Phlebotomus. On account of the failure of experimental animals, on which infected sand-flies have been allowed to feed, to develop the disease, Young and Hertig have begun to doubt if the sand-fly is really the vector of kala-azar in North China. Workers should not, however, be discouraged by such a temporary set-back, and until every channel has been thoroughly explored it would be foolish, in face of all the evidence, to abandon the theory of sand-fly transmission of this disease.

CHRONIC ETHMOIDITIS.*

BY

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WHEN a foreigner offers a treatise before a gathering of this sort, which is really international in its scope, it is more or less understood and expected that his presentation will be rather in the form of a compilation taken from every available authority, and will in the end leave the listener to draw his own conclusions as to the relative efficacy of the various methods described. Now I propose to deviate from this custom and present the subject entirely from our own point of view—in other words, give it as we see and understand it, with the treatment that we have found most suitable for that particular case or condition.

Chronic infections of the ethmoid, as is now well understood, can broadly be divided into the suppurative and non-suppurative. In the first instance an infection is present characterized by the formation and exudation of a purulent secretion, accompanied by the appearance in the ethmoid region of a more or less widespread catarrhal inflammation. The purulent secretion varies in its consistency, at one time being thin, acrid, and almost watery, and at another time assuming the characteristics of a thick yellow discharge, the same as that which the older surgeons were wont to term laudable pus. In the ordinary case variations between these extremes were the rule rather than the exception, depending upon, as the patient would say, the acquisition of a fresh cold, which usually was not the case, but, in reality, represented rather an acute exacerbation of his chronic condition. This would naturally account for the changes in the consistency of the secretion, sometimes thick and profuse, sometimes thin and scanty, and often inducing an erroneous belief that a cure was in progress. As the infection spread, the discharge, particularly that collecting during the night, became more constant, resulting finally in that condition of a chronic purulent ethmoiditis which is so well known to us all as to obviate the necessity of further description.

The other form of ethmoiditis—the non-suppurative type—is a much later development, although it was recognized in a way by some of the early pioneers—as, for example, Woakes of this country and Bosworth of my own—but it was not until after Uffenorde published his treatise that it obtained universal acceptance. The type I refer to is that form characterized by polypoid hypertrophies, and even true polyp formation, unaccompanied by true leucocytic pus. Hitherto Zuckerkandl's postulate, that the polyps were the products of the purulent secretion, had been accepted without question. Even after the publications of the microscopic pathology, both in Germany and the United States, much doubt was expressed as to the proper interpretations of these findings; many months, I might add years, elapsed before this doctrine was accepted at even its face value. I think we all now recognize hyperplastic ethmoiditis as a separate and distinct pathological entity, in contradistinction to the earlier known suppurative infection. The fact that these two can and do occur as separate forms does not preclude the possibility of them being combined and occurring as hyperplastic infection with suppuration. As a matter of fact the probability of suppuration is directly related to the extent of the hyperplasia; the greater the polyposis the more likely is it that the commoner forms of saprophytic micro-organisms will

find a suitable site for their growth with the formation of their suppurative products. When suppuration once gains a foothold I have never seen it disappear.

Since the ethmoid labyrinth is not only divided into two portions (the anterior and posterior) by a complete partition, but these are also subdivided into numerous chambers (cells), and since these may be individually affected, it would be well before taking up the treatment to make a more comprehensive classification. Following this the indications for surgery, with special reference to certain methods, will be greatly clarified.

Suppurative.

- (a) One or more of the anterior cells.
- (b) One or more of the posterior cells.
- (c) Combined, affecting both anterior and posterior cells.

Hyperplastic.

- (a) Localized hyperplasia (small polyps).
- (b) Anterior labyrinth.
- (c) Posterior labyrinth.
- (d) Intracellular.
- (e) Extracellular.
- (f) Combined.
- (g) Suppurative infection.

The three types (d), (e), and (f) may merely represent an extension of the inflammatory process and can occur equally in any part of the labyrinth. The last type represents the final stage, when either a new infection occurs or the old one has advanced so far, and the tissues have become so infiltrated, as to invite leucocytic diapedesis, with the formation of a purulent secretion.

Suppuration in One or More of the Anterior Cells.—This intranasal type, so far as I am concerned, as an individual entity is non-existent, with one exception.

Of course, when an orbital ethmoid cell situated behind or external to the frontal sinus and outside the nose is present, it may easily become infected and simulate a frontal sinusitis; but as we are concerned only with that portion situated within the nasal cavities this lies beyond the scope of our presentation. The remaining anterior cells (with the exception noted above, which I will come to later) are those known as the infundibular, which includes the frontal bulla, when present, and that one lying within the agger of the nose. I do not recollect ever observing a circumscribed chronic purulent infection of the mucosa of these cells unaccompanied by infection of the frontal sinus. Presumably this is possible, but, as it has neither come under my own observation nor that of my colleagues, its occurrence is, so far as I am concerned, only of academic interest.

The exception referred to is a purulent infection of the lining membrane of the bulla ethmoidalis. Formerly abscess in the bulla was considered an event of no uncommon occurrence, but this was probably due to the fact that when present it so overshadowed other infection as to cause the latter to be entirely overlooked. However, other things being equal, the evacuation of a badly diseased bulla will bring about a cure, despite the fact that the infection has embraced other cells in the immediate neighbourhood.

Purulent Infection of the Posterior Cells.—That these cells are more frequently the seat of chronic disease is due to a number of conditions. In the first place, they are larger and more numerous, and, secondly, they are so situated as to be less amenable to aeration. Their drainage can easily be interfered with by slight swellings of the nasal mucosa, and, lastly, their anatomical situation prevents easy access to exact diagnostic instrumentation, even with the aid of the nasopharyngoscope. Being but slightly disturbed by the inspiratory air currents they offer a fine site for micro-organismal growth once infection has taken place. This extension may be so gradual and insidious that the patient is unaware of the seriousness of the condition until a well-marked infection has occurred; he has, it is true, noted the unwonted post-nasal discharge and stuffiness in the nose, particularly on arising, but, as the inconvenience is not great, he attributes the whole matter to a particularly tenacious cold. This, however, is noted more in the hyperplastic variety than in the suppurative.

The combined form, affecting both the anterior and the posterior cells, is always more open in its course, and it

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usually represents (in contradistinction to the other types) the direct sequels of an acute infection, or perhaps a series of acute inflammatory disturbances. In the event of such a widespread infection the symptoms are so apparent as to obviate further elaboration.

The Hyperplastic Types.—These pathologic conditions appear when a portion of the ethmoidal mucosa undergoes hyperplastic changes; they may range from a condition of slight degeneration in a small portion of the lower border of the middle turbinate to the formation of actual sessile polyps the size of a small oyster. While the lower edge of the middle turbinate appears to be most frequently affected, nevertheless the actual polyps, when present, appear to take their origin higher, having their bases in the body of the ethmoid or along the uncinate process. I do not recall ever having observed large single polyps originating along the lower edge of the middle turbinate. The anterior labyrinth is usually the seat of the large extracellular hypertrophies which hang more or less loosely in the nasal cavities, while in the posterior labyrinth the intracellular variety, hidden from view, is the rule. This is probably due to the fact that there is more room for growth anteriorly beneath the turbinate than posteriorly between the body of the ethmoid and the nasal septum. The large so-called choanal polyps do not as a rule originate in the posterior cells, but if traced to their source will be found to spring from the mucosa of the maxillary sinus, forcing their way out through the pars membranacea and extending into the nasopharynx through the medium of a long pedicle. Of course in either labyrinth the primary affection, whether it be intra- or extra-cellular, may become combined; this, after all, only represents in either case an extension of the pathological process from within outward, or without inward, as the case might be. This is well illustrated in those old chronic cases where the entire ethmoid, from the uncinate process to the anterior sphenoidal wall, is one mass of polypoid degeneration. All of us have seen such cases continuing for years accompanied by a profuse watery secretion which would dry on the handkerchief, causing a stiffness, but not staining the linen. When infection by the *Staphylococcus aureus* occurs the secretion becomes thick and yellow, with the characteristics of true pus; but this seems to appear in cycles, particularly on the acquisition of every fresh cold. The true combined form only becomes permanent when the micro-organisms find lodgement deep in the mucosa. Even then the suppuration appears to be different from that caused primarily by the influenza bacillus, for in the first instance the secretion seems to be more profuse and is easily discharged—the nasal passages are comparatively clear—while in the latter the pus is thicker, more tenacious, and exhibits a great tendency to form into crusts.

TREATMENT.

The successful treatment of all sinus infection, particularly where the ethmoid is concerned, has for its basic principles aeration and drainage, with emphasis on the former. We have long since felt that the old dictum of removing all infected ethmoid tissue, irrespective of the kind and extent of the inflammatory process, was as unnecessary as it was radical, for more recent experience has shown us that with proper assistance nature will do much to bring about a resolution of the mucosa in diseased cells after proper aeration has been established. This tendency of nature is of no little importance when we call to mind some of our earlier ethmoid cases which were in the beginning perhaps mild, but after our well-meaning surgical intervention were transformed into a disorganized suppurating mass with landmarks obliterated and with augmented subjective discomforts instead of relief. Observing these results, not only in my own practice but in that of my colleagues, I was prompted to seek the solution, and found that over-enthusiasm was the cause of my undoing. Instead of sending a boy to do a man's work, I went to the other extreme and sent a man to do the work of a boy. In other words, I was prone to overdo the removal of ethmoid tissue rather than to conserve it, thinking that to leave even the slightest amount of diseased mucosa behind would result only in a nidus from which the infection would gradually spread until the condition became as bad or even

worse than before the operation. In those days drainage was our deity, the *sine qua non* of a successful treatment. Ventilation, it is true, was looked upon as a desirable but not necessarily an indispensable adjunct. A suppurating cell should not only be opened but completely eradicated, encroaching upon healthy neighbouring tissue if necessary, in order to bring about our purpose. Now, thanks to our experiences with the sphenoid, in which we saw hyperplastic tissue almost filling the cavity shrink down in a few days under our very eyes until in a short time it was again normal, all this has changed. We know now, and confidently expect, that nature, with a little assistance, will effect a far better and cleaner operation, and procure a physiologically functioning area of tissue in the ethmoidal region, while we, with our widespread and oftentimes haphazard procedures, only leave an area of debris, which soon becomes reinfected and degenerates into a disorganized fibrous suppurating mass.

It is to anticipate this very eventuality that I propose to lay before you for your consideration the various forms of treatment as practised by us at the present time. It is not in the form of a recommendation, but rather as a communication, that these are presented; not to be taken as dogmatic in any sense, but rather at their face value for what they may be worth.

Let us begin with the mildest of the suppurative type, and ascend until we have the severest complicated form to deal with, applying their appropriate treatment as each is met.

Simple catarrhal infection is characterized by mild headaches, stuffy nose, and a fairly constant thin mucoid discharge, becoming thick and yellow at times, the patient being apparently very susceptible to attacks of acute coryza. Rhinoscopic examination often shows little more than hyperaemia and congestion of the mucosa when compared with the opposite side. Pus is conspicuous by its absence, at least so far as the examiner is concerned. However, the patient often states that considerable discharge, particularly post-nasal, is in evidence during the morning hours. This form yields slowly to the old shrinking and cleansing treatment, but shows a great tendency to recur. To obviate this I have found the removal of the swollen and often infected middle turbinate almost a *sine qua non*. The purpose of this is, first, to permit thorough aeration and ventilation of the diseased cells, and, secondly, to furnish sufficient space to make possible the applications of cotton poultices, which are saturated with certain medicaments. In given cases, where the nasal passages are congenitally narrow and the mucosa of the septum greatly thickened, I have found it necessary to resect that part of the septum in its entirety, making a large perforation so that these membranes could no longer swell and compress that of the ethmoid on its respective side.

After the middle turbinate has been removed and the roughened edges smoothed, nothing further is done, even though the temptation be severe; the parts are allowed to heal. After five days have elapsed the treatment by means of the tampons is instituted. This consists of the application of a cotton tampon saturated with a 10 to 20 per cent. solution in half water, half glycerin, of a non-irritating silver preparation, which covers the ethmoid from the anterior sphenoidal wall to the uncinate process. This should be allowed to remain *in situ* at least five hours. I use a preparation called silvol, but there are others which to all intents and purposes are identical. These applications deplete the tissues of their inflammatory content by the hygroscopic action of the glycerin, thereby permitting the silver to penetrate partially the cellular interstices and bring into action its germicidal and astringent effects. In order to obtain the maximum effect three things are essential: the solution should be freshly made, it should be warm, and the tampon should remain in place five or more hours. These treatments are instituted at first every other day, gradually tapering off directly in accordance with the improvement noted. This usually requires only a few weeks, since the affection readily yields to this form of treatment.

Purulent infection confined to the anterior cells, as a disease *per se*, is one of the rarest we are called upon to treat. It is true that occasionally one sees an infected and

suppurating bulla ethmoiditis, and even an orbital ethmoidal cell which simulates a frontal infection, but when the anterior cells are suppurating we have an infected frontal sinus which is also secreting pus. In these circumstances a cure of the underlying ethmoid depends upon first ridding the frontal sinus of its infection. Sometimes after this is accomplished the bulla will continue to secrete owing to the ostium becoming partially occluded from the inflamed and swollen mucosa, thereby seriously interfering with the normal drainage and practically eliminating aeration. When this eventuality occurs it will be necessary to open the floor of the bulla and reinstall both drainage and aeration. If this is the sole remaining focus of infection a cure speedily follows.

Suppuration in one or more of the posterior cells, although not uncommon, is one of the most difficult of sinus infections to detect or to diagnose early. The reason for this is apparent when we consider the mild and oft-times vague symptom-complex together with the almost inaccessible location, even to the nasopharyngoscope, of these posterior cavities. We can study with a fair degree of accuracy the cells emptying into the superior nasal passage, but those which lie to the outside of these and those lying in the depth of the spheno-ethmoidal fissure are beyond our inspection. Indeed, many of these cases, consisting of a low-grade infection in one or more of the cells, have escaped detection for years, having been considered to be merely a chronic catarrhal condition, until the sudden appearance of a severe ocular disturbance invited immediate attention, which then resulted in the discovery of a latent sinusitis. One clue, however, is always at hand if we are sufficiently astute to take advantage of it, and that is the appearance of the middle turbinate. The body of this structure appears slightly hypertrophied, and often has a mottled appearance. While to the casual observer this may escape notice, yet if one carefully compares the turbinate with its fellow on the opposite side, the difference will at once be apparent.

The logical treatment is, of course, to secure better aeration and drainage, which can only be accomplished by the total removal of the middle turbinate. This resection not only aids materially in contributing to these therapeutic advantages, but incidentally brings under our view those cells which subsequently may necessitate opening. Unless the suppurating areas have been disclosed accurately, or unless symptoms are pressing, it is well to wait for a few days in order to determine definitely the exact seat of the infection before attacking these cells. The silver poultices will be of great advantage in this determination. I have often seen an apparent general suppuration under this treatment localize itself into one or two defined regions, which lent themselves admirably to instrumental procedures. Formerly it was our practice to excavate completely all these posterior cells when infection was discovered in their midst, but now we open with the hook, and with the Grünwald forceps remove only the diseased portion until healthy tissue is reached. In this way we have not only procured quite as good end-results so far as a cure was concerned, but we have conserved tissue which certainly possesses a normal functioning activity. After these cells have been opened and exposed to thorough aeration, nature speedily effects a cure which is in direct relation to the thoroughness of the operation.

Combined suppuration affecting the entire labyrinth is usually an old one where the middle turbinate has long since been sacrificed, but from one cause or another the infection has gradually spread until both the anterior and posterior cells are more or less involved. Nothing but a so-called complete exenteration will be of the slightest permanent avail in these cases. In our experience the crux of this situation lies in the preliminary removal of the uncinate process, for by this step we gain from 1/8 to 3/16 inch of room, which may prove of inestimable value in reaching the agger and infundibular cells, to say nothing of the depths laterally to the spheno-ethmoidal recess. This can be readily accomplished with a flat chisel without particular danger in careful hands.

After the uncinate has been removed the posterior-lying cells may be methodically attacked and resected, keeping close to the orbital plate until the anterior sphenoidal

wall is reached. It is well to leave a certain amount of the inner wall of the ethmoid *in situ*, particularly that portion which houses the terminal filaments of the olfactory nerves. While it has been shown that infection may travel through the cut sheaths of these nerves and enter the meninges, nevertheless I do not fear this so much as I desire to preserve the sense of smell in this locality. Regarding the occurrence of meningitis following the severance of these nerves, it must be a very infrequent occurrence, otherwise all of us would one time or another have met with such a tragic misfortune. Even though I have had fatalities I do not believe any of them have been due to this cause. As a matter of fact, I have on several occasions removed diseased bone which exposed the pulsating dura in the immediate vicinity of the olfactory fissure; this in one or two cases was followed by the escape of a quantity of cerebro-spinal fluid. Most of these patients, however, despite my anxiety, recovered without any untoward symptom. Notwithstanding these fortunate sequels, it is nevertheless better to be safe and shun this dangerous region by conserving the olfactory area with its mucosa, since ventilation and drainage should obtain quite as well as though it had also been removed. Following this procedure I know of no condition that reacts more favourably to the silver tampons as an after-treatment than this one.

Hyperplastic ethmoiditis may next be considered, and firstly localized hyperplasia (polyps). The surgery of polyposis and polypoid conditions affecting the ethmoid is so well known that the procedures need not be detailed. I will, however, touch upon some of the more prominent factors concerned in the permanent ablation of these growths. The localized hyperplasias or separate polyps springing from the naso-frontal region and beneath the anterior end of the middle turbinate are usually removed with the snare. Unless, however, the bony attachment is also resected, these are almost certain to return; therefore emphasis should be placed on this phase of the operation in order to ensure a permanent disappearance of the growths. The preliminary resection of a portion of the middle turbinate depends upon the accessibility of these bases to instrumentation. I have often noted in the presence of these moderately large sessile polyps that the hyperplasia is usually confined to the mucosa outside the cells, it being rare to find coexisting intracellular polyps. The one exception to this is afforded by the old chronic cases where the entire labyrinth has long since been diseased. While polyposis of the anterior cells is nearly always extracellular, the opposite obtains with the posterior cells, since one rarely encounters large polyps hanging down into the choana which take their origin from this region. (The large solitary choanal polyp in nearly every instance comes from the maxillary sinus, a fact which I have been able to demonstrate time and time again.) This does not mean that the external mucosa is not also affected, for it, too, shows marked change, but more in the nature of a polypoid degeneration rather than large pedunculated polyps.

When the anterior and posterior labyrinths are jointly affected we have, therefore, both an intracellular and extracellular condition to deal with. As a rule these combined cases have progressed insidiously over a number of years until the entire ethmoid capsule has become a mass of polypoid degenerating mucosa. This is the type of case which is so often associated with asthma and hay fever, or, at least, its symptom-complex can be attributed to the presence of this polypoid tissue. We have found that the only rational treatment from a curative point of view is the complete removal, as far as humanly possible, of the polypoid degenerated tissue.

Several methods lie at our disposal, and we always try to select that one which seems to be particularly suited to the individual case. In this way exigencies such as abnormal anatomical configurations are met with and successfully overcome. Ignoring the ordinary procedures adapted to the simpler conditions, those commonly used in the United States when complete exenteration of the ethmoid is under consideration are the Grünwald, the Hajek, the Mosher, the Sluder, and the Ballenger methods in their various modifications.

CONCLUSION.

A brief retrospect over the intranasal methods of operating upon the ethmoid shows us first of all that, to accomplish successfully any operation worthy of the name, an intimate knowledge of the anatomy, both regional and surgical, is essential. This knowledge, like a two-edged sword, cuts both ways, for it not only gives the operator confidence to remove tissue fearlessly, but also the wisdom to exercise caution when approaching a dangerous area. All of us who have concerned ourselves to any considerable degree with intranasal ethmoid surgery must have been convinced that it is impossible in every case to expose completely the mucosa of each and every ethmoid cell—at least, such holds good in my own experience. There exists, unfortunately, no anatomical configuration of these cells which can be used as a normal model; but in operating (despite all the stereoscopic skiagraphs we might have had made) it is the ideal normal that we must keep in mind, and if in the midst of the exenteration we encounter great variations, they must at once be considered anomalous, and we proceed with the operation accordingly. Small wonder is it then that certain deep-lying cells escape our attention, this being the reason why in these cases our ultimate results are not 100 per cent. perfect. Indeed, it is now my custom to try to impart this knowledge to those patients of better understanding before attempting any operation, and to state that, in my opinion, the improvement should be measured by a certain percentage according to the severity and condition of the case—say from 60 to 95–100 per cent. representing, of course, the perfect result. While all of my patients have by no means been restored to their original normal functioning activities, I have, nevertheless, long since become convinced that, when properly executed, the intranasal operation on the ethmoid offers the least dangerous, if not the most facile, opportunity to the patient for relieving him of his distressing and oftentimes dangerous infection.

THE CONSERVATIVE AND SURGICAL TREATMENT OF CHRONIC ETHMOIDITIS.*

BY

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THERE is, I suppose, no subject that is so fraught with difficulties and doubts for the rhinologist as the problem of chronic ethmoiditis. In the first place, the ethmoidal labyrinth varies enormously in anatomical configuration and complexity, so that, like finger-prints, no two ethmoids are exactly alike. In the second place, the position that the ethmoidal capsule occupies in the nasal cavity and its close relations with other sinuses make it difficult to determine precisely the extent of actual disease. The varieties of infection and the reactions of the individual to them provide further stumbling-blocks in the path of exact diagnosis and a proper line of treatment; moreover, there is a curious lack of unanimity about the classification of chronic ethmoidal disease, so that in many cases it is by no means clear to what particular condition a suggested method of treatment may refer.

It is, I think, of the utmost importance that we should at the outset determine what kinds of inflammatory processes we are prepared to recognize as affecting the ethmoidal labyrinth. Few will, I imagine, dispute the fact that clinically we may recognize two varieties: (1) chronic catarrhal inflammation (polypoid degeneration), and (2) chronic suppurative inflammation. Whether these are distinct pathological entities, whether the one can progress into the other, and whether both varieties may be combined in the same ethmoid, are questions upon which there are so many opinions that discussion of them would only tend to obscure our main issue. I am, however, prepared

to take my stand on the existence of these two clinical varieties of inflammation and to deal with the matter from this aspect.

In the first instance let us consider a case of moderate polyposis; this has occurred as a result of prolonged inflammatory irritation of the ethmoidal mucosa, and the polypi are to be regarded as the product of hyperplastic inflammation of the covering of the ethmoid bone. That they are commonly seen on the free edge or from the under surface of the middle turbinate is due to the fact that this structure, which is simply a folded over portion of the ethmoid, is the most prominent feature in the upper part of the nasal cavity.

Their obvious presence may, or may not, lead one to suppose that similar changes may be present in neighbouring tracts of the ethmoidal mucosa, which may for the moment be out of sight; the possibility is not excluded that the source of irritation may be found in discharge from a neighbouring sinus as opposed to the possibility of purely superficial irritation of the mucosa from a variety of definitely local causes.

It is possible for the mucous membrane covering the ethmoid to become primarily diseased and for the hyperplastic mucosa, owing to its favourable *milieu* of warmth and moisture, to manifest itself as polypus formation. This is the simplest condition; it might, in its early stages, yield to such conservative measures as nasal lavage and the occasional application of mild caustic or astringent solutions, or, in slightly more advanced cases, to the correction of any obstruction which was causing undue congestion in the region of the middle meatus, together with the removal of the polypoid hypertrophy with suitable forceps. This latter procedure should not cause the fact to be overlooked that the inflammatory process has probably spread to the deepest layer of the mucosa, which is the periosteum of the underlying bone, and that the correct removal should always involve a portion of this bone. The snare is an unsuitable instrument for this purpose, and has been abandoned in my clinic for many years.

It is not, however, likely that measures such as these will often suffice, since the cases do not usually come under our notice until they are more advanced and the inflammatory process has definitely spread into the ethmoid cells themselves. When this has occurred it is all but impossible to estimate the extent of the disease, and for that reason it is incumbent on the surgeon to proceed circumspectly.

The chief aim should be to ensure a free airway and free drainage. If this is assured we may expect that a certain number of cases will undergo resolution. Can we attain this object better than by the removal of the middle turbinate? I think not. I am not myself amongst those who regard the middle turbinate with great veneration, and I would far sooner remove it in its sodden polypoid bulk than burrow blindly beneath it in a vague endeavour to open the operculum or break through the bulla. Simple removal of the turbinate without any further intervention will improve the drainage and will cure a certain number of cases.

These conservative measures may suffice for a small proportion of our cases, but in the majority the disease has spread too deeply and the bone has already become friable from osteoporosis. These cases demand more severe measures if a cure is to result.

The problem now is so to plan our operation that definitely diseased tissue is removed with as little interference to healthy structures as is possible. Every surgeon will have his own method of achieving this. Some may rely on repeated "nibblings" with a variety of forceps, whilst others may tear cells open with hooks and remove the debris with a sharp spoon. Others, again, may direct their attention to a particular group of cells that experience teaches them to suspect, and by encompassing their destruction not only remove an area of disease, but also free the ostia of neighbouring sinuses.

Thus far one may go with comparative safety in the belief that little or nothing has been done to destroy healthy tissue or spread infection broadcast through the

* A paper read in a discussion in the Section of Laryngology and Otology at the Annual Meeting of the British Medical Association, Cardiff, 1928.