the mouth presents an exact counterpart of the other.

The process of Nature in forming the teeth is extremely curious, and well deserving of contemplation. I must first remark, that the whole of the temporary teeth are fully formed at the time of birth; although at that period they are, with admirable wisdom, imbedded in the gums, for

the reason, that so long as the child derives its nourishment from the breast, they would not only be useless but inconvenient. It sometimes indeed happens, that a child is born with a tooth already cut; but such a tooth seldom has any fangs, and it is generally found expedient to detach it at once from the gum, to which it is but slightly united.

The rudiments of the teeth may be discovered in the foetus at a very early age; so early, according to some writers, as two months after conception, at which period they may be traced as "an extremely soft jelly-like substance lying along the edge of each maxillary arch." About the third or fourth month this pulpy substance begins to separate into distinct portions, each bearing a resemblance to the tooth which it is destined to form; and slight ridges of bone, traversing the longitudinal groove in which these pulps are deposited, mark the future sockets.

These rudiments of teeth are covered by a delicate vascular membrane closely attached to them by vessels, and each is partially enveloped in another thicker membrane or sac, consisting of

two lamellæ, both of which lamellæ are now, after much diversity of opinion, generally allowed to be vascular. The pulp and its inner membrane derive their organization from the dental branches direct; the outer membrane or sac is supplied by the vessels of the gum, with which it is inseparably connected.

Ossification commences about the fourth month. The surfaces of the pulps begin to harden, and the tips of the incisores are first covered with a shell of bone; the same process then goes on in the canini, and lastly in the molares. The ossific matter is secreted by the inner membrane of the pulp; and the latter having already assumed the form of the future tooth, it is deposited on one or more points according to that form: for example, in the incisores on one point; in the molares on four or five points. In this manner, lamina after lamina is formed, the pulp receding and diminishing in volume until the entire crown is filled up, with the exception of the centre, which is to remain a cavity; the pulp then begins to elongate, and takes the form of the fang or fangs proper to the respective teeth, which, in their turn, receive the deposits of bone. The pulp

which remains after the whole process is completed, occupies the cavity, and serves for a lining or bed on which the nerves and vessels ramify, from whence they penetrate the bony substance of the tooth, and support its vitality.

For some time during the formation of the teeth, the sockets grow much faster than the teeth themselves; by which means they almost cover or enclose the latter, so as to prevent interruption to the processes going on, while, at the same time, they give support to the gums.

FORMATION OF THE ENAMEL.

ON this interesting subject much uncertainty prevailed for a long period, and I am not prepared to say who first raised the veil of obscurity in which it was enveloped. However, we have seen that Lecluse had a tolerably correct notion of the process of deposition of the enamel; and we know that the researches of Dr. Blake, Mr. Fox, and Mr. Thomas Bell, have done much to place the question in a clearer light.

The outer membrane before alluded to, as partially enclosing the tooth, attaches itself firmly to its neck as soon as the shell of bone is complete on the crown; it now, therefore, completely envelopes the latter, though loosely, and its inner lamella is found to have become thicker and more vascular than before. It is thus prepared to enter upon its peculiar function, which is, to pour out from its internal surface a fluid, that first congeals into a

soft, chalky substance, and subsequently crystallizes and assumes that peculiar arrangement of its fibres or striæ which I have before described. In this manner the enamel is deposited upon the tooth, commencing at the same points with the ossification, and gradually covering the entire crown. When the enamel is complete, the tooth is generally so far advanced in the socket, as to wait only for the absorption of the now useless membrane and the superincumbent gum, in order to assume its proper and final position.

THE FIRST DENTITION.

THE term "cutting the teeth" is, as Mr. Fox justly remarks, calculated to convey an erroneous opinion of the manner in which the protrusion of the teeth is brought about. It is not by the mechanical action of the tooth pressing against the gum and actually *cutting* it, that a passage is made; but a regular process of absorption, induced, no doubt, by the pressure, first removes the membranous covering of the tooth, and then so much of the gum as is requisite to allow it to pass.

The period at which dentition commences, varies very considerably, as does also its duration, but, most of all, its effects upon the constitution, some children protruding their teeth almost without the knowledge of their parents and nurses, while others suffer in a most distressing manner, and are in imminent hazard of their lives.

The first teeth are usually cut about the sixth, seventh, or eighth month; in very robust children, however, they not unfrequently begin to protrude as early as the fourth or fifth, while in weakly constitutions they do not appear until the tenth or twelfth month. At the same time I must remark, that the progress of dentition appears occasionally to be totally uninfluenced by the general state of health of the child, the sickly cutting their teeth rapidly, and the healthy more slowly; but these are exceptions to the general rule.

The first set is generally completed in two years and a half, or three years.

The order in which the milk teeth appear is the following:—First, the two central incisores of the under jaw, one preceding the other by a few days; then follow, in about a month, their “antagonists” in the upper jaw: these are succeeded in a few weeks by all the lateral incisores, those of the lower set protruding first, as before. The anterior molares of both jaws take precedence of the cuspidati, which are of slower growth, from being placed deeper in their sockets; the cuspidati come

next; and, finally, the second molares make their appearance.

These temporary teeth are all shed between the ages of seven and fourteen; and this is one of the most singular and interesting operations of Nature. The necessity of teeth for the purposes of mastication commences soon after the child quits the breast; for a short period the hard ridge of the gums, before alluded to, may suffice, but soon a proper set of teeth is provided, which, being completed in a few months, are destined to endure but a few years, and then to give place to a permanent set, more numerous, differing essentially in figure, provided with larger fangs, and, being of slower growth, adapted to wear through life.

NUMBER AND FORMATION OF THE
PERMANENT SET.

THE permanent teeth are thirty-two in number when complete, although the number apparently varies, from circumstances which will be hereafter explained. The older writers, indeed, contended that females usually have but twenty-eight; an opinion altogether erroneous, as there is no difference in this respect between the sexes.

The formation of the adult teeth commences *in utero*, and is frequently not completed until the twentieth or twenty-fifth year, thus occupying a very considerable portion of man's existence.

They are divided into four classes, and consist of four incisores, two cuspidati, four bicuspidates, and six molares in each jaw. The upper incisores are both broader and thicker than the under; the cuspidati are more conical than any of the teeth.

and have longer and stronger fangs, so much so as to cause a ridge in the alveolar process, which may be distinctly seen, or felt with the finger. These teeth seem to be particularly adapted for laying hold of and tearing substances; and, as Mr. Hunter remarked, we may trace in them a similarity in shape, situation, and use, from the human species to the lion—from the least to the most carnivorous of animals.

The bicuspidés, which were, I believe, first distinguished from the molares by that celebrated anatomist, hold a middle station between the latter and the incisores; the upper ones have but one fang, the under, two. The body is divided at top into two points, the anterior of which being higher than the other causes the tooth to resemble one of the cuspidati. The molares are of a square figure, and are fitted for their office by terminating in several points, commonly five, two of which are situated on the inner, and three on the outer surface. They are firmly fixed in the jaw, the upper having three fangs, the under two*.

* Molares are sometimes met with, having four fangs when in the upper jaw, and three when in the lower; and these fangs are occasionally so interwoven with those of the adjoining teeth as to render extraction extremely difficult and dangerous.

The four molares which occupy the corners of the maxillary processes are somewhat smaller than the rest, and from their protruding at an adult age, and sometimes very late in life, they have been denominated *dentes sapientiae**.

As the teeth of the two jaws do not correspond exactly in figure, the superior incisores and cuspidati overlap the inferior in a slight degree; and the upper incisores being broader than those of the lower range, the antagonists do not accurately meet. The consequence of this arrangement is, that each upper tooth rests partially upon two of the lower ones, and the protuberances of the one row are adapted to the indentations of the other.

Another admirable contrivance in the arrangement of the teeth is this: the superior molares are inclined outwards towards the cheek, and the inferior inwards towards the roof of the mouth, so that in the lateral motion of the jaws in mastication, these

* Avicenna first gave them the name of *dentes intellectus*. Aristotle designated them by the word *κραντῆρας* because they contribute to the formation of a deep voice. The Romans called them *morum et sapientiæ dentes*; also *genuini*, *quod a genis pendent*, *ὀψίγονοι*, *sero-geniti*.

teeth are thus made to act in the direction of their respective axes.

The adult teeth are likewise susceptible of a subdivision into two classes; viz. those which replace the first set, and those which are superadded to make up the full number of thirty-two. Those which comprise the former of these classes are the offspring or offsets of the temporary teeth, which latter, at a very early period of their formation, give off a small sac, analogous to the bud of a plant, and which contains the germ of the new tooth.

As a preparatory step to this process, a small recess is excavated in the alveolus by the absorption of a portion of its internal substance; this recess is formed for the reception of the bud or sac *by anticipation*, and not in consequence of the pressure of the latter, which affords a striking instance of the wonderful order and method with which Nature performs her work. The recess being gradually prepared, the new rudiment, that at first appeared but a thickening of the sac, now assumes a distinct form, and is placed within it. As the rudiment in-

creases in size, the recess is proportionably enlarged, and sinks deeper into the jaw-bone, at the same time that the temporary tooth, also proceeding in its growth, rises in the socket, and by these means the parent membrane and its offset are removed to a greater distance from each other.

The connection, however, is still maintained, for the peduncle, or cord which unites them, becomes elongated in the requisite degree; and even when the temporary tooth is completely formed and protruded, and the membrane removed by absorption, the new germ remains attached to its neck by this peduncle. The cell, which was first merely an excavation in the side of the alveolus of the temporary tooth, becomes gradually separated from it by the growth of the alveolar processes, and by a bony partition which is deposited between the two pulps, so that the permanent tooth at length occupies a totally distinct socket. A small orifice at the top of this socket admits the peduncle, by which an union with the parent tooth is still preserved.

The further progress of the adult teeth is precisely similar to that of the milk teeth already

described; but it remains to notice the manner in which the molares are produced.

The twenty teeth which are the immediate offspring of the temporary set, are the incisores, the cuspidati, and bicuspidēs. There are twelve wanting to complete the set: and Nature has thus made provision for supplying the deficiency;—the four anterior molares are formed *with the first set*: they are found at birth in the extreme corners of the jaws, and ossification has then commenced upon their highest points. Like the temporary teeth, they are endowed with a power of reproduction; and as the jaw extends, the first molaris gives off a pulp or sac to form the second; and the second, in due time, gives off one to form the *dens sapientiæ*: thus, the twelve molares are produced independently of the shedding teeth.

THE SECOND DENTITION, OR THE CHANGE OF
THE TEMPORARY FOR THE PERMANENT
TEETH.

THE removal of the temporary teeth to make way for the permanent set, is a process scarcely less interesting and curious than those of which I have already treated.

At about the age of six or seven years, there are twenty-eight of the permanent teeth at different stages of their formation, closely packed behind and beneath the temporary teeth (or, in the upper jaw, above and behind them), so that if none of the latter have been shed, the total number of teeth in the mouth, at once, will be forty-eight.

As the new teeth rise in their sockets (speaking, to avoid confusion, of the lower jaw only), in rear of those to which they are connected, as has

been described, and at the same time increase in size, it is obvious that they must require more room; they must, in fact, come forwards and range themselves in a larger semicircle. At this period, then, absorption commences in the anterior portion of their sockets, and the bony partition which separates them from the deciduous teeth, is removed; this allows them to come forward and press upon the fangs of the latter, in which absorption now goes on until the whole is taken up, and the crowns fall off, leaving vacancies to be filled by the permanent set.

Whether this absorption be a spontaneous and preparatory effort of Nature, or a consequence of the pressure of the adult teeth during their growth, is a point not yet satisfactorily settled, but it is sufficient for our present purpose to know that the removal of the shedding teeth is effected by the process of absorption.

The permanent teeth are usually protruded in the following order:—the anterior molares first make their way through the gum; this occurs about the sixth or seventh year, and the shedding of

the milk teeth then generally commences. Soon after the first molares have appeared, the two central incisores of the under jaw fall out, or, becoming very loose from the absorption of their roots, are easily removed, and are replaced by the permanent incisores. The rest appear at intervals of two or three to twelve months, in the following succession:—the two central incisores of the upper jaw; the inferior lateral incisores; the superior lateral incisores; then the bicuspidæ, cuspidati, and second molares, observing the same order of protrusion, that is, those of the under jaw preceding the upper. The third molares or *dentes sapientiæ* do not penetrate the gums until the age of eighteen to five and twenty. Some instances are recorded of their being cut at very advanced periods of life, even up to eighty, and sometimes they are never protruded.

To this latter circumstance the variation in the number of teeth, before noticed, is frequently owing, but it occasionally arises from the extraction of one or more of the pulps of the permanent teeth, while attached to the necks of the parent teeth, as before explained.

The removal of a pulp thus inadvertently, or from gross ignorance in the operator, allows more space for the development of those on either side, and the latter grow wider, so as sometimes to fill up the vacancy, and prevent the deficiency from being perceived.

While these changes in the teeth are going on, the maxillary bones become gradually enlarged; the anterior portion which contained the shedding teeth, is pushed forward by the growth of the lateral portion destined for the situation of the additional molares. By this process, the round chubby chin of the child is elongated into that elliptical shape which characterises the adult.

There are many irregularities in the order of protrusion noticed in practice, and some curious cases of misplaced teeth are recorded by Miel and others. In one instance, a canine tooth had changed places with the first molaris; and in another, one of the cuspidati stood in the place of an incisor, and *vice versâ*. These cases appear to be well authenticated; however, such occurrences are extremely rare.

Instances of supernumerary teeth are not unfrequently met with. They are abortive formations which owe their origin to the productive faculty of the temporary teeth, these giving off a second process from whence they spring. They are most commonly found in the upper jaw, and assume various shapes, but are always deformed and unsightly, and occasion a very great degree of irregularity.

Before I quit this subject, I would call the attention of the reader to a comparison of the human teeth with those of other animals. Graminivorous animals have no teeth, but molares, with which they grind and pound the grass, expressing its juices and reducing it to a pulp. In ruminating animals, we find incisores on the lower jaw only, which serve to cut the grass, and they have molares for grinding it. Carnivorous animals are furnished with canini for seizing and tearing their prey, and with incisores and molares for dividing it, loosening and breaking its fibres, and thus rendering it fit for deglutition. These teeth, though bearing, as I have before remarked, a certain traceable resemblance to those of man, are yet

found to differ essentially from them. Thus, in beasts of prey the canini or fangs are much longer and larger than the rest of the teeth, and *considerably curved*; the cutting teeth are sharper, the molares are also sharper at the edges, and better adapted for tearing and chopping up tough, fibrous, and tendinous substances; both their teeth and jaws are extremely strong, so that they can easily break and masticate bones, as we may perceive even in the domestic animals.

The inference to be drawn from this comparison seems to be, that as Nature has endowed man with a constitution fitted for all climates, so she has also provided him with the means of rendering the productions of all countries subservient to his use; and the Gentoo, who, in his own country has no need of any teeth but his molares to grind his rice, would, if he were transplanted to the Pampas of South America, be enabled, by his incisores and canini, to feed upon raw beef like the natives. The human stomach and alimentary organs are likewise fitted to convert all kinds of food into wholesome chyle, so that the Irish labourer who lives upon potatoes and milk, with, perhaps, a slice of bacon on a Sun-

day, is as strong and well nourished as the epicure who luxuriates in all the delicacies of modern cookery twice or thrice a day.

DISEASES ATTENDING DENTITION.

SUCH are the delicacy and susceptibility of the frame in infancy, that the local irritation occasioned by the passage of the teeth through the gums, not unfrequently causes an alarming excitement of the whole system, giving rise to inflammatory fevers and convulsions, which sometimes terminate fatally. The treatment of these constitutional symptoms belongs, no doubt, to the physician; but as a dentist, I may be allowed to offer a remark or two upon the subject.

The practice of making incisions in the gums to relieve the irritation of teething, was introduced by Vesalius so early as the commencement of the sixteenth century; it has, therefore, the sanction of experience, and has been long an established remedy. Nevertheless, who will deny that it is

frequently delayed until too late? until the constitutional disturbance, which it is calculated to prevent, has attained such a height that it becomes impossible to arrest or allay it?

I fully coincide with the opinion expressed by Mr. Fox, that under every circumstance of indisposition arising from dentition, the lancing of the gums ought never to be omitted.

Mr. Benjamin Bell is also very decided on this point. He considers that the operation is too long delayed; that the constitutional disturbance commences long before the tension of the gums has attained its height, and that when this is the case, the symptoms naturally subside.

The "lancing" in such a case, must always be understood to mean cutting down upon the tooth, so as to sever the membrane which encloses it and remove the pressure; otherwise no permanent benefit can be derived—none, indeed, beyond the trivial loss of blood. I need scarcely add, that a circular-edged gum lancet is the best instrument for this purpose. Should the incisions heal up

before the tooth appears, they may be repeated without the smallest hesitation.

The permanent teeth are usually cut without much inconvenience, for the excitability which exists in the infant system has by this time worn off. However the *dentes sapientiæ* are, occasionally an exception to this rule, and inflammation, pain and swelling of the cheek precede or attend their protrusion; in this case, the use of the lancet is clearly indicated, nor can it, for the reasons stated above, be superseded, although it may be assisted, by leeches.

It generally happens, even in healthy children, and those who cut their teeth most easily, that there is some febrile disturbance attending the protrusion of each tooth. This is often denoted by a circumscribed spot of red in the cheek, by thirst, peevishness, and restlessness in bed.

These symptoms are almost immediately relieved by a small quantity of nitre; and when they are discovered too late at night to send for medical advice, it may be convenient to some of my readers

to be aware of this. Put ten or fifteen grains into a cup of barley-water, or any drink that the child may be accustomed to, sweeten it well, and let the child take it occasionally as a common beverage. If this do not allay the irritation, a single spoonful of the syrup of poppies may be given; but, in the latter case, the child should take an aperient the next morning, unless its bowels happen to be relaxed.

It has been known ever since the time of Hippocrates that the bowels of children require to be kept open during dentition, and an attention to this simple rule IN TIME, will prevent much mischief.

This object may be attained by administering a small quantity, say half a tea-spoonful or less, of Rochelle salt (which is nearly tasteless) in tea or milk and water; or a few grains of the compound jalap powder (from five to ten, according to the age of the child), may be given in pretty strong coffee, well sweetened; or in jelly of any kind, or moistened brown sugar. The custom of giving children calomel on bread and butter, because it is tasteless, and easily administered cannot be too

strongly reprobated; this powerful remedy should *never* be employed simply as an aperient. The medical spoon will be found very useful in the nursery.

The practice of giving a child some substance to bite during dentition is sensible, provided that substance be not too hard; a piece of India-rubber seems as well adapted for the purpose as anything; and I am inclined to think that the child by its efforts to penetrate it, not only promotes the absorption of the gums, and so assists the protrusion of the tooth, but also, in some degree, deadens the pain: for it is well known that culprits, when about to suffer the lash, are accustomed to put lead and other substances into their mouths, in order that they may both endure the pain the better, and avoid what they deem an unmanly betrayal of their sufferings. Nature is herself the best guide, and it is certain that children suffering from the irritation of cutting a tooth are very fond of biting anything that falls in their way.

Ulcerated gums may, as Dr. Thomas observes, be easily cured by keeping the bowels open and

touching the parts affected with some slightly astringent application, such as borax and honey, or the latter with as much alum as will impart to it a moderate degree of roughness.

This being properly a medical chapter, I will conclude it with a quotation from the same excellent author. "Pure air, proper exercise, wholesome food, an open belly, and every thing that has a tendency to promote general health, and to guard against fever, will greatly contribute to the safety of dentition, as well as to the child's passing quickly through this hazardous period."

IRREGULARITIES OF THE TEETH.

It has been before noticed, that during the formation of the permanent teeth, and their gradual substitution for the first set, the jaw undergoes a marked alteration in figure. From a semicircle it becomes the half of an ellipsis, and we find, that this change is effected principally by the elongation of that portion, which is situated between the second temporary grinders and the coronoid process. This is the space destined for the additional molares.

Now the adult teeth being larger, as well as more numerous than the milk teeth, it is obvious that they require a great deal more room; and, when the absorption of the latter does not progress equally with the growth of the former, the new teeth are crowded up, and are apt to be forced out

of their natural position by the resistance of the old. Again, if the permanent teeth prove, as they sometimes do, disproportionably large in comparison with their predecessors, the jaw may not be sufficiently extended to admit of their being ranged in regular order, in which case some overlap the others, and considerable deformity is occasioned.

In removing any of the adult teeth on account of their irregularity, or the want of space, the care and judgment exercised should be greater in proportion to the greater importance of the teeth to be sacrificed; and since prevention is better, at all times, than remedy, and the remedy, in this case, is itself *an evil*, I would earnestly recommend a frequent inspection of the teeth of young persons by an able, professed dentist, in order to *prevent* irregularities and personal defects, which it may be found impossible to *remove*.

To those parents, however, who have neglected to take these preventive measures, it will be consolatory to know that art can yet do something towards relief. Up to the age of eighteen or

twenty, irregular teeth may frequently be brought to a degree of symmetry with the rest. This is accomplished by continued pressure applied by means of a gold bar and ligatures; but a mere description of this mechanical contrivance, without a plate, would scarcely be intelligible.

The first of these is the fact that the United States is a young nation, and its history is therefore a history of growth and development. The second is the fact that the United States is a large nation, and its history is therefore a history of expansion and conquest. The third is the fact that the United States is a diverse nation, and its history is therefore a history of conflict and compromise.

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DISEASES OF THE TEETH.

CARIES OR DECAY.

THE entire substance of the teeth, except the enamel, being similar in its structure to other bones, is affected in a similar manner by the various causes of inflammation; but, being much more hard and compact, and not possessing the power of exfoliation (or separating the dead parts of bone from the living), the teeth cannot be renewed or restored by that process which effects the renewal or restoration of other bones. Hence inflammatory action in the teeth terminates, sooner or later, in their total destruction.

There are two species of the disease termed caries, which we find distinguished among the

older writers on this subject by the epithets *humid* and *dry*. Modern nosologists, however, have applied to the latter the term *necrosis*, signifying mortification. The difference between them is this:—Caries, properly so called, is an affection of the bones analogous to ulceration in the soft parts. It implies diseased action and a loss of substance in the part attacked, which is thereby rendered softer and lighter, but yet retains its vitality. In *necrosis*, which is precisely similar to gangrene, the portion of bone is entirely deprived of life. Caries generally attacks bones of a spongy texture, and necrosis the more compact ones, in which the vital principle is weakest. However, the two frequently occur together in the same part; and *caries* often ends in *necrosis*.

These remarks will suffice to shew that the decay of the teeth, if perfectly analogous to either of these affections in common bones, should be termed *necrosis*, or gangrene; and a modern writer has adopted the name of *dental gangrene* as more descriptive of the true nature of the disease. But, after all, it is of little practical importance, since, in common parlance, caries is used to signify decay; and the word

gangrene would express the same idea when applied to the teeth*.

The first trace of caries is perceptible on the external surface of the bone underneath the enamel, and it invariably takes a direction towards the cavity. That direction is indicated by a discoloration of the substance, which is greatest at the part where the disease commences, and becomes gradually less distinct as it approaches the inner surface. It is commonly accompanied by an opaque or brown spot on the enamel, arising either from a fracture of that substance, or a partial displacement of its striæ, from the failure of due support in the subjacent bone. Sometimes the enamel may be perfect, and the decay, in its very earliest stage, appear as a brown spot, through the semi-transparency of the former.

From some causes not satisfactorily ascertained,

* This writer, while professing to prevent error and confusion from the use of the term *caries*, appears to me to have left the subject just as confused as he found it, since he employs the word *gangrene* for partial decay, and *necrosis* for total decay: now, both words have the same meaning in their application to the teeth, and therefore may, with equal propriety, be used to signify different stages of the same complaint.

the teeth are extremely subject to these diseases. Several theories have been advanced respecting this tendency, some ascribing it altogether to internal and constitutional causes, others wholly to external or adventitious circumstances. The celebrated Mr. Hunter observes "that it does not arise from external injury or from menstrea which have a power of dissolving part of a tooth; but we may reasonably suppose that it is a disease arising in the tooth itself." Mr. Fox is surprised that Mr. Hunter, having gone thus far, did not give a correct idea of the *only* manner in which the disease can originate, and which he states in his next paragraph. "The proximate cause of caries appears to be an inflammation in the bone of the crown of the tooth, which, on account of its peculiar structure, terminates in mortification."

So Mr. Thomas Bell considers, that as the vitality of the tooth is less in the crown than in the root, caries oftener occurs in the former than the latter: in consequence of inflammatory action, a portion of the tooth dies and operates like an extraneous body upon the surrounding parts, in which, consequently increased action and, ultimately, death

must ensue. This writer regards inflammation and external injury as the sole causes of caries.

Mr. L. S. Parmly, on the other hand, maintains, that "the relics of what we eat or drink, being allowed to accumulate, stagnate and putrefy, either in the interstices of the teeth, as is most commonly the case, or else in those indentures on their surfaces favorable for the lodgment of the food, is universally the cause of their decay, and generally of most other disorders to which they are exposed." Again Mr. E. Parmly writes, "from my own observations, I am induced to believe that caries is universally caused by the action of external agents, and therefore cleanliness, after the proper offices of the dentist are performed, is the only safeguard against it."

Bunon, as we have seen, ascribed caries and most disorders of the teeth, to a peculiar complaint which he called *erosion*.

Such is the diversity of opinion on this interesting and important point and I think it will appear in

this, as it frequently does in other cases, where writers go to opposite extremes, that the truth lies between them. As far as my practice, which has been both long and extensive, enables me to judge, caries arises neither from internal nor external causes *exclusively*, but from both. In this I am borne out by analogy, for it is well known that caries in general is ascribed by nosologists to three causes: First, "caries from external causes; Secondly, from an internal local cause, where no outward injury of the bone and no internal constitutional disease can be suspected to have produced the disorder, and where the affection can be removed by local means: Thirdly, from a general internal cause, or constitutional disease, in which cases, besides local remedies, it is necessary to employ such medicines as are calculated to obviate the particular affection of the system, whence the diseased state of the bone has originated*."

If we omit the possibility of removing the affection on account of the absence of the power of exfoliation, we shall find this statement apply very accurately to the disease in question.

* Cooper's Dictionary of Practical Surgery.—Art. *Caries*.

Every dentist, and, I should imagine, every casual observer, must have remarked, that persons who have had their health much deranged for any length of time, have their teeth in a bad state. This is particularly the case, when that derangement has been connected with liver complaints, and probably the mercury administered for the latter may have contributed mainly to this effect. However, the same thing is also observed of dyspeptic subjects, and those of a constipated habit of body.

It is surely not unnatural to suppose, that that morbid irritability of stomach which extends its influence to the mucous membranes of the throat and mouth, covering the tongue with fur, and causing various disagreeable tastes and sensations, should render the salivary and other secretions so acrid as to cause inflammation of the teeth. But even if we fail altogether to explain the precise manner in which the teeth are acted upon in these cases, still we should be fully justified, from the frequency of the coincidence, in believing the fact.

Besides, the reverse of the position holds good; if we notice a person advanced in years, or even

arrived at that most uncertain stage in the journey of life, called "*a certain age*," whose teeth strike us as remarkably well preserved,—who boasts that he has not a single decayed tooth, and never had the toothache in his life,—we shall almost invariably find that person to be of a hale constitution, and to have enjoyed through life such uninterrupted health as to have escaped altogether the infliction of the doctor. This I say will be found to be the rule; I do not pretend that it is without exception. In short, I feel convinced that persons in delicate health, the nervous and hysterical, the hypochondriac and sedentary, the bilious and constipated (in all of whose cases derangement of the *primæ viæ* exists in a greater or less degree), will, as a *general rule*, be found to have carious teeth.

But while I maintain this position, I am not unmindful that external causes operate, perhaps yet more frequently, to produce this disease. These are, no doubt, injuries to the enamel and bony substance of the tooth, which may be occasioned in various ways. The most obvious of these, is the fracture of a tooth by a blow, a fall, or other accident; these, however, can affect only the front

teeth. A far more common cause of injury is the biting of hard substances during mastication; on which occasions we sometimes feel a shock through the whole jaw, which may convince us with what force the mechanical movements necessary to that process are performed; a shock of this kind is sufficient to chip the enamel, and although we know this to be the thickest on the grinding surfaces, still we know at the same time, that there the greatest waste takes place; and if the piece of enamel thus displaced be not of the entire thickness, yet it will leave a small cavity, which by the action of mastication will soon be worn through to the body of the tooth. This cavity will also become a receptacle for minute particles of food, which, undergoing decomposition, will probably shorten the process of destruction by their own action on the parts around them.

In cases of abrasion of the enamel, the denuded spot is frequently sore to the touch, while the rest of the tooth is entirely free from pain; a fact which sufficiently confirms the foregoing remarks.

Another frequent source of injury to the enamel,

is the foolish and inelegant practice of cracking nuts, biting thread, and employing teeth as a *vice* to unscrew small ivory boxes or needle-cases, to turn the stoppers of smelling-bottles, &c. Indeed, some persons are so utterly regardless of the value and proper uses of their teeth, that they seem to look upon the mouth as a portable tool-chest, where they may find a pair of scissors, or pincers, a knife, a corkscrew, or any instrument almost that they may chance to need. Such practices cannot be sufficiently censured, and they will no doubt be sincerely regretted, when the loss of the teeth is felt.

Let the reader imagine a tooth completely hollowed out and rendered a mere shell by the action of caries, and he will perceive at once how easily such a tooth, though capable of retaining its place a long time, if it be so situated as to escape hard pressure, will be crushed to pieces by the force required to break a hard nutshell. Thus, this common practice alone may, by repetition, effect the total destruction of several teeth.

It remains to mention one other cause of gradual, but certain, injury to the enamel, namely, the use

of *acids*, both medicinally and in the shape of dentifrices and lotions.

Berdmore has recorded the results of some interesting experiments instituted to ascertain the chemical action of acids on the teeth. He found that nitric acid destroyed the enamel in a quarter of an hour; muriatic acid almost as quickly, discoloring the internal substance at the same time; sulphuric acid made the teeth very white, and did not decompose much of them during three or four days, but the enamel had become very rough, and could be easily scraped off.

When we consider that the enamel consists principally of phosphate and carbonate of lime, it is evident that decomposition must be the consequence, if we suffer acids to come in contact with it. The more powerful of these, we see are capable of destroying it in a short time; the others, though they operate more slowly, will, like the drop of water which wears away the stone, ultimately produce the same effect. For these reasons I dissent from those who argue, that the milder acids may be employed with safety and advantage

to remove the tartar and prevent its accumulation: I think all acids dangerous, and would not use even the mildest of them. The tartar may be removed by mechanical means, and its accumulation prevented by proper and timely attention.

Persons whose occupations require them to be constantly tasting and trying various substances, are very apt to corrode the enamel of their teeth by that means. For this, so long as the necessity continues, there seems to be no remedy but care, in preventing the noxious article from touching the teeth, if that be possible, and the frequent use of such dentifrices or lotions as will act chemically in counteracting its injurious effects. These the dentist must adapt to each individual case.

It has been remarked that the upper teeth generally are more subject to decay than those of the under jaw. This circumstance has occupied the attention of various writers, and, of course, various conclusions have been come to respecting it. It seems to be a fault in investigators generally, that they aim at finding one single sufficing reason for that which may be naturally accounted for in

several ways. Thus, some physiologists are inclined to ascribe the effect in question to the upper teeth being exposed, from their position, to the action of the morbid secretions of the nose and the antrum, during catarrhal and other affections. Others think that the lower teeth being more acted upon by the saliva, the solvent powers of that secretion prevent the particles of food from injuring them. I see no reason why both causes should not contribute to the same effect; the one operating detrimentally to the upper teeth, the other favorably to those of the under jaw.

Again it is found that the molares are more frequently decayed than the front teeth. This perhaps may be owing to two causes:—First, they are much more used in the mastication of animal substances, for the knife and fork have rendered the office of the cutting teeth nearly a sinecure; they are, therefore, more apt to be injured in the manner before described, and also to be affected by particles of food retained between them and on their indented surfaces: Secondly, the front teeth, in addition to their difference of figure, have the advantage of more effectual brushing—they are more in sight;

they are more easily cleansed; in short their appearance is of more importance, and they are more anxiously *soignées*. Thus, they are defended from many external causes of decay, and the lower ones are seldom found to be carious; those of the upper jaw are, however, acted upon by some such internal causes as I have hinted at, and are often in a decayed state.

One would think that abundant evidence of caries being attributable to various causes, some internal and some external, may be found in the fact, that we see, on the one hand, persons of a delicate constitution and depraved habit with sound white teeth; and on the other, those of a robust frame and healthy functions, with teeth discolored and decayed. Again we observe caries in the teeth of those who are most scrupulously attentive to cleanliness; and none in those of such as neglect the common means of preserving them*. In the

* The following simple anecdote is *à propos*. A young lady was struck with the appearance of the teeth of a female upwards of seventy. "Pray Mrs.—, what do you clean your teeth with?" "Lord bless you, Miss, I never cleaned my teeth in my life, and I am sure I am not going to begin now,—I don't want to spoil them." This prejudice I believe to be common among the lower orders.

one case, then, the teeth are bad in spite of every care, and in the other, good in spite of every neglect.

Perhaps, indeed, in the former instances, the evil may be in some measure owing to the use of an improper dentifrice; and the latter case can, I think, never occur but in very healthy subjects.

Bunon's theory, to which I have before alluded, is not without some plausible arguments and remarkable facts to support it. There is, for instance, an hereditary disposition to caries in some families, the members of which enjoy good health; and again, it is commonly noticed that teeth decay *in pairs*, or in other words, those that are formed and grow together, are simultaneously affected by disease; the other teeth remaining sound for a length of time afterwards. It is not irrational to suppose, that the cause of decay in these cases exists in the defective formation of the teeth,

It may be argued, perhaps, that a man should not know that he has teeth, as it has been said, by those whose gastronomic powers know no limit or control, "a man should not know that he has a stomach." Many would be happy to remain in ignorance of both facts; but, unfortunately, in artificial life, few can.

arising from constitutional or local disorder during that process.

As there appear to be various causes, constitutional, internal and external, capable of producing caries and necrosis of the teeth, so there is a considerable diversity apparent in the nature and progress of these disorders. Sometimes the decay advances very slowly, and years may elapse before the tooth is gradually worn down to the fang; which may then remain for another long period in the same state, neither painful in itself, nor injurious to the neighbouring teeth. At other times, the crown is speedily destroyed, and the fang attacked by necrosis; it becomes a dead, extraneous body, and by the irritation which, as such, it causes in the parts in contact with it, much mischief is occasioned, and its immediate extraction becomes imperatively necessary. In these cases, the socket inflames, the gum becomes livid, and an extremely unpleasant discharge takes place. Meanwhile the irritation causes absorption of the alveolar processes, and the neighbouring teeth are loosened.

It is a common opinion that caries may be communicated from one tooth to another, and in practice many cases appear to confirm this notion, but others completely refute it; and the inference is, that this disease is modified, like every other, by circumstances which elude our scrutiny.

To enumerate the causes of a complaint, is to point out the best means of preventing it; and I need not detain the reader here by any remarks on this subject, especially as I intend to conclude this little treatise with a few practical hints on the preservation of the teeth.

I proceed, then, to the remedies for decay. When this formidable disease makes its appearance, though it be only in the shape of a minute speck on the enamel, I would recommend my reader to apply instantly to a dentist.

In that early stage the dextrous application of a file may eradicate the disorder without injury to the enamel; but if it be neglected, it will soon make its way towards the cavity of the tooth, and recourse must be had to *stopping*.

This contrivance is very ancient and no less valuable, for it constitutes the only effectual barrier that we can oppose to the inroads of decay. A carious tooth properly stopped is as serviceable as ever, and will frequently remain so for several years. Nor is it more liable to be affected by toothache than the rest, for its cavity, with its exquisitely sensitive membrane, is equally well defended from the causes which give rise to that affection. By renewing the stopping, or preserving it in a perfect state, the progress of caries is very much retarded, and any disagreeable effect on the breath prevented.

The various substances formerly employed for stopping teeth, as gold, lead, tin, pewter, platina, wax, and pastes of various kinds, have one and all been discarded as objectionable on some ground or other; and it is notorious that, up to a recent period, the discovery of a perfectly suitable composition remained a desideratum. Every dentist felt this want, and they who taxed their ingenuity and industry to supply it, came, of course, to different results. It was natural that each should boast the superiority of his own discovery, and consequently

we see various compositions put forth with equal pretensions. They must all, however, be tried by the only true test, that of public experience, and to this I unhesitatingly submit the MINERAL SUCCEDANEUM, an invention which I have employed with such signal success for so many years. Being applied in a liquid state, it enters into all the irregularities of the surface, and thus completely fills the cavity, hardening into a beautifully white polished substance, not to be distinguished from the natural enamel, and perfectly incorrodible.

When caries has made such progress, before recourse is had to professional aid, that the crown is nearly destroyed, and stopping becomes impracticable, there are two modes of treatment to pursue; one is to file down the decayed crown, and attach an artificial one to the fang; the other to extract the stump and fit in an entire artificial tooth. Circumstances must regulate the choice, as all depends upon the situation and condition of the defective tooth, and the facilities for performing either operation with success.

Before I quit this subject, I would say a few words on artificial teeth, for which three substances are now commonly employed, namely, the tooth of the hippopotamus, natural teeth, and an incorrodible mineral composition.

The first of these is used in cases where the gums are tender or spongy.

The second are preferable for their lightness and more perfect resemblance to the other teeth: indeed the natural teeth have long been recognised as the best material for replacing such as may be lost.

The third kind are employed for persons whose teeth, from constitutional or other causes, have a strong tendency to corrode.

Artificial teeth may be made of either of the above substances from a single tooth to a complete set, and fitted so skilfully as not to be distinguishable from the natural teeth, while they perform mastication, and answer every purpose for which the latter are designed. But it must be obvious

that the several operations of modelling, making, adapting, and securing them, cannot be performed with the requisite nicety and skill, but by those who have had great experience in the art, and are well acquainted with all its mechanical resources; it is not surprising then that individuals should frequently experience disappointment and vexation, and find their new purchase of little or no value. It is seldom that a case is so desperate as not to admit of relief from art; and failures must, therefore, be ascribed to want of experience and ingenuity in the dentist.

THE TOOTHACHE.

THIS extremely painful affection is, unfortunately, too common to need a description, and too diversified in its nature to admit of a very accurate one. The pain frequently comes on suddenly, is lancinating and acute, and darts through the head in the direction of the temple or the ear. During the paroxysm, the patient is almost distracted with the intensity of the pain, and tosses his head about from side to side, prepared to submit to any remedy that promises alleviation of his torments. At other times it is more obtuse, and what is termed "a gnawing pain," which being unceasing, renders the sufferer extremely miserable, and deprives him equally of rest.

The predisposing causes of this complaint, as assigned by medical writers, are very numerous,

and comprehend caries, scurvy, catarrh, gout, rheumatism, the hysterical disease, dyspepsia, and pregnancy. The proximate cause, when the disease is not purely sympathetic, is an inflammation of the vascular membrane which lines the cavity of the tooth, or of the vessels which enter at the extremity of the fang.

It is well known, that inflammatory action usually produces a swelling of the part affected, and that the pain diminishes as the swelling increases. In this case, however, the membrane which is the seat of inflammation being confined within a bony cavity, but little swelling can take place, and hence the pain becomes almost insupportable. The same must happen when the vessels are inflamed, since they are pinched and confined by the smallness of the orifice. The inflammation may, possibly, never be so limited as not to affect both the vessels and the membranes simultaneously.

When a carious tooth is the seat of this disorder, it is either produced by those constitutional or internal causes which gave rise to the caries itself, or else it is a consequence of some incidental circum-

stance, as exposure to a current of air, eating or drinking something very cold or very hot, or touching the irritable membrane in mastication. When it occurs in a tooth apparently sound, it is to be referred to inflammatory action going on in the tooth, and which action is most probably destroying its internal structure at the same time; or it is a sympathetic affection, occasioned by nervous irritation.

Sometimes the pain is diffused, and occupies the whole jaw, or wanders from one tooth to another; in which cases we may consider it to be a rheumatic affection.

From the intimate connexion existing between the branches of the fifth and seventh pairs of nerves, an acute pain in the ear is a common concomitant of toothache, especially in the *dentes sapientiæ*; indeed the ear is sometimes the principal seat of the pain. Nor can we be surprised at this, when we recollect that grating sounds frequently produce that singular and disagreeable effect called "setting the teeth on edge," and that some emotions of the mind cause the teeth to "chatter" uncontrollably.

It sometimes happens, that persons suffering great torture from the toothache, are unable to fix upon the affected tooth, and urge the extraction of one remote from the true seat of the disease. In such cases it is common to strike the suspected teeth sharply with an instrument, or, if there be several in a carious state, to probe them; by which means the dentist will easily ascertain this point.

In addition to the general predisposing causes of toothache abovementioned, some authors cite others of an extrinsic character; as a residence in certain climates and situations exposed to peculiar influences. Thus Musitanus, a Neapolitan professor, informs us, that the inhabitants of the shores of the Baltic and other nations of the north of Europe, are extremely subject to this complaint, from the saline particles with which the air of those regions is impregnated. On the other hand it is stated, that in Egypt, where there is a peculiar mildness in the air, neither caries nor odontalgia is known.

The late Mr. Fox inclined to the same opinion, as regards both facts; although he ascribed the

effects to different causes, as dram-drinking in the one case, and simplicity of diet in the other. It seems perfectly consistent with analogy to suppose, that in places where sudden changes of temperature give rise to catarrhal complaints, the toothache will be found also to be most prevalent.

In the treatment of this distressing complaint, it is, of course, of the first importance to ascertain its precise nature, whether constitutional or local. When it is found to proceed from a decayed tooth, the first indication is to alleviate the sufferings of the patient by local applications; the second, if possible, to prevent the recurrence of the disorder.

To enumerate all the remedies which have been tried with the former intention, would require many pages. They consist principally of various kinds of stimulating and caustic substances, as the essential oils of nutmeg, cloves, thyme, cajeput; æther; the mineral acids, opium, camphor, alum, &c. Some of these must, unless applied with extreme caution, prove exceedingly prejudicial to the neighbouring teeth; and it is to be feared that many persons, for the mere chance of obtaining relief,

run the risk of causing irreparable mischief in this manner. A more rational mode of procedure is, the use of leeches to the gums, and holding warm water in the mouth, together with such antiphlogistic treatment as would be instantly had recourse to in ordinary cases of inflammation.

There is, I admit, something repulsive in the idea of placing a leech in the mouth, but it may be done by means of a proper leech-glass in such a manner as to remove those impressions. A reduced diet, with saline aperients, will be proper in most cases of odontalgia, and cannot fail to contribute to the cure when the inflammation runs high. If the mouth be dry, with much thirst, saline draughts, soda water, or small doses of nitre, frequently repeated, will be serviceable.

As topical remedies, perhaps the following may be recommended as those least injurious, and, at the same time, the most generally successful:—

Opium in a small pill.

The same with camphor.

The same with nitrate of potass.

Laudanum dropped on a pledget of lint or cotton
and applied to the carious part, or rubbed on
the teeth and gum with the finger.

Alum 1 dram.
Sweet spirit of nitre $\frac{1}{2}$ oz.

Or,

Nitrate of silver 1 grain.
Distilled water 1 dram.
applied frequently to the cavity on lint or cotton.

As regards the second indication, stopping the tooth, after the irritation has entirely subsided, is the first remedy to be tried; and if the caries do not make its appearance in some other part of the same tooth, which is by no means an uncommon occurrence, it will most probably be successful. The only instant and certain cure for purely idiopathic cases of odontalgia, as I conceive we may term those arising from decay, is extraction; but as this disorder frequently arises from constitutional causes, and may be removed by other remedies, I would caution the reader against being over-hasty in having recourse to this expedient. Persons are too apt to run to the nearest place where they extract teeth, and to sacrifice one after another, frequently without obtaining permanent relief thereby. It would be far more prudent to apply to a dentist, who may safely employ remedies that would be dangerous in other hands, and who, at all events,

will do the best that can be done were it only for the sake of his reputation.

When the pain is erratic, a blister may be applied behind the ear, and the face rubbed smartly with camphorated spirit, spirit of turpentine, spirit of hartshorn and sweet oil, or any rubefacient liniment.

When the patient is suffering from catarrh at the same time with odontalgia, and the latter becomes identified with the former disease, antimonial wine, the pulvis antimonialis or the pulvis ipecacuanhæ compositus, taken at bed-time in gruel or hot barley-water will prove beneficial, and the foot-bath will assist their operation. An aperient draught consisting of—

Epsom salt	3 to 4 drams.
Compound tinct. of senna	2 drams.
Tinct. of jalap	1 dram.
Camphor mixture	10 drams.

May be taken every other morning.

In gouty or rheumatic cases, probably colchicum would be the best remedy, beginning with small

doses of twelve or fifteen drops of the wine, combined with a saline aperient, and the liquor ammoniæ acetatis. The dose of colchicum wine might be gradually increased to a dram, twice or thrice a day. If this fail, sometimes the sulphate of quinine will effect a cure; and it will always be proper to prescribe a course of this invaluable medicine to restore the strength of the patient, and keep off the attacks of the complaint.

If the disorder appear to be connected with irritation of the stomach or first passages, attention must be paid to the state of those organs, and such remedies applied as the prevailing symptoms indicate. When there is a great heat of the stomach, ten grains of nitrate of potash with five of rhubarb may be taken twice a day. In all these cases, a proper evacuation of the bowels is of the highest importance, and the tone of the stomach should be restored by proper remedies. Small doses of quinine, that is, about half a grain in a wineglassful of the compound infusion of gentian, twice or thrice a day, will be found an excellent stomachic, and one which will speedily restore the appetite. When the quinine is given in larger doses, with a

view to its general tonic effect, it may be combined as under—

Sulphate of quinine	2 grains.
Rhubarb	3 grains.
Simple syrup as much as is requisite to form a pill	
Or,	
Sulphate of quinine	3 grains.
Extract of gentian	2 grains.
Syrup as much as is sufficient.	

In either case begin with two pills per day, and after a few days, increase the number to three; the former may be taken to the extent of four daily.

It remains, before I conclude this chapter, to mention a remedy for toothache, which has been tried by several celebrated dentists, and which was a favorite one with the late Mr. Fox; although, as he himself confesses with a candour highly honorable to him, he did not find it answer his expectations. It consists in extracting the tooth, with a view to destroy the nerve, and immediately replacing it. This expedient is by no means of modern date, as it was practised by Bourdet, and even before his time, Mouton proposed a similar plan, namely, to loosen the tooth so much as to distend the nerve and destroy its sensibility. It appears to me that

neither mode can be of any essential service, for we find, that when the vessels of a tooth are ruptured by an accident, the tooth generally dies, turns black in the course of time, and produces so much mischief to the surrounding parts, that it becomes necessary to extract it.

The German homœopathic system of medicine, which has lately attracted a good deal of attention in this country, has been applied to the cure of diseases of the teeth and gums, and my readers may, perhaps, expect some account of it in this place. I confess, that in the perusal of the only work that I have met with on the subject*, I have found nothing satisfactory.

The plan of the author is curious: he does not classify and describe the disorders, and then proceed to their respective treatment in the ordinary way, but he places at the head of each chapter the name of an article of the *materia medica*; mentions the time of taking it, the period of operation,

* Die Dynamik der Zahnheilkunde, bearbeitet nach den Grundsätzen der Homöopathie, von S. Gutmann, Zahnarzt in Leipzig. 1833.

and, after some general observations, enumerates the various symptoms which that particular medicine is calculated to remove.

If this mode of treating the subject be singular, the concluding portion of his work is yet more so; for there he gives us an alphabetical list of the diseases, and prescribes various specifics *according to the description and situation of the affected tooth!* For instance, the remedy for "simple pain" in a molaris of the upper jaw, on the right side, is ammonia; for the same in a molaris of the under jaw, magnesia; for the same in an upper incisor on the left side, phosphorus. Having given this general description of the author's mode of treatment, of the success of which he states some remarkable instances, I leave the reader to draw his own inference, not doubting, at the same time, what that inference will be.

OF THE EARTHY DEPOSIT CALLED
TARTAR.

WITH the exception of decay, there is nothing more destructive of the teeth, or more conducive to an unhealthy and disagreeable state of the mouth, than the accumulation of the calcareous substance which it has been long customary to designate by the above appellation, but which has latterly, with more propriety, been denominated the salivary calculus.

That this concretion is deposited by the saliva there can be little reason to doubt, for it is found by analysis that its component parts are held in solution by that secretion; besides, it is invariably found to accumulate most rapidly in those places which are nearest the orifices of the salivary ducts; hence the outer surfaces of the superior molares, and the posterior surfaces of the incisores of the under jaw, are most affected by this deposit.

Generally, indeed, the lower teeth are more encrusted with it than the upper; and if an individual have acquired a habit of masticating on one side, he will find the greatest deposit of the calculus on the opposite side, which proves that friction tends to prevent its accumulation.

When first deposited, the calculus is soft, friable, and of a light buff or yellowish hue; but it gradually changes to a dark brown or black, and becomes extremely hard. There is a kind peculiar to young persons, which is of a green cast.

The deposition of the salivary calculus appears to be an almost universal occurrence, and to be in a great measure unavoidable; but, in some persons, it is so slight that the ordinary friction of the teeth in mastication suffices to remove it; while, in others, it is so copious and constitutional, that the most scrupulous attention to cleanliness will scarcely enable them to keep it from becoming disgustingly abundant.

In most cases this deposit is very much influenced by the state of health, and more especially, of course,

by any circumstance which excites the secretion of the saliva, or changes its quality. Thus fevers of all kinds, complaints of the stomach and liver, colds, the use of mercury, the want of aperient medicine, excesses of the table, smoking, and even confinement to the house in those who are habituated to daily exercise, may be enumerated as exciting causes.

The tartar generally clings to the necks of the teeth, and carries on its operations like an insidious enemy; insinuating itself under the loose edge of the gum, it gradually detaches it from the teeth, and by its irritation induces absorption of the alveolar processes, thus undermining and ejecting the teeth which it has not the power, like caries, to destroy. For a time, indeed, the accumulated tartar itself will form a prop to the tooth; but when, by any accident, it is deprived of this support, it must inevitably fall out.

Persons are apt to think it hard to lose their teeth in this way, while perfectly sound; but they forget that they owe it to their own neglect, as

it seldom happens that this deposit cannot be kept in some sort of control by proper means.

The tartar is sometimes found in great quantities, fully equal in size to the teeth about which it has grown up, and it is not unfrequently very rough and rugged, causing great soreness and ulceration of the tongue or cheek: in such instances the whole mouth is very unhealthy, and the breath much affected by the fœtor of the vitiated secretions.

The only remedy for tartar is the operation called *scaling*. This should be performed with the utmost care, and with the instruments *alone*; all preparatory applications of an acid nature being highly prejudicial. The object should be to remove the tartar entirely, but without injury to the enamel; and if this be skilfully managed, the patient will experience no inconvenience, but, on the contrary, much comfort and satisfaction from an operation, respecting which unfounded prejudices are entertained. If through the awkwardness or ignorance of the operator, the enamel be injured, the remedy is likely to prove worse than the disease. When, from neglect, the calculus has accumulated

in large quantities, it is desirable to remove it gradually, at intervals of ten days or a fortnight, lest the sudden exposure of the necks of the teeth should produce pain and tenderness.

The teeth being once cleansed from this unsightly and injurious accumulation, the individual should be careful, by the use of a proper dentifrice and lotion, to prevent it from again settling on the teeth; when the gums will soon grow up to their former height, and the threatened absorption of the sockets, and consequent loss of teeth, be prevented.

THE DENUDING PROCESS, OR LOSS OF
THE ENAMEL.

FOR this singular, and hitherto unexplained, affection of the teeth, it is difficult to find an appropriate and expressive name. I believe it was the celebrated Hunter, who first called it *denudation* : a designation, which conveys, it must be confessed, but a general and obscure notion of the disorder ; at the same time I am not prepared to suggest a better.

Nor is it a matter of great facility, to give a clear description of the peculiar appearance which this disease exhibits. It is generally observed, however, in either of two forms. In one case it attacks the incisors only in the outer surface of the enamel, a slight longitudinal depression of which is first perceptible. Had the enamel been melted like

wax, and a small quantity scooped out before it had time to cool, it might be expected to present precisely the appearance here seen. It is perfectly smooth, and as highly polished as the rest of the enamel. In the other case, the groove or depression, instead of being longitudinal, is horizontal, and is not confined to the incisores, but extends gradually to the cuspidati, the bicuspides, and occasionally to the molares.

So long as the disease is removing the enamel only, there is no discoloration of the tooth; but when the bony structure is laid bare, it changes colour, though it still frequently remains sound for a considerable length of time afterwards; at other times the bone is removed to such an extent as to expose the membrane, as in decay; and occasionally the latter disease is induced by the denudation of the bone, which is thus exposed to the various causes of external inflammation.

The teeth affected by this complaint, are commonly tender, and susceptible, in a high degree, of

the variations of temperature, the application of heat or cold, of acids, &c.

The causes of this remarkable complaint, both proximate and remote, remain a complete mystery, nor am I aware that any writer has given even a clue to their discovery. Mr. Hunter considered it to be a disease inherent in the tooth itself; Mr. Fox ascribed it to a certain solvent quality in the saliva; Mr. Thomas Bell believes the former opinion to be erroneous, and he shews that the latter must be so, from the circumstance that certain teeth are more liable to the affection than others. It cannot be produced by the process of absorption, because it invariably commences in the enamel—an inorganized substance; and that it is occasioned by friction or the use of acid dentifrices, is disproved by the fact, that it is known to occur in cases where neither of these causes could have operated: besides, friction could not be so limited in its effects; and acids would act upon the whole surface of the tooth, as well as in a totally different manner, namely, by rendering the enamel softer and rougher.

I must be content, like my predecessors, to leave this matter in obscurity, and as I can give no satisfactory account of the causes of the disease, I will not pretend to prescribe means either of prevention or cure.

INTERNAL ABSCESS.

ACTIVE inflammation of the delicate and exquisitely sensitive membrane which lines the cavity of the tooth, is accompanied by a deep-seated severe pain, of a peculiar kind, owing, no doubt, to the circumstance to which I have before alluded, namely, the compression of the part inflamed, which has little or no room to swell, as in ordinary cases of inflammation. From the same cause, the consequences of inflammatory action in a part so situated must, naturally, be unusually severe; and thus we find, that the vessels which ramify on the membrane of the tooth, frequently take on a diseased action, by which suppuration of the membrane is induced; absorption of the bony substance follows as an immediate consequence, and the orifice at the extremity of the fang becomes enlarged. The pus discharges itself into the alveolar cavity, where it again produces absorption; the

gum in the mean time becomes inflamed, acquires a spongy texture, and, at length, affords a passage to the collected pus.

Owing to the mortification of the membrane, the purulent matter so discharged is extremely foetid; a circumstance which some writers have regarded as constituting a diagnostic distinction between internal abscess and common abscess of the alveolus, in which latter disease the pus is nearly inodorous, except where the tooth has become carious.

At that stage of the disease, in which mortification of the membrane commences, the tooth begins to acquire a dark colour, the common result of the loss of vitality.

The only remedy for this affection, when it has extended to the formation of pus, is extraction; for if the tooth be retained, the opening will remain fistulous, and the foetid discharge continue to infect the breath, while the gums will become extensively ulcerated, and occasion absorption of the alveolar processes of the neighbouring teeth.

In the early inflammatory stage of the disorder, the free use of the lancet, or the application of leeches to the gums, with the aid of astringent lotions, may succeed in checking it; therefore, whenever a severe, heavy pain is felt, indicating the presence of inflammation, these means should be had recourse to *without delay*.

EXOSTOSIS OF THE FANGS.

LIKE other bones, the roots of the teeth are sometimes affected with exostosis, which consists in a deposit of bony matter, of a hard compact texture, more or less transparent, and somewhat resembling ivory*.

This affection is tardy in its progress, and is usually attended, at first, with only a trifling degree of pain, so that the existence of the disease may, and most commonly does, remain unnoticed for a considerable time. It seldom occurs in a tooth otherwise healthy, but seems to be occasioned by some slight chronic inflammation, which induces and keeps up a morbid action of the vessels, either of the proper membrane of the tooth, or the periosteum of the fang.

* The arteries are the agents employed in the formation of bone. Any artery in the body may assume this function; hence we find ossification taking place in parts where it should not exist, and which it ultimately destroys; as the heart for instance.

When the enlargement of the fang produces a corresponding extension of the cavity by the process of absorption, the pain will naturally be inconsiderable; but when this is not the case, the mechanical pressure of the root must not only occasion violent torture to the patient, but be productive of those other effects which commonly result from irritation, namely, a thickening of the periosteum and suppuration.

Exostosis, perhaps more than any other affection of the teeth, is apt to give rise to those excruciating pains which have so frequently been mistaken for tic douloureux, and for which constitutional remedies have been prescribed with no effect.

All persons, then, suffering from those paroxysms which are termed "nervous pains" would do well to cause their teeth to be rigidly examined, and severally struck with some metallic instrument, with the view of resorting to extraction, which is the only remedy in this case, should there be good reason to ascribe their sufferings to some such purely local cause.

MECHANICAL INJURIES OF THE TEETH.

In the chapter on "Decay," I alluded to mechanical injuries as a frequent cause of that disorder, but my observations were principally confined to those minor accidents of the kind which happen in mastication, or from an improper use of the teeth. I come now to consider those graver cases, in which more extensive injury is occasioned by a violent blow or fall, and where, from the nature of the cause, the effect is usually limited to the front teeth.

The most common result of a smart blow from a stick, stone, cricket-ball, &c., or from striking the teeth against any object in falling, is a fracture of the enamel, of greater or less extent; but when the teeth are struck with great violence, they are sometimes loosened, sometimes broken in half, or totally

shivered, and occasionally the fangs are driven by the shock deep into the bony substance of the alveolar process.

When the enamel of a healthy tooth is fractured, the part should be filed smooth; and if the bone be not denuded, the injury may probably not extend farther; but when the bone is laid bare, it becomes liable to decay from the common external causes of inflammation before described; however, it may remain for a number of years in the same state, with no other inconvenience than tenderness to the touch in the abraded part, and a sensibility to hot or cold liquids, attended by a slight discoloration. In some cases of this nature, a deposit of bone has taken place within the cavity to remedy the external defect, and afford the requisite protection to the vessels of the tooth.

When the bone itself is fractured to such an extent as to expose the membrane of the tooth, inflammation will ensue; the tooth will become so exquisitely sensitive, that a touch of the tongue will be insupportable; and if it be not extracted,

the inflammation will, most probably, extend rapidly to the root and the alveolar cavity.

If a tooth be loosened by accident, it will very often become fast again, and continue as serviceable as before; but if the vessels have been ruptured, and the tooth thus deprived of vitality, it will gradually acquire a bluish tinge, and sometimes a darker hue.

When the blow is so violent as to force the tooth entirely out of its socket, without much injury to the latter, it may be replaced and tied to the adjoining teeth, with a good prospect of its retrieving its firmness; but when the alveolar process is fractured, inflammation will most probably ensue, and it will become necessary, ultimately, to extract the tooth.

Accidental injuries of the teeth should be immediately attended to by a dentist, for they mostly affect those teeth which are essentially important both to enunciation and personal appearance; and it is requisite in these, as in other cases of wounds

and bruises, to guard against inflammation by proper remedies.

I need scarcely remark, that injuries of this kind to the temporary teeth are but of little consequence, comparatively, as the mischief will be remedied by a permanent set; and even when one of the latter is lost by a young person, the gap is frequently filled up by the enlarged growth of the neighbouring teeth, which, under such circumstances, have a tendency to approach each other.

DISEASES OF THE GUMS AND ALVEOLAR
PROCESSES.

I HAVE already described the gums as a vascular semi-cartilaginous substance, possessing, in a healthy state, but little sensibility; a fact which is self-evident, when we reflect that the friction of hard and rough substances in mastication, occasions no pain; and that in aged persons, the gums absolutely perform the functions of teeth. In disease, however, and that comparatively slight, the case is sadly altered. An inflamed gum is exceedingly sensitive: the child will refuse the breast, and the adult restrict himself to "spoon-meats" rather than incur the risk of irritating it.

The gums are, besides, very easily disordered, for that truly English malady, "a cold," is sufficient to render them tender, flabby and spongy.

Between the gums and the alveolar processes which they envelope, there is at all times an intimate connexion, and under circumstances of disease so strong a sympathy exists, that we seldom find one of these affected for any period, or to any considerable extent, without the other participating more or less in the disorder. Hence both these structures are liable to suffer from disease and irritation in the teeth, and are equally subject, with other parts of the body, to idiopathic diseases, and to the influence of constitutional irritation.

One of the most common affections of the mouth, is that denominated "gum-boil," but which, for the reason that the gum is but secondarily affected, I consider improperly so called; and I shall follow an able writer already quoted, in naming it

ALVEOLAR ABSCESS.

This disease originates within the socket, and is a consequence of inflammation of the periosteum of the fang of the tooth. The teeth whose roots are thus affected, are generally in a carious state: sometimes the crowns are entirely gone, and the fangs being totally decayed, act as lifeless extraneous bodies upon the surrounding parts, and

call forth an effort of Nature for their expulsion. Occasionally, however, the inflammatory action is found to occur in a tooth previously healthy, and is accompanied by toothache; it may also result from mechanical injuries; and I have known cases where persons were remarkably subject to this affection on every slight cold. In the case of a young lady who had but one carious tooth, it seemed not only constitutional but hereditary; as she informed me that her father (who had never changed his first teeth), was, like herself, very much troubled with gum-boils.

Whatever be the remote cause of the disorder, it is the immediate consequence of inflammation terminating in suppuration. Where matter is thus formed within the alveolar cavity, the tooth becomes exceedingly sore, is loosened and slightly raised by a thickening of the periosteum of the socket; the gum becomes red, thickens, and throbs with pain; and the cheek at length participates in the disorder, being more or less tumefied.

The matter is enclosed within a sac, which surrounds the extremity of the fang, and which, by its

pressure against the socket, induces the ulcerative process, whereby a portion of the side of the socket is first removed, and then the gum immediately over the fang of the tooth while an opening is formed for the escape of the pus.

In some cases, the inflammation will subside as soon as a discharge of the matter has taken place; but most commonly a fistulous opening remains, from which matter is occasionally, if not constantly, exuded; and the extraction of the diseased tooth is the only effectual remedy.

At other times, the ulcerative process goes on to a very considerable extent, either producing a sore in the cheek, which will inevitably be disfigured by an ugly scrofulous-looking scar; or, if it take another direction, committing frightful ravages on the alveolar processes, on the palate, and even the maxillary bones, in which mortification not unfrequently ensues.

Many instances must occur in the practice of every dentist, in which, from neglect of the alveolar abscess, or from the invincible repugnance of

the patient to extraction, the mischief extends to the loss of several teeth, and sometimes of a portion of the jaw-bone; in which latter case, the tedious process of exfoliation is set up, and the sufferer kept in a state of uneasiness, becoming disgusting to himself and others, from the constant accumulation of an offensive discharge.

Such being the not unfrequent consequences of the disease under consideration, it is obviously of the first importance to employ active means, with a view to a check it in its early stage.

The indication of cure is the same in this as in other cases of abscess. In the inflammatory stage, local bleeding by leeches, low diet, saline aperients, diaphoretic and refrigerant remedies will be proper. These will sometimes succeed in checking the disorder, and prevent the formation of pus; but when it arises from the irritation of a dead root, or a tooth far advanced in decay, there is much less probability of success than when the tooth is little or not at all affected by caries, or when the inflammatory action has been brought on by mechanical violence.

In the suppurative stage, the formation of matter may be encouraged by fomentations, and the swelling punctured, with a view to evacuate it as soon as possible. Some writers recommend the application of cold lotions to the face (at the same time that fomentations of the mouth are employed), to prevent the bursting of the abscess externally.

It must be confessed, however, that these means are, in most cases, only palliative; and so long as the tooth which has occasioned the disease is retained, a recurrence of it from time to time must be anticipated: it will, therefore, be desirable to resort at once to extraction, more especially where the tooth is decayed, or sore to the touch, and loosened in the socket.

Extraction generally effects a rapid cure of the abscess; but sometimes in strumous subjects, and others in bad general health, the progress is more tardy: and under particular states of the constitution, we find it assume a malignant character.

Such cases, as well as those tumours of various kinds, which, though arising from irritation of the teeth, owe their peculiar character to constitutional causes, fall more properly within the province of the surgeon.

SWELLING AND TENDERNESS OF THE GUMS.

THIS affection, popularly called "scurvy," is of very frequent occurrence, and is characterised by preternatural redness of the gum, a turgid state of the vessels, and a tendency to bleed on the slightest touch.

This is the first and simplest form of a disease, which is probably excited in most cases by morbid irritability of the stomach, or by some constitutional affection, as a fever; at other times it may be ascribed to a strumous habit, or a cachectic tendency; and the use of mercury to excess can scarcely fail to give rise to it, sooner or later.

When the first symptoms which I have described are neglected, the gums gradually become soft, spongy, and tender to such a degree, as scarcely

to admit of the mastication of anything hard. In consequence of ulceration going on in the periosteum of the socket or the fang, matter exudes in small quantities near the necks of the teeth, which are soon exposed by the receding of the gum. The alveolar processes next participate in the irritation, and becoming at length totally absorbed, the fangs of the teeth are seen denuded and blackened, presenting a most disagreeable appearance. Finally, deprived of all support, the teeth drop out one after another; and thus not unfrequently leave persons in the prime of life almost toothless.

It is a remarkable fact, that the process of absorption is never found to progress more rapidly in the gum than in the socket, so as to expose the bone of the latter. Whenever the gum recedes from a tooth, the socket is removed also to the same or a greater extent, and the tooth itself laid bare.

As I before remarked of the salivary calculus, which produces similar results, this disease appears almost universal, for few persons are totally exempt from it through life.

When attended to in its earliest stage it is easily controlled, and the free use of the lancet, assisted by lotions of an astringent nature, such as tincture of myrrh, or of myrrh and bark, properly diluted, or a solution of alum, will speedily remove it. If the gums have become spongy and loose, leeches may be more serviceable as abstracting a greater quantity of blood; or the scarification may be repeated at intervals, care being taken to render it effective by cutting sufficiently deep. The best mode, perhaps, is to pass a common lancet between the teeth, quite down to the transverse sections of the alveolar processes. I agree with some practitioners in thinking it desirable to make the incisions longitudinally, because, otherwise, the gums, in healing, will be drawn away from the necks of the teeth.

In obstinate cases, where there is a strong tendency to ulceration, and the disease threatens to prove rapidly destructive, more powerful means must be employed: a solution of lunar caustic applied with a camel's hair pencil to the edges of the gums, or used as a lotion (sufficiently diluted) will generally prove efficacious.

ABSORPTION OF THE ALVEOLAR PROCESSES.

CONNECTED as the alveolar processes are with the teeth on the one hand, and the gums on the other, it is not surprising that they are found to be sympathetically affected by all the diseases of those parts. Their absorbents, which, as we have seen, perform so important a part in removing the fangs of the temporary teeth, seem to retain, through life, an unusual degree of excitability, and are consequently called into increased action by inflammation, either of the teeth or gums. Whenever the teeth are removed by any cause, the sockets become completely absorbed; thus, in aged persons who have lost all their teeth, we find the alveolar processes entirely gone; the loss of substance causes the maxillary bones to collapse; the roof of the mouth becomes nearly flat, and the chin being drawn up by the muscles of the lower jaw, the face

is shortened by almost a couple of inches, while the flesh is puckered up into wrinkles, and we have before us the personification of old age.

Absorption of the alveolar processes is sometimes found to occur as an idiopathic affection, the teeth being sound, and the gums remaining free from the symptoms which I have described in treating of the complaint called "Scurvy." As this disease commonly shews itself between the ages of forty and fifty, and is, in fact, nothing more than the operation of the same cause by which the teeth are naturally removed in advanced age, some writers regard it merely as the first step towards general decay.

I am inclined to think this opinion correct, generally speaking; but when it occurs in young persons, we must regard it as a genuine disease, which owes its origin to some constitutional idiosyncrasy, or to some remote or latent cause of irritation. In some cases the ravages of this formidable disease are confined to one or two teeth; in others they extend to the whole of one or both jaws.

As the absorption of the alveolar processes proceeds, the gums participate in the disorder, and recede from the teeth. They sometimes assume the turgid, unhealthy appearance described in the last chapter; and the disease becomes fully identified with "scurvy."

Whether that be the case or not, the treatment recommended in the last chapter, will be equally applicable to this disease; and where the teeth are loosened, we must resort to the usual mechanical means of rendering them firm and serviceable.

ALVEOLAR EXOSTOSIS.

THE above may, perhaps, not be considered an inappropriate name for that affection which consists in a deposition of bony matter within the alveolar cavity, by which the tooth is forced out of its natural position, and sometimes totally ejected.

The teeth most liable to be thus displaced are the incisors, especially those of the upper jaw; and, generally, only one tooth is affected at a time.

Owing to some morbid action of the arteries which supply the periosteum of the cavity, a formation of bone takes place, sometimes at the bottom of the socket; at others on one side. In the former case, the tooth appears merely elongated; in the latter, it is thrust forward, backward, or sideways, according to the situation of the deposit.

Occasionally the alveolar processes become enlarged by exostosis, and the teeth separated so far as to leave an unsightly gap.

All these affections occasion deformity of the mouth, and being very unmanageable, almost invariably result in the loss of the teeth. When these are not extracted, they are sure to be thrust out; for, while the formation of bone is going on in the socket, the fangs are removed by absorption, set up no doubt by the irritation produced.

Not unfrequently, when the deposition of bony matter takes place at the bottom of the alveolus, the minute foramina, by which the vessels of the tooth are transmitted, become closed up, when the tooth loses its vitality, turns black, and is apt to occasion abscess and other mischief in the neighbouring parts.

THE EFFECTS OF PTYALISM ON THE TEETH
AND GUMS.

IN the foregoing pages, I have taken occasion to allude several times to the baneful effects of mercury, when given to such an extent as to affect the constitution.

The circumstances which invariably attend the exhibition of this Herculean medicine, are such as to convince us that it must become a fruitful source of disease in the teeth and gums, since these parts are so affected by its peculiar action as to form the most certain guide for its administration.

As soon as the system becomes affected, the saliva is secreted in unusual quantity, the gums are sore and turgid, and the breath fœtid. This is what is called a state of ptyalism or salivation.

If the mercurial action be kept up, all these symptoms become greatly exaggerated; the saliva pours from the mouth incessantly; the gums swell to

the tops of the teeth; the teeth themselves are loosened by a thickening of the alveolar periosteum, and rendered so extremely tender that mastication is quite out of the question; while, in severe cases, every tooth in the head aches, and even the jaw-bones are affected with a pain resembling rheumatism.

One of the most remarkable facts connected with the exhibition of mercury is, that in some constitutions a single dose will produce decisive, although mild, symptoms of ptyalism. Two grains of calomel, combined with three of antimonial powder, prescribed for a young lady in a case of ophthalmia, have been known to occasion, in one night, soreness of the gums, and foetor of the breath. In other cases, eight grains, combined with opium, have been taken daily for ten days, before a similar effect was produced.

If to the local action of this powerful remedy above described, we add the prostration of strength which accompanies, and the biliary derangement which commonly follows, its administration, we shall have no difficulty in accounting for the mischief which it occasions.

Mercury exercises a specific action on the absorbent system, and in some ophthalmic cases, it is occasionally given to a great extent, with the sole intention of calling into vigorous action the absorbents of the eye.

Now, as we have seen that the absorbent vessels connected with the alveolar processes are extremely active, and easily excited, it is obvious that they must be influenced by a mercurial course; and accordingly, we find one of the common consequences of the latter to be a premature loss of the teeth from absorption of the alveolar processes.

Sometimes the teeth will drop out during the exhibition of mercury; and occasionally the mischief extends to ulceration of the whole mouth, terminating in adhesion and contraction of the parts, so as almost to prevent the patient from taking sufficient food. At other times, mortification of the alveolar processes and maxillary bones takes place to a frightful extent.

In ordinary cases, however, the symptoms attending ptyalism are such as I first described, and

these subside soon after the discontinuance of the mercury: the gums retire to their former level, and the teeth become as firm as before, leaving no apparent consequences of the mercurial excitement. There is too much reason, at the same time, to fear that these consequences will, sooner or later, become visible. I have sometimes noticed; that the gums recede farther than they ought, leaving the necks of the teeth bare; and the latter are not unfrequently a prey to the salivary calculus.

In persons who have undergone several courses of mercury, I have seen a general wasting of the gum, tartar of the front teeth, and the molares affected with caries to the number of three or four, the crowns of which gradually crumbled away without pain. In one of these cases, the individual had never suffered from toothache, *except* during the administration of the medicine.

Little can be done to alleviate the distressing effects of mercury on the mouth, so long as its action on the system is kept up. Astringent lotions will afford some relief; but they must be resorted to with caution, because it is desirable to

watch the state of the mouth as the best criterion of the general operation of the mercury.

After its specific action has ceased, if the gums continue swollen, the lancet may be freely employed; and the general state of the mouth will call for redoubled attention, to prevent, as much as possible, the evils likely to result, not only from the increased action of the absorbent system induced by the mercury, but from the temporary unavoidable neglect of the teeth.

DEFECTIVE PALATE.

NATURAL defects in the structure of the roof of the mouth occasionally occur.

The most common instance of malformation, is that of the palate-bones being too much arched, a circumstance, however, which occasions no other inconvenience than an unpleasant roughness of the voice, especially in an attempt to sing.

Sometimes there is a fissure in the bony structure of the palate; at others the *velum pendulum palati*, or soft palate, is defective; and, occasionally, the deficiency extends to both. In these cases, articulation is impeded, and much annoyance is felt from the passage of food into the cavity of the nose.

Imperfections of the *ossa palati* are more frequently a consequence of some affection of the gums and alveolar processes, or the secondary

symptoms of syphilis, which latter very often attack these bones.

The extent of the mischief varies according to the causes which have produced it.

Sometimes there is a considerable exfoliation of the palate, attended with the loss of several of the front teeth, together with their alveolar processes. At others, there is merely a loss of substance of the palate-bone from caries, occasioning a fissure of greater or less extent.

To remedy these defects, whether natural or incidental, is exclusively the province of the dentist; and such have been the improvements of modern times in the mechanical department of the dental art, that there are few cases of the kind to which a remedy cannot be applied with complete success.

When, however, the soft palate is defective or lost, there is considerable difficulty in treating the case, owing to the extreme irritability of the parts connected with it, which is sometimes so great as to render it impossible to supply the defect.

OBSERVATIONS ON THE IMPORTANCE OF
THE TEETH.

To insist on the importance of the teeth, whether in regard to the functions of digestion and articulation, to which they are so essential, or to personal appearance, in which they are so much concerned, must appear a waste of words, were it not obvious that there are many persons who never give themselves the trouble to think upon the subject; who seem scarcely aware that they possess teeth at all, while their gross and culpable negligence renders that fact too apparent to their friends and associates.

Mastication is the first process of digestion, and unless it be duly performed, the subsequent processes can never go on properly. It is a mistaken

notion that the mere chopping of the food is all that is required, and that "patent masticators," or any other contrivance can supply the place of teeth.

By the motion of the maxillary bones in the comminution of food, the salivary glands are compressed, and the saliva, being poured forth from the ducts, mingles with the food, which is turned about by the tongue until every portion of the mouthful is duly incorporated with the saliva. Then, and not till then, is it properly prepared for deglutition.

So essential is this preparatory process, that the neglect of it is sufficient to occasion dyspepsia; and it is generally found that those who masticate well, digest their meals much better than such persons as are accustomed to eat too quickly.

Dyspeptic patients invariably find soups, stews, and hashes, less easy of digestion than plain solid food, and I think the chief reason of this is, that the former, requiring little mastication, do not sufficiently excite the secretion of saliva.

I need not dwell upon the numberless concomitant evils, which may thus owe their origin to imperfect mastication. It is sufficient to know that artificial teeth are now brought to such perfection as to perform this function in a manner little inferior to the natural teeth, and that they may be used with every comfort.

The next point of view in which we are to consider the importance of the teeth, is that of their connexion with the grand prerogative of man—the gift of speech. The teeth are absolutely essential to a perfect articulation, and are mainly concerned in the modulation of the voice. Their preservation is, therefore, essential to all persons who do not seclude themselves from society; for what can be more disagreeable than that mumbling which renders conversation a task, and robs it of half its charms; unless, indeed, it be the sputtering in one's face which sometimes accompanies the exclusive favor of a confidential *sotto voce* communication?

To all public speakers, whether in the senate, in the pulpit, at the bar, or on the stage, teeth, real or artificial, are a *sine quâ non*. Without them

the graces of eloquence are lost, and the powers of oratory very much diminished.

No person to whom a correct articulation, and a clear impressive delivery are of consequence, can be ignorant of the effect which the loss of teeth has upon the powers of voice, and none I conceive will delay to call in the aid of art; but it would be well if all such persons were impressed with this fact beforehand, as one of the strongest inducements to bestow upon their teeth the necessary care.

As an essential point of beauty, the teeth must ever stand pre-eminent. No regularity of features, no brilliancy of complexion, no sparkling eyes, or silken braids of jetty hair, can render that lady beautiful who, when she opens her lips (though they be of coral), discloses a set of teeth irregular or discolored. On the contrary, even homely features and a sallow complexion are embellished and rendered agreeable by a good set of teeth. A mouth large and ill-formed will pass unnoticed, when it contains teeth beautifully white and even.

In short, under every circumstance, good teeth, well kept, will prove a redeeming feature, be the

others what they may. Even the sooty African becomes an object of some interest, when he smiles and exhibits a perfect row of white teeth, in strong relief against the ebony of his skin.

On the other hand, the effects of decay, the accumulation of tartar, the blackened and denuded fangs, and the taint of the breath, which is a common concomitant of bad teeth, will invariably prove disgusting and loathsome.

Regular teeth, white, and free from all extraneous matters, are an ornament equally attractive in either sex. Those persons who do not possess this natural advantage, should endeavour, by extreme care and cleanliness, and a timely resort to artificial aid, to remedy the imperfections, and supply the deficiencies, of nature, in order that their teeth, if not an agreeable object, may be prevented, as far as possible, from becoming a repulsive one.

HINTS FOR THE PRESERVATION OF THE TEETH.

IN the foregoing pages, I have endeavoured to shew, that *neglect* is one, and perhaps the most prevalent, cause of decay, as well as of most of the other disorders to which the teeth are liable.

In treating of these disorders under their respective heads, I have stated the remedial and preventive means applicable to each, as far as such are known; but still I think it may be of service to my readers, to recapitulate here the advice that I have given, and which, for the sake of being at once clear and concise, I shall put in the shape of twelve hints or maxims.

1.—Pay proper attention to the general health, and especially to the daily relief of the bowels*.

* The simplest and best method of attaining this important object, consists in the use of injections of warm water. This observation applies more particularly to persons of a constipated habit, who, being under the necessity of having almost constant recourse to art, are too apt to injure their stomachs by taking

2.—Cleanse the teeth with soft brushes and tepid water, at least night and morning; also after dinner if convenient: brush them both horizontally and vertically.

3.—Have three tooth-brushes; one of the common shape, nicely fitted to the size of the teeth, to avoid friction of the gums; a second, with the brush-part placed at right angles, and the handle a little curved inwards, for cleansing the inner surfaces of the teeth; a third composed of harder hair cut of various lengths, like the modern hair brushes, to remove any particle of food that may be lodged between the teeth, or any salivary deposit that may adhere to them, while yet in a soft state. The two former of these are for constant use; the last, as the physicians have it, *pro re natâ*.

nauseous and irritating drugs, and thus aggravate their disorder. Happily, the prejudice, *peculiar to this country*, against the use of *lavements*, is at length giving way to conviction; and the various neat contrivances for the purpose find a ready sale. Among these, there is none, perhaps, more simple and efficient than the clysmaduct, invented by Mr. Jukes; and certainly the public are greatly indebted to that gentleman, for his endeavours to conquer a false delicacy which has proved so insuperable an obstacle to the employment of a remedy that is universal on the Continent, and where, it may be observed, *en passant*, dyspeptic complaints are far less prevalent than with us.

4.—Use some good and *harmless* dentifrice twice or thrice a week.

5.—In taking any acid medicine, employ a medical spoon; if this be not at hand, rinse the mouth immediately afterwards with pure water, and wipe the teeth carefully with a napkin. A little magnesia or soda, added to the water, will effectually prevent any mischief from the acid.

6.—Frequently inspect the teeth by means of a mouth mirror, or, which is better, pay periodical visits to a dentist*.

7.—Avoid all those causes of mechanical injury to the enamel, to which I have alluded in the chapter on caries.

8.—If a toothpick be absolutely essential to personal comfort, use it as little and as carefully as possible. Prefer a soft quill, very thin flexible ivory or tortoise-shell, to either gold or silver, and the tooth-brush before described to everything else.

* This practice is now become very common among the higher classes, and in schools of the first rank.

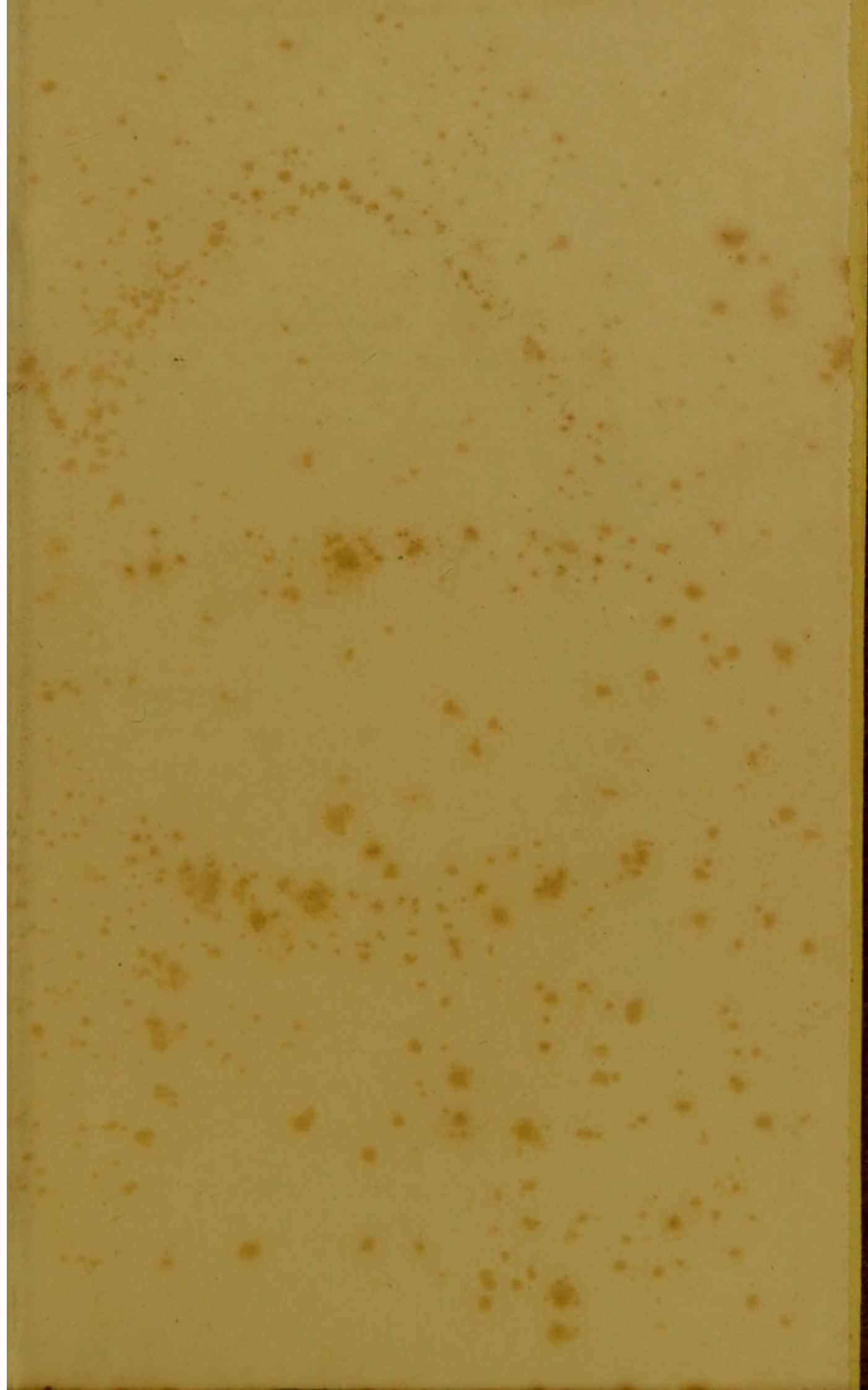
9.—If the teeth ache or become loose; if the gums swell or recede from the teeth; if tartar be formed, or a trace of caries discovered, call in professional advice without delay.

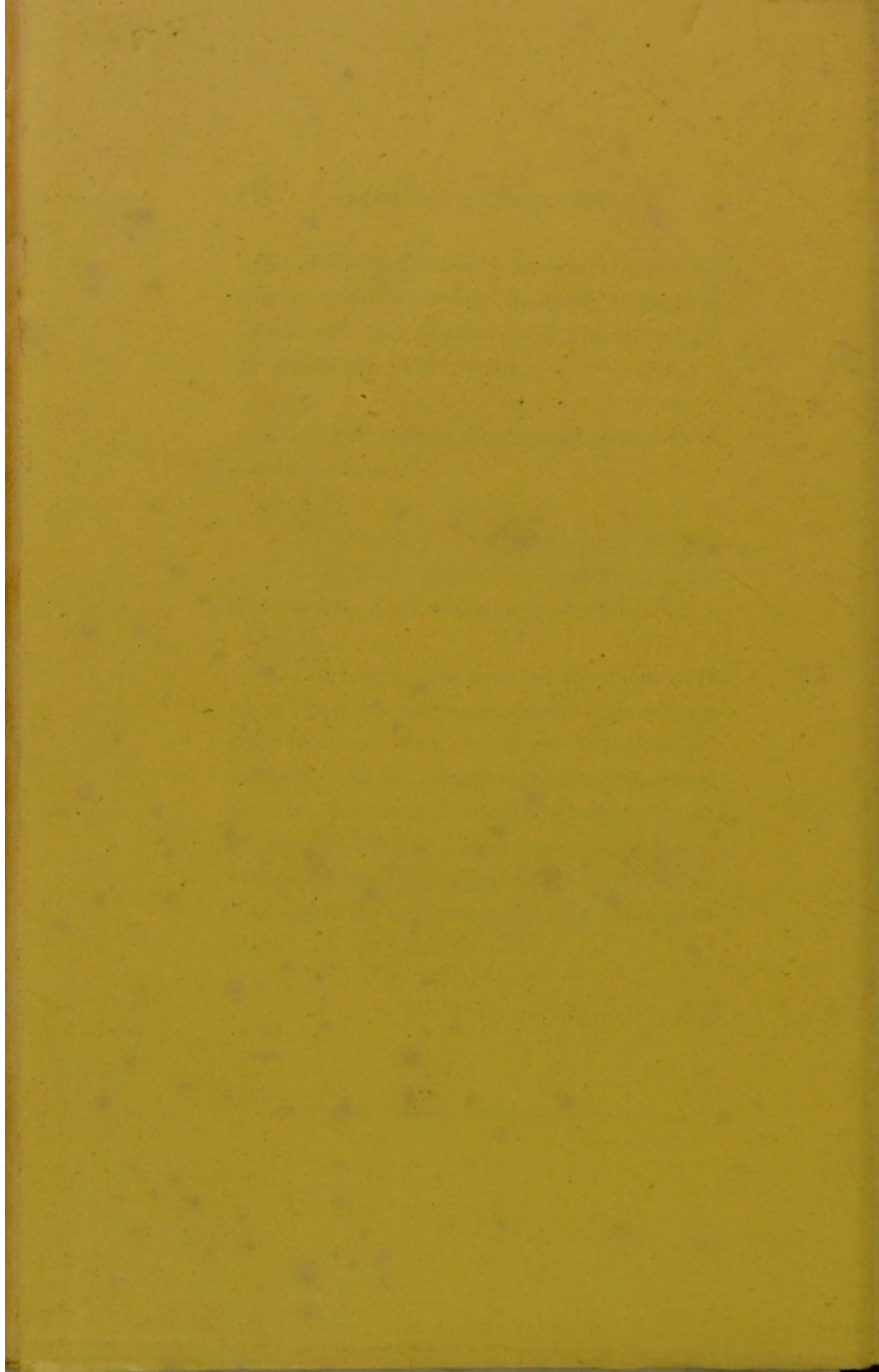
10.—Resort to extraction of the teeth only as a *last* resource.

11.—When a tooth is lost or extracted, have its place immediately supplied by an artificial tooth, with the view of preserving those adjoining.

12.—Remember that there are three periods of life at which the teeth demand more than ordinary care: these are—first, during the first dentition: secondly, while the temporary teeth are being shed and the adult teeth protruded: thirdly, when in the natural course of things, decay and absorption commence: lastly, recollect that the same observations apply to all circumstances of interrupted health.

FINIS.





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