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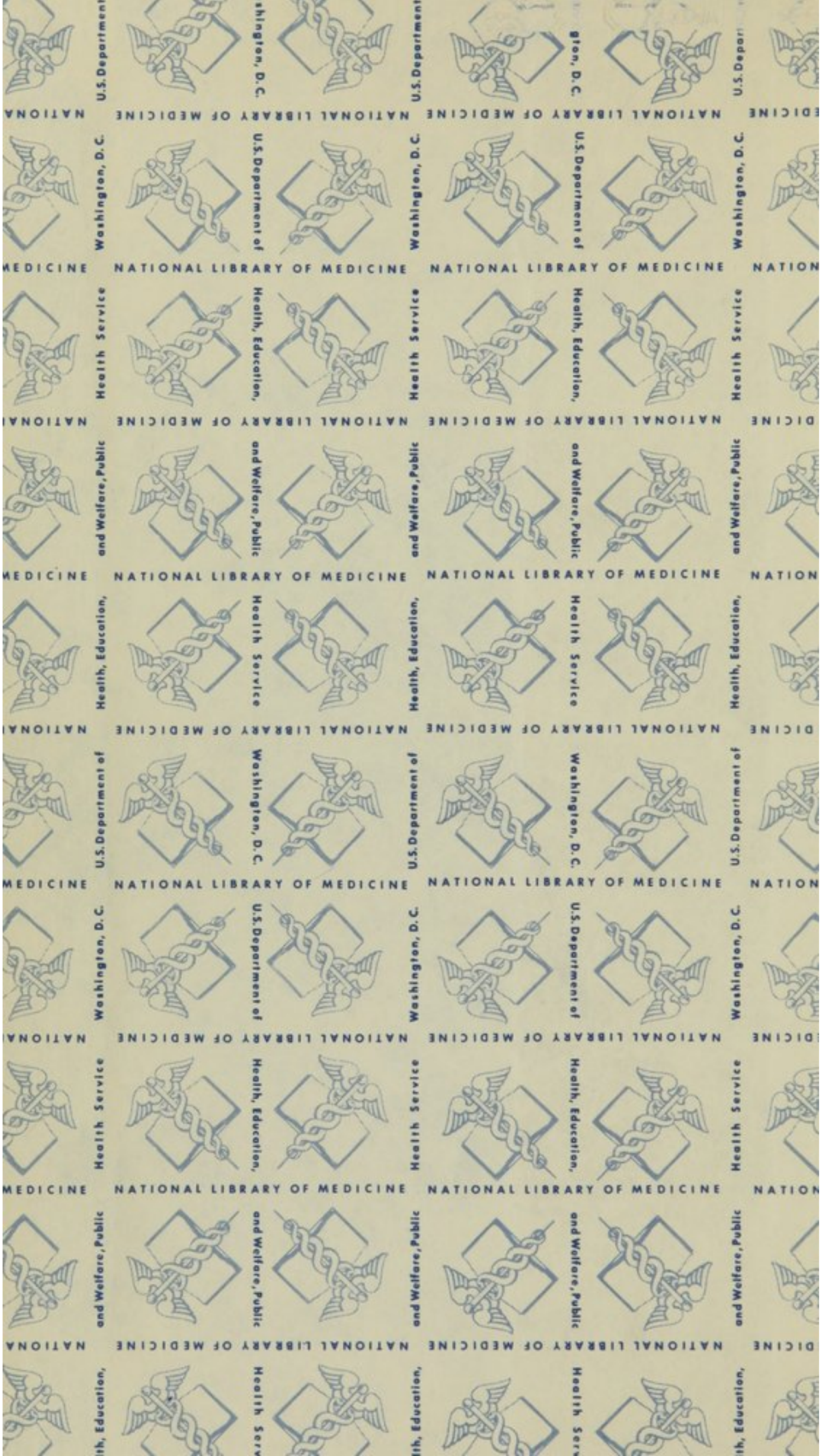
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DISSERTATION

ON THE

DISEASES OF THE

MAXILLARY SINUS.

Read before the American Society of Dental Surgeons, at their Third Annual Meeting, held in Boston, July 20, 1842.

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PREFATORY ADDRESS.

Mr. President and Gentlemen:—

At the last meeting of this association, I had the honour to submit to your consideration, a memoir on the "Characteristics of the Teeth, Gums, &c. &c." and I now beg leave to submit another, on the diseases of the maxillary sinus; and in doing this, I am actuated by the belief, that a short, and at the same time, comprehensive treatise, on the morbid affections of this cavity, would not be altogether unacceptable to the members of the dental profession.

Few works, devoted exclusively to these diseases, and none in our own language, that I am aware of, have ever been published. Most that has been written upon them is contained in works on general surgery; many of which are either out of print, or can be obtained only

with great difficulty. Mr. Thomas Bell, it is true, in his excellent work, entitled, "The Anatomy, Physiology, and Diseases of the Teeth," treats upon them at considerable length; but, it could hardly be expected that, in a publication of this kind, as much space should be given to the diseases of this cavity, as their importance demands. The description given of them, however, by this able and accomplished writer, discovers an accuracy of observation that could only be possessed by such as have made them a subject of close and thorough investigation. I might also mention the names of others, who have written upon one or more of these affections, but it is unnecessary to do so now; I may hereafter have occasion to refer to some of their opinions.

But, although the diseases of the maxillary sinus, have engaged the attention of many able writers, little, comparatively, of what has been written upon them is accessible to the members generally, of the dental profession; and in view of this fact, I have been induced to attempt the preparation of a brief treatise upon them. That one is needed, all, I think, will unhesitatingly admit; and that it is important that the dental practitioner should understand the pathology and curative indications of these affections, none, I believe, will deny; for, caused as they in most instances are, by an unhealthy condition of the teeth, their treatment, as is remarked

by Mr. Bell, "is so intimately connected with that of these organs, as to be universally considered as forming a part of the legitimate object of this branch of practice."

With these prefatory remarks, I shall proceed, firstly, to make a few general observations on the morbid affections of this cavity, and afterwards to notice separately each of the diseases to which it is liable.

CONTENTS.

DISEASES OF THE MAXILLARY SINUS.

CHAPTER I.

INTRODUCTION.

In the remarks which I am about to offer on the diseases of the maxillary sinus, it will be unnecessary to give a full description of this cavity, inasmuch as that has been done, by nearly every writer on general anatomy, since the middle of the seventeenth century. It will be sufficient to observe, that it is of an irregular quadrangular shape, and situated in the middle of each superior maxillary bone, between the orbiter plate and the palatine and alveolar processes, that it is lined by the pituitary membrane, and communicates with the nose by means of an opening between the superior and inferior turbinated bones, which, though large in the skeleton, is not more than one-fourth or fifth the size of a common goose-quill in the living subject, and is always partially closed by a duplicature or fold of the mucous membrane.*

It was not however, until the knowledge of anatomy had made considerable progress, that the existence of this cavity was known, *Casserius*, an anatomist of *Padua*, who flourished during

* Vide Memoires de l'Academie de Chirurgie. Tom. 12, edit. in 12, p. 4.

the latter part of the sixteenth and early part of the seventeenth centuries, is said to have been the first to discover it; but no correct description of it was given, until about the middle of the latter, and to *Nathaniel Highmore*, author of a treatise on anatomy,* published in 1651, the credit of this belongs. Hence the name of "*antrum highmorianum*," by which it is usually designated.

This cavity is subject to some of the most formidable and dangerous forms of disease that the medical or surgical practitioner is ever called upon to treat; and yet, there are few diseases incident to the human body, that have not received more attention from writers on pathology and therapeutics than these. Diseases are sometimes here met with, over which neither the surgeon nor physician can exercise any control, and whose progress is only arrested with that of the life of the unfortunate sufferer.

All of the diseases to which the antrum maxillare is subject, however, are not of so dangerous a character; some are very simple and easily cured, but even those which are regarded as the least dangerous, and that yield most readily to treatment, when instituted during their incipient or early stages, often, if neglected for a considerable length of time, or if improperly treated, assume a new and so aggravated a form, as to bid defiance alike to the skill both of the physician and surgeon. But, while on the one hand, the most simple affections that are here met with, may by neglect or improper treatment, ultimately become incurable; those on the other, which are considered as the most malignant and dangerous from their inception, might, I have no doubt, by a timely and judicious employment of suitable remedies, be effectually and radically removed.

* This work is entitled, "*Corporis Humani Desquisitio Anitomico.*"

The form which the disease puts on, it must be admitted, is determined by the state of the constitutional health or some specific tendency of the general system, and we can therefore readily imagine, that a cause which in one person, would give rise only to simple inflammation of the lining membrane, or a mucous engorgement of the sinus, would in another, produce an ill conditioned ulcer, fungus hæmatodes or asteo-sarcoma. But simple inflammation and mucous engorgement of this cavity, not unfrequently cause caries and exfoliations of its surrounding osseous tissues, and as a consequence in some instances, even the destruction of the life of the patient.

The importance then of early attention to the diseases of this cavity, is very apparent, and this is the more necessary as it is often difficult and sometimes even impossible to determine the character of the malady, until it has progressed so far as to have involved, to a greater or less extent, the neighbouring parts; when, if it has not become incurable, its removal is, at least, rendered more tedious and less easy of accomplishment. It may therefore, be safely assumed, that in a very large majority of the cases of disease of the maxillary sinus, the danger to be apprehended, results more from neglect, than any necessarily fatal character of the malady, so that in forming a prognosis, the circumstances to be considered, should be, the state of the constitutional health, the progress made by the affection, and the nature and extent of the injury inflicted by it upon the surrounding tissues. If the general health be not so much impaired as to prevent its restoration by the employment of proper remedies, and the disease has not inflicted extensive and irreparable injury upon the neighbouring structures, the prognosis will be favourable; but if

the functional operations of the body have become so much deranged as to prevent their restoration, and the bones of the face and nose have become seriously implicated with the affection of the sinus, the combined resources both of medicine and surgery will prove unavailing.

In young and middle aged subjects of good constitutions, a morbid action may exist in the antrum for years without giving rise to any very alarming symptoms, while the same species of affection in another less healthy constituted, would rapidly extend itself and degenerate into so malignant a form of disease as to threaten the speedy destruction of the life of the patient. Medical history abounds with examples of this kind, and they conclusively establish, that the state of the general health and habit of body, whatever may have been the primitive characteristics of the malady, ultimately determine its malignancy, and that in the treatment of affections of this cavity, as well as other local diseases of the body, these should not be overlooked.

But, independently of the danger of the affections which seat themselves here, they, for the most part are very loathsome, and subject the patient to great annoyance. They change the qualities of the secretions of this cavity and cause them to exhale a very nauseating and fetid odor. This, in many instances, is almost insufferable to the patient, and when it is considered that these secretions must have egress through some opening, and when prevented from escaping through the natural one into the nose, as is often the case, that they evacuate themselves through an artificial one formed by art, or effected by their own acrimonious and disorganizing qualities, through the cheek, alveolar border or palatine arch, the inconvenience, it can readily be imagined, must be great.

And, they are not only exceedingly annoying, but they are also sometimes very painful; but the degree and constancy of the pain by which they are attended, vary according to their nature and the nervous susceptibility of the individual. The pain is sometimes lancinating and excruciating almost beyond the power of endurance, but when it is very severe, it is usually less constant; at other times it is slight, but more constant.

The occurrence of disease in the maxillary sinus, as I have already intimated, is often very insidious. It not unfrequently happens that it exists for weeks and even months before its presence is suspected—the slight uneasiness occasioned by it being attributed to some morbid condition of the teeth or gums, and the symptoms attendant upon one description of affection of this cavity, are often so similar to those that accompany another, that it is impossible to determine the character of disease that is developing itself, until it has made considerable progress.

But man is not the only animal that is subject to morbid affections of the antrum maxillare. Dr. Wm. Cook,* states that while residing in the country, a disease prevailed among cattle which caused them to go mad, and that it was believed that they had been bitten by a mad dog. Having a desire to ascertain the seat and nature of the malady, which was attended with such singular, and in most instances, fatal effects, he examined the head of one that had died of it. His researches were first directed to the brain, but as no morbid appearances were there observable, he next laid open the superior maxillary, and to his great astonishment, found the antrum filled with fetid matter. But although he

* Vide note to Morgagni's work on the Seats and Causes of Diseases, &c. &c. vol. i. page 167.

was fortunate enough to discover the seat of the disease, he does not attempt to give any explanation of its cause, nor does he even state the season of the year at which it prevailed. The affection however, evidently consisted of a mucous engorgement of the sinus, accompanied, most probably, by ulceration of its lining membrane and caries of its osseous walls.

The morbid affections of the maxillary sinus, are, for the most part, similar to those of the nasal fossæ. There is, however, one form of disease which seems to be peculiar to this cavity, and that is mucous engorgement. Deschamps mentions two, dropsy and purulent accumulations,* but the first of these, properly speaking, is never met with in this cavity, and authors who have enumerated it among the diseases that occur here, have evidently mistaken mucous engorgement for it. The fluids that accumulate here are of a mucous or muco-purulent character, except when they are the result of the disorganization of some of the surrounding parts; then they are sanious.

Previously to the discovery of this cavity, the diseases of the maxillary sinus were little understood; and though their distressing and often fatal effects must have been frequently observed, their real seat was not known, and consequently the means employed for their cure could seldom have succeeded in accomplishing it. They were thought to have originated within the substance of the osseous tissue, and I have no doubt, that many of the supposed cases of *spina ventosa* and *tumours* of the superior maxillary bone, spoken of by some of the older writers, were morbid affec-

* Vide, Traite des Maladies des Fosses Nazales et de leurs Sinus; art. v. sec. 2, page 226.

tions of this cavity. Even subsequently to the knowledge of the existence of this antrum, similar mistakes seem to have been committed. Many cases of disease of the superior maxilla are narrated by authors without any mention, or even allusion to this cavity, which, from the description given of them, were obviously seated in it. Several such are recorded by *Wiseman*, in his treatise on surgery, published in 1676.* But notwithstanding his seeming ignorance of the seat of these affections, he evidently had a pretty correct idea of their curative indications, for the plan of treatment which he adopted differs but little from that pursued at the present day.

The most simple form of disease that occurs in this cavity, is inflammation of its lining membrane, and this in most instances may be said to precede all others. It often subsides spontaneously, but when it continues for a long time, it is apt to become chronic, and then it not unfrequently gives rise to other and more formidable kinds of disease. When unattended by any other morbid affection, either local or constitutional, it is easily cured.

A purulent condition of the fluids of the antrum is a very common affection, but it is seldom met with in persons of good constitutions. It seems to be dependent upon a bad habit of body and inflammation of the pituitary membrane of the sinus, which last results more frequently from dental irritation than any other cause. This condition of the secretions of the antrum, sometimes gives rise to caries and exfoliation of portions of the surrounding bone, and to fistulous ulcers, but when it is dependent upon no other local cause than simple inflammation of the mucous membrane,

* Vide, Book iv. chap. iv. Obs. 12, 13 and 17, pages 265, 280 and 281.

it is seldom that such effects result from it, but when complicated with other morbid conditions of the cavity, they are not unfrequent.

All purulent conditions of the secretions of the pituitary membrane of this cavity, are by some denominated abscess. The name however, as is justly remarked by Mr. Thos. Bell, is improper. Abscess is a different affection, and it is one, that very seldom occurs here; yet, instances of it have been met with, at the extremities of the roots of teeth that had perforated the sinus, and it sometimes happens that when an abscess is seated in the alveolus of a superior molaris, the matter, instead of making for itself a passage through the socket of the tooth on either side, escapes into this cavity, and finally with its secretions, through the nasal opening. Mr. Bell, the gentleman, whose opinion I just referred to, describes a case of abscess seated in the upper part of the antrum,* but this as he himself states, is the only one of the kind on record.

Ulceration of the lining membrane is an affection less frequently met with than either of the preceding. It is rarely, if ever idiopathic, but seems rather to be dependent, both upon some other local malady and some specific constitutional vice. Scorbutic and scrofulous dispositions and those in which there exists a venereal taint, are by far more liable to be affected with ulceration of this membrane than persons of sound constitutions, and consequently local remedies alone, are seldom adequate to its cure. It is almost always complicated with fungi of the membrane and caries of the walls of the sinus, and when neglected for a long time, it sometimes takes on a cancerous form and becomes incurable

*Anat. Phys. and diseases of the teeth, page 269.

Next in the order of arrangement, which I propose to adopt in treating upon the diseases of this cavity, is caries of its walls. This, though always complicated with one or more other forms of diseased action, seems nevertheless to be worthy of separate consideration. Like ulceration of the lining membrane, it is an effect of some one or more other affections. It may result from accumulation of the secretions of the sinus, ulceration, or from tumors.

The occurrence of fungus and other kinds of tumors is less frequent than any of the preceding affections, yet this cavity is not exempt from them, and they constitute the most dangerous description of malady that the superior maxilla is subject to. Although is it probable, that in their incipient stage, they might in nearly every instance be radically removed, it is seldom that they are cured after they have attained a very large size, and implicated in their morbid action to a considerable extent the circumjacent tissues. They have, however, been successfully extirpated even after they had acquired so great a volume as to have implicated to such an extent the surrounding parts, as to have rendered necessary the removal of the whole of the superior maxillary bone. They usually grow with great rapidity, and when not radically removed, are generally soon reproduced.

Besides these, other varieties of disease are occasionally met with here, and the antrum is liable to injuries, from blows and other kinds of mechanical violence, and from the introduction of insects and other foreign bodies; but of these, it is not now necessary to to speak, as they will hereafter come up for special consideration.

In regard to the causes of the various morbid affections of the maxillary sinus, there exists some diversity of opinion. It is thought by some that these diseases often result from certain

specific constitutional vices, independently of any local agency whatever; others attribute them to the obliteration of the opening of this cavity into the nose; some again suppose them to be dependent upon the same causes as are the diseases of the nasal fossæ, while others contend that they are produced by dental irritation. Now, that all of these may exert an influence upon this cavity, is undeniable; but that some do not do it to the extent, and in the manner which many seem to suppose, is clear; and, while I do not profess to be at all singular in the views which I entertain upon this part of the subject, I hope to be able to point out some errors, into which, not a few have evidently fallen. Opinions are frequently formed or adopted, and conclusions arrived at, that are neither warranted by facts nor supported by sound philosophy, and as it is important to a correct knowledge of the therapeutical indications of at least, most diseases, that their causes be understood, I shall endeavour, in the course of the present treatise, to point out those which are principally concerned in the production of the several morbid affections of the maxillary sinus, or rather to explain the different kinds of influence, that those already mentioned, are capable of exerting upon this cavity, for, as I have before stated, I do not deny that it is to the presence of some one or more of these, that the diseases to which it is liable are attributable.

In carrying out this design, it is not my intention to indulge in vague speculation; I shall rely principally upon facts, to establish the views which I propose to advocate, for one fact, is worth a dozen theories based upon no better foundation than mere hypothesis; and although the detail of these be tedious and comparatively uninteresting, it is only by their aid that we can hope to

arrive at truth, and it is this, that those, to whom the treatment of diseases involving life, is committed, should most desire.

The effects exerted upon this cavity by a bad habit of body or constitutional vice, are not such as many seem to suppose. They do not amount to perceptible manifestations of disease; they only consist in an increase of the susceptibility of the tissues of which it is composed, to morbid impressions, and when an unhealthy action is lit up in it, in a more aggravated, and not unfrequently different form of disease than that which would otherwise have been produced. And, not only is the susceptibility of this cavity to morbid impressions increased by an ill habit of body, or constitutional vice, but that also, not unfrequently, of every part of the whole organization; and this increase of susceptibility, may exist for years, and not result in marked demonstrations of either general or local disease. But, if the body, or any part of it, in the meantime, be subjected to the action of morbid irritants, disease, either general or local, according as the whole or only a part of it is acted upon by them, will be the result. Again, the same cause of irritation acting upon another, in whom there exists no constitutional vice, and who, as a consequence, is not possessed of so great an aptitude to be morbidly excited, might not determine any appreciable unhealthy action.

Thus it may be seen, that disease of the maxillary sinus is dependent upon some other determining cause than a particular disposition or vice of the general system; and yet, without this, no morbid effects might be produced, or if produced, they would be of a different and less aggravated character. Any disposition or vice of body, which weakens the vital energies of the system, increases the susceptibility, or what in medical language it

would be more proper to term, excitability of all its parts endowed with sensibility, those of this cavity equally with the rest. There are various kinds which have this effect: as for example, the scorbutic, scrofulous, venereal, mercurial, &c. &c., each of which, may influence the character of the morbid action excited in it, in a manner peculiar to itself, or similar to that which might be exercised by another, and cause it to assume a greater or less degree of malignancy, according as the functional operations of the body generally are more or less enervated by it.

This seems to be the only way in which a bad habit of body, is capable of affecting the maxillary sinus; it is a predisposing, but not an exciting cause of disease, and it is important that this distinction should be borne in mind,—the one, should never be confounded with the other, because an error of this sort, might, and would in many instances, lead to the adoption of incorrect views concerning the therapeutical indications of the disease.

I might enlarge upon this part of the subject, but it is not necessary to do so now, inasmuch as I shall have occasion to advert to it hereafter.

Inflammation and even ulceration of the pituitary membrane of the nose, sometimes extend themselves to the maxillary sinus, but a morbid action is not so frequently excited in this cavity, by an unhealthy condition of the nose, as the intimate relationship subsisting between the two, might lead some to believe. It is seldom that both are affected at the same time, and hence I infer, that, although lined by one common membrane, the propagation of disease from one to the other, is an occurrence, which but rarely happens.

But although the diseases of the nasal fossæ, may occasionally

give rise to a morbid condition of the maxillary sinus, it is questionable whether the exciting causes of the affections here met with, ever act directly upon this cavity. Concealed as it is, within the substance of the superior maxilla, and communicating with the nose only by means of a very small opening, it would seem to be beyond the reach, of at least, most of the causes, to the action of which, the diseases of the nasal fossæ are attributed.

The obliteration of the opening of this cavity, is sometimes caused by disease in the nose, and when this happens, it is followed by a mucous engorgement of the sinus, inflammation of its lining membrane, distention of its osseous walls, and not unfrequently by other and more complicated forms of disease. But the closing of this opening is oftener an effect than a cause of disease in this cavity, and it generally re-establishes itself without any assistance of art, after the cure of the affection which caused it.

If all the circumstances connected with the history of the diseases under consideration could be ascertained, I think it would be found that these affections are more frequently originated by a morbid condition of the teeth, gums and alveolar processes, than any other cause. There are no sources of irritation to which this cavity is so much and so often exposed, as that of the dental organism. It is separated from the apices of the roots of the superior molares and bicuspides only by a very thin plate of bone, and it is sometimes even penetrated by them,* so that it could

* Some are of the opinion that the maxillary sinus is never penetrated by the roots of any of the teeth, except in cases where disease has destroyed the thin plate of bone which usually covers the apices of those immediately beneath it; but that this is incorrect, is proven by the fact, that both antra are often perforated by them, which would hardly be the case were the perfora-

scarcely be otherwise than that aggravated and protracted disease in the teeth and alveoli beneath it, should exert an unhealthy influence upon it. The pain occasioned by diseased teeth, is often very severe, sometimes almost excruciating, and the inflammation excited by them in the alveolo-dental periostea and gums, frequently extends itself to the whole of one side of the face. It could hardly be possible therefore, for this cavity to escape. Alveolar abscess, and sometimes necrosis and exfoliation of the socket of the affected tooth, result from the inflammation thus lit up. It often happens too, that the gums and alveolar periosteum are affected for years with chronic inflammation, and other morbid affections, which it is not now necessary to enumerate.

If, in addition to these facts, other proofs be necessary to establish the agency of dental and alveolar irritation in the production of disease in the maxillary sinus, they may be had. Many of the affections that are here met with, are often cured by the removal of diseased teeth after other remedies have been employed in vain, and that too, without even perforating the antrum. This would not be the case, if the irritation arising from them did not extend to this cavity, and if the disease in it were not dependent upon the irritation produced by them.

Most writers on these affections agree in ascribing them to a morbid condition of the teeth and alveoli. There are some, however, who though they admit that dental irritation may perhaps

tions the result of disease, for it rarely happens that both cavities are affected at the same time. Indeed, I have never, except in a solitary instance, known one antrum to be perforated by the roots of the teeth, when the other was not similarly penetrated, and it is by no means uncommon for the floor of this cavity to be pierced by the apices of the roots of the first and second superior molares.

occasionally give rise to them, seem nevertheless to attribute their occurrence in the majority of instances to other causes, such as irregular exposure to cold, blows upon the face, and certain constitutional diseases. Others again assert, that "if we except caries of the teeth, and the diseases of the dental periosteum, which can be communicated to the pituitary membrane, the causes of these diseases are unknown."* These are important exceptions, but that they are sometimes traceable to other causes, there can be no question. It is very certain, however, that these give rise to them more frequently than any other, and in their treatment, the state of the health of the teeth and alveoli should never be overlooked.

I shall now proceed to the consideration of the different affections of this cavity, under their respective and appropriate heads.

* Vide, Traite des Maladies des Fosses Nazales et de leurs Sinus; par I. L. Deschamps, fil, art. v. sec. 2, page 226.

CHAPTER II.

OF INFLAMMATION OF THE LINING MEMBRANE.

As has before been intimated, inflammation when not complicated with any other morbid affection, is the most simple form of disease to which the pituitary membrane of the antrum maxillare is subject. It precedes and accompanies all others that are here met with, and it will therefore be proper to offer a few remarks upon it, before entering upon the consideration of those of a more aggravated nature.

Shielded, as the pituitary membrane of this cavity is, from most of the acrid and irritating agents to which it is exposed in the nasal fossæ and some of the other cavities of the body, it would rarely here be affected with inflammation, were it not that it is frequently acted upon by other morbid excitants, whose immediate influence seldom extends beyond the alveolar border and face. But, exposed as it is, to the action of irritants of a very aggravating kind, inflammation of it, is of frequent occurrence—more so perhaps, than many are aware of, and it is to this, that those deep seated pains in the superior maxilla and face, which are usually denominated rheumatic, are, in many instances, attributable.

Inflammation of the lining membrane of the maxillary sinus, when not complicated with any general morbid tendency, or con-

stitutional predisposition, seldom gives rise to any other form of diseased action; and it usually subsides spontaneously on the removal of the cause that induced it. This membrane in good constitutions, is less subject to inflammation, and as a consequence, to any other description of morbid action, than those in whom there exists some vice of body, or unhealthy predisposition. Febrile and gastric affections, eruptive diseases, such as measles, small-pox, &c. &c. syphilis, an excessive and protracted use of mercurial medicines, a scorbutic or scrofulous diathesis of the general system, and in short, every thing that has a tendency to enervate the vital powers of the body, increases its irritability.

When in a healthy condition, it secretes a slightly glutinous, transparent and inodorous fluid, by which it is constantly lubricated, but inflammation in it changes its secretions; it causes them to become vitiated; at first, to be less abundant, afterwards to be secreted in larger quantities than usual, to be more serous, and so acrid as sometimes to irritate the membrane of the nose over which they pass after having escaped from the antrum. It also causes them to exhale an odour more or less offensive, according as the inflammation is severe or mild. It moreover gives rise to a thickening of the membrane, and sometimes to an obliteration of the nasal opening. This last, however, rarely occurs, but when it does happen, an accumulation of the secretions and other morbid phenomena, of which I shall hereafter treat, result from it as a necessary consequence.

Inflammation of the pituitary membrane of this cavity, is sometimes followed by inflammation of that of the nasal fossæ; but I am of the opinion, that when this happens, it is occasioned by the acrid qualities of the fluids that are discharged from the sinus into the nose.

If at any time during the continuance of the inflammation, the patient is attacked with severe constitutional disease, the local affection will be aggravated and sometimes caused to assume a different character.

The inflammation when long continued, degenerates into a chronic form, and is sometimes kept up for several years, without giving rise to any other unpleasant effects, than occasional paroxysms of a dull and seemingly deep-seated pain in the face, and a vitiated condition of the fluids that are secreted in this cavity. The slightly fetid odour which they exhale, ceases to be annoying or even perceptible to the patient, as he becomes accustomed to it.

Symptoms.—The symptoms by which this affection is characterized, though not always precisely the same, are nevertheless, for the most part, very similar. Boyer describes them to be severe, fixed, and deep-seated pain under the cheek, extending from the alveolar border to the lower part of the orbit, local heat, pulsation, and sometimes fever.* He however tells us that these symptoms are not always present, and that the disease sometimes exists when it is not suspected. I apprehend that this is never the case. Other affections of the face and superior maxillary, may be mistaken for this, and this for others, but that it should exist without being attended with pain or any other signs indicative of its presence, I cannot believe to be true, and I cannot imagine how he arrived at such a conclusion.

Deschamps distinguishes the symptoms from those of other affections of this cavity by "a dull, heavy pain in the region of it," which he says, "becomes sharp and lancinating," and extends from the alveolar arch to the frontal sinus. The disease goes on

* Vide, Traite des Maladies Chirurgicales, &c. &c. tom. vi. art. 3, page 138.

without interruption, increasing until the superior maxilla of the affected side is more or less involved. This malady he tells us cannot be confounded with any other, if there is no external visible cause; it differs, he says, from a retention of mucus, by being painful at the commencement, and by not being accompanied with swelling of the bones;" he distinguishes it from polypus, as that causes no pain, and from cancer, which occasions pain of a different kind. "Suppuration and ulcers have peculiar signs which cannot be confounded with those of inflammation." Pain in the molar, and bicuspid teeth, accompanied by a sense of fluctuation in the parts, he seems to regard as a very certain indication of inflammation, and especially when joined to the other symptoms. "If an external cause, is discovered, it" he says, "will furnish a certain diagnosis,"* he also mentions fever and headache as almost invariable accompaniments.

The inflammation, if not subdued by appropriate remedies, after having continued for a length of time, gradually assumes a chronic form; the pain then begins to diminish, and is less constant; it becomes more dull, and is principally confined to the region of the antrum. The teeth of the affected side cease to ache, or ache only at times, but still remain sensitive to the touch. The mucous membrane of the nostril next the diseased sinus, is often tender and slightly inflamed, and if the other one be closed in the morning, or after two or three hours sleep, by pressing upon it with the thumb or one of the fingers, and a violent expiration made through this, a thin watery fluid, of a slightly fetid odour, will be discharged, and pain will be experienced in the region of the antrum.

*Traite des Maladies des Fosses Nazales et de leurs Sinus; sec. 2, art. ii. pages 236–7.

Causes.—The explanation of the causes of inflammation of the pituitary membrane of the maxillary sinus, as given by Deschamps, is far from satisfactory. After stating that it is produced by all those general causes which give rise to it in other parts of the body," he enumerates among, what he denominates, "peculiar causes," a degeneration of the humour which it pours out, "blows upon the cheek, fractures, wounds, and the extraction of teeth."* What he means by those general causes, I am at a loss to understand, except it be certain morbid dispositions of body, irregular exposures to cold, &c. &c. The influence which these exert upon the mucous membrane of this cavity, has been explained in another place: it will therefore be unnecessary to repeat what has already been said concerning them, except it be to state that they first exercise the same influence upon the membrane in other parts of the body, that they do here, and that this consists, not in actual disease, but only in an increase of excitability. The exciting cause of inflammation of this cavity, is local irritation, and, a degenerated condition of its secretions, blows upon the cheek, wounds and the extraction of teeth, may be enumerated among the agencies which are sometimes concerned in its production.

Boyer says, "This inflammation may be produced by a blow upon the cheek, by small-pox, measles," &c. but the most ordinary cause is caries and pain in the teeth.† The two last, although not mentioned by Deschamps, are very frequently concerned in the production of this affection. All morbid conditions of the teeth, in fact, and of the gums, that give rise to irritation in the alveolar

*Traite des Maladies des Fosses Nazales et de leurs Sinus; Art. 2, page 236.

†Traite des Maladies Chirurgicales, &c. &c. Art. iii. tom. 6, p. 138.

periosteal tissue, may be regarded as among the most frequent of its exciting causes. And, of the affections of the teeth that do this, caries, necrosis and exostosis may be mentioned; also, loose teeth, and the roots of teeth that have either been fractured in an attempt at extraction, or by a blow or fall, and left in their sockets, or that have remained after the destruction of their crowns by decay. It sometimes happens too, that inflammation is excited in this membrane by fractured alveoli, but when an accident of this sort occurs, the detached portions of bone are generally soon thrown off by the operations of the economy, and the cause being removed, the inflammation immediately subsides. But not so with the roots of teeth. They often remain concealed in their sockets for years, except they be removed by art. Nature, it is true, makes an effort to expel them from the jaw, but this is accomplished only by a slow and very tedious process, and not, in many instances, until they have given rise to some serious affection. But, of the deleterious effects that result from roots of teeth in the alveoli, it is not necessary now to speak; as extraneous bodies they are always productive of more or less irritation.

As to the influence which the diseases of the gums exert upon the alveolar periosteum, suffice it to say, that it is little, if any less hurtful than that resulting from the affections of the teeth. Disease here is very certain to communicate itself to that membrane. It is, in fact, to the morbid affections of this structure, that the diseases of the alveoli, are most frequently attributable. It is true, the diseases of the gums, do not often give rise to acute alveolar periostitis, but they excite in the lining membrane of these cavities, a chronic inflammation, which, if not arrested, sooner or later eventuates in their destruction, and as a consequence, to the gradual loosening, and ultimately, loss of the teeth.

Thus it may be perceived, how very liable the periosteal tissue of the alveolar cavities is to become inflamed; and, inflammation having been lit up here, how very easy it would be for it to extend itself to the maxillary sinus; and that it often does propagate itself to this cavity, no one, I should suppose, could doubt. But, we are not left to mere conjecture, or doubtful inference, in regard to this matter. Not only is inflammation, but every other form of disease to which this cavity is subject, more frequently traceable to alveolo-dental irritation, than to any other cause. The truth of this assertion is established by the result of the treatment of cases which I shall hereafter have occasion to notice.

Having said thus much concerning the causes of inflammation of the lining membrane of the antrum maxillare, I shall now proceed to describe its remedial indications.

Treatment.—The curative indications of the affection under consideration are simple, and for the most part, similar to those of inflammation in other parts of the body. "Bleeding from the arm, feet, pediluvia, antiphlogistics, mild purgatives, emollient cataplasms, anodyne applications to the cheek, fumigations to the nose, by means of an inverted funnel," says *Deschamps*,* are the means usually employed. Originating, however, as does most frequently inflammation of the lining membrane of the maxillary sinus, from the irritation produced by decayed, dead or loose teeth, the removal of these, will, in most cases, be all that is required to accomplish a cure. This is the practice which Boyer recommends,† and Deschamps says, "it is not uncommon for the disease to cease immediately after the extraction of an affected

* Vide, Maladies des Fosses Nazales, sec. 2, Art. ii. p. 238.

† Vide Maladies Chirurgicale, tom. vi. page 139.

tooth."* But when the inflammation is severe, its reduction will be expedited by bleeding from the arm, saline purgatives and fomentations to the face. In many cases, great benefit will be derived from the application of leeches to the cheek, as recommended by Mr. Thos. Bell.† I have known the most decided advantage to result from their employment; but, when the disease is dependent, as it in most instances is, upon an unhealthy condition of the alveolar process, the first thing to be done, is to remove from them all such teeth or roots of teeth, as are productive of the least irritation, for, while any local sources of irritation are permitted to remain, neither topical nor general bleeding, nor any other treatment will be of permanent advantage.

The treatment of inflammation of this cavity, however, may be best illustrated by the following cases, which, from very many similar ones, that have fallen under the author's notice, he will briefly narrate.

Case I.—In the spring of 1840, W. H., æt. nineteen, of a sanguino-scorbutic temperament, called to consult me concerning a deep-seated pain, which he had felt, for more than two months, in his left cheek. On interrogating him, I ascertained that he had occasionally, during this time, discharged a fetid matter from the nostril of the affected side. For the relief of the pain in his cheek, leeches and anodyne fomentations to the face, and purgatives had been prescribed, but from these he obtained only temporary relief. At length, his medical attendant, suspecting that the affection was in some way connected with his teeth, which were in a very unhealthy condition, advised him to obtain

* Maladies des Fosses Nazales, p. 238.

† Anatomy Phys. and diseases of the Teeth, p. 251.

my opinion with regard to the agency that they might have in its production.

The first and second molares, the third not having yet appeared, and the two bicuspides, on examination, I found so much decayed, as to render their restoration to health impossible. Abscesses had formed in the sockets of the first bicuspis and second molaris, and the matter from which was almost constantly discharging itself from fistulous openings through the gum beneath the upper lip and cheek. Both the bicuspides and molares of this side were sensitive to the touch, and the gum around them was in a spongy and inflamed condition.

Not being able to institute any treatment that would be of service to his teeth, and convinced that the affection of his cheek, was attributable to the irritation which they produced, I advised their immediate extraction, to which operation he at once submitted. Four weeks afterwards, he called and informed me that the pain in his cheek subsided about ten days after the removal of his teeth, and that it had not since returned.

Case II.—Mrs. L——, æt. about twenty-seven or eight, of a scrofulous habit, had been at times affected, for more than two years, with a deep-seated pain in the right side of her face, midway between the orbit and alveolar ridge; and on closing the left nostril, and making a violent expiration through the right, discharged a slightly, yet perceptibly fetid mucus matter, which occasionally excoriated the mucous membrane lining this cavity of the nose. This pain, from the fact that it was most severe in cold and damp weather, was thought to be rheumatic. General and local bleeding, fomentations, mustard plasters, purgatives, anodynes, tonics, and many other remedies were in vain employed.

A severe paroxysm of tooth-ache about this time, July, 1841, more than two years subsequently to the time when she first felt the deep-seated pain in her cheek, induced her to apply to me for my professional services. On examining her mouth, the crowns of the second molaris, dens sapientia, and first bicuspis of the affected side were destroyed by caries; the gums covering the sockets of their roots, were inflamed and very sensitive. It was the roots of the wisdom or third molar tooth that ached, and for the alleviation of the pain of which, she had called upon me. Extraction being the only remedy that held out the least prospect of relief, I at once proposed that operation, and at the same time urged upon her, the importance of having the roots of the second molaris and first bicuspis removed. A great deal of persuasion however, was necessary to obtain her consent, she being of an exceedingly nervous and timid disposition, but having made up her mind to submit to the operation, she determined to have it immediately performed. She had no cause to regret their removal, for not only was she freed from the annoyance which they occasioned to her tongue, gums, &c. but the operation was likewise followed by a speedy subsidence of the pain in the cheek, and a cessation of the fetid discharge from the nose.

Case III.—In December, 1841, I was consulted, by Mr. S. M. J——, twenty-three years of age, and of sanguinous disposition. He had been affected for several months, with a dull heavy pain, which as he said, seemed to be seated deep in his right cheek, and as in the case last described, a fetid mucus matter was discharged from the nostril of the affected side, on making a violent expiration through it, with the other nasal cavity closed. His teeth, to all appearance were perfectly sound, but the gums around

the first and second bicuspides and first molaris, were inflamed, spongy, and slightly ulcerated between their edges and the necks of the teeth, from which, they had separated up to the edges of the alveoli. These morbid phenomena, he attributed to a blow, which he had received from a fall, upon these teeth about two years before. It was immediately followed by pain, inflammation, and in about two months, by the exfoliation of several small portions of the alveolar processes, which came out through the gum. These were the only unpleasant effects which he experienced at the time, but there was always afterwards, a slight soreness in the teeth, that had received the injury. This, as he informed me, gradually extended itself higher and higher up into the substance of the jaw, until, about four months previously to his having called on me, when its place, seemed to be taken, by the kind of pain first described; and soon after the fetid discharge from the right nostril was discovered.

That the deep-seated pain in the right superior maxillary, was occasioned by inflammation of the mucous membrane which lined its sinus, I could not doubt, and that this had resulted from the alveolar irritation, caused by the violence that had been inflicted upon the first and second bicuspides and first molares, to me, was equally evident, and under such circumstances, the removal of the injured teeth, seemed to constitute the proper curative indication, I therefore, at once, proposed their extraction, which operation he immediately submitted to. Three weeks after, the pain in his jaw had entirely disappeared.

I could mention a number of similar cases, where the pain and other inflammatory symptoms, have been relieved simply by the removal of decayed and dead teeth. When the inflam-

mation is dependent upon the presence of these, and that it is in a large majority of cases, there can be no question, their extraction will suffice in nearly every instance, to effect a cure; but when it has been produced by any other cause, as for example, a sudden exposure to cold, a blow upon the cheek, fractures of the alveoli, &c. &c. then the application of leeches to the gums and cheek, fomentations, bleeding from the arm, purgatives and other treatment may be called for.

This affection, as is remarked by Boyer,* would be of little consequence, were it not that it is liable to give rise to other and more dangerous forms of disease, such, for instance, as a purulent condition of the secretions of this cavity or an engorgement of it. It should never therefore, be permitted to continue, but should be as speedily arrested as possible; and for the accomplishment of this, the means here pointed out, will, if timely and properly applied, be found fully adequate.

Inflammation of the pituitary membrane of the maxillary antrum, sometimes causes the opening into the nose to become closed, and when this happens, an engorgement of the cavity is certain to result. Various other morbid phenomena also occasionally arise from it, but the most common form of disease, resulting from it, is an altered or purulent condition of the mucous secretions of the cavity, and it is this, which I propose next to notice.

* Maladies Chirurgicale, tom. vi. page 139.

CHAPTER III.

OF A PURULENT CONDITION OF ITS SECRETIONS AND ENGORGEMENT.

A PURULENT condition of the secretions of the maxillary sinus and mucous engorgement, are indiscriminately, though very improperly, denominated by most writers on the affections of this cavity, abscess. To this, neither bears the slightest resemblance. Deschamps, treats of the former under the name of suppuration, and the latter under that of dropsy.* In speaking of the first he tells us, "if after the time of the inflammation has passed, the surrounding parts cease to be painful, while the affection still continues to cause pain in the antrum, and the fever, though diminished, occurs at irregular intervals, and if the inflammation is followed by a pulsating pain, we will have reason to suppose that an abscess has formed in the sinus; and," he continues, "all doubts will be removed, if on the patient's inclining his head to the opposite side, matter is discharged into the nostril, or if some tubercles are formed near the outer angle of the eye, or alveolar border, which last happens more frequently; and finally, if the purulent matter not finding any opening through which to

* Vide Maladies des Fosses Nazales, pages 227 and 239.

evacuate itself, distends the sinus to such an extent as to form a tumour outwardly upon the cheek." In short, all the symptoms which he mentions as belonging to the disease, are those that accompany the one now under consideration. The matter he says is of a "putrid serous consistency."

Bordenave has fallen into a similar error. He too, terms an altered state of these secretions, suppuration of the membrane, and he tells us that inflammation is not necessary to it. He seems moreover, to have confounded in alveolar abscess those cases where the matter, instead of evacuating itself as it ordinarily does, through an opening which it makes for its exit through the alveolus and gum into the mouth, escapes into the antrum, with abscess of that cavity. Again, he asserts that the disease, (suppuration as he calls it) may be independent of the surrounding parts, and although ordinarily implicated with an altered condition of them, he affirms, it is sometimes the effect of disease primarily seated in this cavity.*

There is no doubt that a purulent condition of the fluids of this cavity is often complicated with ulceration of the lining membrane, but that the affection is at all analagous to abscess or suppuration, its very nature and situation, is sufficient to disprove. "A reference to the structure of the antrum," says Mr. Bell, "would appear to be sufficient to point out the improbability, to say the least, of the occurrence of abscess in such a situation. That a mucous membrane covering, in a thin layer, the whole internal surface of such a cavity, should become the seat of all the consecutive steps of true abscess, is a statement

* Vide Memoirs de l'Academie Royale de Chirurg. vol. 12, p. 8. 12mo.

bearing on the face of it an obvious absurdity."* But notwithstanding the seeming improbability of such an occurrence, and it is certainly one that very rarely happens, abscess does nevertheless sometimes seat itself in this cavity; but, it is a different affection altogether from that usually treated of under that name. I have already adverted to a case narrated by Mr. B., a description of which, I intend hereafter to give.

When complicated with ulceration of the mucous membrane, and it is probable that a purulent condition of the secretions of this cavity, in most instances is thus complicated, the affection is precisely analagous to ozena, and, by many of the older writers, it is designated by that name. Mr. Bell describes it, and very properly too, as being similar to gonorrhœa—both diseases equally consisting of an altered secretion, in the one, of the pituitary membrane, and in the other of the mucous lining of the urethra, which, in neither instance possesses any of the characteristics of abscess, though the matter in both is purulent.†

It has been before stated that the obliteration of the nasal opening was more frequently an effect than a cause of disease in the maxillary sinus; it does, however, sometimes become closed, from other causes than an unhealthy condition of this cavity, and when this happens, an engorgement of the sinus is the inevitable consequence, but the fluids thus accumulated are not always at first purulent. They however may become so, by their retention in the cavity, and, when the closing of the opening is the result of previous disease in the antrum, the secretions are more or less altered from the very first.

* Anat. Phys. and Diseases of the Teeth, page 253.
† do. do. page 254.

The accumulation of the secretions of the antrum, whether in a healthy or purulent state, is a constant source of irritation to the lining membrane, and the pressure which they ultimately exert upon the surrounding walls, causes a new form of diseased action to be set up, that not unfrequently involves the whole of the bones of the face as well as those of the base of the cranium, and which, if not soon arrested, ultimately destroys the life of the patient. They, however, when prevented from escaping through the nasal opening, eventually make one through which to evacuate themselves, and this is sometimes effected through the cheek, at other times beneath it, just above the alveolar ridge, or through the palatine arch or alveoli down by the sides of the roots of one or more of the teeth, and thus establish a fistula, from which a fetid matter will be almost constantly discharged. From openings of this sort, the matter is sometimes evacuated for years, while the disease in the antrum, in the meantime, very frequently, does not seem to undergo any apparent change. At other times the membrane ulcerates and the bony walls become carious.

But, a purulent condition of the mucous fluids of this cavity, independently of caries of the bone, or even of simple fistulous openings, is an exceedingly troublesome and unpleasant affection. The odour from the matter is of itself, often very annoying even to the patient, and when the secretions are retained for some days in the sinus before they are evacuated, the fetor from them is sometimes almost insufferable.

In good constitutions, the secretions, of the antrum, are not so liable to become purulent, even though they be confined for a long time in the cavity. It is only in scrofulous, scorbutic, or debili-

tated habits that they are liable to become thus altered. Inflammation of the lining membrane, the immediate or proximate cause, may exist for years without giving rise to it. The differences in the effects produced upon them, and the surrounding parts, by inflammation of this membrane is owing to the differences in the state of the constitutional health of those affected by it.

Where a puriform state of the secretions of this cavity is complicated with ulceration of the membrane, the matter will have mixed with it a greater or less quantity of flocculi, sometimes of so firm a consistence, as to block up the nasal opening, and prevent its exit. Mr. T. Bell says, he has seen more than one case in which a considerable accumulation had taken place in the antrum, accompanied by the usual indications of this affection, (muco-purulent engorgement of the sinus) when a sudden discharge of the contents into the nose, took place, "in consequence of the pressure having overcome the resistance which had thus been offered to its escape."* Cases of a very similar nature have fallen under my own observation, the history of some of which may be given in the course of this essay. The formation of these flocculi rarely cease, except with the cure of the ulcers of the membrane; they give rise to considerable irritation, and their presence always constitutes an obstacle to the cure. They are, however, usually easily removed by injections.

The pituitary membrane of the antrum when in a healthy state secretes, as I have before stated, a transparent, slightly glutinous and inodorous fluid, which is poured out only in just sufficient quantities to lubricate the cavity. But, no sooner is inflammation excited in the membrane, than its secretions become more

* Vide, Anat. Phys. and Diseases of the Teeth, p. 258.

abundant, and, at first thinner, but afterwards thicker and more glutinous.* Their colour and consistence are not always the same. Instead of being transparent, they sometimes have a dirty opaque appearance; at other times they assume a greenish, whitish or yellowish colour, and in some instances they bear a considerable resemblance to pus, which, it has been conjectured, might be owing to a suppuration of some of the mucous follicles of the lining membrane of the antrum, and a consequent mixture of pus with its secretions. Mr. Bell, however, inclines to the opinion that it is attributable to an "alteration simply" of the secretions of the cavity.† But their colour and consistence, I am disposed to believe, are determined by the degree of inflammation, the length of time it has existed, the state of the health of the lining membrane, and that of the surrounding osseous walls, the egress which the matter has from the sinus, and the general habit of the body.

Mucous engorgement of the maxillary sinus and purulent accumulations, it has been remarked, are more common to young subjects than to middle aged ones, or persons in advanced life. An eminent French writer says, that of three individuals affected with dropsy (mucous engorgement) the oldest was not twenty years of age.‡ Although these affections are more common to young persons than individuals of advanced life, they are by no means confined to the former. Debilitated habits, though not equally, of every age, are subject to them.

Symptoms.—The diagnostics of the several affections of the antrum, as has been intimated in a preceding place, are so much

* Vide, Maladies Chirurgicale, tom. vi. p. 140.

† Vide, Anat. Phys. and Diseases of the Teeth, p. 254.

‡ Vide, Traite des Maladies Chirurgicales et des Operations qui leur conviennent, tom. vi. p. 139.

alike, that it is often difficult to distinguish those that belong to one from those that are attendant upon another. The symptoms of mucous engorgement and purulent accumulations, however, are generally such, as will enable the practitioner to distinguish, with considerable certainty, these affections from any others that are here met with. They are always preceded by inflammation of the lining membrane; a description of the signs of which, having already been given, I need not repeat. Omitting these then, I will at once proceed to mention those by which they are accompanied.

In speaking of those which more particularly belong to a purulent condition of the secretions of the antrum, Deschamps says, the affection may be distinguished by a dull heavy pain, extending along the alveolar border; but, upon this symptom alone, little reliance can be placed; as it is always present in chronic inflammation of the pituitary membrane of this cavity. But in addition to this, he mentions the presence of decayed teeth, soreness in those that are sound, and on the patient's inclining his head to the side opposite the one affected, the discharge of fetid matter from the nose.* These are certainly very conclusive indications of purulent effusion in this cavity. Bordenave, after enumerating the symptoms indicative of inflammation, mentions the following as belonging to the affection of which I am now speaking; viz. dull and constant pain in the sinus, extending from the maxillary fossæ to the orbit; a discharge of fetid matter from the nose, when the patient inclines his head to the opposite side, or when the nose is blown from the nostril of the affected side.† These are the symptoms which are mentioned by almost every writer

* Vide, Maladies des Fosses Nazales, sec. 2, art. 3, p. 240.

† Vide, Memoirs de l'Academie Royale de Chirurgie, 12mo. tom. 12, p. 10.

upon the subject, as indicative of a purulent condition of the secretions of the maxillary sinus.

The diagnostics indicative of engorgement, differ materially from those which denote simply a purulent condition of the mucous secretions of this cavity. The pain instead of being dull and heavy, as just described, becomes acute, and a distressing sense of fullness and weight is felt in the cheek, accompanied by redness and tumefaction of the integuments covering the antrum.‡ The nasal opening having become closed, the fluids of the cavity gradually accumulate until they fill it, when, finding no egress, they press upon and distend the surrounding osseous walls, causing those parts which are the thinnest ultimately to give way. The effects are generally first observable anteriorly beneath the malar eminence, where a smooth hard tumour presents itself, covered by the mucous membrane of the mouth. But this is not always the point which first gives way, the sinus sometimes bursts into the orbit, at other times outwardly through the cheek, or through the palatine arch. The long continued pressure that is thus exerted upon the bony walls of this cavity, often cause them to become softened, by the destruction of their calcareous molecules.

The tumour which is at first hard, in a short time becomes so soft as readily to yield to pressure. A distention of the maxillary sinus, Deschamps says, may be distinguished from other diseases that affect the skin or intermediate structure between it and the bone, by the uniformity or regularity of the tumour, its firmness at the commencement, the slowness with which it progresses, and

‡ Vide Bell on the Teeth, p. 256, see also Maladies des Fosses Nazales, page 228.

above all, by the natural appearance of the skin, and the absence of pain when pressure is made upon the tumour. An obliteration of the nasal opening he says, may be suspected by the dryness of the nostril of the affected side,* the mucous membrane of which becomes thickened, and the cavity contracted; inflammation and sponginess of the gums, loosening, and sometimes, (in consequence of the destruction of their sockets,) displacement of the teeth, may also be mentioned as occasional accompaniments of engorgement of this cavity.†

Causes.—On the causes of these, in common with the other affections of the maxillary sinus, I have before spoken; it will not therefore, be necessary to say much in this place concerning them. It may be well, however, to repeat, that the secretions of this cavity rarely become purulent in individuals possessed of good constitutional health, so that it would seem, that although local irritation be necessary to it, this is capable of producing it only in those labouring under a bad habit of body, or in whom their exists a tendency to such alteration. Inflammation of the lining membrane, no matter how produced, is the immediate cause, and this, as has been before shown, results more frequently from alveolo-dental irritation, than from any other cause; and I am not the only one that is of this opinion;—it is maintained by almost every writer upon the morbid affections of this cavity. The teeth that are most frequently concerned in the production of irritation in the lining membrane of the antrum, are the first and second molares, but the bicuspides and dens sapientiæ, do sometimes cause it. But, it being conceded by nearly every one that

* Vide Maladies des Fosses Nazales, pages 228–9.

† Vide, Anat. Phys. and Diseases of the Teeth, p. 257.

the exciting cause, of not only this, but also all the diseases of this cavity, is dental irritation, I need not spend time in recapitulating what has before been said upon the subject, or in controverting absurd and erroneous opinions.

Engorgement of the sinus is attributed to several causes, among which, are blows upon the cheek, caries of the teeth, &c. &c. But, whatever may be the exciting or primary causes of this affection, it is certain that the proximate or immediate cause, is the closing or obliteration of the nasal opening. This, like purulent secretion, may be produced by inflammation and thickening of the lining membrane of the sinus, which is perhaps the most frequent cause.*

Treatment.—The curative indications of muco-purulent secretion and engorgement of the maxillary sinus are, 1st, If the nasal opening be closed, the evacuation of the retained matter; 2dly, The removal of all local and exciting causes of irritation; 3dly, and lastly, the restoration of the lining membrane.†

For the fulfillment of the first, an opening must be made into the antrum, and this should be effected in that part which will afford the most easy exit to the retained matter; but as it regards the several methods that have been proposed for the accomplishment of this object, practitioners differ; and, before I proceed

* Fauchard says, in the Anatomical Mus. of the University of Copenhagen, he saw caries of the bones of the face produced by a molar tooth, the crown of which having turned outwards, had penetrated the maxillary sinus. *Mem. de l'Academie de Chirurg.* vol. v. mem. 257. Also the fangs of the bicuspides and front molaris sometimes penetrate the sinus. Bertin Osteologie, vol. xi. p. 309.—Portal Camp. d'Anatomie Medicale, vol. i. p. 210. Note 2.—My Uerzichniss, No. 3278; there are in the Bresl. Mus. No. 8128, two teeth, as it were absorbed, which had been drawn out of the maxillary sinus.—*Otto's Compend. of Comp. Anat.*

† Vide Anat. Phys. and Diseases of the Teeth, p. 259.

further, it may not be amiss to notice some of the various methods that have been adopted.

Dr. Drake, an English anatomist, and author of a work entitled "Anthropologia Nova," has the credit of being the first to propose a plan for the evacuation of accumulated fluids from this cavity, and the method adopted by him for effecting this object, consists in the extraction of a molar tooth and the perforation of the sinus through the alveolus of one of its roots. This method of treatment however, is said by some to have been inserted into Drake's anatomy by Dr. Cowper, an eminent anatomist and surgeon,* but having never seen any evidence touching the correctness of this conjecture, I suppose, its truth is probably somewhat questionable. M. Gûnz says the credit belongs to John Henry Meibomius, who a long time before proposed a very similar method of treating these affections.† Henry Meibomius, many years after the death of his father John Henry, proposed for the evacuation of accumulated fluids in the antrum, the extraction of one or several teeth.‡ But, the perforation of the maxillary sinus through the alveolus of a molar tooth, is said not to be the most ancient method. Molinetti, as early as the year 1675, describes an opening made through the cheek into the antrum, the wall of which, after having been exposed by a crucial incision through the integuments covering it, was penetrated with a trephine. And, the perforation of this cavity through the alveolus of a superior molaris, is an operation which, according to Velpeau, was performed by Zwinger a long time before it was performed by Meibomius; and

* Heister's Surgery, note to chapter 72, p. 445.

† Vide, Mem. de l'Acad. Royale de Chirurg. 12mo. vol. xii. p. 12.

‡ Vide, Discurs. de Abscessibus internis, Dresd. 1718, p. 114, and la Dissertation d'Gunz.

Vanuessen, says, Ruysch, extracted several molares and cauterized their sockets, for the destruction of a polypus, until an opening was made into the antrum large enough to admit the finger.* But Drake, according to Bordenave, seems, nevertheless, to be entitled to the credit of having been the first to perforate the maxillary sinus through the alveolus of a molar tooth, by means of a punch, for the evacuation of accumulated fluids, and the injection of the cavity. We are also informed by the same author, that Cowper treated a case of maxillary ozena, which had caused a large quantity of ichorous and fetid matter to be discharged through the nose, by extracting the first molaris and perforating the antrum through the alveolus with an instrument suited to the purpose.†

It is not at all probable that Meibomius was the first to propose the perforation of the antrum through the alveolus of a molar tooth, for his researches were not published until 1718, twenty-one years after the publication of Drake's system of Anatomy, and besides, he regarded the perforation of this cavity as a dangerous operation, and on that account, confined himself simply to the extraction of a tooth. Saint Yves, says Velpeau, treated with success, a person affected with fistula, the floor of whose orbit had been destroyed, by the removal of a tooth.‡

With regard to the tooth most proper to be extracted, authors differ. Cheseldon preferred the first or second molaris, Junker recommends the extraction of the first or second bicuspides, and if a fistula had formed, to enlarge it instead of perforating the

* New Elements of Operative Surgery, p. 446.
† Mem. de l'Acad. Royale de Chirurg. vol. 12, 12mo. p. 13.
‡ New Elements of Operative Surgery, p. 446.

floor of the antrum. It is at present pretty generally conceded that the second molaris, it being directly beneath the most dependent part of the cavity, is the most suitable tooth to be removed; but, if this be sound, the first molaris, dens sapientiæ, or either of the bicuspides, if carious, should be extracted in its stead, and in fact, none of the teeth that are in an unhealthy condition should be permitted to remain.

An opening having been effected through the alveolus of a tooth into the antrum, it should be kept open until the health of the cavity be restored. For this purpose, sounds and bougies adapted to the purpose have been introduced. Heuerman, recommends the employment of a small canula, which is also preferred by Bordenave and Richter, the latter of whom says, it should be kept closed to prevent particles of food from getting into the sinus. But, whether a canula or bougie be introduced into the opening, it should be so secured as to prevent it from coming out or getting up into the antrum. Deschamps recommends that it be fastened to one of the adjoining teeth by means of a silk or metallic ligature.*

Lamorier, an eminent surgeon of Montpellier, recommended perforating the antrum immediately above the first molaris, or rather between it and the malar bone. In this, he seems to have been influenced by the consideration that the wall of the cavity here, present the least thickness, and that this is the most dependent part of the sinus. But, if a fistulous opening had previously formed in some other place in the mouth, he did not always deem it necessary to make another. His method of operating is as follows. The jaws being closed, the commissure of the

* Vide, Maladies des Fosses Nazales, sec, 2, Art. 1, p. 234.

lips are drawn outwards and slightly upwards with a curved instrument, called a speculum; this done, the gum is incised across the malar apophasis,* or maxillo-labial sulcus,† and the bone made bare, which is next pierced with a spear-pointed punch. The opening is afterwards enlarged if found necessary.

Desault is of the opinion that the opening should be made through the canine fossa, beneath the upper lip, and for that purpose, after having laid bare the bone, he employed a sharp triangular and a blunt-pointed perforator, which he invented for the operation. Runge says, Velpeau used nothing but a scalpel. Charles Bell invented a trephine for the purpose, but this, it is thought does not possess any advantage over the instruments employed by Desault and Runge. In cases of fistula in the cheek from the antrum, Ruffel advises the insertion of a trocar, to be carried through the gum, so as to form a counter opening. Through this, in a case which he treated, he passed a seaton, and it remained six weeks; at the expiration of this time, a cure was accomplished. This practice has been followed by Callisen, Zang, Busch, Henkle, Bertrandi, Faubert and others.‡ Callisen is of the opinion that when the tumour points in the palatine arch and a fluctuation is felt, the artificial opening should be formed there. Gooch, says Velpeau, in a case which he treated, advised the perforation of the antrum through the nasal surface, and fixing in the opening a canula of lead. We are also informed by the same author, that, Acrel, after having operated in the manner proposed by Cowper, inserted a second canula into the sinus through a

* Vide, Mem. de l'Acad. Royale de Chirurg. 12mo. vol. 12, p. 37.

† Vide, Velpeau's Surgery, p. 447.

‡ Vide, Mem. de l'Acad. Royale de Chirurg. 12mo. vol. 12, Obs. 18 and 21; also New Elements of Operative Surgery, p. 447.

fistulous opening that had formed in the nose. The method attributed to Wienhold, consists in penetrating the sinus from the upper and external part of the canine fossa, with the instrument directed obliquely downwards and outwards, so as to avoid the branches of the infra-orbital nerve; and then placing in the opening thus made a little lint. Weinhold, directs, that when the antrum has no other opening, the instrument to be carried entirely through the palatine arch, and then by means of a curved needle and thread, he introduces a roll of lint, saturated or covered with some appropriate medicine, and this he designs to act as a seton.*

Velpeau says, the perforation is effected "in the point of election or of necessity. The first varies according to the ideas of the operator. The circumstances, on the contrary, determine the second. In cases of abscess, dropsy, fistulæ, and ulceration, the operation is almost always performed in the place of election. Then, provided one of the molar teeth be unsound, it must be extracted, together with the adjoining tooth; the gum is then to be cut down to the bone, externally; internally, behind and before, forming a kind of a square flap, and to be completely detached from the surrounding tissues; after this the alveoli are to be perforated with the instruments of Desault, and an opening made large enough to admit the finger into the sinus."* For the evacuation simply of purulent mucus, or accumulated fluids, I believe with Boyer,† that the opening should always be made from beneath; and, I am the more convinced of the importance of giving the alveolus of an extracted tooth the preference, from the consideration that it is to the irritation produced by some one or more of

* New Elements of Operative Surgery, p. 448.
† Vide, Maladies Chirurgicale, tom. vi. p. 149.

these organs, that these affections are attributable. Even though a fistula may have been formed above the alveolar ridge, beneath the cheek, or in the palatine arch, we should not neglect to extract such teeth, whether carious or sound, as may be productive of irritation. It may not always in such cases be necessary to perforate the sinus from the socket of a tooth, though the cure in most instances would be expedited by it.

Jourdain, an eminent French dentist, and graduate in surgery, instead of seeking egress for matter accumulated in the maxillary sinus, by any of these methods, proposed, in a memoir which he presented to the academy, in 1765, to probe the cavity by its natural opening and then by suitable injections to restore it to health. The academy gave this proposition its attention; it was carefully and minutely discussed. The practicability of obtaining entrance into the sinus in this way was called in question; it was contended that the difficulties presented by the peculiar structure of the parts were such that they could seldom be overcome; but to remove all doubt upon the subject, a trial was determined on.

While this subject was before the academy, M. Allouel, jr, claimed the credit of the discovery for his father, who, he said made it in 1737, and treated with success in 1739, a case of disease in the antrum by injecting it through the natural opening. But, the academy determined that inasmuch as M. Allouel had never published it, Jourdain could not have borrowed it from him, and was therefore entitled to the credit of being the discoverer. It is certain that he was the first to announce it to the world.

The instruments employed for probing and injecting the sinus

are, says Bordenave,* 1st, a small silver sound with a button on one end, and a plate in the form of a heart at the other, to be held between the fore-finger and thumb of the operator: 2d, a hollow sound without either button or plate, containing a stilet of whalebone, with its extremity extending beyond the sound between the fingers: 3d, a small syringe, with a pipe adapted to the hollow sound. The two first instruments should be curved something like the letter S, and vary a little in size.

The treatment of affections of the maxillary sinus by injections through the nasal opening, having been almost entirely abandoned, a more minute description of the instruments employed for the purpose is not deemed necessary. But it may be well, before dismissing this part of the subject, to state that the academy, when this method of treatment was proposed by Jourdain, at once appointed commissioners to investigate its merits, who, after having made a number of trials, came to the conclusion that the introduction of a sound by the nasal opening, although perhaps possible, was so exceedingly difficult, that it could seldom be effected. They attempted it upon each antrum of five subjects, and the result proved that the sound pierced the membranes between the turbinated bones more frequently than it entered the sinus by the natural opening. Their report was therefore unfavourable, and Bordenave in remarking upon this method of gaining access to the cavity, states that while the membranes between the ethmoidal and inferior turbinated bones may be pierced without causing serious injury, it induces us when it happens, to suppose that we have entered the sinus by the natural opening, which "goes to prove that the operation is as difficult as it is un-

* Vide Mem. de l'Acad. de Chirurg. 12mo. vol. 12, p. 47.

certain." He adds, however, that while there are cases in which the use of injections through the natural opening will suffice to effect a cure, these would succeed in only a very small number of the cases, inasmuch as these diseases result more frequently from morbid conditions of the teeth than from any other causes.*

The only advantage then, as is justly remarked by the last named author, that is derived from injections, is the cleansing of the membrane of the antrum, or the disgorgement of the cavity, and this, while the cause remains, will not suffice to effect a cure, while the removal of that, and the giving of vent to purulent or accumulated fluids will of themselves, in most instances, be all that is required to bring about a healthy action. The cure, no doubt, will many times be greatly facilitated by the employment of suitable injections, but that these exercise as great a curative influence as many imagine, I have yet to be convinced. They may in those cases where a morbid action has been kept up so long in the mucous membrane of this cavity, as to have nearly destroyed its power to re-act, be highly serviceable, but the difficulty of doing this through the natural opening, as is shown by the result of the experiments of the commissioners appointed by the French Academy, and those of others, who have attempted it, is such as must forever preclude their introduction in that way.

Moreover, M. Allouel and Jourdain, who have attempted to establish the efficacy of injections, by the citation of cases, seem to have overlooked the agency which the removal of the causes, during the employment of the injections, had in bringing about the cure; so that arguments advanced by them in favour of their method of treatment do not prove any thing in its favour. "They

* Vide, Mem. de l'Acad. Royale de Chirurg. vol. xii. 12mo. p. 51.

might," as Bordenave justly observes, "just as well have been cured without as with them."* Boyer, in alluding to the method proposed by Allouel and Jourdain, asserts that it is opposed both to reason and experience.† It is also condemned by almost every writer upon the diseases of this cavity.

When the natural opening is closed, the first indication, as has been stated, is the evacuation of the matter and for this purpose, a perforation should be made into the sinus, and the most proper place for effecting this, it has been shown, is through the alveolar cavity of the second molaris.‡ It may however be penetrated from that of either of the other molares or bicuspides. The perforation, after the extraction of the tooth, is made with a strait trocar, which will be found much more convenient than those usually employed for the purpose. The point of the instrument after having been introduced into the alveolus, through which it is intended to make the opening, should be pressed against its bottom in the direction towards the centre of the antrum. With the handle of the instrument in the hand of the operator, a few rotary motions will suffice to pierce the intervening plate of bone. If the first opening be not sufficiently large, its dimensions may be increased to the necessary size, by means of a spear-pointed instrument. In introducing the trocar, care should be taken to prevent a too sudden entrance of the instrument into the cavity. Without this precaution, it might be suddenly forced into it and against its opposite wall. The entrance of it is usually attended with a momentary severe pain, and its withdrawal followed by ed by a sudden gush of fetid mucus.

* Mem. de l'Acad. de Chirurg. vol. xii. p. 52.
† Maladies Chirurgicale, vol. vi. p. 149.
‡ Vide, Anat. Phys. and Diseases of the Teeth, p. 261.

It is not always necessary to perforate the floor of the antrum after the extraction of a tooth; it occasionally happens, as has already been remarked, that some of the alveolar cavities communicate with it.

An opening having thus been effected, it should be prevented from closing, until a healthy action shall have been established in the lining membrane, and for this purpose a bougie or leaden or silver canula may be inserted into the opening and secured in the manner as previously noticed, to one of the teeth. It should, however, be removed for the evacuation of the secretions of the antrum at least twice a day. The establishing of an opening at the base or most dependent part of the sinus, will, in those cases where a fistula has been previously formed, in most instances, be followed by its speedy restoration. Having proceeded thus far, the cure will be aided by the employment of such general remedies as may be indicated by the state of the constitutional health, and for the reduction of the local inflammation, leeches to the gums and cheek will be found very serviceable. The antrum should, in the meantime, be injected with, at first, some mild or bland fluid, and afterwards with gently stimulating liquids.* Diluted port wine, a weak solution of the sulphate zinc, and rose water and also that of copper and rose water,† have been recommended. Diluted tinct. of myrrh may sometimes be advantageously employed, and when the membrane is ulcerated, a weak

* Anat. Phys. and Diseases of the Teeth, p. 262.

† The following are the formula of Mr. Thomas Bell.

℞. Zinci Sulphat, grs. vi. ℞. Cupri Sulphat, gr. iv.
Aqua Rosæ, f. ℥ vi. M. Aqua Rosæ, f. ℥ vi. M.

In addition to the above he recommends the subjoined.

℞. Tinct. Myrrh, ℥ i.
Decoct. Hordei, f. ℥ vi. M.

solution of the nitras argentum* will be highly serviceable. For correcting the fetor of the secretions of this cavity, a weak solution of the chloride of soda or lime, may be injected into the antrum.

Dr. Isaac I. Greenwood, an eminent dentist of New York, employed with success in a case of muco-purulent secretion of the antrum, caused by an alveolar abscess, "suds made from tepid soft water and old Castile soap," and he mentions another, treated in the same way by his father, the late Mr. John Greenwood.†

In cases of muco-purulent secretion simply, a weak decoction of galls,‡ may be injected into the sinus with very considerable advantage.

Injections of a too stimulating nature are sometimes employed. This should be carefully guarded against, by making them at first very weak, and afterwards increasing their strength as occasion may require; but when symptoms of a violent character are in this way produced, they should be combatted by leeches to the gums and fomentations to the cheek.

But, dependent as these affections in most instances are, upon local irritants, greater reliance is to be placed on their removal, and the giving vent to the acrid puriform fluids in the sinus, than to any therapeutical effects exerted upon the cavity by injections. As adjuvants, they are serviceable, but a cure cannot be accomplished by them, while the exciting cause remains unremoved.

*This should at first be used very weak, say in the proportion of one grain of Nit. Arg. to two ounces of soft water. Its strength, however, may, if necessary, be gradually increased.

† Vide American Journal of Dental Science, vol. 2, p. 179.

‡ ℞. Gallæ Pulv. ʒ ii.
Aqua Font. f. ℥ vi. M.

This opinion is sustained by the result of the treatment in the two following cases.

Case IV.—Mr. W. S——, æt. twenty-four years, of a full habit, and slightly disposed to scorbutus, applied to me in the spring of 1839, to obtain my opinion with regard to an affection of his left antrum. It had existed for nearly a year, and the floor of the sinus had been perforated through the alveolus of the second molaris, which had been previously extracted. Injections, first of diluted tinct. of myrrh, and afterwards of a solution of the sulphate of zinc, diluted port wine, &c. &c. had been used regularly once or twice a day for eight months ; but still, the matter that was discharged whenever the opening was unclosed, was exceedingly fetid. It had a thick muddy appearance, and turned silver black almost immediately on being brought in contact with it.

Before the antrum was perforated from beneath, this fetid matter was discharged from the nose, which at first, had induced the belief, that the affection was ozena. The heavy pain daily felt in the cheek, and the occasional sudden discharges of purulent matter from the left nostril, when laying upon his right side, led the medical attendant to suspect that the disease was seated in the maxillary sinus, and for the purpose of introducing what he conceived to be the proper remedies, perforated its floor through the alveolus of the second molaris, as just stated. The operation was immediately followed by a discharge of purulent and very fetid matter.

The use of injections, although persisted in for so long a time, were not productive of any permanent benefit, and the patient had almost begun to despair of a cure. His teeth had been examined, but as none in the left side of the upper jaw appeared to be

affected with caries, they were not suspected as having any agency in the production of the disease. On examining his mouth, however, I at once perceived that although the teeth were free from decay, they were nevertheless coated with tartar. His gums were inflamed and tumefied; their edges around the bicuspides, the first molaris and dens sapientiæ, were ulcerated, and the alveoli so much wasted that the teeth were considerably loosened, and sensitive to the touch.

Such being the condition of his teeth, gums, and alveoli, the cause of the affection in the antrum, was to my mind apparent. That it was attributable to the irritation in the two last, I felt fully convinced, and therefore advised the immediate extraction of the above-mentioned teeth, and to this operation, as a dernier resort, he reluctantly submitted. Four weeks after their removal the secretions of the antrum ceased to be offensive, and the opening through the alveolus of the second molaris was permitted to close. The injections it is true, that had been previously employed, were continued, but as they had not, previously to the removal of the teeth, exerted any curative effect upon the affection of the maxillary sinus, it is not fair to presume that they had subsequently. It was therefore evidently to the extraction of these that the restoration of the cavity was attributable.

Case V.—In the summer of 1840, Mr. B. of a strumous habit, æt. nineteen, applied to me for advice, concerning an affection of the right maxillary sinus, that had troubled him for several months. He informed me that nearly a year before, he had broken the crown of one of his teeth; (the second bicuspis of the affected side,) and that a few weeks after he was seized with a severe throbbing pain in its alveolus; this gradually extended to his cheek, but

in the course of a few days, it abated in intensity, though the pain had never entirely subsided. About four weeks after the attack, he began occasionally to discharge a glairy and exceedingly fetid mucus from the right nasal cavity. This continued for several weeks, when it nearly ceased, and a similar matter was discharged through the root of the tooth that had at first caused the disturbance, which by this time had become funnelled up to its apex, so that a probe could be passed through it into the antrum, from which cavity the matter seemed to come. To prevent the matter from discharging itself continually into his mouth he kept the canal in the root plugged with raw cotton, which he removed two or three times a day to give vent to the accumulations of purulent mucus.

Persuaded that the disease of the antrum had resulted from the inflammation excited in the alveolus of the second bicuspis by the decayed root that was in it, and the abscess that had in consequence formed and discharged itself into the sinus, the indication of cure, was too obvious to be mistaken. It consisted in the removal of this local irritant, and to this operation he readily and at once submitted. The muco-purulent discharge without other treatment, soon ceased, the opening through the alveolus closed in about ten days, and he has since remained well.

In the foregoing case, the cure was effected without the use of injections of any kind, and simply by the removal of the root of one tooth, the second bicuspis, which had caused the disease.

The particulars of the following case are obtained from "Observations of Bordenave on the Diseases of the Maxillary Sinus,"* a paper embodying reports of forty highly interesting cases.

* Mem. de l'Acad. Royale de Chirurg. vol. xii. obs. 3, p. 10.

Case VI.—"In 1756," says our author, "I was consulted by a lady whose right cheek was tumefied. About a month previous she had experienced acute pain under the orbit of the affected side; and she had felt a pulsation and heat in the interior of the sinus, and the maxillary bone was slightly elevated. These signs determined me to propose the extraction of the third molar tooth,* and the perforation of the antrum through the alveolus. The operation was followed by a discharge of purulent matter, the sinus was afterwards injected, the maxilla gradually reduced itself, and a cure was effected in about two months."

Although injections were employed in the above case, it was no doubt to the giving of vent to the matter contained in the antrum that the cure was attributable. As it regards the cause that gave rise to the affection in the first instance, not a single word is said. It might have resulted from inflammation, lighted up in the sockets of one or more teeth, and propagated from thence to the mucous membrane of this cavity, or from inflammation here, produced by some other cause, and a consequent obliteration of the nasal opening.

The following brief statement is taken from the history of a case narrated by Fauchard.†

Case VII.—The child of M. Galois, æt. twelve years, whose first right superior molaris was decayed, had a tumour situated anteriorly upon the upper jaw of the same side, extending up to the orbit. M. Fauchard, supposing this tumour, which was about the size of a small egg, had been caused by the carious tooth in question, determined on its extraction as the only means of ac-

* The bicuspides are called by most French writers, molares, and by the "third molar tooth," he means the one which we call the first.

† Le Chirurgien Dentiste, tom. i. obsv. 8, p. 483.

complishing a speedy and certain cure, and the result proved his opinion to have been correct. The removal of the tooth was followed by a large quantity of yellow serous matter, which on examination was found to have escaped from the antrum. The tumour disappeared soon after the discharge of the matter, and a complete cure was effected.

Bordenave, in noticing the foregoing case, inclines to doubt that the tumour communicated with the maxillary sinus, for the reason that the matter escaped through the alveolus of the first molaris immediately after its extraction. He, however, admits that the acumen and knowledge of Fauchard, are such as to have prevented deception in the case.* Admitting then the statement to be correct, and surely the circumstance mentioned by Bordenave does not in the least tend to invalidate it, for it is of frequent occurrence, a cure is effected simply by the removal of a decayed tooth, to the irritation produced by which, the disease was undeniably attributable. The two following cases are described at length by the last named author in the "Memoirs de l'Academie Royale de Chirurgie."†

Case VIII.—A woman in 1731, had the first superior molaris, the crown of which had been destroyed by caries, extracted. Not many days after the operation, she was attacked with a pain in the upper jaw that extended from the maxillary fossæ to the orbit. The pain was so great as to deprive her of rest, but there was no tumefaction of the cheek or gums. An opening through the alveolus into the sinus was discovered, and into which a probe was introduced by a surgeon. The withdrawal of this was fol-

* Vide, Mem. de l'Acad. Royale Chirurg. vol. xii. p. 13.
† Vide, vol. xii. 12mo. observations 5 and 6, pages 12 and 19.

lowed by a discharge of yellow fetid matter. M. Lamorier, who was afterwards consulted, removed from the opening a tooth that had been thrust into the antrum and prevented the egress of the matter, which by its retention had become purulent. Injections were employed, and a part of which, at the expiration of thirty days, escaped from the nasal opening. A perfect cure was soon after effected.

In this case, the affection of the sinus, was evidently the result of the injury inflicted upon the socket of the first superior molaris in an attempt at the extraction of the tooth. Inflammation was excited by this and the presence of the tooth that had been thrust into the antrum, which extended itself to the lining membrane of this cavity, and caused a temporary obliteration of the nasal opening, so that to effect a cure it was necessary to obtain free vent for the retained matter. In restoring a healthy action to the mucous membrane of the cavity, the injections may have been serviceable.

Case IX.—A girl, æt. twenty-six years, in having a decayed and painful superior dens sapientiæ on the right side extracted, the tooth was broken and all the roots but one were left in their sockets. These caused an abscess to form, and this was followed, for a short time, by a subsidence of the pain; which however soon returned, and a dull heavy sensation was felt in the antrum of the affected side. From thence the pain extended to the eye and ear. The gums at length became tumefied, and the pain less constant; but the patient, although five teeth were in the meantime extracted, remained in this condition for five years. At this time, 1756, M. Beaupreau, who was consulted, found on examination, that the gums where the first tooth had been extracted,

had not entirely united and that a small tubercle had formed here from which a fluid of a bad smell and reddish colour was discharging itself. He introduced a probe into the fistulous hole of the tubercle, which after having overcome some obstacle that at first impeded its passage, penetrated the antrum. The opening was enlarged and mercurial water applied to the carious bone, but it soon closed and the pain which had ceased returned. Injections were resorted to. These discharged themselves in part through the nasal opening, and the patient continued in this way until an exfoliation of the bone took place, when a cure was at once effected.

The cause of the disease in this, as in the preceding cases, was alveolo-dental irritation, and a cure, would at once have been accomplished by the removal of the roots of the tooth that had been left in their sockets, as was proven by the fact, that it was not until they were thrown off with their exfoliated alveoli, that it was effected.

In alluding to these and similar cases, Bordenave concludes that there are not many cases where the extraction of teeth simply, will suffice to effect a cure. The inference, to say the least of it, is unfair, for in the case last given, it was to the presence of the roots of a tooth, that had been fractured in an attempt to extract it, and left in their sockets, that the affection was attributable, and we have every reason to believe, that the cure was wholly owing to their removal.

The history of the following exceedingly interesting case, which was communicated to the Faculty of Medicine, by Professor Dubois, is contained in the 8th number of their bulletin, for the year 13, and also in Boyer's works on Surgical Diseases.

Case X.—Upon a child between seven and eight years old, at the base of the ascending apophysis of the superior maxillary bone, a small hard round tumour of the size of a walnut, was perceived by its parents. About a year after, the child fell upon its face and caused a considerable discharge of matter from its nose, and at the same time bruising the tumour. No other injury was produced, and the tumour did not increase perceptibly in size, from the eighth to the fifteenth year. During the next year however, it sensibly augmented, and from the sixteenth to the eighteenth year, it attained so great a volume that the floor of the orbit was elevated, which caused a diminution in the size of the eye, and restricted the motions of the eyelids. The arch of the palate was depressed and the nasal fossæ almost closed. The nose was forced to the right side at the upper part of the tumour, and there was a considerable elevation beneath the sub-orbital fossæ. The skin below the inferior eyelid was of a violet red colour and very tense. The upper lip was elevated and the gums on the left side protruded beyond those on the other side of the arch. Respiration was painful, and the patient spoke with difficulty. Sleep was laborious and mastication was attended with pain. "In this state," says M. Boyer, "he was seen by M. Dubois, September 1st, 1802, but as he was not able to determine on the proper operation, M. Sabatier, M. Peletan and himself were called in. It was the opinion of all, that there was a fungus tumour of the antrum, and for the removal of this M. Dubois was requested to make choice of his own method of operating.

A fluctuation was felt behind the upper lip, and this determined M. Dubois to commence the operation by making an incision there.

This was followed by a discharge of a large quantity of a glairy lymphatic substance. Through this opening a sound was introduced into the antrum, and to M. Dubois' surprise, this cavity contained no tumour, but upon moving the sound about it struck upon a hard substance, in the most elevated part of the sinus, which, on being removed proved to be a canine tooth. Preparatory, however, to its extraction, two incisors and one molaris were removed and their alveoli cut away. Injections were afterwards employed and the patient was soon restored to health.

It is not necessary to stop to inquire how this tooth got into the antrum; aberrations of this sort in the growth of the teeth are frequently met with, and some precisely similar instances have already been referred to.*

In all the cases which have as yet been noticed, the affection was traceable to local irritation, and in all except this last, it had originated in the alveolar ridge. But, the following case of mucopurulent engorgement may be thought by some to have been occasioned by a different cause. Yet, there are circumstances connected with the history of even this case, that go far to justify the belief, that if the teeth had been in a healthy condition the affection would not have been produced.

Case XI.—Mr. G. a labourer, æt. about thirty, of a decidedly scorbutic habit, applied in the spring of 1834, to an eminent medical gentleman of this city, to obtain his advice concerning an affection of the left side of his face, under which he had been labouring for several months. The physician to whom he applied, after having examined the case, came to the conclusion, that it was mucous engorgement of the maxillary sinus, and

* Vide note, on page 46.

requested him to call upon me, and have one of his molar teeth extracted, and the floor of the antrum through its alveolus pierced. He at the same time desired, that if his opinion in regard to the nature of the disease proved to be correct, I would take charge of the case altogether. On examining his mouth, I discovered that nearly all his teeth of both jaws, gums and alveoli were extensively diseased, and on inquiry obtained from him the following statement with regard to the commencement and progress of the affection of the antrum.

About six months previous to this time, having been exposed while pursuing his ordinary avocations, to very inclement and several sudden changes of weather, he contracted a severe cold; in consequence of which, he was confined to his bed for several days; during this time, he was twice bled, took two cathartics, and other medicines

The disease at first concentrated itself in his head, face, and jaws, which at the expiration of eight or ten days, was subdued by the above treatment, with the exception of the pain in his left cheek, and soreness in the superior teeth of the same side. The pain in his cheek, although not constant, still continued; the nasal cavity of that side ceased to be supplied with its usual secretion, the teeth became more sensitive to the touch, and finally at the end of four months, a slight protuberance of the cheek was observable, accompanied by a tumour upon the left side of the palatine arch, which, when I first saw him had attained to half the size of a black walnut, and it was by the fluctuation here felt, that the physician whom he first consulted, was induced to suspect the true nature of the disease.

Acting under the direction of the medical gentleman, under

whose care the patient had placed himself, I extracted the second left superior molaris, and through its alveolus penetrated the antrum by means of a straight trocar, and after the withdrawal of which, a large quantity of a glairy fetid mucous fluid was discharged. The perforation was kept open by means of a bougie, secured with a silk ligature to an adjoining tooth, as recommended by Deschamps, and the antrum injected three times a day; at first, simply with rose water, to which a small quantity of sulphate of zinc was afterwards added. By this treatment, the lining membrane of the antrum at the expiration of five weeks was restored to health, and the secretions that escaped through the perforation no longer exhaled a fetid odor.

The patient not experiencing any inconvenience withdrew the bougie, and allowed the aperture to close. In about two months, he again presented himself to me, and was similarly affected as when I first saw him. I now extracted the first superior left molaris, and perforated the antrum through its alveolus, and a quantity of fetid mucous fluid was again discharged; the dens sapientiæ, and the first and second bicuspides of the affected side, which were carious, were also extracted. Injections of sulphate of zinc and rose water, diluted tincture of myrrh, diluted port wine, a decoction of Gallæ, were alternately employed for three months, at the expiration of which time, the nasal opening which had been previously closed, was re-established, and a perfect cure was effected.

The condition of the teeth in the case just narrated, may not be thought to have exerted any agency in the production of the affection of the antrum, but there are circumstances connected with its progress that would seem to justify a different conclusion.

The presence of the decayed teeth beneath the sinus, may not only have contributed to aggravate the morbid action lighted up in it by the cold which he had taken, but they may also have caused it to locate itself in this cavity; and the fact that the inflammation of its lining membrane and the obliteration of the nasal opening continued until they were removed, would at least, seem to warrant such an inference. That the injections were beneficial, I do not doubt, but that the cure was effected by them, no one, I think, will dare to affirm. I am far from believing that the presence of the decayed teeth was the sole cause of the disease in the antrum, but that they contributed to, and protracted it, I cannot hesitate to believe, and but for the increased excitability and perhaps actual inflammation, induced in the mucous membrane of this cavity, by the exposure of the patient to inclement and sudden transitions of weather, it is probable that the sinus would never have become affected, and I think it not unlikely, that notwithstanding the disturbance that may have been originated in it by this cause, no very serious or lasting morbid effect would have been produced, if the teeth and alveoli had been in a perfectly healthy condition.

A very interesting case of muco-purulent secretion of the mucous membrane of this cavity, occasioned by an exostosis of a superior molaris, which gave rise to an obstinate ozena, came under the observation of the author in 1839. A detailed account of it, might very properly be introduced into the present treatise, but inasmuch as the history of the case has been recently published in the "Maryland Medical and Surgical Journal," the "Medical Examiner," and the "American Journal of Dental Science," I have thought it best to omit it.

The particulars of the following highly interesting case were communicated to me by Dr. L. Roper, an eminent dentist of Philadelphia, in a conversation which I had with him about six months since.

Case XII.—Miss M——, a young lady from the West Indies, of about fourteen years of age, had a fistulous opening beneath the right orbit, that communicated with the maxillary sinus. By means of a probe introduced through the opening into this cavity, the apices of the roots of the first superior molaris could be distinctly felt.

Medical aid was sought at an early stage of the disease, but as no permanent benefit resulted from the treatment adopted, the young lady, at the expiration of nine months, was brought by her father to Philadelphia, and in the spring of 1831, placed under the care of the late Dr. Physick; who, suspecting that the affection of the antrum had resulted from, and was still kept up by irritation produced by the first superior molaris of the affected side, which was considerably decayed, directed her to be taken to Dr. Roper, who, concurring with him in opinion, at once extracted the carious tooth. The operation was followed by the immediate discharge of a large quantity of thick, muddy, and greenish matter. The fistula under the orbit soon closed, and without further treatment a perfect cure was accomplished in the course of a few weeks.

The foregoing are all the particulars which I could obtain concerning this interesting case; but I have no doubt that, if all the circumstances connected with its early history were known, it would be found to have resulted from inflammation of the lining membrane of the antrum, caused by irritation in the socket of the tooth that was extracted; and this opinion is sustained by the

facts, that this tooth was affected with caries, and that its removal was followed by an immediate cure of the disease.

In Bordenave's collection of cases of disease of the maxillary sinus, published in the Memoirs of the Royal Academy of Surgery,* there are several cases similar to the one just narrated. I subjoin a description of the two following.

Case XIII.—A servant of the Count of Maurepes had been afflicted for six months with a fistula upon the left cheek, a little below the orbit, which penetrated the maxillary sinus, caused by the spontaneous opening of an abscess. The third and fourth molares, (which are the first and second according as the teeth are now designated,) both of which were considerably decayed, were extracted by M. Hevin, but as there were no openings through the alveoli, he perforated one with a trocar; this opening gave vent to a great quantity of putrid sanies, and it did not close for more than a year after it was made, but the fistula of the cheek healed in about ten days.

Case XIV.—In 1717, a soldier of the regiment of Bassigny, who had for a long time a fistula in his cheek penetrating into the maxillary sinus, was treated for it at the Hotel Dieu, of Montpelier. The matter settling near the orifice of the fistula, prevented it from closing. M. Lamourier, on examining the mouth of the soldier, perceived that the second superior molaris was decayed; this he extracted and profited by the alveolar cavity, in opening the base of the sinus. The fistula of the cheek was by this means cured in a few days, but the counter opening was not immediately permitted to close.

* Vide Observations vii. viii. xii. and xiii. vol. 12; 12mo. ed. pages 26, 33 and 34.

In cases of fistula resulting simply from engorgement of the sinus, the treatment, as has been shown by the result of that in the foregoing cases, consists in the formation of a counter opening, which should always be effected at the most dependent part of the cavity, and in the removal of all sources of local irritation. Injections should also be employed.

In the cases that have thus far been presented, I have selected such as were not complicated with abscesses, ulceration of the lining membrane, or caries of the surrounding osseous walls; but to the existence of the two last, the affections on which I have just been treating, often give rise. But I will not extend my remarks further upon mucous engorgement and a purulent condition of the secretions of this cavity. The next form of disease on which I propose to speak, is abscess—an affection, differing in all its characteristics from those that have thus far been treated on.

CHAPTER IV.

OF ABSCESS.

Abscess in the maxillary sinus, although very rare, does, notwithstanding, sometimes happen. The structure of the parts composing this cavity, would seem, as has been remarked by Mr. Bell, to render the occurrence improbable, and if the fact were not well established, it might perhaps be doubted. If the apices of the roots of some of the superior molares did not occasionally perforate the floor of this cavity, the occurrence of abscess in it would indeed be rare, but, as the antrum is sometimes thus penetrated, its formation here is not, after all, a matter of so much surprise. An abscess is just as liable to form at the apex of the root of a tooth penetrating this cavity, as at that of one in its alveolus, but it is very seldom that one is found seated in any other place in it. The case described by Mr. Bell is supposed to be the only well authenticated one on record. Bordenave, however, gives the history of a case of disease of the maxillary sinus,* which at the time of my previous allusion to the abscess of this cavity described by Mr. B., had escaped my recollection, so similar to this, that there can be little doubt in regard to the nature of the disease. In both instances, the affection was seated in the upper part of the antrum beneath the orbit. But, it is unnecessary to say more at present concerning these cases, as I intend in the proper place, to give a description of them.

* Vide Mem. de l'Acad. Royale de Chirurg. vol. 12, ed. 12mo. obs. xi. p. 31.

Mr. Hullihen, in a well written article in the "American Journal of Dental Science,"† contends that abscess of the antrum as well as alveolar, consists in the effusion of pus, formed in the pulp cavity of a tooth, "between the bone and lining membrane." That this view of the subject is incorrect, is proven by the fact that abscesses are as frequently formed in the sockets of dead teeth as living ones. The matter from alveolar abscess in those cases where the plate of bone intervening between the extremity of the root or roots of a superior molaris or bicuspis, as the case may be, is thinner than the osseous walls surrounding it or them, often escapes through it into this cavity, after having first, as Mr. H. justly remarks, effused itself between the bone and lining membrane. But in this case, it cannot properly be termed an abscess of the antrum. Although the matter escapes into this cavity, and it, in consequence becomes involved in disease, yet the disease having originated in the alveolus of a tooth, which is still its principal seat, it is, in the strictest sense of the term, an alveolar abscess. It not unfrequently happens that the pus from an abscess formed in the socket of a superior molaris, discharges itself into this cavity and escapes through the nasal opening for months and sometimes for years, for, after an abscess has once formed at the apex of the root of a tooth, purulent matter will continue to be formed, though not always in the same quantity until the irritant that caused it is removed. The pulp, or ganglion as some French writers term it, may suppurate, and the matter be confined in the cavity of the tooth for a long time without causing alveolar abscess, and the purulent matter contained in the sac at the extremity of the root of a tooth, is not formed, as Mr.

† Vide vol. ii. page 179.

H. supposes, in the cavity of the organ. The alveolo-dental membranes at the apex of the root of a tooth around the nerve cord, are more vascular and are endowed with greater nervous sensibility, than at any other part, consequently the inflammatory action here is always the greatest, and it is here that suppuration first takes place.

The apices of the roots of the first and second superior molares, when they do not actually perforate the floor of the antrum, are often above its level, and covered by only a very thin shell or cap of bone, and hence in case of an abscess in one of these, although strictly alveolar, the matter is more liable to make for itself a passage into this cavity, than through the gum into the mouth. When this happens, it gives rise to inflammation of the lining membrane and causes its secretions to become more or less vitiated, and often leads to an erroneous opinion concerning the real nature of the disease.

But it is only when the root of a tooth actually penetrates the floor of the antrum, or the tubercle at its apex becomes situated in it, that the abscess can properly be said to be of this cavity. And when the root of the tooth does penetrate it, the tubercle, although formed at its apex around the nerve cord, as it is commonly called, is between the lining membrane and periosteal tissue, both of which, in the immediate vicinity become directly and at once involved in the inflammation here lighted up, and this sometimes extends itself to every part of the cavity, causing in some instances, an obliteration of the nasal opening. This however, does not often occur, but when it does, it is followed by engorgement of the sinus, and occasionally, by ulceration of its lining membrane, and disease in the surrounding bone.

It is sometimes the case, that the plate of bone intervening between the extremity of the root of a tooth, around which a tubercle has formed, and the antrum, is destroyed, and the tubercle, instead of being wholly confined within the alveolus, is forced up, as it enlarges, almost entirely into this cavity. The inflammation after having attained a certain height, is succeeded by suppuration, and the secretion of pus goes on until the sac bursts, when the matter is discharged, and, mixing with the mucous secretions of this cavity, ultimately escapes with them through the nasal opening, if it be not closed, into the nose.

As it regards the morbid effects produced upon the lining membrane and surrounding bony parietes of the antrum, by an abscess of this kind, it is of little consequence whether it be formed in it, if the matter be discharged there, or in the alveolus of the tooth that gave rise to it. The effects are about the same in one case as in the other. If the general health of the patient be good, and the natural opening of the sinus remains pervious, they seldom assume an alarming character, but under other and less favourable circumstances, the most dangerous and aggravated forms of disease to which this cavity is liable, may result from an abscess seated in either place.

Symptoms.—In the incipient or forming stages of abscess of the maxillary sinus, the symptoms are similar to those that characterize inflammation of the lining membrane of this cavity, or violent inflammatory tooth-ache. The pain is generally most severe in the upper part of the alveolar ridge, above some one of the molar or bicuspid teeth. From thence, it often extends to the lower part of the orbit, ear, temple, muscles of the cheek and scalp. It is more or less constant, and a throbbing is felt high up in the alve-

olar border beneath the cheek. If the abscess originated at the apex of the root of a tooth, this organ will appear slightly elongated and sore to the touch; the cheek in most instances is a little tumefied and more or less flushed.

The pain after having continued for several days, is succeeded by suppuration, when it immediately subsides. Slight paroxysms of cold and heat are now felt, and if the natural opening of the antrum be not closed, purulent matter will occasionally be discharged.

If the abscess be seated in any other part than the base of the antrum, the symptoms may differ in some respects from the foregoing. But if purulent matter, or mucus mixed with pus be discharged from the nostril of the affected side, when the patient inclines his head to the opposite one, or makes a sudden and forcible expiration through it, while the other is closed, the existence of abscess in this cavity, will be very conclusively indicated.

The abscess having burst, pus will be discharged from it, from time to time, for several days, which will escape through the nasal opening, except this passage has become closed or choked up with hardened floculi or other foreign matter, and then it will cease altogether, or very nearly so. The disease however, if the irritant that gave rise to it still remains, is by no means cured. A recurrence of it generally takes place, every time the patient takes cold, when all the symptoms just described will be again experienced, and each succeeding attack leaves the parts implicated in the morbid diathesis thus lighted up, in a more unhealthy condition, and as a consequence more susceptible of being acted upon by morbid irritants. Suppuration also, at each successive attack takes place, and the pus gradually assumes a worse character.

Causes.—It will not be necessary to say much concerning the causes of abscess of the antrum. It will be sufficient to state, that they are the same as those of tooth-ache, inflammation of the alveolo-dental periostea and inflammation of the lining membrane of this cavity, and it is to the presence of one or other, or both of these that it is attributable. And these may be excited, by caries of the teeth, a blow upon them, or a dead or loose tooth, or a blow upon the cheek and by exposure to sudden changes of weather, as from heat to cold, &c. Other causes may sometimes be concerned, but the foregoing are the principal, and all that it is necessary to enumerate here.

Treatment.—In the cure of abscess of the maxillary sinus, as as well as that of a muco-purulent condition of its secretions or engorgement, the first and most important indication to be fulfilled, is to obtain a vent for the matter, from the inferior part of the cavity. The best method of doing this has before been described, and it is unnecessary to recapitulate the directions that have already been given for the accomplishment of this object.

The formation of abscess in this cavity might however, in almost every instance be prevented, by the timely adoption of proper treatment. On the occurrence of severe, deep-seated and throbbing pain in the upper part, of the the alveolar ridge or just above it in the region of the antrum, such as has been described as attending the formation of abscess in this cavity or in that of the alveolus of a superior molaris, or if the tooth directly beneath the place where it was first felt, be considerably decayed, or its lining membrane exposed, or if it be dead, loose, or its socket much diseased, it should be immediately extracted. By this simple operation, the formation of abscess not only in the socket of the tooth, but

also in the antrum, may, in almost every instance be prevented. If however, it be not followed by an immediate subsidence of pain, leeches should be applied to the gums and fomentations to the cheek. If the patient be of a full habit, and if there be any general febrile symptoms, saline purgatives may also be employed with advantage. But in the majority of cases, the extraction of the tooth will be all that is required to arrest the progress of the disease.

The curative indications, if the abscess be of recent formation, and has resulted from the presence of a diseased tooth, are similar to the preventive, The first thing to be done is to remove the tooth that caused it, and if this operation be not delayed too long, it, in most instances will be all that is necessary to effect a cure. In addition to this, Mr. Hullihen recommends the perforation of the antrum;* but in those cases where the abscess has formed at the apex of the root of a molaris, this is not necessary, because in all such cases, the alveolus communicates with this cavity, so that on the removal of the tooth, there will be a sufficiently large opening into it; and besides, the tubercle or sac although situated within the sinus, is in nearly every instance brought away with the tooth.

But, when the abscess has been of long standing, and the lining membrane of the antrum become seriously affected, in addition to the removal of the tooth, other treatment will have to be resorted to. The opening into the antrum, if necessary, should be enlarged, and it should be prevented from closing until the health of the lining membrane is restored; and for the promotion of this, injections, such as have been previously recommended,† will be found serviceable.

* American Journal of Dental Science, vol. ii. p. 182.

† Vide page 57.

In cases of simple abscess of the antrum, seated at the apex of the root of a superior molaris, I have never found it necessary to adopt other treatment than the foregoing. It may, however, in some instances, be necessary to remove more than one tooth, even though that be the one that gave rise to the abscess. The following case presents an example of this kind.

Case XV.—Miss E. M—, æt. seventeen, of a scrofulous habit, was placed under my care in the spring of 1837, for the purpose of obtaining relief from a severe deep-seated pain in her right cheek, apparently a little above the first superior molaris, and which was supposed to result from a diseased condition of several teeth on that side of the upper maxillary. The pain, although very severe, seldom lasted more than three or four days. She had experienced several attacks of it,—the first about eighteen months before I saw her, and its subsidence, every time, was followed by occasional discharges of purulent matter from the nostril of the affected side. These discharges, at first, continued only for three or four days, but they lasted longer after each successive attack, and became more acrid and offensive.

Three days previously to my seeing her she had had an attack, and the inflammation at the time had nearly reached a crisis. Her cheek was slightly swollen and considerably flushed, and an exceedingly painful throbbing sensation was felt in the region of the malar apophysis. I directed four leeches to be applied to the gum covering the lower part of this, beneath the cheek, fomentations to the face, and pediluvium before going to bed. These, I was informed, had been prescribed in preceding attacks, and that only very temporary benefit had been obtained from them, I, in consequence, contented myself, knowing that the inflammation

would soon run its course, by advising the application of anodyne fomentations to the face.

The next day I saw her, and the pain had nearly subsided, but there was considerable inflammation and sponginess in the gums around the superior bicuspid and molar teeth. The first molaris was very sensitive to the touch. The morning of the second day after I saw her, matter resembling pus, and of a fetid odor, was discharged from the nose. Believing that this came from an abscess in the antrum, caused by the presence of the first superior molaris, I advised its immediate removal, to which, after considerable persuasion, she submitted. As I had suspected, this proved to be the tooth which had occasioned the mischief. At the extremity of its two outer fangs, which were almost in contact, was a tubercle the size of a large pea, and there was an opening into the antrum through which a small goosequill could be passed. A considerable quantity of bloody mucous matter streaked with pus, immediately escaped from it. The importance of having several other decayed teeth removed, was urged, though not as necessary to the cure of the affection to which she had been subject, but she would not submit to the operation.

Three weeks after the extraction of the tooth, I again saw her, and was informed that she had not since experienced any pain; the alveolus had closed, but a glairy fetid matter was occasionally discharged from her right nostril. The alveolus was re-opened by cutting away the fleshy granulations that had filled it, and a small quantity of matter such as I have just described, came away. Injections were now employed of diluted tincture of myrrh and rose water with a small quantity of sulphate of zinc. The opening was prevented from closing, and the use of the injections persisted in for

three or four weeks, when the bougie that had been inserted in the alveolus to prevent it from filling up, was left out. The opening soon closed, and in the course of ten or twelve days, a glairy fetid matter was again occasionally discharged from the nostril of the affected side, and again a vent was procured for it through the socket of the tooth that had been extracted. This was now kept open for five or six weeks, when it for the third time was permitted to close, and for two weeks there were no signs of a return of the discharge of fetid glairy mucus from the nostril; but at the expiration of fifteen or sixteen days it became apparent that the mucous membrane of the antrum was not restored; its secretions again became fetid. Suspecting that the diseased condition of the teeth, gums, and alveolar processes beneath the cavity exerted a morbid influence upon it, I, a second time, urged the removal of the first bicuspis, and the second and third molares, which were all so much decayed as to render their restoration out of the question. With much persuasion the consent of the patient was obtained, and the teeth were at once extracted.

Four weeks after, the secretions of the antrum had become healthy, and they have since remained so.

The morbid condition of the mucous membrane of the antrum, although in this case it had no doubt resulted from the abscess that had formed at the apices of two of the roots of the tooth first extracted, was subsequently kept up, by the irritation of the alveolo-dental membranes, occasioned by the other decayed teeth.

Before I conclude my remarks upon abscess of this cavity, I will give the history of the two cases to which allusion has before been made, the one is narrated by Mr. Thomas Bell,* and the

* Anat. Phys. of the Teeth, and Diseases p. 270.

other by Bordenave.* The following detailed statement of the first I quote from the author's treatise on the teeth.

Case XVI.—"Mary B——, aged eighteen, of an unhealthy and somewhat strumous aspect, of languid disposition, and of retiring and timid habits, came under my care on the 3d of January, 1817, in consequence of severe and continued pain on the left side of the face, of a dull heavy character, and, apparently deep-seated; but occasionally darting in acute paroxysms, across the face towards the nose. The cheek was swollen, and the palate somewhat enlarged. About a year before the first superior molaris of that side had been extracted on account of severe pain in the face, but without producing any relief, and the pain was consequently attributed to rheumatism, from which complaint she had long suffered to a great degree, in the shoulder, hip, and other joints, and for which she had been under the care of many medical practitioners, both in London and Bath, having been sent to the latter place for the use of the waters. When I first saw her, the general health was much deranged: the stomach, bowels, and liver performed their functions very imperfectly; and the uterus partook of the general sluggishness of the system, menstruation being almost wholly suppressed, and the periods only indicated by increased indisposition, and especially by an exacerbation of the pain in the face.

No discharge had taken place from the nose, but, from the nature and situation of the pain, the direction of its paroxysms, the enlargement of the cheek and palate, and from an occasional trifling discharge of pus from the alveolus of the tooth which had been extracted, I could not doubt that the antrum was the seat of

*Mem. de l'Academie Royale de Chirurgie, ed. 12mo. vol. xii. p. 31, Obs. 11.

the disease. On examining the teeth, I found that the second bicuspis also was diseased, and as it had at times occasioned considerable pain, I extracted it with the view of removing every possible source of irritation.

Six leeches were ordered to be applied to the face, and afterward the continued application of a cold lotion. Medicines were also administered with reference to the general health, both as regarded the digestive and uterine functions; and on January 7, I determined on puncturing the antrum. I consequently introduced the trocar through the anterior alveolar cavity of the first molaris, and found that when the instrument came in contact with the lining membrane, the most acute pain was produced, indicating the existence of a high degree of inflammation in that structure. On withdrawing the trocar, when the antrum was freely opened, I was surprised, and a little disappointed, at finding that not the smallest discharge made its appearance. There was a small quantity of glairy mucus, but nothing more. I introduced the blunt end of a probe, and found that the opening was quite free; but on passing it upwards towards the orbit, its passage was resisted by a firm elastic substance, which gave the impression that a solid tumour existed in the upper part of this cavity, and which produced intolerable pain, on being pressed with the probe. I now injected some tepid water, and found that the nasal opening was pervious, as the water passed freely into the nose. As the operation had produced a considerable increase of pain, and as the parts appeared a good deal inflamed, I ordered six leeches to be applied, the bowels to be freely opened, and an opiate to be taken at night.

January 9.—The pain has been extremely severe ever since the operation, with scarcely any mitigation excepting for a few hours

after the application of the leeches. A probe now introduced into the antrum, met with similar resistance, but much nearer the orifice than before, proving that the tumour had increased; and on injecting warm water, it no longer passed into the nose. The leeches, the aperient, and the opiate were repeated.

January 11.—The pain has continued without cessation, and no sleep has been procured by the opium. The inflammation is not apparently reduced. Pulse one hundred, small and feeble. The palate is a little enlarged, but not more so than might be accounted for, by the thickening of the integuments by inflammation, I could now distinctly feel with a probe, that the tumour was not only increased in size, but that it had become softer, yielding in some measure to pressure, and conveying the impression that it contained fluid. I therefore introduced a sharp-pointed instrument, which, with a little force, pierced the tumour, and a gush of pus instantly took place, with immediate relief to the symptoms.

Here, then, was a sac containing pus, existing doubtless as a distinct cyst, the result of inflammation in the membrane; for it is scarcely probable that the membrane itself had become separated from its attachment by the formation of pus between it and the bone. That the former was the true situation of the disease, may be inferred from the fact that no subsequent caries of the bone took place, which would, undoubtedly, have been the case, had the matter been formed in contact with the bone; and it could scarcely have been produced between the mucous membrane and the periosteum, as these two structures, though essentially distinct from each other, are inseparably connected.

The pus continued to be discharged for a day or two, and then entirely ceased. On passing the probe a week after the former

operation, I found the same resistance as before, and in the same situation; the cyst was again punctured, and again the pus was discharged. This alternation of the repletion and evacuation of the cyst regularly recurred for a considerable time, but the opening into the nose did not again become stopped. The general health, however, in the meanwhile, improved, and the pain in the face was greatly diminished, returning only, with any degree of violence, when the cyst was full.

At length the repeated perforation of the sac, followed by the use of strong astringent injections, and aided by the remedies that were directed to the state of the general health, restored the antrum to healthy condition; the menstrual disturbance was by degrees entirely obviated, and the stomach at the same time assumed its healthy function; but it was two years from the time when I first saw her before she had recovered her health, which at the best was never robust."

The case described by Bordenave, is, in many respects, similar to the foregoing. The following account of it is taken from the Memoirs de l'Academie Royale de Chirurgie.

Case XVII.—"The subject of the present case was a young Russian of about ten years of age. He was seized with acute pain in his teeth, which was soon followed by tumefaction of the cheek. An abscess developed itself two days after, above the second molaris, and this was succeeded by a cessation of pain. For the cure of this new affection, the extraction of the decayed tooth, as also the two neighbouring ones, was decided on. Through the alveolus of the first, the antrum was then perforated. It was afterwards injected with appropriate remedies, and the opening prevented from closing by the introduction of pieces of

cotton into it. The treatment having been conducted thus far, the patient was put under the care of Bordenave. The injections when thrown in with force passed in part through into the nose, and the liquid which returned brought with it thick and fetid matter. From time to time the patient experienced a sensation in the sinus near the orbit, like what would be produced by the bursting of something, and soon after each of these paroxysms, there was a discharge of a large quantity of fetid pus. When the escape of this matter was prevented by the contraction or closing up of the opening, a slight uneasiness was experienced. To prevent this, Bordenave dilated the opening with prepared sponge, and placed into it a silver canula pierced with several holes, for the purpose of permitting the matter freely to escape. Time after time the matter became thick and lumpy, and on an occasion when the canula was withdrawn to be cleaned, the patient, by sucking, effected a discharge of foreign matter. At the expiration of six months, the matter having become of a better quality, the use of the canula was discontinued. Its replacement however, as Bordenave supposed, having again soon become necessary, it was restored, and its use continued for nearly two years, at the expiration of which time the quality of the matter had become healthy. The patient ceased to feel any uneasiness in the sinus, but as the opening did not close, it was slightly cauterized. It now soon healed, and at the end of 1758, the disease had terminated. For the correctness of the foregoing statement, Bordenave refers to M. Morand, who visited the patient with him."

It is highly probable that, had this case been treated in the manner in which Mr. Bell treated his, a cure would have been

much sooner effected. I should think it highly important that the matter should have free egress both from the cyst in which it is secreted, and from the antrum as soon as it escapes from that into it.

Finally, that abscess does occasionally form in other parts of this cavity than the base, is conclusively proven by the two last cases. It is true, these are the only ones of which we have any account, yet, nevertheless, they establish the fact that it is possible for them to occur in any part of the sinus.

CHAPTER V.

OF ULCERATION OF THE LINING MEMBRANE.

This is not an idiopathic affection. It is always, I believe, symptomatic of some other morbid condition of the mucous membrane of this cavity, and often gives rise to some of the worst and most aggravated forms of disease that are ever here met with. It is not therefore a simple disease, but is complicated with the one that caused it, and often with some other to which it has given rise. I shall treat of it, however, as a separate affection. Its attacks are preceded by a purulent condition of the fluids of the antrum, and are often followed by fungi and sometimes by caries of the surrounding osseous walls. The membrane covering the floor of the cavity, is usually first attacked, but ulcers having formed here, they generally soon extend themselves to other parts of the sinus.

Ulceration of the lining membrane of the maxillary sinus is frequently complicated with ulceration of the lining membrane of one or both of the nasal cavities; and, it is sometimes mistaken for ulceration in the nose, but it is not easy thus to mistake the seat of the disease. The existence of ulcers in the antrum can only be inferred from certain signs, but when seated in the nose, they can almost always be seen, and besides, the matter secreted by those situated here, exhales a less fetid odor than does that of ulcers of the maxillare sinus. The reason of this is obvious. The air that finds its way into this cavity is retained in

it a long time and consequently becomes more highly impregnated with the fetor of the matter secreted in ulcers situated here, than it does with that of ulcers of the nose, over which, it is almost constantly passing. This of itself, as has been justly remarked by Deschamps,* will enable us to determine, almost to a certainty, the seat of the disease. But there are other signs that will assist us in ascertaining its location. The foregoing, however, are sufficient, especially when taken in connection with the symptoms that precede the formation of the ulcers.

Ulcers of the maxillary sinus present as great a variety of character as do those of other parts of the body. Their nature is determined by the state of the constitutional health and the causes that produce them. But it is not necessary to go into a minute description of the various kinds of ulcers that are here met with. It will suffice to state that they for the most part partake of the disposition of the subject in which they occur, and that the following varieties have been met with; namely, the simple, or that resulting from mechanical injury; the fungus, the scorbutic, venereal, cancerous, gangrenous, scrofulous, inveterate, carious, &c. &c. Sir Everard Home divides ulcers into six kinds, each of which being determined by the nature or condition of the part that it is situated in.† The first, are ulcers in parts endowed with sufficient strength or curative power to effect their restoration. The second, are those situated in parts too weak to effect a recovery. The third, are ulcers in parts having too great an action for the formation of healthy granulations. The fourth, are those seated in parts possessed of too indolent an action, whether

* Maladies des Fosses Nazales, sec. 2, Art. vi. p. 262.

† Cooper's Surgical Dictionary, vol. ii. p. 381.

arising from the state of the parts or general constitutional health. The fifth, are ulcers located in parts that have acquired some specific diseased action. The sixth and last, are those situated in parts that are prevented from giving out healthy granulations, by a "varicose state of the superficial veins of the upper part of the limb." But, these remarks are applicable only to ulcers in general; yet, as those of the maxillary sinus often present characteristics similar to those of other parts of the body, they may not be deemed inappropriate here. The kind of ulcer last noticed, however, never occurs in the antrum.

In the simpler species of ulcer, the matter is of a thick consistence and nearly white, but as the disease increases in malignancy, it is thinner and varies in appearance from transparent to a dirty brown, yellow or black.

Symptoms.—Many of the signs attendant upon ulceration of the mucous membrane of the maxillary sinus, are similar to some that accompany other affections of this cavity, as for example, deep-seated heavy pain in the cheek, the occasional escape of matter into the nose, &c. &c. But in addition to constant pain in the region of the antrum, the following may be mentioned as signs indicative of ulcers of this cavity. The escape of a fetid sanies into the nose on the patient's inclining his head to the opposite side, or through an opening which it has itself effected, or that has been formed by art for its escape. Also, the traversing of the ulcer from the interior through the bony walls of the cavity and external soft parts. An opening of this sort may be effected through the cheek, near, or even into the orbit, which last has often happened; at other times it is effected through the canine fossæ or palatine arch. Moreover, the matter escaping from the

sinus, often has floculi mixed with it, which is never the case, in simple muco-purulent secretion of the sinus. These floculi sometimes, as has been before stated, choke up the natural opening of the cavity and cause its secretions, together with those of the ulcers to accumulate, and distend its osseous walls until they ultimately give way, or an opening is formed for their escape. It occasionally happens however, that the floculi that have gotten into the nasal opening, and thus prevented the egress of the fluids secreted here, after choking up this conduit for a long while, suddenly give way and permit the matter to pass out into the nose.

When the ulcer is of a fungous character, the matter secreted by it, is thin and of a dark brown or blackish colour; and it has mixed with it blood and pus.* It is also, says Deschamps, slightly painful, and can only be distinguished from other ulcers by the introduction of the bougie into the sinus, and that like polypus, it is capable of spreading itself and penetrating every opening that will give it passage; but in consequence of its being of a softer consistence, it makes less impression upon the surrounding parts.

If the ulcer be of a cancerous nature, the pain will be sharp and lancinating and affect the whole of the side of the face; the matter will be serous, very fetid, and streaked with blood. If it is discharged through the natural opening into the nose, it will cause the pituitary membrane of the nasal cavity of the affected side to become exceedingly irritable, sensitive to the touch, and ulcerated. The bones of the affected side of the face soon become softened or carious, the teeth loosen, and the external soft parts inflame and ultimately ulcerate; openings are formed into the sinus, fever of a low grade supervenes, and ultimately death closes the scene.

* Maladies des Fosses Nazales, sec. 2, Art. vi. p. 263.

Causes.—A degenerated or altered state of the secretions of this cavity, is said to be the most common cause of ulcers in it.* This may be an exciting cause, and it may be one of the most frequent exciting causes, but were it not favoured by a constitutional predisposition or tendency, it would not perhaps often give rise to them. Local irritation, whether produced by an altered condition of the fluids of this cavity or by the presence of decayed or dead teeth, the roots of teeth, or a blow upon the cheek, may be, and doubtless is, the exciting cause of ulcers in the mucous membrane of the maxillary sinus. This, however, in a subject of good constitutional health, would have to be very severe and continue for a long time, to result in ulceration of this membrane, and even then, a cure would soon be effected by the restorative efforts of the economy. It is only in bad habits, or debilitated constitutions, that malignant ulcers are often met with in the maxillary sinus.

Deschamps, although he acknowledges that diseased teeth often exercise a morbid influence upon this cavity, and that the apices of the roots of these organs are sometimes in contact with its mucous or lining membrane, seems nevertheless to doubt that they have any agency in the production of ulcers here. His reasoning upon the subject, however, is far from satisfactory. While he admits that by the contact and adhesion of the dental periosteum and mucous membrane of this cavity, by the penetration of its floor by the roots of teeth, inflammation and ulceration may be produced, he denies that this can be positively proven. Now, although we may not be able to adduce positive evidence in confirmation of it, the circumstantial proofs which we have, are so

* Maladies des Fosses Nazales, sec. 2, Art. vi. p. 159.

clear and strong, that no candid inquirer can for a single moment doubt that the disease in question, when favoured by a bad habit of body, often results from dental or alveolar irritation. And, in reply to the question which he a little further on propounds, "How can the extraction of a tooth be of service in the subduction of inflammation of the mucous membrane with which the dental periosteum is only simply in contact,"* I answer that by this operation a constant source of irritation may be, and often is removed. But, ulcers having absolutely formed here, a cure cannot always be effected by the removal simply of the exciting cause.

But, inflammation of the lining membrane of the maxillary sinus, and as a consequence, an altered condition of its secretions, may, it cannot be denied, be produced by other causes than irritation resulting from a diseased condition of the teeth, and it is to this, that ulceration in it, is attributable.

Treatment.—As in the case of mucous engorgement of this cavity, the first indication of cure is to give egress to the purulent matter, and in this as in the other affection, the opening should be formed at the most dependent part of the sinus; and this should be effected in the manner as before described through the alveolar border or rather alveolus of a molaris. It should be made large enough to admit the little finger, and if there be any teeth so much affected as to be productive of irritation to the parts subjacent to the antrum, they should at the same time be removed.

Free egress for the matter having been obtained, and all local irritants removed, the antrum should be injected from time to time, with gently stimulating and detersive fluids. This, in cases of simple ulcer, if the constitutional health be not seriously impaired,

* Maladies des Fosses Nazales, sec. 2. Art. vi. p. 259.

will often, as is proven by the result of the treatment detailed in the history of the following case, be all that is necessary to effect a cure.

Case XVIII.—Mrs. R——, æt. about twenty-five years, of a scrofulous habit, having been affected for several months with a pain in her left cheek, which at times was very severe, and supposing it might be connected with her teeth, applied to me in the winter of 1836, for the purpose, if possible, of obtaining relief. She informed me that she had been several times temporarily relieved by a sudden discharge of matter from the nostril of the affected side, after sneezing, and once after a violent expiration through this cavity of the nose while the other was closed. I at once suspected the disease to be ulceration of the mucous membrane of the antrum, and a purulent condition of its secretions.

On examining her mouth, I found the most of her teeth to be more or less affected with caries. The crowns of the first and second superior molares of the left side were nearly destroyed, and over the roots of the second, externally, was a fistula from which, matter had at times been discharged, as I was informed, for several years. This communicated with an abscess partly between the apices of its three roots; and, as neither this nor the first molaris was of any service, their restoration being wholly impracticable, and as both obviously exercised a morbid influence upon the neighbouring parts, I advised their immediate removal. To this operation, she readily submitted, and it having been performed, I at once perforated the antrum through the socket of the second tooth, by means of a suitable trocar. The withdrawal of the instrument was followed by the discharge of more than a table-spoonful of thickened fetid mucus, streaked

with blood and pus. The opening was enlarged to about the size of a goosequill and the sinus injected with tepid water and the tincture of myrrh. The opening was prevented from closing by means of a bougie prepared for the purpose. Whenever this was removed during the first eight or ten days, a small quantity of whitish pus was discharged with the mucus that came away. The injections were continued for about four weeks, and at the expiration of this time, as the secretions of the antrum had ceased to be offensive, and as they were no longer mixed with pus, the bougie was left out and the opening permitted to close. A complete cure was effected.

If the ulcer be of a fungous nature, the employment of escharotics, and sometimes even the actual cautery becomes necessary, and this last should be repeated until the fungi are completely destroyed. With regard however to the employment of escharotics, such as the nitrate of silver, blue vitriol, &c. &c. for the purpose of destroying luxuriant granulations in ulcers, Sir E. Home* is of the opinion that it is better to combine them with some other substance, so as to prevent them from immediately destroying the granulations. He believes that when this is done, the surface of the ulcer underneath, is more liable to reproduce them, than when they are removed by absorption, and it is for this reason that he prefers, in the employment of caustics, to mix them with other substances, so that they shall only exercise a strongly stimulating effect, and thus cause the granulations to be gradually removed by the action of the absorbents.

The surface of the ulcer should, if practicable, be kept clean by means of dosils of dry lint or pledgits spread with some simple

* Cooper's Surgical Dictionary, vol. ii. p. 382.

ointment. The treatment of ulcers of this cavity, however, is usually attended with more difficulty, on account of their concealed situation, than those of most of the other parts of the body. Among other things, Deschamps recommends injections of a decoction of quinine. In many cases a lotion of sulphate of zinc may be used with advantage. But the remedies to be employed in the treatment of ulcers of the maxillary sinus, as in the treatment of ulcers of other parts, should be varied to suit the indications of each particular case. In debilitated subjects, tonics, such as quinine and preparations of steel are said to be highly serviceable. There are some cases in which mercurials are highly beneficial. Strict attention should always be paid to the regimen of the patient, and such general treatment adopted as may be best calculated to restore the constitutional health, for upon this, the cure of the local affection often depends.

If the ulcer be of an irritable nature, warm fomentations, conveyed to the interior of the antrum by means of a properly constructed funnel, of a decoction of poppy heads, chamomile flowers, or the leaves of hemlock, will often prove beneficial in soothing the pain. Tincture of myrrh, diluted, or a decoction of walnut leaves may often be advantageously employed as injections in cases of indolent ulcers,—the last of which, is recommended as an application to ulcers of this character in other parts of the body by Hunezawsky,* and both of which are favourably spoken of by Sir E. Home.† This last named writer recommends "diluted sulphuric acid and the juice of the powder of different species of pepper in a recent state," and also nitrous acid diluted with

* Acta Acad. Med. Chirurg. Vindob. t. 1. 1788.

† Cooper's Surgical Dictionary, vol. ii. p. 385.

water. The unguentum hydrargyri nitrate, mixed with lard, and the ceratum resinæ, and the unguentum elemi, mixed with the balsam of turpentine, are also recommended, but the application of ointments to ulcers of this cavity is always attended with inconvenience, and it is on this account that they are less easily cured when seated here than when situated in other parts of the body.

Many of the ulcers of the maxillary sinus are regarded as incurable, as for example, such as are of a cancerous nature, and ulcerated fungus hæmatodes. But although the resources of surgery have hitherto, in most instances, proved inadequate to the cure of these formidable diseases, yet nevertheless they should be put in requisition, and we should endeavour to combat them by every means in our power. Deschamps says, the interior of the antrum should be exposed at the commencement of the disease. He recommends the formation of a large opening, if the alveolar ridge be healthy, above it, if not, through it.* As much of the cavity as possible should be exposed. This done, he directs, if there be a cancerous tumour, that it be as thoroughly extirpated by means of a curved and flat bistory or curved scissors as possible. All that may have escaped removal by this means he says, should be touched with the actual cautery. These, he says, are the only remedies "to be employed when the membrane is in a state of cancerous ulceration." The surgeon, he adds, "should destroy the parts in such a way as to leave only the osseous surfaces, and he should pay some attention to these bony parts, which also he should carefully cauterize."† The disease having

* Maladies des Fosses Nazales, sec, ii. Art. vi. p. 265.

† Maladies des Fosses Nazales, Sec. 2. Art. vi. p. 266.

been thus removed, the surrounding osseous walls that have been cauterized will soon exfoliate, when a chance for a cure will be afforded, and of which, if the neighbouring parts have not been so extensively invaded, nature will avail herself. The administration of soothing and anodyne medicines are also directed. Arsenic has been employed with advantage both as an external and as an internal remedy in ulcers of this kind.

There are other kinds of ulcers of this cavity, but it is not necessary here to describe the treatment for each of the various forms which this description of disease puts on. Particular and ample directions for that of each are laid down by writers on affections of this kind, and though they may not have special reference to their occurrence in the antrum maxillare, they will, for the most part, be found as applicable to them here, as when they are seated in other parts of the body.

The following case of fungus ulcer complicated with alteration of the walls of the sinus is taken from Bordenave's collection of observations on the diseases of this cavity, in the Memoirs of the Royal Academy of Surgery.* Although the history of the case, in its translation, is abridged a little, yet no important fact connected with it is here omitted.

Case XIX.—The subject of this case was a women twenty-six years of age, and who having exposed herself, while in a critical state of health, to cold air, was in 1759, attacked with acute pains in the left side of her upper jaw, in the alveolar ridge of which, were the roots of several decayed teeth. The following day her jaw was much swollen, and although the pain ceased in a few days, the swelling still continued, without any change in the

* Obs. xvii. in tom. 12th, 12mo. ed. p. 56.

appearance of the skin; yet nevertheless, her face was deformed in shape. The orbitary apophosis of the maxillary bone became elevated, and the substance of the bone softened. The interior of the nose was also affected and the opening of the sinus into this cavity was closed. The matter collected in the antrum began to escape, twenty-two days after the attack, through the alveoli.

In January, 1761, the symptoms becoming more aggravated, she went to Paris in search of medical aid. M. Beaupreau was consulted, and on examining the affected parts, determined on the extraction of the decayed teeth, which were considerably broken. They however adhered so firmly to their alveolar cavities that he could not move them without shaking their sockets. This deterred him from proceeding with the operation as he had begun, and he resolved to remove the whole of the alveolar border with a bistory, from the lateral incisor to the first molaris, and in this way remove the teeth with the bone. This done, he made a section of the bone, which had become softened, with a pair of scissors, in the direction of the cuspidatus. The antrum was much dilated; its membrane fungous and ulcerated. He then treated it with detersive injections, adhesive dossils, covered with digestives, composed of the oil of turpentine. In addition to these, mercurial ointment and red precipitate were used. Alterative pills and beverages clarified with cress, were also prescribed; and this treatment was successful, for, five days after it had been commenced, the tumour had perceptibly diminished, the pus became of a better quality and less in quantity. At the expiration of two months the discharge became mucous. Injections of lime water, at first strong, and afterwards milder, were used. The natural opening was closed, and it continuing impervious, an open-

ing through the base of the sinus was preserved. At the expiration of two months the parts had recovered, and the general health of the patient was restored.

The medical treatment, in the foregoing case was very proper; it accorded with the curative indications of the disease, but the surgical, evidently involved a greater sacrifice of parts than was absolutely called for. The extraction of teeth was not, however, as well understood at that time as at present, and it was to the want of proper knowledge and skill in this department of surgery, that the removal of so considerable a portion of the alveolar ridge was had recourse to. It is often necessary, it is true, to make a very large opening into the sinus, but it is seldom requisite to make one as large as the one that must have been made in this instance; and although nearly the same treatment was adopted in a case of a somewhat similar nature by Bourdet,* the practice is nevertheless objectionable. When the subjacent bone and alveolar border are in a carious or necrosed state, their removal would be proper, and there are diseases that occur in this cavity which render the operation necessary, but in neither of the cases just noticed were the bones carious, nor was the nature of the diseases such as to require so large an opening. In the first case, the outer wall of the sinus, as would seem from the description given, was softened, but in the other, Bourdet says the bones were not diseased.

It sometimes happens that when the inferior opening is very large, it never closes, and when the natural opening becomes obliterated, it is requisite to preserve one through the alveolar ridge; in either of these cases the employment of an obturator is

* Dissertation sur les Depots du Sinus Maxillare, obs. 111, p. 13.

necessary to prevent particles of food and extraneous matter from getting into the sinus. But of these, I shall hereafter speak.

The history of many more highly interesting cases of ulceration of the mucous membrane of this cavity, might be here introduced, but as this form of diseased action is so often complicated with caries, necrosis and other alterations of its osseous walls, I have thought that it would be as well to reserve them until I came to treat of those affections; which I shall now proceed to do.

CHAPTER VI.

OF CARIES, NECROSIS AND SOFTENING OF ITS BONY PARIETES.

Various opinions concerning the pathological peculiarities of the several morbid conditions of the osseous tissues of the body have been advanced; but it is not my intention, at this time, to notice any of them, further than may be necessary to a correct explanation of the curative indications of the diseases of those of the maxillary sinus.

The bones, endowed with vitality, are, like other parts of our organization, liable to disease. They are furnished with blood-vessels, nerves and absorbents, from which they derive nourishment, and, the teeth excepted, the power of undergoing various changes. These attributes however are more peculiar to some bones than others. The power of recuperation, for example, is possessed in a much higher degree by cylindrical than by flat bones, and the teeth are entirely destitute of this attribute. Unlike other bones, they are incapable of repairing any loss of substance which they may sustain from mechanical violence or other causes. Nor do their morbid conditions, exostosis and necrosis excepted, bear any resemblance to those of other bones.

Excepting then, the affections of these organs, the diseases of the bones are regarded by most writers, as analogous to those of

the soft parts, and like which, they too, are said to be susceptible of being affected by constitutional vices.

By the ancients, caries and necrosis were regarded as one and the same disease. Modern surgeons, however, discriminate one from the other. Caries of bones, is represented as analogous to ulceration of soft parts, while necrosis is said to be similar to mortification. Caries does not at once destroy the vitality of the bone; a diseased action, tending to soften and otherwise alter the texture of it, is often, for a long time carried on; its cells are filled with fungous flesh, while there is constantly discharged from the affected part, a dark-coloured fetid sanies. Necrosed bone, is deprived of all vitality. The whole or only a part of a bone, (except when it occurs in a tooth, and then the whole organ perishes,) may be affected by it.

Besides caries and necrosis, there are other morbid conditions to which bones are liable, but I shall not, at this time, speak of but one, and that consists in a softening of their texture, which, by surgeons, is designated by the name of mollities ossium. This softening is supposed by some, to be owing to the absorption of the phosphate of lime of these tissues, but I am inclined to the opinion that it is occasioned by the chemical decomposition of this earthy material, by some morbid or altered fluid exhaled or poured out upon the bone or part of the bone thus affected.

Having premised these few general remarks, I shall proceed to notice more particularly the affections to which I have just adverted as occurring in the walls of the maxillary sinus. The bony parietes of this cavity, and sometimes the whole of the subjacent alveolar border and even that of the superior maxillary, and the nasal, palatine and orbital bones, as well as some that

belong to the base of the cranium and the malar bone, are involved in caries or necrosis. Mollities ossium, though it rarely occurs in the alveolar ridge, frequently affects the walls of the sinus. Caries may affect a considerable portion of both for a long time, without completely destroying the vitality of the diseased parts, and during its continuance a fetid sanies will be discharged from one or more fistulous openings through some part of the cheek, alveoli, gums, palatine arch, or into the sinus, and from thence through the natural opening into the nose. The disease however eventually terminates in the decomposition and death of the parts affected by it, and then by an operation of the economy, this is separated from the living bone and thrown off, or in other words, is exfoliated. But, although caries ultimately causes the death of the bone or part of the bone affected by it, it does not always precede the destruction of vitality in osseous tissues. The occurrence of necrosis therefore, although it may result as a consequence of caries, is not necessarily dependent upon it.

When the parietes of the antrum or alveoli are affected by necrosis, the soft parts in contact with the diseased or dead bone, inflame, ulcerate and discharge a fetid ichorous matter. The gums sometimes become gangrenous and slough. The destruction of the vitality of the osseous parts often progresses very slowly, and thus piece after piece is exfoliated until the disease is arrested.

But besides these affections, it not unfrequently happens that the osseous parietes of the antrum, are so softened as to be easily bent. This alteration of the bone, as well as the others just noticed, are, in nearly every instance preceded by some other affections of this cavity.

The annoyance occasioned by caries and necrosis of the bony

walls of this cavity or of the alveoli, to the unhappy patient, is very great. The fetor of the sanies is sometimes almost insufferable, and moreover, this matter often excoriates and inflames the parts with which it comes in contact to such a degree, as to cause them to become exceedingly sensitive and not unfrequently to ulcerate.

Symptoms.—It is sometimes difficult to distinguish caries and necrosis of the bony parietes of the antrum from some of the affections that seat themselves within this cavity. They therefore often exist for a long time without being suspected. But, the signs that indicate mollities ossium or softness of the walls of this cavity, are such, as not to be easily mistaken for those of any other affection. In this disease, the walls of the sinus yield to pressure, and regain their former shape when the pressure is removed. Its existence, therefore, may always be known by these signs, and as these are sufficient, it is not necessary to enumerate any of the others by which it is characterized. But caries and necrosis not being so easily detected, often make considerable progress before their existence is ascertained. The fetor and appearance of the matter discharged, do not always furnish a diagnosis that can be relied upon, inasmuch as some of the diseases that occur within this cavity, cause its secretions to become equally as offensive, as the sanies resulting from caries or necrosis, and not unlike it in appearance. Their existence however may in most instances be inferred, from the discharge of a dark-coloured fetid sanies, but the exfoliation of pieces of bone will set all doubt at rest.

Caries or necrosis may often be detected by perforating the antrum and exposing the denuded or diseased bone, or when

there is an external opening, by probing it. In this way any loose or dead bone may be felt with the instrument; and the diagnosis in either case will be satisfactory.

When caries or necrosis is situated in the alveolar border, or floor of the antrum, its existence can be more readily ascertained. The occurrence of either in the alveolar ridge, causes the gums to inflame, and to assume a dark purple or livid appearance, to separate from the sockets of the teeth, and frequently to slough off in large pieces and expose the caried or necrosed bone. When situated in the floor of the antrum, the rough denuded bone may be easily felt with a probe or stilet, introduced through the fistula in the gums or alveolus of a tooth from which the matter is discharged.

The pain accompanying these affections does not constitute a diagnosis of much importance, since this is said not to belong to the osseous tissue, but to the soft parts that cover it.

Causes.—Caries, necrosis and other alterations of the osseous walls of the maxillary sinus are thought by some, to result, very frequently, from certain specific or constitutional vices; such for example, as the venereal, scorbutic, scrofulous, cancerous, &c. independently of any previous morbid condition of the soft parts. But, I have yet to be convinced, that disease ever occurs in an osseous tissue, except in the teeth, while the soft parts in contact with it, are in a healthy state. I am of the opinion therefore, that the contrary supposition is gratuitous. A bad habit of body or constitutional vice, may perhaps, increase the susceptibility of the bony tissues of the body to morbid impressions, but I do not believe that it ever gives rise, independently of the condition of the soft parts with which they are connected, to actual disease in them.

The immediate cause of caries and necrosis of the osseous walls of the antrum maxillare, is the destruction of their periosteum, caused by inflammation or ulceration; and these last may result from a purulent condition of the secretions of the mucous membrane of this cavity, engorgement, abscess, or from the presence of foreign bodies or tumours, a blow upon the cheek or from other kinds of mechanical violence. They may also result from the irritation produced by diseased teeth, but the pressure of incarcerated fluids may perhaps be regarded as the most frequent cause; and from this too, results some of the most aggravated forms of disease that ever attack the maxillary sinus.

A morbid action kept up in the periosteum for a long time, by ulceration of the lining membrane, or any other aggravated form of disease in the sinus, or neighbouring soft parts, is apt, especially in bad habits, to result in caries of the bone, but when the inflammation is so severe as to cause the immediate destruction of the periosteal tissue, necrosis at once takes place.

The softening of the bone seems to be the result of the action of some solvent fluid upon it, capable of decomposing or breaking down its calcareous molecules. And, although inflammation and ulceration are always present, and appear necessary to the exudation of this fluid, its production nevertheless, seems to be dependent upon some peculiar state or habit of body.

Thus, it is from other affections of this cavity, that those now under consideration are attributable.

Treatment.—Complicated, as are most frequently, caries, necrosis and other alterations of the osseous walls of the maxillary sinus, with other affections of this cavity, their cure is often difficult and generally tedious. The first indication to be fulfilled

however in their treatment, as in the case of engorgement, and of a muco-purulent condition of the secretions of the sinus, is to obtain free egress for any fluids which may have accumulated in it, and this should be effected in the manner as before described, by the extraction of a molaris or bicuspis, and the perforation of the base of the cavity through its socket. In addition to this, if the disease of the osseous tissue be complicated with any other affection of the sinus, the means necessary for the cure of the disease with which it is complicated, should at once be employed. But it is not necessary here to describe the treatment of the other diseases of this cavity; inasmuch as that has already, or will hereafter be done.

Deschamps, in treating upon the affections of the osseous walls of this cavity, after stating that the perforation or opening into it should be large enough to expose the seat of the disease, recommends the employment of detersive and stimulating injections, a decoction of quinine, tincture of myrrh and aloes, &c. &c. These last, he says, may be introduced into the antrum as injections or by means of pledgets moistened in them. He also directs the cavity to be "cleared of all foreign matter which may have obtained admission into it."* This treatment, having a tendency to promote a healthy action in the lining membrane of the sinus, will often be all that is required; but it should be continued until the caried or necrosed bone has exfoliated, and the secretions of the antrum cease to exhale an offensive odor. The dead bone, however, having exfoliated, a cure is generally soon effected.

But it sometimes happens that the disease of the bone has been produced by some very malignant and incurable affection of the

* Maladies des Fosses Nazales, chap. iv. p. 279.

soft parts; in that case, the resources of art, will of course, prove unavailing. And, when the disease of the bone has extended itself to the greater part of the superior maxillary and the bones with which it is connected, as for example, the nasal, palatine, orbital, &c. the most that can be hoped for, from the skill of the physician, is a palliation of the symptoms. Art, in such cases, can seldom if ever effect a cure, and there are other cases in which it can only retard the progress of the disease, or assist nature in her efforts to separate the dead from the living bone.

It is impossible to lay down rules for the treatment of alterations of the walls of the maxillary sinus, from which it will not be necessary occasionally to deviate. But, it will be sufficient to state, that in those cases where they are extensively involved in caries or necrosis, it will be proper, in addition to perforating the base of the sinus, if by this means the dead bone cannot be so exposed as to enable the surgeon to detach it from the living, to cut away the whole of the alveolar border beneath the cavity, or to penetrate the sinus above it, or even, as Deschamps recommends, "through the cheek itself, whether there be an ulcer penetrating these parts or not." Having by this means exposed the necrosed bone, it should be carefully detached from that which is sound, and removed. By this, the disease interiorly will be more fully exposed, and a better opportunity afforded for applying such other remedies as its peculiar nature may call for. It is important that the sinus should be kept clean, and that the air be kept from it, and whenever any loose pieces of bone are discovered, they should be removed, but their exfoliation should not, as is justly remarked by the author last quoted,* be hastened, by impro-

* Traite des Maladies des Fosses Nazales, chap. iv. p. 281.

per interference, unless the state of the patient's health be such as to render it absolutely necessary, for by so doing, a piece of bone that is still attached to the soft parts may be broken. But while this should be carefully avoided, all dead pieces, isolated from the soft parts, should be detached from the sound bone with which it may be connected, and removed.

The character which the affections of this cavity put on, being determined by the state of the constitutional health, or some particular vice of body, it often becomes necessary in their treatment to have recourse to general remedies. If the subject be of a scrofulous or scorbutic habit, or is affected with any specific constitutional vice, such remedies as are indicated by the affection of the general system under which he may be labouring, should be employed. But it is not necessary here to describe the signs by which the various habits of body and constitutional vices are designated, nor is it essential to point out the curative treatment respectively required by each. Full and ample directions upon these subjects will be found in works devoted especially to the affections of the general system.

But although the character and malignancy of the disease are determined by the state of the constitutional health, or disposition of body, its occurrence seems nevertheless, to be dependent upon local irritation. Its continuance also, in many instances, results from this; and the cure, in cases of this kind, soon follows the removal of the cause that gave rise to it. In a case, the history of which I am now about to detail, an example of this sort is furnished.

Case XX. L. S—, a maiden lady of about thirty years of age, of a scorbutic habit, had been affected with pain in her left cheek

and alveolar ridge of the upper jaw of the same side, for nearly two years; which at times, had been almost insupportable. Nearly all of her teeth were affected with caries, and from between the necks of several, on the left side in the superior maxillary and gums, a fetid sanies had been exuding for two or three months. Her appetite had become greatly impaired, and a tumour half the size of a black walnut, having formed upon the palatine arch of the affected side, she became alarmed, and in the fall of 1840, came from her residence on the Eastern Shore of Maryland, to Baltimore, in pursuit of medical aid. She appplied to Professor T. E. Bond, who, after investigating her case, and satisfying himself that the affection of the face and mouth was the result of the diseased condition of her teeth, advised her to place herself under my care; which she did, on the following day.

The alveoli of four of the teeth of the affected side, in the superior maxillary, were, on examination, found to be in a necrosed condition, as was also a part of the palatine bone of the same side. The gums around these teeth had separated from the alveolar processes, and had a dark livid appearance. A thin dark coloured, ichorous matter, which when brought in contact with silver, almost instantly turned it black, was constantly exuding from between them and the necks of the teeth. The left nostril was dry, and the opening from the sinus into it had evidently closed, but an exceedingly fetid matter had been discharged from it during the early stages of the disease. The tumour which had formed on the left side of the arch of the palate, was soft and elastic. When pressed, a dark coloured sanies was discharged from the alveoli, and it, for a time, disappeared.

The alveolar processes being in a necrosed and loose condition,

it was with some difficulty that I succeeded in removing the bicuspides and the first and second superior molares of the left side, without bringing their sockets away with them. The operation was followed by the discharge of a considerable quantity of fetid sanies; and, in a few days, the alveoli having become completely detached from the sound bone, I removed them, together with a part of the floor of the antrum. The opening thus formed into this cavity was large enough to admit the end of the forefinger. Several small pieces of bone were afterwards exfoliated, from where the teeth had been extracted, and three pieces from the left side of the palatine arch.

Without any other treatment, the place from which the teeth and alveoli had been removed, except the opening that communicated with the maxillary sinus, had in about seven weeks become entirely covered with firm and healthy granulations. But from the opening into the antrum, a fetid matter was still discharged. This, however, became less and less offensive, until at the expiration of six or eight weeks more, the opening into the nose having become re-established, it lost its fetid odor, and the aperture at the base of the sinus soon after closed.

Thus, in a little more than three months, a complete cure was effected. The patient left the city in the following spring and I have not since heard from her.

The history of the two following cases is taken from Bordenave's Observations on the diseases of the antrum maxillare, as published in the "Memoirs of the Royal Academy of Surgery;"* and although in its translation as here presented, it is considerably abridged, no important fact connected with either, has been omitted.

* Obs. xix. and xx. vol. xii. 12mo. pages 61 and 64.

Case XXI.—A ribbon-weaver, sometime after having received a blow upon the left cheek below the eye, experienced pain in his teeth; which was followed by swelling of the cheek and the formation of a tumour beneath the orbit, where he had received the blow. These symptoms yielded to general treatment, but in about a month after, the swelling returned, which was supervened by fever, and a discharge of acrid serous matter in the mouth. These were followed by the formation of a tumour of the palate, from which a large quantity of fetid matter was discharged—an offensive breath, and the removal, by an operation of the economy, of two roots of teeth and one sound tooth. In 1760, Bordenave took charge of the patient, and on examination, found his gums tumefied, black and nearly mortified. The flesh, he says, had separated from the palate bone, and the vitality of the parts was nearly destroyed. The countenance of the patient had a leaden aspect. These symptoms, together with an inspection of the parts, induced M. Bordenave to suspect a disease of the antrum, complicated with a scorbutic vice.

Having satisfied himself with regard to the nature of the affection, he laid bare the decayed bones, and dressed them in a proper manner. Anti-scorbutics were prescribed, and injections were employed, which passed through into the nose. The matter soon became less abundant and of a better quality. The general health of the patient at the same time improved, and the secretions of the antrum were in part discharged through the nose. At the expiration of about six weeks, the exfoliation of nearly the whole of the alveolar portion of the superior maxillary, took place. He could now introduce his fingers into the sinus. Several small pieces of bone were afterwards exfoliated, and by a proper

course of treatment, the fleshy portions of the palate, together with the adjoining parts united and closed the opening into this cavity. In a little more than seven months a complete cure was effected.

Case XXII.—A man, whose right superior maxillary at the upper part, had been swollen for about three months, had at the same time, a soft tumour on the interior of the palate, which, on being pressed, caused matter to be discharged from the nostril of that side. These affections, together with tumefaction of the gums, looseness of several of the teeth, and a fetid breath, induced M. Planque, under whose care the patient was placed, to suspect suppuration of the maxillary sinus, complicated with a scorbutic diathesis of the general system. The molares, which only adhered to the gums, having been extracted, matter was discharged through their alveoli. A portion of the maxillary bone was now discovered to be carious, and this, in about a month began to loosen, and a piece about an inch and a half long, and half an inch in width, some time after exfoliated. The tumour exteriorly disappeared; the walls of the sinus approximated, and a cicatrix ultimately closed the opening into this cavity.

The details of many similar cases are on record, but it would be extending the limits of this paper too far, to introduce them here. The history of the cases already given, will suffice to illustrate the treatment of affections of this description. I should however, have given the history of one of mollities ossium of the walls of this cavity, had I not, while treating of ulceration of the lining membrane, quoted a case in which, that affection had become complicated with this.

It sometimes happens that when a very large opening has

been formed through the inferior part of this cavity, it does not always readily close. This, however, does not often occur, except the natural opening has become obliterated. But, when the parts do not manifest a disposition to unite, the practice introduced by Bordenave and Scultet,* which consists in cauterizing the interior circumference of the opening, will, in most instances, prove successful. If, however, this and all other means fail, the opening should be closed by means of an obturator of fine gold. This should be accurately fitted to the parts, and secured by means of a broad clasp, to a molar or bicuspid tooth, and if there be none suitable on the side of the mouth to which it is to be applied, the gold should be extended to one on the opposite side. If it be necessary to replace the teeth that have been lost, with artificial ones, these may be so mounted that the plate upon which they are set, shall cover the opening into the maxillary sinus, and thus obviate the necessity of any other obturator.

* Vide, Memoirs de l'Academie Royale de Chirurgie, 12mo. vol. 12, p. 82.

CHAPTER VII.

OF TUMOURS OF ITS LINING MEMBRANE AND PERIOSTEUM.

The lining membrane and periosteal tissue of the maxillary sinus occasionally become the seat of fungous and other descriptions of tumours, and in consequence of the concealed situation of this cavity, morbid productions originating in it, often, as has been previously remarked, make considerable progress before they attract attention; and hence, the efforts of art for their cure, which might otherwise frequently be successful, in most instances prove unavailing. The presence of a tumour in this cavity may give rise to all the diseases to which its osseous walls are liable, as well also as to most of those that are incident to its soft tissues. As soon as a morbid growth here, has filled the sinus, it, as it continues to augment in size, presses upon the lining membrane, and excites in it imflammation and sometimes ulceration, and causes its secretions to become vitiated. A diseased action is communicated to the periosteum of the surrounding osseous walls; it ceases to furnish them with the healthy juices which they require for their preservation, thickens, ulcerates, and is at once destroyed, or exudes a corrosive fluid. The bony parietes of the sinus are soon softened or become affected with caries or necrosis, and one or more fistulous openings are formed through the cheek, alveoli, or palatine arch.

But these are not the only effects that result from tumours situated in this cavity. As they increase in volume, after having filled the sinus, they gradually distend and displace its bony parietes; the floor of the orbit is sometimes elevated, and the eye more or less forced from its socket; the palatine arch and alveolar ridge are depressed, the teeth loosened and caused to drop out, and when the tumour is of a soft fungous nature, it not unfrequently escapes through the alveoli into the mouth, and after forcing the jaws asunder to their greatest extent, protrudes from it in enormous masses. Bertrandi gives the history of a case of polypus excrescence of the antrum, which after having destroyed the palate, anterior part of the maxillary bone, and filled the mouth, forced itself up into the orbit, elevated its roof, pressed upon the brain, and ultimately occasioned apoplexy and death.* Other similar cases are on record. Mr. Cooper says there are three specimens of diseased antrum in the museum of London University College.

The tumour in two of these, had "made its way from the antrum to the brain." The third was taken from a patient of his, which had died. The tumour in this case, which was of a medullary and scirrhous character, forced itself up into the orbit, displaced the eye, and ultimately caused the death of the patient. The same author mentions another case, the subject of which was a boy in St. Bartholomew's Hospital, who had a tumour of the antrum which "made its way through the orbiter plate of the frontal bone and cribriform plate of the ethmoid into the cranium," and though the portion of it that entered the brain was as large as a small

* Vide, Traite de ses Operations Chirurgicales, p. 369.

orange, he says the boy was only in a comatose state about forty-eight hours previously to his death.*

Tumours occupying the maxillary sinus do not always originate in its lining membrane or periosteum. They sometimes arise from the pituitary membrane of the nose, frontal sinus, or ethmoidal cells, and after having found their way into this cavity, augment in size, until they produce the effects just described. Some suppose that the morbid productions found here, originate more frequently in the cells of the ethmoid bone, than in the lining membrane of this cavity;† but I am disposed to believe that this opinion is not well founded, and that it has chiefly resulted from the great liability of most kinds of tumours of the maxillary sinus, to be reproduced after having been extirpated,—which is often attributable to the continuance of the cause that gave rise to them in the first instance, or to their imperfect removal. That they do however sometimes originate in the ethmoidal cells, there can be no question.

It sometimes happens that tumours having their seat in the antrum, after having filled it, make their way into the nose, where they acquire a size equal to, or even greater than that to which they had previously attained here, thus dividing themselves, as it were, into two parts—one occupying this, and the other, one of the nasal cavities. Occurrences of this sort are not unfrequent, and they sometimes lead to the adoption of an incorrect opinion, with regard to the real seat of the disease. Thus, a polypus of the antrum is occasionally mistaken for one of the nose, and the

* Vide Professor Reese's Appendix to Cooper's Surgical Dictionary, American edition of 1842, page 29.

† Vide Traite des Maladies de la Bouch, t. i. p. 210, &c.

error frequently not discovered, until an attempt is made to remove it.

The character of morbid growths in this cavity is exceedingly variable, as much so as is the state of the constitutional health of different individuals, and the causes that give rise to them. They not only vary in their appearance and structure, but they vary in their malignancy. Some are of a healthy flesh colour, soft, sensible, but not painful, and present a smooth, regular surface; others varying in their consistence from hard to soft, and in their colour from a pale yellow to a deep red or purple, present a rough, irregular, and not unfrequently ulcerated surface, and are more or less sensitive to the touch and painful. Some have their origin in the mucous membrane, and others, both in this, and the periosteum. Some are attached by a broad base, and others, it is said, are connected only by a mere peduncle.

But as it regards this latter description of tumours, which are usually designated by the name of polypi, their occurrence in the maxillary sinus is questioned by some writers. Sir Benjamin Brodie does not believe that they ever form in this cavity;* and in this opinion Mr. S. Cooper fully concurs;† but that they are occasionally met with here, seems nevertheless to be pretty conclusively established. A case described by M. Bertrandi in his treatise on Operative Surgery, page 369, has already been referred to, and Bordenave, in his observations on the diseases of the antrum maxillare, gives the history of a case treated by M.

* Vide London Medical Gazette, for December, 1834. p. 850.

† Vide Professor Reese's Appendix to Cooper's Surgical Dictionary, American edition, 1842, p. 29.

Doublet.* Rusch declares that he has twice seen polypus of this cavity, and Petitt, Levrette and other writers also affirm that they have witnessed polypi here.† The occurrence then of polypi in the maxillary sinus, although very rare, it must be admitted does sometimes happen. But other descriptions of tumours are certainly more frequently met with in this cavity. Of these, some are of a simple fibrous, sarcomatous, or osteo-sarcomatous nature,‡ and when thoroughly extirpated, are seldom reproduced; others are of a medullary, cancerous, or carcinomatous character. These last, although originating in the mucous membrane, if long neglected, are very liable to be reproduced after their removal, and generally occasion the death of the patient.

It sometimes happens that several fungi, and from opposite and various points in this cavity, spring up. The chances of cure, when this is the case, especially if they are of a malignant character, are greatly lessened.

Tumours in the maxillary sinus seldom grow very fast during the early stages of their formation; but, as they enlarge, the neighbouring parts become involved in the diseased action, and consequently furnish them with fluids less healthy in their qualities, and thus cause them to assume a character of greater malignancy, and generally to increase more rapidly in size.

Having premised these few general observations on tumours of the maxillary sinus, I shall proceed to describe the principal signs by which their existence here is indicated.

* Vide Mem. de l'Academie Royale de Chirurg. 12mo. t. 13, p. 393.

† Vide Traite des Maladies de la Bouch, tom. 1, p. 212, and sur cure des Polypes de la matrice, de la gorge, et du nez, page 253.

‡ Vide Professor Reese's Appendix to Cooper's Surgical Dictionary, American edition, 1842.

Symptoms.—The occurrence of tumours in the maxillary sinus is rarely accompanied, previously to their having obtained a size sufficiently large to fill it, by symptoms differing materially from those occasioned by many of the other affections that locate themselves here. But, after they have filled the sinus, the indications soon become less equivocal. Swelling of the cheek, depression of the palatine arch and alveolar ridge, loosening of the superior molar teeth of the affected side, inflammation and sponginess of the gums, elevation of the floor of the orbit, and protrusion or concealment of the eye, are symptoms which result from the presence of tumours in this cavity, but they are not peculiar to these affections alone; many of them are produced by mucous engorgement of the sinus. But when to these is superadded the discharge of a bloody sanies from the nose, or from one or more fistulous openings through the cheek, alveolar ridge, or palatine arch, the diagnosis will be conclusive; and the existence of a tumour in the antrum will then be established beyond doubt.

There are also other signs by which the occurrence of a morbid growth in this cavity may be known; as for example,—the dropping out of the superior molares of the affected side, and the protrusion of portions of the tumour through the alveoli.

The pain is seldom severe until the tumour has filled the cavity, except the excrescence be from its inception of a malignant character; but as it augments in size and forces the walls of the sinus asunder, it becomes more and more severe. It sometimes, during the progress of the disease, becomes almost excruciating. In a case of fungus hæmatodes of this cavity, which the author, a few years since, had an opportunity of witnessing, the patient was in the habit of taking upwards of two tea-spoonsful of black drop at a time, for the procurement of ease and sleep.

But in addition to the foregoing symptoms, several of the affections already treated on, together with all the effects produced by them, not unfrequently result from tumours in this cavity. Inflammation and ulceration of its lining membrane, a purulent condition of its secretions, and caries, necrosis and a softening of its osseous walls, seldom fail to follow some of the stages of the formation of the morbid productions now under consideration.

The symptoms peculiar to each variety of tumour, it is not necessary to mention, inasmuch as they are given by most writers on general surgery.

Causes.—Most writers on the affections of the maxillary sinus, are of the opinion that tumours in this cavity result spontaneously, as a consequence of some specific constitutional vice, independently of local causes. I do not however believe that they are ever thus originated. But that a bad habit of body or some constitutional vice is necessary to the production of the affections under consideration, I do not doubt, but that this is capable of giving rise to them in parts uninfluenced by local irritation, I think exceedingly questionable. Having however already expressed my views with regard to the agency exerted by particular habits of body and constitutional vices in the production of diseases in this cavity, it will not be necessary to repeat what I have before said upon the subject.* It will be sufficient to remark that most, if not all of the morbid excrescences here met with, result from local irritation and constitutional vices; and that both are necessary to their production.

Scorbutic and scrofulous habits, and persons whose general health has been impaired by certain constitutional diseases,—such

* Vide introductory remarks, pp. 17—22.

as the venereal, protracted inflammatory and bilious fevers, dyspepsia, &c., are most subject to tumours of the maxillary sinus; but every thing in fact, which has a tendency to increase the irritabilty of the soft tissues of the body may be considered as so many predisposing causes. The local causes are the same as those of most of the other morbid affections of this cavity. Diseased teeth, gums and alveolar process are probably among the most common. The irritation produced by these so frequently extends itself to the antrum, that their agency in the production of tumours here, cannot be questioned. There are, however, other causes of irritation to which this cavity is exposed, such for example, as blows upon the cheek, wounds, &c.

Treatment.—It is only in the early stages of the formation of tumours in the maxillary sinus, that surgical treatment can be adopted with success, and even then, their entire extirpation is necessary. If this be not accomplished, a speedy return of the disease may be expected. But, preparatory to the removal of the diseased structure, a large opening should be made into the antrum, so as to expose as much of it as possible; and with regard to the most proper place for effecting this, Deschamps, recommends when the alveolar ridge has been started, the removal of the first or second molaris, and the perforation of the sinus through its socket with a "three-sided trocar of suitable dimensions." But when the alveolar ridge and teeth are sound, he directs the opening to be made through the outer wall of the sinus above the ridge, and this he thinks, on account of its being more direct, is preferable to the other mode.* An opening may be easily effected in either way into the sinus, as its walls are generally, so much softened as to offer but little resistance.

* Malades des Fosses Nazales, sec. ii. art. iv. p. 244.

When the opening is to be made through the external parietes, the instrument recommended by Mr. Thos. Bell,* to be employed for cutting away the bone after it has been exposed, is "a strong hooked knife," which is probably as well adapted to the purpose as any that could be used. Some surgeons employ strong curved scissors, but the hooked knife, I should think preferable.

A free opening having been effected into the antrum, a finger of the operator should be introduced, and the nature of the diseased structure ascertained. This done, he will be enabled to determine the proper procedure to be had recourse to for its removal. If the tumour partakes of the character of those called polypi, it may be seized with a pair of forceps and torn away, but if it be attached by a broad base, its extirpation will be most readily effected with a knife. But, even with this, it is often exceedingly difficult to effect its total removal, so that it not unfrequently becomes necessary to employ the actual cautery; for, if any small portions be left behind, as has before been stated, a reproduction of the disease, will generally very soon take place. When the disease has originated, or is seated, in the periosteum, the cautery has proved to be the most effectual means of preventing its return of any that has been tried. The French surgeons have applied it with great success. Desault, in a case of fungous tumour, succeeded in effecting a cure after three applications. The root of the disease, by the employment of this, can often be destroyed, when less effectual means would fail. But it is important when it is had recourse to, that it should have such a degree of heat, as to accomplish this object instantaneously else, the inflammation that would otherwise be excited by its ap-

* Anat. Phys. and Diseases of the Teeth, p. 282.

plication in the surrounding parts, would greatly retard, if it did not prevent the cure. The remarks of Mr. Thos. Bell upon this subject, who says, "the white heat should be employed,"* are worthy of attention.

In remarking upon the bold practice of the French surgeons in the treatment of these affections, the author just quoted says, it "Is worthy of our praise and imitation;" and, continues he, "the timidity which, until very lately, almost excluded the use of the actual cautery in this country, has been one cause, and that a very prevalent one, of failure in the treatment of some of these cases; but it is not so easy to account for the still more culpable dread, which has in so many instances prevented any attempt from being made to extirpate the disease; a degree of pusillanimity which is at once an opprobrium on the profession, and a fatal injustice to the sufferers, who thus abandoned to the unrestrained progress of the disease, are left to perish by a lingering and most painful process, without even an attempt being hazarded for their relief."

The foregoing comparison, instituted by Mr. Bell, between the practice of the French and English surgeons in the treatment of tumours of the maxillary sinus, perhaps is correct; but it is due to truth to say, that the bold practice of the former has been fully and successfully emulated by American surgeons. Dr. A. H. Stevens, Professor of Surgery in the University of New York, in 1823, in a case of fungous tumour, attached by a broad base to the lower part of the antrum, removed a large portion of the lower and anterior parts of the upper jaw. The patient recovered and is said to be living at the present time.† In 1841, Dr. J. C. Warren, of

* Anat. Phys. and Diseases of the Teeth, p. 282.

† Appendix to Cooper's Surgical Dictionary, p. 30.

Boston, for a case of cephalomatous tumour of this cavity, removed the superior maxillary bone. This operation also, was successful.* The same operation was performed soon after, and for the removal of a tumour of the antrum, with success, by R. D. Mussey, of Cincinnati, Ohio.†

But the operation for the removal of the superior maxillary, did not originate with American surgeons; Velpeau says it was performed by Acoluthus in 1693, for a tumour of the face.‡ By a reference however, to the history of the case as given in a memoir of the Academy of the Curiosities of Nature,‖ it will be perceived that the tumour originated in the maxillary sinus, and that only a part of the jaw-bone was removed. If however, we can believe Wiseman, this most formidable operation was performed at a still earlier period. He says in his surgery, the first edition of which was published in 1676, "That he cut into a man's cheek, sawed in pieces the alveolus, and took out the whole jaw, and cured him."§ But although the operation may have been performed thus early, it does not at all detract from the credit due to modern surgeons, since the method of effecting it, is at least, original with them.

Thus it is perceived, that the diseases under consideration not unfrequently call for one of the most formidable operations in surgery, and that by it, many unfortunate sufferers have been snatched, as it were, from the very jaws of death. But notwithstanding the performance of even this operation, the application of the cautery often becomes necessary to prevent a reproduction of

* Boston Medical and Surgical Journal for 1842.

† Western Lancet for 1842.

‡ Velpeau's Operative Surgery, p. 263.

‖ Decad 3, ann. 4o. Obs. 57.

§ Vide Wiseman's Surgery, page 285.

the excrescence, and there are many cases in which it cannot be repressed by this. The result of the most thorough and best directed treatment depends on the state of the constitutional health and the nature of the disease. In depraved habits and shattered constitutions, if the tumour be of a carcinamatous character, a cure need never be expected.

The hemorrhage, during the operation for the removal of tumours of the antrum, is sometimes so profuse as to require very prompt and active means to arrest it. It may generally, however, be controlled by the employment of compresses and suitable styptics, but should these fail, the actual cautery should be had recourse to.

The history of the following cases, promiscuously taken from various works, will perhaps furnish a more correct idea of the methods of treatment most proper to be pursued, than any description which could otherwise be given. The first four cases are taken from the Memoirs de l'Academie Royale de Chirurgie.*

Case XXIII.—A man about thirty-five years of age, had a fleshy tumour about the size of a large pea, situated in a space formed by the decay of the first and second superior molares of the left side. This tumour caused a dull pain; it was excised, and the actual cautery applied to arrest the bleeding and destroy remaining portions of the excrescence. It re-appeared, and three months after was double the size of the former, and impeded mastication. The two decayed teeth were loose and the others were painful; and a fetid matter escaped through the nose and mouth.

After the extraction of the two decayed teeth, M. Dubertrand, discovering that the tumour had its seat in the antrum, seized it with polypi forceps and brought the whole of it away. After

* Tome 13, obs. 1, 5 and 7th, pages 372, 387, 393 and 424.

the extraction of the tumour, the opening through the alveolus was large enough to admit the little finger. M. Dubertrand next destroyed such portions of the alveoli and maxillary bone as were decayed. But after the extirpation of the tumour, he found it necessary to introduce a plug of cotton into the antrum, to arrest the hemorrhage that followed the operation.

The secretions of the maxillary sinus ceased to exhale an unpleasant odour, in three days they became healthy, and in less than one month, the patient was restored to health, and the opening from the mouth into this cavity was closed with firm granulations.

The tumour just described was of the simplest kind, but had it not been completely eradicated, it would doubtless have soon reappeared.

Case XXIV.—Acoluthus, reports the case of a woman thirty years of age, who in 1693, came to Pologne in Silesia, in search of aid for a peculiar disease of the antrum, under which she was labouring. Some time after the extraction of a tooth from the left side of the upper jaw, a small tumour appeared in its alveolus, and it made such progress, that in two years, it attained the size of a double fist. It occupied nearly the whole cavity of the mouth, and distended the jaw to such a degree that it was feared it would rupture it. The lower jaw was depressed, the lips could not be made to meet, and the tumour increased so fast, that in a few weeks, the woman's life was despaired of—she being threatened with suffocation, hunger and thirst. Under these circumstances, Acoluthus determined to attempt a cure.

The tumour was very hard and occupied the greatest part of the palatine arch; the upper teeth of the left side were in its

centre. The operation was commenced by enlarging the mouth, beginning at the commissure of the lips, and passing it transversely through the cheek. This enabled Acoluthus to attack the exterior of the tumour with a curved bistoury. The excrescence was as hard as cartilage and scarcely yielded to cutting instruments applied by a strong hand. He however succeeded in bringing three or four teeth together with a portion of the superior maxillary bone. But the operation as yet had extended only to the exterior half of the tumour; the other which filled the palatine fossæ, he says, it was impossible to bring away. The removal of that was effected only by piece-meal and at different times. The operation was long, laborious and very painful. The actual cautery was applied to the bleeding vessels and fungous flesh. The appearance of the patient, a few days after the operation was such as to inspire hope for a favourable termination of the disease. The actual cautery was applied several times, and finally there were no indications of a reappearance of the excrescence, except at the point where it had first originated. Some portions of bone, were afterwards found to be carious, and the removal of these was followed by a prompt and speedy cure.

This was the operation alluded to by Velpeau, as embracing the removal of the superior maxillary, previously noticed, but from the description here given of it, it would appear that only a small portion of the bone was taken away. The alveolar ridge and anterior parietes of the sinus was all that was removed. The history of the case, however imperfect as it is, and the result of its treatment, proves that the resources of art are adequate to the cure of many of the most formidable and threatening of the affections of this cavity, if their employment be not delayed too long.

Case XXV.—In 1755, M. Doublet was consulted by a lady thirty-nine years of age, who had a tumour the size of a hazlenut at the internal angle of the left eye, upon the *os unguis*. This was movable and hard, but the patient experienced no pain from it. Some time after she complained of difficult respiration, through the left nasal cavity. Upon examination, M. Doublet discovered a polypus of a soft flabby, consistency. This he thought should be extracted before attempting to remove the exterior tumour, which, having effected, that subsided and the patient enjoyed good health for four months. At the expiration of this time, a tumour three-fourths larger than the first made its appearance, which was extracted, and the patient again remained well for one month. But by this time, another polypus had made its appearance in the left nostril, softer than the first. This was treated by escharotics, and some time after a fourth polypus made its appearance, and a fourth tumour showed itself at the angle of the eye. The progress of these was more rapid than any which had preceded them, and they were accompanied by violent headache. The patient's general health, notwithstanding the local affection, was good, and the tumour and polypus did not exhale a fetid odour. The glands of the mouth were swollen. Alteratives were prescribed and an issue was opened. These appeared to give the patient some relief, but the tumour at the angle of the eye notwithstanding made such progress, and the maxillary sinus, which before was not suspected of being diseased, became so completely filled, that the palatine process of the maxillary bone, separated. This was followed by a considerable swelling of all the internal membrane of the mouth, the gums became hard and black, and in the month of March, 1758, the patient died.

On submitting the diseased part to a post mortem examination, a large tumour, says M. Doublet, was found in the antrum, which completely filled it, and it had attained double this size under the zygomatic arch and near the angle of the eye. The palatine process of the maxillary bone was pressed out about the width of two fingers; the upper row of teeth were displaced, and yet there was neither ulcer in the soft parts nor caries in the hard. The two tumours were scirrhous and no appearance of polypus was observed in the nose.

What the result of proper surgical treatment would have been in this case, had the seat of the disease been known, it is impossible to conjecture, since not a word is said concerning the causes, neither local nor constitutional, that gave rise to the tumour. There is nothing, therefore, in the history of the case, of special interest to the practitioner, and I have given place to it here only for the purpose of showing the importance of ascertaining the seat of morbid productions which develop themselves in the nose. It is not at all improbable that, had it been known in the case just described, a more successful plan of treatment might have been instituted, and the life of the patient saved.

Case XXVI.—A young lady of Picardy having been exposed to the changes of weather for three years, in attending to business which required of her to be much on horseback, experienced, at the end of the first year, a chilly sensation in her left cheek; this increased, and her cheek became swollen, and her molar teeth of the affected side loosened and two dropped out.

The swelling of her cheek increased, and she was affected with lancinating pains in that side of her face; her breath became offensive and she lost two more teeth. Becoming alarmed, she

went to Rouen to obtain medical advice, but receiving no satisfaction, she afterwards went to Paris, and applied, November 20th, 1740, to M. Croissant de Garengeot, who found her face greatly disfigured. Her mouth, he says, was on the right side, the left side of her nose much elevated, the left cheek very large, and the upper lip of the same side greatly thickened. Bluish flesh of the size of an olive occupied the alveoli of the teeth which had dropped out, the left side of the roof of the palate was thrown inwards and resembled the exterior projection of the cheek. The anterior wall of the antrum had become softened as well also as that of the left nasal bone, and the whole cavity was filled with fungous flesh.

M. Garengeot commenced the operation by seizing the bluish excrescence which had appeared through the alveoli with a hook and cutting it away; and he says he incised transversely, every day, from within the mouth, the buccinator muscle, and brought away part of it as well as the flesh which so much augmented the size of the jaw.

The hemorrhage was so abundant that it was impossible to proceed further with the operation. The excrescence was rapidly reproduced after each operation; these excisions were repeated seven or eight times in six weeks, and the hemorrhage, each time, was very great. The seat of the disease was in the anterior of the sinus. The fungous flesh contained in this cavity was removed, as well also as some osseous projections.

The excrescence continuing to be reproduced, the consent of the patient, who had until now refused to have the actual cautery applied, having been obtained, its use was resorted to, twice a day, for eight days. The success, says M. Garengeot, which

followed this treatment was incredible. The flesh soon took on a healthy consistency, the palatine arch returned about two-thirds to its natural situation, and the bad odour of the mouth gradually disappeared.

The application of the cautery was continued, once a day, for three weeks, and the patient did nothing more than to use a slightly stimulating and astringent gargle. On the 20th of March she returned home cured.

It is very probable that had the operation in the case just described been thorough, there would have been no return of the disease, for it is evident from the description which M. Garengeot gives of the operation, that the seat of the affection was not reached until it had been repeated seven or eight times; and then, I think it very likely, not until he had recourse to the actual cautery.

The utility of the actual cautery, not only for the purpose of thoroughly destroying every remaining vestige of fungous tumours of the antrum maxillare after their removal, but also for the suppression of hemorrhage, would seem to be fully established by the result of the treatment of cases twenty-four and six. That there are cases where it will fail to prevent their reproduction there is no question, but this does not detract from its value.

The employment of arsenical preparations has, in some instances, been found highly advantageous in repressing the growth of fungous excrescences. The following case is cited by Mr. Thomas Bell as an example.*

Case XXVII.—"James Woodly was admitted into Guy's Hospital, September 4th, 1821, for a fungous exostosis, which arose

* Anat. Phys. and Diseases of the Teeth, p. 283.

from the antrum maxillare, and made its way through the palate. After his admission he had the fungus removed two or three times, and a variety of caustic applications were afterwards made use of; notwithstanding which the tumour reappeared. At length Sir A. Cooper, after having made an incision from the corner of the mouth outwards through the cheek, removed the tumour from a greater depth than had previously been effected. After this operation the wound in the cheek readily healed, and the following strong solution of arsenic was daily applied to the part from whence the tumour had been removed.

℞. Arsenic, oxyd. alb. ʒ vi.
Potass. Subcarb. q. s.
Aq. Distillat. M. ft. solutio.

The solution required to be diluted in the first instance on account of its occasioning him a good deal of pain, in a few days, however, he used it of the strength mentioned in the formula. It was applied regularly every afternoon, after which he did not take any food until the following day. At the time of its application he had a piece of oiled silk, of a horse-shoe shape, passed into the mouth, its sides being turned up to prevent the solution escaping into the mouth: his head then hanging down over a basin, a piece of sponge moderately saturated with the solution was applied to the disease upon the oiled silk, pressed against the part; such of the solution as was then pressed out, passed along the channel of the oiled silk into the basin over which the head was hanging, and the saliva escaped behind the oiled silk into the same utensil. He kept the sponge in this situation until it gave him considerable pain, when it was removed and the mouth carefully washed. He suffered great pain in his

mouth during the period of the cure; but the arsenic did not produce any other unpleasant symptoms. This application was continued for a few weeks, at the end of which time he was completely cured; a cavity being left in the site of the tumour, which however, gradually became covered by a continuation of the membrane which naturally lines the palate."

There are a number of highly interesting cases of sarcomatous, carcinamatous, and other kinds of tumours of the maxillary sinus, in Jourdain's Treatise on the Surgical Diseases of the Mouth; some of which, I had intended to introduce into this treatise, but apprehending that it would extend it to too great a length were I to do so, I have concluded to omit their insertion. A number of other equally interesting cases reported in various other works,* are for the same reason excluded.

But before dismissing this branch of the subject, I will add the history of one more case of tumour of this cavity, taken from the "Boston Medical and Surgical Journal," the treatment of which, involved the removal of the superior maxillary bone, given by that justly distinguished and eminent surgeon, J. C. Warren, M. D. of Boston, and although it is of considerable length, the method of procedure is so minutely detailed, that it furnishes a more correct description of the operation, than any which could otherwise be given.

Case XXVIII.—"The patient, Mr. J. G." says Dr. Warren, "is 35 years old, well constituted, and in every particular strong

* Vide Journal de Chirurgie, tom. 1; Parissian Chirurgical Journal, tom. 1.; Œuvres Chir. de Desault, par Bichat, tom. 2.; New London Med. Jour. vol. 1.; Eichorn. Diss. de Polypis in Antro. Highmori. Trans. of a Society for the Improvement of Med. and Chir. Knowledge. Recueil Periodique de la Soc. de Med. tom. 2.; No. 9. Edinburg Med. and Chir. Jour. Nos. 83 and 84; Traite des Maladies Chirurgicales, tom. 6.; Traite des Maladies des Fosses Nazales, New York Jour. of Med. and Surgery, Western Lancet. Cooper's Surgical Dictionary, Benj. Bell's Surgery, vol. 4, &c. &c.

and healthful, with the exception of the disease which called for this operation. About nine months since he began to be affected with frequent and considerable bleedings from the nose. These bleedings occurred about once a week, and were sometimes profuse. During the occurrence of one of these attacks, he was led to pass the finger deep into the left nostril, and discovered there a tumour about the size of a pea, in the outer side or wall of the cavity.

The bleedings continued and the tumour grew, till it made a visible appearance in the aperture of the left nostril. Alarmed at this, he consulted Dr. Winslow Lewis, who, suspecting a formidable disease, advised him to apply at the Massachusetts General Hospital for advice and assistance. He was there examined by Dr. Hayward and myself, and presented the following appearances. The left nostril was filled by a tumour of a deep red colour and soft consistence, discharging blood freely on being subject to a slight touch. A probe could be introduced into the cavity on the inner side of the tumour along the septum of the nose; but, on the outer wall, was soon arrested in its progress by the tumour, which appeared to be connected with this part, and bled so copiously as to prevent a continuance of the examination in this direction. The external appearance of the face being examined, the nose was seen to be tumefied on the left side by the protrusion of the nasal process of the upper jaw, and also by that part of the bone forming the exterior wall of the nasal cavity. On opening the mouth, the hard palate was seen to be the seat of a tumour of an elastic character, oval form, and size sufficient to occupy a considerable portion of this cavity, obviously produced by the pressure of a substance in the nostril above. The mucous membrane of the mouth was not altered in colour or consistence.

On passing the finger through the mouth into the posterior opening of the nostril, this aperture was found to be filled by a soft elastic tumour, similar to that which occupied the anterior aperture. The septum of the nose was slightly inclined into the right nostril.

Such were the history and appearances of this tumour. Its vivid red colour, soft consistence, disposition to bleed, rapid growth, and consequent breaking down of the bones which surrounded it, satisfied me that it was a cephaloma, a malignant fungus, which would destroy the patient's life in a short time unless extirpated: and I, therefore, advised him to enter the hospital, and have it removed. The patient agreed to this course, and went home to make his arrangements.

In nine days after, he entered. When I came to examine the tumour again, I found that, during this short period, it had enlarged considerably; and especially that it had extended to the right side of the palate so far as to leave a small space only between it and the teeth of that side. I was now seriously apprehensive that no operation could wholly eradicate the tumour, and felt much doubt whether it would be expedient to attempt one, in itself always severe, and which in this case would he attended with dangerous bleeding. After weighing the arguments on both sides for three or four days, I came to an affirmative conclusion, provided other gentlemen were of the same opinion. On the Saturday following, the 4th of December, a consultation was held, consisting of Drs. Hayward, Townsend, and Holmes, and these gentlemen being satisfied that as there was no other ground of hope for the patient, and that he must die in a most distressing manner, the operation was decided on, and immediately after executed.

The principal difficulties I anticipated in this operation were the following:—1. Profuse bleeding, which the character of the tumour, the tendency of blood to the head produced by it, and the fulness of the patient's habit, seemed to promise. 2. Impracticability of dividing the bones without sawing, as the patient was of an aspect which indicated unusual solidity of the osseous texture. 3. Fatal syncope, from the quantity of blood lost and the pain of the operation.

To obviate these dangers I proposed—1. Compression of the carotid arteries, tying of the wounded vessels when they bleed freely, and the use of the actual cautery. 2. Division of the bones by the cutting forceps, which I had caused to be made and used for the last twenty years. 3. Waiting occasionally to give the patient time to recover, and recruiting him with cordials.

Every thing being arranged, the patient was placed in a chair, his head well supported, and the operation was then begun in presence of the medical class and a considerable number of medical gentlemen of the city.

I made an incision from the middle of the external edge of the left orbit to the left angle of the mouth, down to the bone. A most copious gush of blood succeeded. The internal flap was then quickly dissected up to the middle of the nose, cutting up at the same time the cartilage of the left wing of the nose, and freeing the globe of the eye from the inferior part of the socket by the division of the inferior oblique muscle, the fascia of the eye, and the periosteum. The outer flap was then rapidly dissected from the os malæ and os maxillæ, and around the latter bone as far as its union with the pterygoid process of the sphenoid; but the uniting space was not at this time penetrated on account of

the large pterygoid branch of the internal maxillary, which would have been difficult to secure in this stage of the operation.

The two flaps being separated, the anterior extremity of the spheno-maxillary fissure was perforated, and I then proceeded to the division of the bones. The os malæ was attached directly opposite to the perforation in the spheno-maxillary fissure. The cutting forceps were then applied to the broadest part of the malar bone, and divided it smoothly in a few seconds. Second, the same instrument was applied at the internal angle of the eye, in an oblique direction from the lower edge of the orbit to the lower termination of the os nasi. Here the projection of the tumour into the orbit occasioned some dfficulty, from the little space left for its introduction into the orbit; but, the instrument being fixed, the bone was divided without difficulty.

In the meantime, the blood continued to flow in torrents. One considerable artery required immediate ligature: and the bleeding of the others was controlled by compression of the carotid artery. The mouth of the patient filling with blood, frequent pauses were required to afford him an opportunity of ejecting it, and occasionally he was recruited by a little wine.

The most difficult part of the operation remained; that of dividing the sound from the unsound parts within the mouth, and separating the maxillary from the sphenoid and palatine bones without injury to the latter; so as to leave the patient the whole of the soft palate, with the palatine plate of the os palati to support it. In order to accomplish this without dissection, I made an incision through the mucous membrane of the hard palate, beginning at the edge of the palatine plate of the os palati, and extending the incision forwards to the external edge of the jaw, then

upwards across the alveoli into the bone. To facilitate this incision, the middle incisor tooth of the left side was taken out in such a way as to break the anterior part of the alveolus. Then by a single stroke of the cutting forceps the upper maxillary bone was divided, and its palatine plate cut through as far as its junction with the os palati. In order to separate the palatine plates of the maxillary and palatine bones, I hoped to be able to clear the mouth of blood for a moment to make a transverse cut between these plates. But to see was impossible, from the flow of blood. Therefore, passing the fore-finger of the left hand into the mouth, I felt the last molar tooth, and turning the pulp of the finger forwards to receive and support the instrument, I struck a strong-pointed knife through the hard palate at the union of the maxillary and palate bones, separated these bones, and was able also to separate the maxillary bone from the pterygoid process of the sphenoid, and thus accomplished the disunion of all the bones concerned. Finally, the knife was passed externally behind the upper maxillary bone into the space between this and the pterygoid process, to divide the second branch of the fifth pair of nerves. This was done by a stroke of the instrument, and the patient made a great cry, evincing that this nerve had been reached.

Seizing the bone with the left hand by its orbitar and alveolar portions, it was by a gradual movement started from its situation, and aided by a few touches of the knife, its remaining periosteal attachments were divided, and the whole bone and tumour dislodged from the face.

The patient having lost much blood, had now become faint, and was, therefore, placed on a table. The portion of swelled mucous membrane on the right side of the palate was cut off with

ease, and it now only remained to arrest the hemorrhage. A ligature was applied to the superior ethmoidal branch or continuation of the maxillary artery. The hemorrhage from a second artery also required to be arrested. This was not easily done, for it was impossible to discover the orifice of the wounded vessel. It was, therefore, touched with caustic potass, and lint applied to it. As the bleeding might recur, the wound was not immediately brought together, but was covered with a cold-water compress, and the patient left in the operating theatre. He was able to swallow and speak, notwithstanding his exhaustion and the length of the operation.

The time expended during the operation I do not know, having always considered it the part of folly to measure an operation by time, rather than the exigencies of the case. I was informed, afterwards, it was over forty minutes. The principal part of this time was expended in waiting for the patient to relieve his mouth and throat of blood, which appeared to embarrass him more than I had expected. But the time employed in the incisions, both of the soft and hard parts, was short, and certainly could not have exceeded ten minutes.

In three hours after the operation, no bleeding having occurred, the wound was dressed by passing five sutures and applying a cloth of four thicknesses wet in cold water, to be moistened from time to time; and then he was carried to his bed. He passed the night rather uneasily; but the next day he was more quiet. The pulse, for four or five days after the operation, varied from 80 to 112; at the end of six days it was 72. The third, day, the wound being wholly united, the stitches were withdrawn by Mr. Hayward, the house-surgeon, at my request. In two or three

days, the patient was able to take softened bread; and, in three weeks from the operation, went home to pass the Christmas with his family—in two days after which, he was discharged. At the present time, eight weeks after the operation, he is at home, takes food freely, and speaks intelligibly. The left eye, at first much swelled, is in a natural state, and he uses it without uneasiness. On the left side of the palate there is an aperture of a triangular form. Through this, the os ethmoides may be felt, the projections of which were mistaken by the patient for a return of his disease. The food occasionally passes through this aperture into the nostrils, and embarrasses the patient momentarily. The soft palate is entire. There is a slight paralysis of the left side of the upper lip, from the division of the facial nerve; and a want of sensibility in the left side of the nose and the left upper lip, from the division of the second branch of the fifth pair of nerves.

Description of the Tumour.—The tumour, after its removal, exhibited the following appearances. At its summit appeared the lower floor of the orbit of the eye, at the inside of which was a portion of the nasal process of the os maxillary superius. On its outer part projected one half of the os malæ; below appeared the left half of the palate, with the exception of the part which belongs to the palatine plate of the os palati. A portion of the fossa canina, and the whole alveolar margin, with the correspondent teeth, were visible. On the inner wall of the mass appeared three considerable red-coloured lobes, attached to the outer and inferior part of the maxillary cavity, by something like a pedicle, about an inch in diameter—the three lobes being connected at their attachment, but separated at their internal or nasal extremity into an anterior, middle, and posterior lobe. The superior maxillary

nerve was seen in and behind the orbit. The whole was covered by membranes which separated it from the parts in contact. One lobe had made its way through the bone of the face; the others through the partition between the nostril and antrum."

Having now quoted the description of the operation and tumour, I shall notice but a few of the remarks that follow. "The texture of the tumour," says Dr. Warren, "was in consistence somewhat spongy and elastic, and was very vascular." Again he observes: "In order to judge of the propriety of operating in such cases, we must distinguish from each other the different tumours which begin in the maxillary cavity and extend into the nostril, and raise the bony parietes of the face, orbit, and palate. I have seen four different species of such tumour. First, the osteo-sarcoma, of the upper maxillary bone; second, the fibrous tumour; third, scirrhoma; and fourth, cephaloma."

"The first, osteo-sarcoma, is the most formidable in appearance, and attains the greatest size. Its growth is rapid and luxuriant; it breaks down the surrounding bones, and produces enormous deformity. This affection, terrible as it is in appearance, is tractable by operation, and its careful removal is generally followed by a successful result. The second, fibrous tumour, is of slower growth, and more limited in its ravages. This may be removed with a reasonable certainty of its not returning. Third, scirrhoma. This form of tumour of the antrum is characterized by its hardness, the pains which attend it, its moderate growth and certain fatality. Fourth, the cephalomatous is rapid in its growth, and of a spongy texture, produces excessive bleedings, and terminates by death unless removed at an early stage."

It was for the removal of this fourth species of tumour that Dr.

Warren operated, and although more than a year has elapsed since the operation was performed, there are no indications, so far as I have been able to learn, of a return of the disease.

In remarking upon the causes of malignant tumours, Dr. W. argues that those who hold that such morbid production, "are necessarily and early the result of a contaminated circulating fluid," "must of course believe that every operation for their removal," "is utterly unavailing," and, while he admits "that a great number" "are followed by signs of a general vitiation of the blood," he believes that inasmuch as they are not always reproduced after their extirpation, that they often attack persons who are unaffected with any general or constitutional vice whatever.

I fully concur in the opinion, that, if all malignant tumours resulted from a vitiation of the circulating fluid, independently of all other causes, no operation for their removal would be successful, but I cannot admit that, inasmuch as they are sometimes successful, it follows, that individuals unaffected with any constitutional taint or vice, may, and not unfrequently do, become the subjects of them. I do not think that this conclusion is warranted by the premiss, but having already endeavoured to show, that local causes alone, are incapable of producing them, and that they were dependent, both upon these, and some constitutional vice or taint, it will not be necessary to repeat what has before been said upon the subject.

In conclusion, I would remark, that Professor Pattison proposed in 1820, for the dispersion of fungous tumours of the maxillary sinus, the tying of the carotid artery. He was induced to recommend this method of treatment, from the consideration, that the "capability of action of a part, is proportioned to its vascularity,"

and that thus by cutting off the circulation of blood to it, the morbid growth would slough and be thrown off. He says this practice has been successful where it has been adopted, in all the cases that have come to his knowledge.*

* Vide Appendix to Surgical Anatomy of the Head and Neck, pages 477–8.

CHAPTER VIII.

OF EXOSTOSES OF ITS OSSEOUS PARIETES.

The osseous walls of the maxillary sinus sometimes become the seat of bony tumours—a disease designated by medical writers by the name of exostosis. This, however, is not an affection peculiar to the bony parietes of this cavity; all of the osseous structures of the body are liable to be attacked by it.

Exostoses, like many other diseases, presents several varieties. It is divided by some writers into true and false, the one consisting of a tumour composed wholly of bone, or nearly so, and the other, of a tumour composed both of ossific matter and fungous flesh, or of a mere thickening of the periosteal tissue.* Sir Astley Cooper divides exostoses into periosteal, medullary, cartilaginous and fungous. The first consists of a deposition of bony matter on "the external surface of a bone and the internal surface of its periosteum," and to both of which it firmly adheres. The second consists of "a similar formation, originating in the medullary membrane and cancellated structure of the bone;" this description of exostosis never attacks the walls of the maxillary sinus. By cartilaginous exostosis he means that which is preceded by the formation of cartilage, which forms the nidus for the ossific deposite."

* Vide Dictionnaire des Sciences Medicales, t. xiv. p. 218.

Fungous exostosis he describes to be a tumour not so firm in its consistence as cartilage, but harder than fungous flesh, having interspersed through its substance spicula of bone, of a malignant character, and dependent upon some peculiar constitutional diathesis, and action of vessels.* This species of exostosis differs but little, if at all, from osteo-sarcoma.

Exostoses differ as much in shape as they do in structure. They sometimes rise abruptly from the surfaces of bones by a narrow and circumscribed base, projecting in large irregularly or spherically shaped masses; at other times they rise very gradually, covering a larger surface of the affected bone, but less massy and with limits less perfectly defined. An exostosis has been known to occupy the whole extent of the surface of a bone. "The whole external surface of one of the bones of the skull was found occupied by an exostosis, while the cerebral surface of the same bone was in a natural state."† Both sides and the whole thickness of bones are occasionally affected by this disease. But this is what Sir Astley Cooper calls periosteal exostosis.

This disease is said to attack some bones more frequently than others. Those of the skull, the lower jaw, sternum, humerus, radius, ulna, femur, tibia and bones of the carpus are said to be the most subject to it.‡ It also, very frequently attacks the upper jaw, and none of the bones of the body, in fact, are exempt from it.

The texture of exostoses is sometimes spongy and cellular, at other times it is very dense. Dr. E. Carmichael, a distinguished surgeon and physician, formerly of Fredericksburg, but now of

* Surgical Essays, part 1, page 155.
† Vide last American edition of Cooper's Surgical Dictionary, p. 362.
‡ Vide last Am. ed. of Cooper's Surgical Dictionary, p. 362.

Richmond, Va., described to me, about four years since, an exostosis of the superior maxillary, which had, a short time before, fallen under his observation, larger than a hen's egg, and as solid as ivory. Exostoses of the roots of the teeth are always hard, exceeding in density, very frequently, even tooth-bone; and instances are sometimes met with of osseous tumours upon other bones possessed of nearly an equal degree of solidity. Exostoses of this description grow less rapidly than those which are more cellular; but they notwithstanding sometimes acquire a very large size: it is not, however, uncommon for such, after having attained a greater or less size, to cease to grow, and "remain stationary" through life, without giving rise to any very serious or unpleasant consequences.*

Exostoses sometimes attain an enormous size, and especially upon cylindrical bones; very large ones too, are frequently met with upon the maxillæ. The largest one however, I believe, of the maxillary sinus, of which medical history furnishes any account, is exhibited upon a specimen of morbid anatomy, presented in 1767, by M. Beaupreau, to the French Academy. A description and drawing of this tumour is contained in the Memoirs of the Royal Academy of Surgery, but we have no account of the history of its formation, nor of the symptoms that resulted from it. The tumour occupies the whole of the right maxillary sinus, and several of the neighbouring bones are involved in it. It is very large near its base and projects from the lower part of the orbit, forward and downward, six inches. Its largest circumference, is said to be one foot. The upper part of the maxillary bone, says Bordenave, projects on the side of the orbit, and

* Vide Cooper's Surgical Dictionary, p. 363.

straightens the cavity; the *os unguis* is included in the mass of the tumour and is represented as being nearly effaced. The nasal bones of the left side are displaced, and the right nostril entirely closed up, and the exostosis projects so much on the left side as to be nearly underneath the malar bone. The inferior part of the maxillary bone, says our author, is so extended near its base, that it inclines obliquely to the left, and the pterygoid apophyses of this side are larger than those of the other. The malar bone is described as being involved in the upper and external part of the exostosis, which extends to the left maxillary bone.

Exteriorly, says Bordenave, the tumour had a smooth and polished appearance, its upper part was very hard, inferiorly its substance had become thinner, was wanting in some places, and the interior of the exostosis was exposed. The substance of the bone here was spongy and serous, and in appearance, not unlike pumice stone. The walls were thick, and measured in some places one inch.*

From this brief description, taken from the one given of it by Bordenave, some idea may be formed of the dimensions and appearance of this enormous and most remarkable exostosis.

A case of exostosis of each antrum is described by Sir Astley Cooper, both of which, forced themselves up into the orbits, and pushed the eyes from their sockets. One made its way into the brain, and caused the death of the patient.†

Mr. Thomas Bell does not believe in the occurrence of "true exostosis upon the bony parietes" of this cavity,‡ but too many

* Vide Memoires de l'Academie Royale de Chirurgie, t. xiii. obs. xii. p. 412.

† Surgical Essays, part 1. p. 157.

‡ Vide Anat. Phys. and Diseases of the Teeth, p. 281.

examples have presented themselves, to leave any room for doubt upon the subject. Although none may never have fallen under his own immediate observation, there are many well authenticated cases on record,—the details of some of which, I shall presently give. But apart from these, I think it would be difficult to assign any sound reasons for supposing that the osseous walls of this cavity should be more exempt from the disease than the other bones of the body.

Symptoms.—The attacks of exostoses of the walls of the maxillary sinus, are generally so insiduous, that the presence of the disease, is not for a long time, even suspected. Those which result from venereal vice, Boyer says, are preceded by acute pain, extending at first to almost every part of the affected bone, but which afterwards confines itself to the affected portion. Those which are occasioned by scrofula, the same writer tells us, are attended by a duller and less severe pain, and that the symptoms of those resulting from causes purely local, such, for example, as a blow, are very similar.* But these signs are common to the disease wherever it may be situated, and when it is seated in the maxillary sinus, they do not distinguish it from many of the other affections that occur here; for they are often produced by them, as well as by exostoses. And furthermore, the disease, not unfrequently gives rise to other symptoms which are attendant upon several of the other affections of this cavity, so that previously to the distension of its walls by it, it may be confounded with inflammation of the lining membrane, or sarcomatous or other tumours. But after it has filled the sinus, or very considerably thickened its exterior walls, it will cause them to offer a firmer resistance to

* Traite des Maladies Chirurgicales, t. iii. p. 545.

pressure, than will any of the other diseases of this cavity. When therefore, they have become distended, if they are firm and unyielding to pressure, the presence of exostosis may be inferred.

Causes.—There is a difference of opinion among writers on the diseases of the bones, with regard to the causes of exostoses. Certain constitutional diseases, such as "scrofula and lues venerea," are thought by some to give rise to the affection. That the last of these diseases is favourable to its production, is, I believe, admitted by all; but Sir Astley Cooper declares that no evidence has yet been adduced to prove that the former is ever concerned in its production.* Others impute the disease to local irritation produced by contusions, fractures, &c. &c. But it is probably dependent upon both local and constitutional causes, and that neither, independently of the other, is capable of producing it.

Treatment.—A variety of plans of treatment have been recommended for this disease, and Bordenave assures us that it may be cured, if suitable remedies are applied before the exostosis has acquired much solidity. Assuming that it sometimes results from constitutional causes, he directs that the treatment should be commenced by the employment of such means as are indicated by the nature of the vice with which the patient may be affected. If a venereal vice be present, the use of mercurial medicines are recommended. The author, last mentioned, says he has known it to be successfully treated with mercury.† Topical applications, such as fomentations and cataplasms, have also been found serviceable. Boyer advises poultices of linseed meal, and a decoction of the "leaves of henbane and nightshade." Iodine and mercury

* Vide last American edition of Cooper's Surgical Dictionary, p. 363.

† Vide Memoires de l'Academie Royale de Chirurgie, t. xiii. p. 403.

have been employed, but not, I believe, with any decided advantage. Sir Astley Cooper thinks the best internal remedy is "oxymuriate of quicksilver, together with the compound decoction of sarsaparilla.* But I believe, with Boyer, that a dispersion of an exostosis can never be effected.† Its progress may perhaps be partially arrested, but I do not believe, as many do, that it is ever removed by the absorbents. But it is not advisable to remove exostoses unless they continue to augment and are likely to become dangerous, or are productive of serious inconvenience.

When, therefore, the remedies which have here been mentioned, after having been thoroughly tried, prove unsuccessful, the tumour should be fully exposed; firstly, by the dissection of the gum and other soft parts from the exterior wall of the sinus, and secondly, by the perforation of this cavity with a trephine, or such other instrument as can be most conveniently employed. This part of the operation, though simple, should be conducted with care, but if the tumour be large and attached by a very broad base, its removal will sometimes prove more difficult, yet by means of suitably constructed saws, scissors, knives, &c., it may, in most instances, be easily effected. An external wound through the cheek should always, if possible, be avoided.

The method of operating, however, will be best understood by a description of that pursued in the two following cases. The first was treated by Dr. B. A. Rodrigues, dentist, of Charleston, S. C., and reported by him for the "American Journal of Medical Sciences."

Case XIXX.—"On the 14th of August, 1837, Charity, a ser-

* Vide last Am. ed. of Cooper's Surgical Dictionary, p. 365.

† Traite des Maladies Chirurgicales, t. iii. pp. 554—557.

vant woman of Mrs. Miller, called on me to ascertain whether I could afford her any relief in her wretched condition. She had been labouring under incessant and agonizing pain in the antrum highmorianum of the right side, which she regarded as the consequence of the impaired condition of the teeth. On this supposition, she had several of them extracted, without any appreciable abatement of her sufferings. Yet deluded with the belief that some one of the remaining teeth was the secret agent of all she suffered, she persisted in having more extracted. Still the evil continued, the suffering was unabated, the cause undetected; and to add to the depression of her hopes, and the aggravation of her ills, a purulent discharge oozed from the empty sockets of the affected side. She again had recourse to medical advice, hoping that this phasis of her malady might lead to some indication that would relieve her; at least, that it might reveal its hidden sources, its condition, and its prospects of being remediable. And here for the first time, was it suggested that the antrum was in an unsound state.

It was at this moment, under these circumstances, that she applied to me to perform an operation, which her medical adviser declared to be indispensable. At first, I imagined it to be an abscess from the cavity from which the pus was discharged, from the strange sensations experienced, and from the greater frequency of this disease over others peculiar to this part, I inserted a trocar into the socket of the second molar, and, instead of the gush of matter I had expected, the passage of the instrument was intercepted by a hard, dense, impregnable substance. The existence of an exostosis now forced itself on me. To make assurance doubly sure, I had access to several of my medical friends, among

whom, was Dr. Geddings. On examination of the part, the consideration of the symptoms, the obstinate nature of the disease, they concurred with me in opinion, that an exostosis was present, and that the sole indication of relief was its extirpation. Accordingly, on the 18th of August, the above gentlemen with several others of the profession were present, when I proceeded to perform the operation. With a common scalpel, I dissected away the gum from the canine tooth to the last molar, raised the flap which it made from the alveolar process, and with a trephine opened into the cavity. Success was easier than had been anticipated in consequence of the carious condition of the process, which was so general on the affected side, as to reach from the second incisor anteriorly to the pterygoid process posteriorly. In the loss of substance, the external parietes of the cavity shared, so that the bony tumour which filled up and occupied it, could be readily reached. The trephine was applied, the cavity enlarged, and the exostosis removed. It measured in circumference three inches, was light, and cancellated on its surface, but dense and more resisting in its more internal layers. There was little or no hemorrhage to delay the operation, or any application to arrest it. After removing every spiculum of diseased bone, and cleansing out the cavity, the flap was replaced and to nature was entrusted the cure. Granulations sprouted up in full luxuriance, and in the short period of four weeks, the woman was in the enjoyment of excellent health."*

That the foregoing was a case of true exostosis of the maxillary sinus, does not admit of doubt, and it is to be regretted, that more of the early history of the disease and the circumstances connect-

* American Journal of Medical Sciences.

ed with its development are not known. They might perhaps lead to a correct explanation of the causes that gave rise to it. The presence of local irritants in the immediate vicinity of this cavity, is proven by the fact that the patient's teeth were in a diseased condition, but to what extent they may have contributed to the production of the exostosis, it is impossible to determine, since we are not furnished with any information concerning the state of her general health. She may have been affected with some constitutional vice, or peculiar habit of body, whereby the osseous structures of the system were predisposed to affections of this description, requiring only the presence of some local irritant to induce the morbid action necessary to their development. That such predisposition did exist, and that such action was excited by the irritation produced by the diseased teeth, I believe would appear, if all the circumstances connected with the previous history of the case could be ascertained.

When the connection of the exostosis is such as to prevent its complete removal, the application of the actual cautery to any remaining portions, will prove serviceable, by causing such parts to be exfoliated. The history of a case is related by M. Bordenave, treated by M. Runge, in which a portion of the exostosis was left, and which ultimately caused the death of the patient.* This would probably have been prevented had an exfoliation of the remaining diseased portions of bone, been brought about by an application of the actual cautery.

Case XXX.†—The subject of this case was a man 33 years of age. He had been for a long time afflicted with a tumour in

* Vide Memoires de l'Academie Royale de Chirurgie, t. xiii. p. 405.

† Vide Memoires de l'Academie Royale de Chirurgie, t. xiii. obs. xi. p 408.

the region of the right antrum. It depressed the palatine process of the maxillary bone and the palate bone of the affected side in such a manner as to restrict the movements of the tongue, while on the other side it pressed against the floor of the orbit so as to cause a protrusion of the eye. Anteriorly, it had elevated a portion of the maxillary and malar bones which covered it, and extended to the most dependent part of the nose, whilst posteriorly it extended as far as the posterior mouth. Its effects upon the lateral parts were nearly the same as those which it had exerted upon the others.

After having exposed the anterior parietes of the antrum, M. David, sawed from below upwards to the uppermost part of the projection of the tumour, which was of a spherical shape, and nearly three inches in diameter, and after having elevated that part, he discovered the tumour, which was white and hard; although spongy, and bearing a strong resemblance to soft agaric, it occupied the maxillary sinus. It had changed the form of this cavity and increased its dimensions to an extraordinary degree. The greater portion of this hard osseous substance, although firmly adhering to almost every part of its bony envelope, was by a persevering employment of various means, such as the crotchet, elevator, surgeon's rasp, &c. &c., detached by M. David. But in doing this, he inflicted some injury upon the floor of the orbit, and to some portions which still adhered to the palatine process of the maxillary bone, he applied the actual cautery, which was repeated several times.

An opening was formed by this operation four and a half inches deep, and from right to left, of more than three inches, but a cure was notwithstanding speedily effected by it, which, had

the use of the cautery been omitted, would not perhaps have been successful.

Exostoses of the maxillary sinus, often give rise to other morbid conditions of this cavity, the remedial indications of which, should be properly attended to, as should also those of any constitutional affection, vice or habit of body that the patient may be labouring under at the time.

When the exostosis is not complicated with any other disease of the cavity, the restorative energies of nature, after its removal, will generally be all that is required to complete the cure.

CHAPTER IX.

OF WOUNDS OF ITS PARIETES AND FOREIGN BODIES IN IT.

The walls of the maxillary sinus are sometimes fractured by blows and pierced by sharp-pointed instruments. Fauchard mentions a case, in which a canine tooth had been driven up into it,* but this is an accident that rarely happens. The instance here alluded to, is, I believe, the only one on record; and as might be supposed, it was followed by severe pain, and it ultimately gave rise to a tumour upon the cheek near the nose, and three fistulous openings, from which a fetid matter was discharged. The sinus however having been opened and the tooth taken from it, a cure was at once effected.

It often happens when the walls of the sinus are fractured from a blow or other mechanical violence, that portions of the bone and foreign bodies are driven into the cavity, and which by remaining there become a constant source of irritation to its lining membrane, and, not unfrequently a hidden cause of other and more malignant forms of disease. Bordenave describes the case of a French officer, who had the walls of one of his maxillary sinuses fractured by a fragment of a bomb. Dressings were applied to the wound, but it did not heal, and upon examination

* Le Chirurgien Dentiste, tom. i. page 391.

sometime after by M. Allouel, several pieces of bone and a splint which nearly filled the cavity were found. These were removed, but a cure was not immediately effected; a fistulous opening still remained, and it was not until a long time after, when another splinter came away, that the external opening healed.* The same writer mentions the case of a man who had a nail forced head foremost by the discharge of a gun, into his right cheek and maxillary sinus. The opening became fistulous, and although the point of the nail was subsequently discharged, it was not, until M. Faubert had removed the remaining part, that the fistula closed.†

Wounds of the antrum are almost always complicated with fractures of its osseous parietes, so that the effects resulting from them are more to be dreaded than those which would be produced simply by the penetration of it with a sharp instrument.

Treatment.—The nature and extent of the injury inflicted, should determine the treatment most proper to be adopted for wounds of this cavity. Complicated, as they in most instances are, with the presence of extraneous substances in the sinus, the removal of these constitutes the first, and not unfrequently, the only remedial indication. This should never be neglected. When any extraneous bodies, or portions of bone, have been forced into the sinus, these should first be all carefully removed. The external wound should next be dressed with adhesive slips so as to prevent the formation of an unsightly cicatrix. If constitutional symptoms supervene, they should be met with appropriate remedies.

The following interesting case of a wound of the maxillary

* Vide Memoires de l'Academie Royale de Chirurgie, t. xiii. obs. xiv. p. 418.

† Vide Memoires de l'Academie Royale de Chirurgie, t. xiii, obs. 15. p. 417.

sinus, inflicted with a dirk-knife, reported by R. S. Welden, student of medicine, and treated by W. H. Donne, M. D., of Louisville, Ky., is taken from the Western Journal of Medicine and Surgery.

Case XXXI.—"Schuti, a gardener, aged 42 years, a native of Germany, in a rencontre with an athletic man, on the 3d of May, 1840, was struck with a dirk-knife, which entered about an inch above the right superciliary arch, passed through the corresponding eyelid downwards and backwards, evacuating the humours of the eye, and penetrated the antrum. The globe of the eye was divided by a vertical incision, through which the aqueous humour escaped; the iris was extensively detached at the ciliary margin, and could be partially seen through the transparent cornea—its surface being somewhat obscured by small coagula. The hemorrhage was slight and easily controlled by moderate pressure. The patient complained of intense pain in the temple and cheek of the wounded side, shooting deep into the orbit. Three points of interrupted suture were used to approximate the edges of the divided eye. Lint, saturated with laudanum and warm water, constituted the dressing.

May 4th.—Some tumefaction in the eyelid; pulse 110; tongue coated and dry; skin hot; patient has spent a very restless night. Ordered following medicine, tart. emetic, gr. i.; sulph. magnesia, ʒ ss.; to be dissolved in one-half pint of water, and a tablespoonful to be taken every half-hour, until nausea is induced—after which the interval may be increased.

May 5th.—Bowels freely evacuated; pain less; skin moist; pulse 90 and soft. From this period until the wound healed—the space of three weeks—no constitutional symptoms of an untoward

character occurred. The patient, however, contended that a portion of the knife-blade remained in the roof of his mouth. But on the most careful examination no foreign body could be detected.

On the 10th of August, 1842, Mr. Schuti called and requested Dr. Donne to examine his mouth, stating that for six months past he had been annoyed by a rough, projecting substance, which some person had informed him was a piece of dead bone, but which he believed to be the point of the knife, that had been driven down into the bone by the violence of the blow. On looking into the mouth, a small black speck was discernible about one-half inch from the interval between the first and second molar teeth. The parts adjacent were somewhat tumefied and inflamed. Dr. Donne made several attempts to extract this body with a pair of common dissecting forceps, but found it immovably fixed in the substance of the bone. By dissecting around it with a bistoury, down to the palate process of the superior maxillary bone, he was enabled to get a firmer hold, and, with a pair of curved tooth-forceps, succeeded in removing a fragment of the blade, one and one-fourth inches in length, and three-fourths in width at the widest part; the extraction was not effected without considerable violence, and was attended with extreme suffering. The fragment came out with an audible snap, which induced those present to suppose, at first, that it had been broken; but on inspecting its surfaces closely, they were found similarly oxidized, and wanting the lustre which a recent fracture had presented. Upon probing the aperture through which the fragment had been extracted, no other piece could be detected. This opening would scarcely admit the curved probe which Dr. Donne passed into the antrum,

in order to satisfy himself that the whole of the foreign body was removed. The next day there was a slight discharge from the aperture, though the patient has suffered very little pain since the operation."

The foregoing is certainly one of the most singular cases of which we have any account, and the most remarkable circumstance connected with it is, that no more injury should have resulted from the presence, for so long a time, in the maxillary sinus, of the portion of the blade of the knife that had been broken off. In the cases previously noticed, as reported by Bordenave, disease of the mucous membrane of the antrum, and the discharge of a fetid sanies resulted from the presence of the foreign bodies in this cavity. The same effects were also produced in the case described by Fouchard, of the canine tooth which had been forced up into it.

That foreign bodies are sometimes admitted into the maxillary sinus through wounds penetrating its exterior parietes, has already been shown, but that they should gain access to it in any other way, would seem almost impossible. The smallness and peculiar situation of the opening which communicates with it, is such, as one would think would preclude the introduction of extraneous substances of any kind through it, yet they have been found here when they could not have gained admission in any other way. There are several well authenticated cases on record in which worms have been found in this cavity. The case mentioned by Bordenave in Obs. 12, page 380, vol. 13, of the Memoirs of the Royal Academy, of a diseased maxillary sinus, from which several worms were at different times discharged, does not prove that they obtained admission into it through the nasal opening, and

thus, as some writers have conjectured, gave rise to the disease with which it was affected. In this case, a fistulous opening from the cavity, had existed for a long time previously to the discharge of the worms from it, and it is very probable that they introduced themselves through this. A cause sufficient to have produced the disease in the sinus, had been operating for two years, immediately preceding its manifestation. The patient during the whole of this time was affected with pain in the superior teeth of the affected side.

Deschamps says, his colleague of la Charité Hospital, found a worm, in the maxillary sinus of a soldier, whom he was dissecting, four inches long, and the same writer informs us that a similar example is furnished in the Journal of Medicine. The particulars of a case which came under the observation of Mr. Heysham, physician of Carlisle, taken from a work entitled "Medical Commentaries," are contained in Cooper's Surgical Dictionary.* The subject of this case was a strong woman, sixty years of age, who was in the habit of taking a great deal of snuff. She was affected for a number of years with severe pain in the region of the maxillary sinus, which "extended over one side of the head." She was never entirely free from this pain, but it was greater in cold than in warm weather, and for the purpose of obtaining relief she had been twice salivated, and had taken various anodyne medicines. The pain however, instead of being mitigated by these means, became more severe. Her teeth on the affected side were all extracted, and as a last resort the maxillary sinus was perforated. But this, for several days did not give any relief. Injections of bark and "elixir of aloes," were thrown into it, and "on

* Vide Art. Antrum, page 155.

the fifth day a dead insect" of more than an inch in length, and as thick as a "common quill," was removed from this cavity.

But, instances of the introduction of insects or foreign bodies of any description, into the antrum through the nasal opening, fortunately, are so exceedingly rare, that the Memoirs of Medicine do not furnish more than four or five well established examples.

The signs indicative of the presence of insects or foreign bodies in the maxillary sinus, are so obscure, that the fact can only be ascertained by perforating the cavity and on an examination of its interior. Some say that foreign bodies here cause an itching, crawling or tickling sensation in the substance of the cheek. But this is an uncertain diagnosis, for such sensations are not unfrequent in the region of this cavity. That they sometimes cause great pain, is proven by the history of the case related by Mr. Heysham, the particulars of which I have just noticed, but this like the other signs, is not peculiar to occurrences of this sort alone. It is more or less common to all the morbid affections of this cavity.

The proper remedial indication for foreign bodies in the antrum, is their removal. When insects are discovered here, injections of oil and tepid water are recommended. This constitutes about all the treatment necessary to be employed in cases of this kind.

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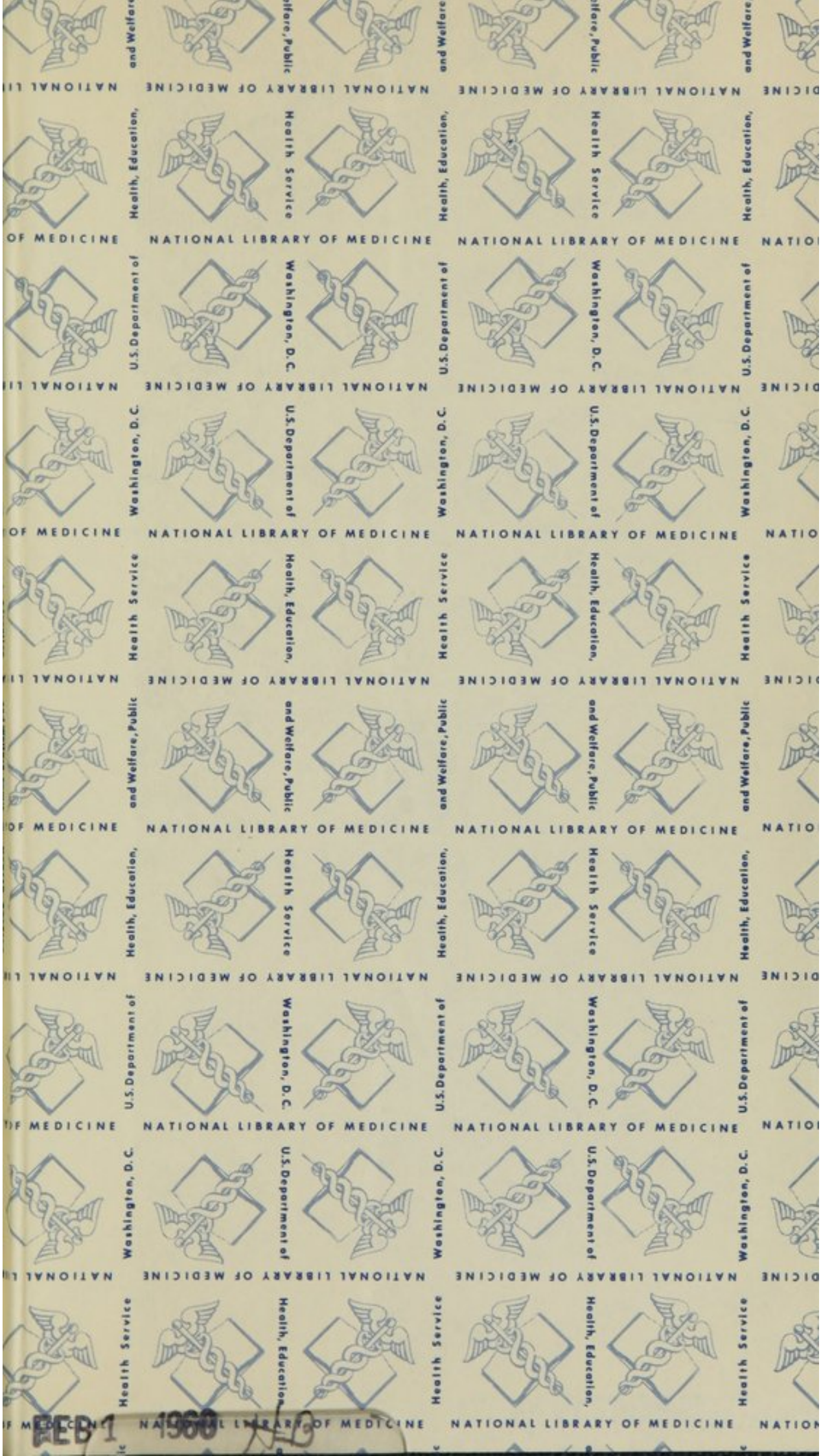
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