for the time at least? Not only can this be done, but by the removal of the sarcoma in this way we have the additional advantage, over an external operation, of retaining a wide, patulous, nasal cavity, through which the growth can again be attacked and destroyed if recurrence should take place.

The claim I make is that inasmuch as a large majority of the cases of nasal sarcoma originate in the soft tissues of the nose—even Freeman's case, described so graphically, illustrates this point—they can at almost any time be operated upon with the electro-cautery, provided the bony framework of the nose has not become affected with the disease, that in many of these cases a cure can be accomplished by thorough and careful and painstaking treatment, and that even in cases usually considered inoperable great and beneficial relief can in some cases be secured to the patient by the same means.

BRITISH MEDICAL ASSOCIATION.

Annual Meeting, held at Toronto, August 21, 22, 23, 24, and 25, 1906.

SECTION OF LARYNGOLOGY AND OTOLOGY.

(*Report of Proceedings, continued from p.* 569.)

J. DUNDAS GRANT, M.D.EDIN., F.R.C.S.ENG., *President.*

A DISCUSSION ON THE TREATMENT OF DEVIATIONS OF THE NASAL SEPTUM.

INTRODUCTORY PAPER.

BY STCLAIR THOMSON, M.D., F.R.C.P.LOND., F.R.C.S.ENG.,
Physician for Diseases of the Throat in King's College Hospital; Surgeon for Diseases of the Throat, Nose, and Ear in the Seamen's Hospital, Greenwich.

LET me first express the pleasure I feel in being honoured by a request to open the subject of our discussion to-day. I feel it the more, as this Section promises to be, not simply a meeting of British laryngologists, but a congress of English-speaking specialists.

I take it that the efforts of the opener should be directed to

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limiting the subject we are called on to debate, while bringing out the points which promise to be most fruitful in discussion. If I omit a good deal of what one would find in a formal treatise or essay on the subject, it is because I realise that I am speaking in a gathering of experts, where much of an academical nature may be taken for granted. We are here to confer on matters which are still in course of evolution, to clarify points which are still hazy, to exchange views on dangers or difficulties, to render more certain and simple methods which at present are uncertain or complicated, and to get rid of outgrown conceptions and proceedings.

The field of discussion is cleared for us by the title of debate. We are not asked to consider the pathology or indications for treatment in septal deformities, but to debate the methods of cure. In opening this discussion I will also endeavour to abide by the request of our President—that is, that our remarks should, as much as possible, be based on personal experience. In this way each of us may hope to add something of value to the subject, and no one need aspire to embrace it all.

That the subject is well chosen will be evident to anyone who cares to peruse a debate at the Laryngological Society of London, held three years ago,[1] devoted to "The After-treatment of Intranasal Operations." Although this debate included operations on the turbinals, much of it was concerned with what we are called on to discuss this morning, and the remarks of Mr. H. T. Butlin paint a vivid picture of the troubles which, until quite recently, we all met with only too frequently. He said:

"While I have had no difficulty at all in many cases, there have been other cases in which no kind of after-treatment has seemed to be attended with success. The more one does for some patients the worse they seem to be. The difficulty of preventing adhesions, of maintaining the large passage one has made at the time of the operation, of raising the valleys and keeping them up, of lowering the hills and keeping them down, etc., is enough to choke off the youngest and most stout-hearted of nasal surgeons. There have been patients with nasal troubles on whom I have operated whom I have afterwards heartily wished I had never seen. Of course, I hear of nasal surgeons who never meet with such cases as these. I can only congratulate them. But I can truthfully

[1] *Vide Proceedings*, November 6, 1903, vol. xi, p. 1, reported in the JOURN. OF LARYNGOL., RHINOL., AND OTOL., January, 1904, vol. xix, p. 22, and the *Laryngoscope*, January, 1904, vol. xiv, p. 48.

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say that I have been consulted by patients of many of the best nasal surgeons in this town on account of the failure, or very partial success, of operations which they have undergone; and I have no doubt, on the other hand, that some of my failures have in like manner consulted some of my colleagues among the members of the Laryngological Society. Each of these patients always seems to think that, had the operation been performed by some other surgeon than the man who did operate, he would have been a sound and happy man."

In opening the above debate Sir Felix Semon deplored that the after-treatment should occupy a period of many weeks. He described an imaginary typical case of nasal stenosis, and after detailing the formerly usual treatment, he laments that only too often the net result is that when the healing of the wound has been completed, the permanent enlargement of the passages is much less considerable than it was at the moment of the completion of the operation.

Many other members of the Laryngological Society were equally candid, and expressed a want of satisfaction with septal operations. Our debate to-day will, I have no doubt, demonstrate how recent progress has altered this.

Deviations of the septum include obstructions caused by deformities in the quadrilateral cartilage, the ethmoid, vomer, or maxillary nasal spine. Any attempts to classify these deviations are unsatisfactory. Even the division into two groups of cartilaginous and bony deviations fails to embrace the majority of conditions met with. When, occasionally, the deviation is limited to the cartilaginous septum, the operation of Asch will restore the patency of one obstructed nostril. I have not performed it more than half a dozen times; they were carefully selected cases, and the results were satisfactory. Moure's operation I have never tried, but I have seen the results, and think they can be improved upon. I have no experience of the Gleason or Hajek operation, and it has always seemed to me that it would only partially correct the deviation in one nostril, while tending to obstruct the opposite one. A bony deviation, springing from a more or less vertical septum, has generally some cartilage in part of its length. It can be removed with a saw. I have no experience of electric drills or trephines, nor of electrolysis.

But the majority of septal deviations are compounded of deflections and outgrowths of both cartilage and bone. In many cases both nostrils are more or less obstructed. Until recently I knew of

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no method which could deal with such cases satisfactorily. To produce a large perforation in the septum always appeared to me inartistic, unsurgical, and in many cases ineffectual, for the obstruction not infrequently ran so far back as to be beyond it. Our President has expressed the opinion that it is most undesirable to produce a perforation. It substitutes one deformity for another; and as Mouret and Toubert observe, it is not a treatment, but a *confession d'impuissance*.[1] To shave off the crest of these deviations seldom leaves any tangible patency, while those rhinologists who talk of "simply pushing the weakened septum into the median line" can only be admired for their faith in the malleability of the septum, while we congratulate them on the tolerance of their patients, who will bear the necessary renewal of packings or splints for three weeks afterwards. The rough, unsurgical, and ineffectual use of Adams' forceps and such like barbarous contrivances already belongs to the past history of rhinology.

For my own part, the deviations most requiring treatment were formerly just those in regard to which I felt most powerless. In some cases I avoided operation on the septum by removing part of the turbinals, but in many I felt compelled to advise the patient to tolerate his nasal stenosis, as I knew of no satisfactory method of correcting it. A few years ago I would only operate on half a dozen septa in a session, but now I feel justified in operating on forty or fifty. This confidence is begotten of the adoption of the method of excising septal obstructions by the submucous method, and I take it that our debate will be largely concerned in discussing the methods, difficulties, advantages, and disadvantages of this operation, while considering simpler measures which may sometimes be used instead of it. My own technique need only be briefly outlined, as I have recently described it in detail.[2]

If I give a short sketch of it, my purpose is chiefly to refer to points which call for discussion. Anæsthesia and ischæmia are produced by the surface applications of cocaine and adrenalin, employed twenty to thirty minutes before starting the operation. With the patient on an operating table, in a sitting posture, an incision is made on the convex side ½ cm. behind and parallel to the junction of skin and mucous membrane. The incision, with practice, can be carried through the mucosa and cartilage at one stroke, without puncturing the opposite side. The mucosa and muco-perichondrium are stripped up off the convexity. Through

[1] *Société Française d'Otologie*, etc., May, 1906.

[2] *Med.-Chir. Trans.*, June, 1906; and *Lancet*, June 30, 1906.

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the incision in the cartilage the membrane of the concavity is similarly separated. The main part of the denuded cartilage is then excised with Ballenger's swivel septum knife. Remaining portions of cartilage, and the ethmoid and vomer if deviated, are removed with Hartmann's forceps. The nasal maxillary spine, or the anterior extremity of the vomer, is next laid bare and attacked with chisel and hammer. By prising this up we can expose the vomer with any spur or crest, and separate its muco-perichondrium on each side down to the floor of the nose. The vomer is then followed backwards as far as necessary, sometimes even close to the neighbourhood of the choanæ, until we find that the fleshy septum hangs perfectly plumb in the middle line. All this can be done through the one incision described. If the free end of the quadrilateral cartilage projects into one nostril, the incision is made over it. The incision is closed with one or two sutures, and the nostrils are lightly packed for forty-eight hours with sterilised cotton-wool, well smeared with plain vaseline. Afterwards no treatment is required beyond the occasional use of a cleansing alkaline lotion or some oily application. Removal of portions of hypertrophied turbinals may subsequently be required, especially in the formerly unobstructed nostril.

The first case of this operation, shown at the Laryngological Society of London, was presented by me on May 6, 1904. At the debate in November, 1903, already referred to, I expressed the opinion that this was the most promising of septal operations, and further experience has strongly confirmed me in this view.

The objections which may be raised will call for our discussion to-day. The chief ones are: (1) the difficulties of the technique; (2) the anæsthesia; (3) hæmorrhage; (4) stitches; (5) possibility of collapse of the bridge of the nose; (6) danger from subsequent blows on the nose; (7) unsuitability for children.

The technical difficulties disappear with practice and patience. Hæmorrhage has never given me trouble, and I am surprised to read of surgeons who refer to it and the frequent mopping required during the operation. The method of anæsthesia described renders the operation painless until we come to the removal of bone, which is disagreeable. I have tried, and have abandoned, the submucous injection of cocaine and adrenalin. My first cases were done under chloroform, and I have recently reverted to it for nervous patients requiring an extensive operation. The stitches expedite healing. No collapse has occurred in any of my patients, and Freer's experience shows that there is no added risk from subsequent blows

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on the nose. Under sixteen to eighteen there is increased difficulty in operating in narrow noses, and at an earlier age there is the possibility that it might hinder complete development, and the risk of the deviation re-forming if not very completely removed. But other surgeons will doubtless give us their experience on these points.

The more actual objections which occur to me are the following: (1) incompleteness of operation; (2) flapping septum; (3) previous operations.

Some surgeons—not infrequently those who are late in adopting the method or whose experience is limited—have recently attempted to disparage the difficulties of the operation. Such an attitude can only be based on incomplete removal of deviations, often induced by anxiety to perform it quickly. Other operators even say that this completeness is uncalled for, as it is sufficient to free the obstructed nostril to secure "reasonable patency." But if we are able, by an operation so rapid in its results and so free from disagreeable after-treatment, to secure a complete and permanent bilateral air-way, surely it is only right that we should do this for our patients. It is incomplete operation which causes the flapping condition in which, during quick inspiration, the fleshy septum is sucked against the outer wall of the narrower side, thus leaving the patient with only one free nostril. If the operation is carried out perfectly, both sides are equally free, and the septum, though flaccid, will remain vertical. The careful preservation of the perichondrium secures greater firmness of the fleshy septum. Previous treatment renders the operation more difficult; the mucosa may be changed into scar-tissue adhering closely to the septum, or the two mucous membranes may be united together, and the task of separating them becomes most difficult. This last difficulty is a strong argument for operating completely at the first intervention.

The advantages of this operation may be summarised as follows (1) no general anæsthetic required; (2) no hæmorrhage; (3) absence of pain and shock; (4) no reaction; the post-operative temperature seldom rises above 99° F.; (5) absence of sepsis, with its possible extension to ear, sinuses, or cranial cavity; (6) no splints required and no plugs after forty-eight hours; (7) rapid healing, without crust-formation; (8) no risk of troublesome adhesions; (9) short after-treatment; (10) speedy establishment of nasal respiration; (11) suitability for all deformities of cartilage or bone in the septum requiring treatment; (12) the space gained is not only that resulting from a vertical septum, but the extra room

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secured by removal of the cartilage, which is sometimes an eighth of an inch in thickness; (13) no ciliated epithelium is sacrificed; (14) accuracy of result can be depended on, and the prognosis is, therefore, the more definite; (15) improved appearance of the nose externally.

I do not wish to magnify our office, but it is wrong both to our patients and ourselves to minimise, by adopting a half-measure, an operation which, with skill and patience, can result in so much permanent benefit to those requiring it.

Nasal treatment is too often labelled as consisting in "trifling operations." So long as the beneficial results were insignificant this may have been justifiable, but as we advance to more certain and perfect measures surgery should claim as assured a position when directed to the nose as it does in regard to other organs or cavities of the body.

At the same time, we must not allow ourselves to be carried away in regard to the submucous operation. While it is applicable to all deviations, even the worst, it must only be employed when we are convinced that it is called for and that no simpler measure can take its place. And when we talk of a simpler measure, we should mean one which is not only of easier performance, but which in its execution and after-treatment will be as effective in curing the patient *tuto, cito, et jucunde.*

Introductory Paper.

By John O. Roe, M.D.,
Rochester, N.Y.

The title of this discussion brings us at once to the well-recognised fact that there is more than one method employed for the correction of deviations of the septum, although the author of each method may regard his operation as the *sine quâ non* for all forms and conditions of deviations of the septum that we may encounter

It would be interesting, did time permit, to note the evolution and also the desuetude of the different methods that have been brought forward for the purpose of straightening deformed septa or for the removal of the obstructing portion, from the Blandin punch down to the last method of resecting the cartilaginous and bony framework. With the exception of the punch—which removes rather than corrects the deformity, and leaves that which is most undesirable, a perforation of the septum—every method

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has some desirable feature which makes it better adapted for certain cases and conditions than any other method.

It often happens, however, that some operators who attempt an approved method do not grasp its principles fully or have not acquired or do not possess the necessary skill, or who employ the operation in cases where it is not adapted, and, failing to get the good results reported by the author, abandon and condemn the operation.

In many cases the deviation of the septum may be so complicated as to require for its correction the combination of two or more methods in one operation. For instance, in the deviation of the cartilaginous portion without marked thickening, the Watson, the Gleason, the Asch, or the Roberts and the pin method of holding the septum in place may be especially advisable; while, if complicated with deviation of the osseous or osseo-cartilaginous portion, the method of fracturing it by means of comminuting forceps, the writer's method, is believed to be the best and easiest. Therefore, when different conditions are combined in the deformity, different operations should be combined for its correction.

The operations required for the correction of the nasal septum may be divided into those required for the preliminary work of putting the nasal passages in proper condition and those for the straightening of the septum itself. The preliminary work of removing the associated abnormalities of the nasal passage before the main operation is, judging from the lack of reference to it by the writers on the subject of deviations of the septum, commonly overlooked, although highly important.

In determining such associated abnormal conditions, it is important to ascertain as far as possible the etiology of the deflection, whether resulting from an extrinsic cause or from an intrinsic condition, for the etiology of the deflection often has an important bearing upon its treatment. If a diathesis, a strumous, tuberculous, rachitic, or a syphilitic disease has been the predisposing cause, the general condition of the system should first receive particular attention.

If due to defective development, or to unequal development of the nasal chambers, to disease or disorders of the septum or other portions of the nose, no preliminary constitutional attention may be required; but it is still important that all such conditions should be taken into consideration in the correction of the deviated septum, in order properly to provide nasal passages of equal capacity for respiration.

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Having determined these conditions, it is also necessary before correcting the deviation of the septum to remove such conditions as have contributed directly to the cause of the deviation, or are active in maintaining it. If, in the case of a child, the deviation be due to a contracted superior maxilla and a high-arched palate, the result of obstructed nasal respiration from adenoids and enlarged tonsils, these latter conditions should first receive attention; the tonsils and the adenoids should be removed and the jaw expanded by the orthodontist to its normal proportion, when, in many instances, the septum and palate will resume their normal position.

If the septum has been crowded over by an enlarged or expanded middle turbinal cell, or deformed turbinated bones, these should be removed, for it would be impracticable to restore the septum to its normal position with these obstructions standing in the way.

It is also highly important to remove such conditions as would cause either nasal passage to be obstructed when the septum is placed in the median line. It is quite common to find nasal passages on the concave side of the septum more or less obstructed by hypertrophy of the turbinals, enlarged ethmo-turbinal cells, polypoid or other growths. While not impinging upon the septum in its deflected condition, these obstructions would, in most cases, close the passage completely if the septum were put in the median line.

It is likewise necessary to remove minor irregularities of the septum, except when the operation of submucous resection is to be performed. In many instances enchondromata and exostoses and local hypertrophies of the soft tissues are found upon one side of the septum, giving it the appearance of being deflected when viewed from that side only.

Frequently we find a pad of tissue located opposite a vascular turbinate, produced by frequent attrition of the erected turbinate against the septum, causing what I have somewhat figuratively termed "septal corns." These conditions should, as a rule, be removed beforehand, so that the septum is reduced to a uniform thickness throughout, permitting the parts to become healed before the operation for the correction of the deviation of the septum is undertaken.

On undertaking the main operation it is especially important to carefully select the operation best suited to the form and conditions of the deflection, and the associated conditions of the nasal passages.

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If there is a marked thickening of the septum, the submucous resection is especially called for. In other cases, if the set or lower attachment of the septum is at one side of the median line, and otherwise generally straight, the Watson or Gleason operation is especially adapted. If the deflection is confined to the cartilaginous portion the Asch might in some cases be of special service; whereas, if the osseous or the osseo-cartilaginous portion is deviated, the Roe operation by the use of fenestrated comminuting forceps is the one to be selected.

As I have already stated, no one operation is adequate to all conditions in all cases, but each is adapted to a certain variety; and, therefore, one operation is often a supplement to others. The one operation which I have mentioned, which will be found more often to meet the requirements of different cases, or to supplement other operations, is the Roe method of fracturing the septum by comminuting forceps.

Deviations of the septum, as first and best classified by Jarvis, may be divided into osseous, osseo-cartilaginous, and cartilaginous.

The most frequent form is the osseo-cartilaginous, occurring in about 60 per cent., while deviations of the cartilaginous portion alone do not exceed 30 per cent. Therefore, other things being equal, the form of operation best adapted for the correction of deviations of the osseo-cartilaginous portion should be twice as often called for as those adapted for the correction of the cartilaginous portion alone. In nearly all instances the bend in the septum found in the osseo-cartilaginous cases takes place at or just behind the osseo-cartilaginous junction or articulation; consequently, in order to overcome all resistance, it is necessary to fracture this portion of the septum so as to change the direction of that portion of the septum below this point, much in the same manner that the direction of the hang of a door is changed at its hinges.

This operation, therefore, is of special service in correcting deflections of the osseo-cartilaginous portion, and in those cases in which the general direction of the septum at this point requires changing, and is, therefore, a valuable supplement to other operations. It also becomes a valuable adjunct to the submucous resection operation, where there is no marked thickening of this portion of the septum, rendering it unnecessary to resect the osseous portion when it can be so easily and quickly fractured and placed in the median line.

In these cases of moderate deflection, the long deviation, this

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operation will be found of special service, for it is with the greatest ease that the septum can be placed in the median line.

For overcoming the cartilaginous resistance supplementary incisions at the salient points nearly through the cartilage from one side to overcome the resistance may be required.

In dealing with those cases of marked local thickening of the septum, a favourite method of mine is the submucous removal of sufficient amount of this thickened portion to reduce the septum to its normal thinness. This I do by raising the perichondrium or periosteum from the convex side throughout this thickened and deflected portion. This is carefully cut away with a cartilage knife or saw, as the case may require, and the elevated perichondrium replaced and held there by gentle packing of the nostril. In this way the removal of the entire cartilaginous or lower portion is avoided with a better result and comparatively no liability of perforations. Spurs, ridges, and excrescences of the septum I also remove in this same subperiosteal manner.

The comparatively new operation of submucous resection has recently become so popular that every bent septum, regardless of conditions, is at once elected for this operation, which in many cases is much better corrected by other operations, with very much less liability to large perforations resulting therefrom.

This is particularly the case in thin septa, in which the tearing of the perichondrium or periosteum is quite apt to take place, and which I have found difficult to avoid, or the vitality of the membrane is so seriously impaired thereby that perforations result.

It is important to refrain from the performance of submucous resection in these cases where the lower portion of the nose is undeveloped and inclined to flatten already, and when any further weakening of the support would lead to depression of the anterior portion of the nose. This liability should be taken into special consideration in the case of children, where the development of the nose is not completed.

The enthusiasm for the operation of submucous resection is very likely to cause the operator to overlook this danger of so weakening the septum as to cause flattening of the anterior portion of the nose. While this liability is disclaimed by many operators, it is nevertheless true, the writer has observed, in many cases that have been operated on by some of his *confrères*, that this result is liable to take place; and in children, in whom the development of the nose is incomplete, these developmental centres should not be removed.

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Introductory Paper.

By George R. McDonagh, M.B., L.R.C.P.,
Toronto.

In undertaking to discuss the subject of operations for the correction of deviations of the nasal septum, I cannot help a feeling of embarrassment in attempting to do so before such a distinguished audience, all of whom are so intimately acquainted with every feature of it. I fear that I am unable to add much that is new to the discussion or to bring forward any new operation, but having had a fair experience in dealing with these cases for many years, I shall merely restrict myself to expressing any opinions I may have formed based on the results of my own work.

I think that it will be generally admitted that the operation which has been most lately introduced, namely, the submucous resection operation, deserves the foremost and fullest consideration. In suitably selected cases no other operation which has been proposed has ever, at least in my hands, produced nearly such good results, and I think great credit is due to those men who have introduced it and have done so much to devise the instruments and elaborate the delicate technique required for its success. Before speaking of this or other operations for the correction of nasal deviations, I wish to allude first to the prime necessity for the operation—that is to say, the obtaining of sufficient space in the nasal passages for free breathing. Other ill effects are, of course, often produced by septal deviations, such as various neuralgic pains, headache, sneezing, and perhaps asthma and hay fever; but the obstruction to free breathing through the nose is the most important consideration, and it is from this point of view chiefly that I wish to discuss the operations for the correction of them. In many cases, even when there is some deviation of the septum, obstruction to free breathing is kept up more by enlarged, or hypertrophied, or intumescent turbinals, than by the deviation itself, and in many cases these enlarged turbinals may have tended to produce, and still tend to increase, the septal deformity. Therefore I would urge, first, the importance of giving such attention as may be required to these other causes of obstruction before undertaking what may be considered a rather serious operation on the septum. I do not think that a perfectly symmetrical septum is by any means a matter of special importance, or that slight deviations, small spurs or ridges—if they chance to exist—must necessarily be removed, unless, indeed, such unsymmetrical

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septum or spurs interfere with normal nasal breathing or cause other symptoms of importance. With this view in mind, therefore, and before discussing the complete resection operation, I wish to refer to a large number of cases which are difficult to classify, but in which much simpler operations will suffice to attain the desired result—that is, free breathing space—without resorting to the rather radical and difficult operation of submucous resection. Such cases are those in which there is marked thickening of the bone or cartilage, spurs, ridges, and such like outgrowths on one or perhaps both sides of the septum, without much or any corresponding concavity on the other side. In such cases I do not think it necessary (or at least in very few of them) to do the complete excision operation. I think other and simpler methods will suffice. I have been in the habit of doing what I might describe as a modified submucous operation, by raising the mucous membrane off the spur or ridge, as is done in the ordinary resection operation, and then with a knife or Bosworth saw removing the cartilage or bone as nearly to a plane as possible, and finally replacing the mucous membrane over the cut surface. This is the same operation in principle as that proposed by Bosworth long ago, but it has the great advantage of requiring only a brief time for healing, and so avoids the long process of granulation required and the accompanying discomfort to the patient which exists when the mucous membrane is removed with the bone, as in the Bosworth operation. I have done this simple operation quite frequently and have been almost always satisfied with the result. It certainly will not produce a straight septum in all instances, but in such cases as I have referred to, namely, when the obstruction is due to outgrowth or thickening, a satisfactory breathing space can be obtained. A simple type of deviation, and frequently met with, is a slight vertical ridge just behind the columella. Ordinarily this does not obstruct breathing materially, but when the person is lying on the opposite side the ala on the deviated side falls in against the ridge and acts like a valve in preventing inspiration. In such cases, if the mucous membrane is elevated and a strip of cartilage cut off with the knife, it is astonishing how much relief is obtained, not so much from the amount of tissue excised, but that it has been sufficient to prevent the valve-like action with the ala. In many cases also I have had excellent results from what is known as the Gleason operation, in which a U-shaped or horse-shoe-shaped flap is made, including the deflected portion, which is then pushed through into the opposite fossa. A better result is

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usually obtained in this operation when some thickening of the septum exists, or when, as in vertical S-shaped deviations, there is some projection or shoulder on the concave side on which the flap will catch, and which will hold it in position without artificial supports. With the Asch operation I regret to say I have not had good success. Probably the fault lay more with the operator than with the operation. But in all operations of this character, where incisions are made through the septum and the fragment placed in the new or straight position and held there by artificial means, such as pins, plugs, or tubes, and even when these are worn for many weeks, there always exists the tendency, owing to the natural resiliency of the cartilage, for the parts to eventually resume their former positions.

Although I have mentioned these older plans of operation first, I do not wish it to be understood that I think they at all compare in usefulness or in perfection of result to the complete resection operation, or that they can do more than take its place in certain cases, but rather to suggest that if a simpler and safer plan will suffice in any instance to attain the desired result that plan should be resorted to. Of the submucous resection operation I cannot speak in too high praise, and in suitable cases no other operation can take its place.

The special class of cases to which it seems to be particularly adapted are those in which there is deflection without much or any thickening of the cartilage—as, for instance, dislocation of the columnar cartilage, obstructing one nostril, and also deflection of the cartilage more posteriorly or of the perpendicular plate, but without thickening. In such cases no other operation ever gave me satisfactory results, and I think I have tried most of them. I have tried parallel incisions, stellate incisions, and other varieties, and have endeavoured to so weaken the cartilage as to overcome its resiliency completely, and I have had my patients wear the Asch tube or some modification of it for many weeks, with, at the time, apparently good results; but in three or six months later more or less return to the old deviated position had taken place.

For such cases I think a solution of the difficulty is to be found in the resection operation. In all these cases of simple bending of the septum to one side, which used to be the most difficult for me to manage, I can now assure my patient with reasonable confidence of a good result. As far as I can judge from numerous articles written about the resection operation, the writers are of the same opinion that in all cases every fragment of bone and cartilage down

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to the maxillary crest should be removed. I cannot, however, bring myself to believe that such very complete excisions as removal of the whole of the vomer, cartilage, and perpendicular plate can often be necessary, and it may be that the enthusiasm for thorough operations on the septum, and perhaps the degree of expertness arrived at by the operator, has caused the pendulum to swing beyond a judicious limit. If by any chance this should be so, a happy medium will be reached in due time, and when the operation is restricted to suitable cases only, and to the removal of such portions of the septum only as interfere with nasal breathing, it will be one of the most valuable in surgery.

It is unnecessary for me to refer to the technique of this operation. This has been most thoroughly elaborated by writers on the subject, and the essential principles of the technique are now fairly familiar to all. Different writers differ more in detail than in principle, and each operator will adopt such modifications as may seem to him most convenient in carrying out his ideas. Of the objections to the operation which I have noted, I may say, first, that the difficulty of performance should not be held of great consideration, because with practice that can be overcome, and ought not to be argued against the principle of the plan. Secondly, there is the danger of the falling in of the bridge. Ordinarily this does not seem to take place, certainly not in recently operated cases; but in the event of blows or falls on the nose subsequently, I imagine that serious deformity might result, and this is an argument against a too radical operation, if it can be avoided. Also the eventual results of the operation on young people before the nasal framework has arrived at full development are uncertain. Thirdly, the danger of perforation of the septum is not great, certainly not of large ones, and small perforations do no more than sentimental harm. Besides, as we become more expert in operating, we may fairly expect perforations to be of rarer occurrence. Fourthly, the introduction of horsehair sutures are, I think, a decided advantage, particularly, of course, when a perforation has been inadvertently made, but in other cases as well the sutures tend to hold the mucous membrane in place when it might be dislodged accidentally by the packing. As to the dressing, I have found that a strip of thin rubber sheeting or oiled silk placed over the septal mucous membrane before the gauze packing is introduced greatly facilitates its removal when that is necessary, as it avoids any adhesion of the gauze to the mucous membrane, and therefore lessens the danger of disturbing its position. As to the anæsthesia,

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I find cocaine gives practically complete anæsthesia, and, except in very nervous patients, allows of satisfactory manipulation, but I have observed considerable depression following during that night and next day. Whether this is due to the cocaine I am unable to speak with certainty, but I think it is. As to the position of the patient, I have found the sitting position tend so much to syncope that I have adopted by preference the horizontal position, with the head fairly high. The inconvenience to the operator is only slightly increased.

Finally, as to the operation in children, I believe that, unless very necessary, it would be well to postpone it until more nearly full development of the nasal framework has taken place. Evidence of Eustachian or middle-ear catarrh, for instance, or other symptoms of gravity, would, I fancy, justify the operation in children, but in such cases surely no more of the cartilage or bone should be removed than absolutely required.

In conclusion, I wish to state that, other things being equal, I think a patient is better to be in possession of the natural supports of his septum—that is, the cartilage and bone; if any plan can be devised short of removing these supports, and if any simpler or less radical operation will suffice, that should be performed. Also, I do not think it judicious to advocate the complete resection operation for septal deviations, or to recommend that more of the cartilage or bone should be removed than is absolutely necessary to attain the object for which the operation is undertaken.

THE PROBLEM OF THE CORRECTION OF DEFLECTIONS OF THE NASAL SEPTUM SOLVED BY THE SUBMUCOUS RESECTION.

By Otto T. Freer, M.D.,
Chicago.

The enthusiasm with which the modern submucous resection was received a few years ago indicated the dissatisfaction of rhinologists with the older methods for the correction of deviations, which depended on forcing the septum into a vertical plane after various incisions through it, or which, not even attempting this, were satisfied with the sawing off of the apex of deflections under the name of spurs, crests, or ledges. The reason for the easy victory of the submucous resection over the procedures mentioned was, that whatever its method of performance, its principle, that of

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sacrificing as superfluous the deflected cartilage and bone, seemed reasonable and was in accordance with the anatomical conditions as opposed to the less rational attempt of the older fracturing methods, which tried to force the elastic, resilient structure of the septum into a vertically and horizontally straight line, a proceeding to which the faults of uncertainty of result and violence of performance necessarily belonged. The submucous resection not only owed its immediate popularity to its correct principle, but its continuance in favour is also due to it, its followers realising that failure to obtain perfect results is due to faults in their own technique and not in the logic of the method. Although the submucous method, therefore, seems to be in no danger of in turn being displaced by another way of operating and is constantly gaining adherents, it still has able opponents, while many are as yet but half convinced of its merits, fear its results, or, despairing of being able to execute it, adhere to the older procedures. For these reasons, to hasten its universal acceptance it still needs defence and advocacy and assurance on the part of the experienced that it is within the range of ordinary skill. The chief cause why the submucous resection has not, however, even in its short existence, displaced all other procedures is the fact that so far it does not represent a uniform standard operation but is a conglomeration of more or less suitable methods, differing widely in their idea of the proper mode of performance, none of which has universal vogue, and which have not much in common beside their recognition of the correctness of the principle of exsecting the deflected cartilage and bone. The different views of so many advisers are bewildering to any one who wishes to take up the submucous resection and obviously inspire distrust of its merits, especially as a view of the execution of some of the procedures advocated does not create confidence in it. If the first window resection observed by a student had been one I saw performed by an exponent of a certain method a short time ago, he would have been convinced that the operation was barbarous, painful, exhausting to both patient and surgeon, and imperfect in its results. While the older advocates of the submucous resection differ as to essentials, the confusion is increased by a number of new authors who, possessing but moderate or little experience, straining to be original and giving little heed to what has gone before, are continually trying to create the whole procedure anew. They commonly include in their methods errors discarded by their more experienced predecessors, devise a new instrumentarium possessing no especial

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originality or fitness for its purpose, and always commend its simplicity as its chief advantage. Not understanding the completeness of result obtainable with more elaborate means, they are satisfied with the partial one they attain with their crude ones. Such writers retard instead of advancing the cause of the submucous resection, for their followers are apt to be far from convinced that it is the only way. Nevertheless I so regard it; for my experience with 178 operations has shown me that, if rightly performed, it may be relied upon with absolute certainty to remove any deflection, no matter how extreme, hard to get at, or extensively bony, with less injury, suffering, and after-treatment than when any other method is used. It is this perfect assurance of success that is one of the best features of the submucous resection, and the recent statement by a writer on the subject that it is fitted for but 90 per cent. of the deviations encountered, and the remark of another that it is only suited to curved scoliosis, and not to extreme angular deviations of the septum, show that these authors do not understand the possibilities of the method they attempt to practise. I say, as formerly, that the submucous resection is the best means for the correction of all deflections without exception, and that it is especially suited to extreme and difficult ones. In time, what is of valne in the many articles on the subject will be assembled into a uniform and standard manner of performance, but this desirable result can be much hastened if the newer writers cease to try to invent the operation and instruments all over again and ohoose the best from what already exists in such profusion, for the time has come for an impartial and thorough study of the subject by observers who, unbiassed by methods of their own, will give what seems reasonable in the various modes a trial and weld what proves feasible into a classical submucous resection. At this time, however, no one should speak until a large material and a study of the subject from the bottom entitles him to do so. At present the authors of longer experience can relieve the submucous resection of much that impedes it by showing what their work has taught them to regard as wrong tendencies of the method, and I shall, therefore, speak of a few of what I deem its mistaken directions and misconceptions as to its nature and execution.

I first wish to call attention to the often-made assertion that the operation is easy. Those who select only simple cases or are satisfied to leave a large part of the deflection untouched, thinking that enough has been done when a piece of cartilage, and possibly

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a fragment or two of bone, have been removed, can do what they regard as the operation quickly and easily. The thorough submucous resection, including frequently the ablation of the deflected submaxillary crest and vomer, demanded by most cases if the nostril is to be perfectly freed, is another task, and a hard one for a novice, for whom, if conscientious, and until he has learned by experience, his first operations may prove long and exhausting, and largely because he is not used to recognising the changed appearance of the parts after the resection is under way. To such beginners I have often had to point out the location of the crista and other parts.

In certain methods much is made of the speed with which the operation is accomplished, as if it were necessary to complete it in haste. The spirit of the method is that of patient, painstaking deftness, not of hurry. As the patient does not suffer there is no reason why the surgeon should stint his time. As elsewhere, here also hasty work means rough and incomplete work and increased trauma.

Critics of the method often refer to it as painful. I think that much depends on the method of local anæsthesia whether the patient suffers or not, and I still employ pure cocaine for the purpose, rubbing it in the form of flake crystals into the mucosa with a little moist swab, always preceding it with 1 to 1000 adrenalin. The amount of cocaine absorbed is no more or even less than where solutions are used, and the concentration of the drug produces a local insensibility so great that even children of seven and nine years have submitted to the operation, including the resection of the bone, without complaint. The loss of feeling is also rapid, being complete in five minutes.

Of late purely theoretical objections have been raised against operating upon children before the fifteenth year, the reason given being that the septum takes an important part in the development of the adult nose, one author—seemingly having in mind the removal of the entire septum as the essence of the submucous resection—saying that "the septum should not be removed during the years of active growth." Properly done, the submucous resection never removes more than the deflected portion of the septum, and only in extreme cases does this equal one third of the area of the entire septum. The important upper anterior part of the cartilage under the triangular cartilages of the external nose is always spared, and there is therefore always a large enough frame left about the window made to maintain the form of the septum in

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its growth. During five years in which I have resected the deflections of thirty-two children between the ages of seven and fifteen, and of twelve between the ages of seven and eleven, I have seen no damage to the development of the children's noses. The parents would not have been slow to tell of any, and such of the children as I have seen long after the operation have shown, instead of nasal deformity, an improved physiognomy and appearance of health due to the free nasal breathing established. An undesirable effect of growth noticed in some younger children was a tendency to a partial reproduction of the deflection, but never to any sinking of the nasal bridge. I have also found, although it has lately been asserted that the cartilage is not reproduced, that the septa of such children as I examined in this respect grew firm over the site of the window in the cartilage in a few weeks, and I attributed this to the great regenerative power of childhood, and to the careful saving of the perichondrium possible with my method of operating, which permits free and minute inspection of the entire operative field. The perichondrium is easily left upon and removed with the cartilage if not looked for.[1] Nearly all my deviations in children were extreme, wholly blocked one nostril, and, if sigmoid, both, and injured the patients' health enough to absolutely demand resection. Children should, therefore, not be deprived of the benefits of the operation because of theoretical objections inspired by a timid imagination.

I have not changed my reversed L and long vertical initial mucous membrane incisions, which give widest access to the difficult deeper parts of the deflection and are described in my later writings on the subject, in which my method of operating is given in detail.[2] I repeat that the anterior buttonhole cut of the Killian type made in front of the deviation is inadequate for deflections which are largely bony, which have strong angles, or where the denudation is difficult. To overcome the disadvantages of the buttonhole cut the long speculum is used to hold away the mucosa on either side of the cartilage and bone resected between its blades. However plausible on paper, in practice this speculum is much in the way of instruments and is not needed, for it is not necessary to hold aside the mucosa of the concave side, because, when separated, it hangs away out of the reach of forceps of its own accord, and all that is required is a flat retractor to hold the mucosa of the

[1] *Annals of Otology*, pp. 218, 219, 1905.

[2] *Annals of Otol., Rhinol., and Laryngol.*, June, 1905; *Journ. of Amer. Med. Assoc.*, September 30, 1905; *Fränkel's Archiv f. Laryngol.*, 1906, p. 152.

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convexity out of the way in some cases. For this purpose I now use a retractor like those of my set for holding the nose open, but with a blade an inch and a half instead of three quarters of an inch long. A great advantage of my reversed L mucous membrane incision is the fact that the anterior flap so formed, when reflected, uncovers a large area of cartilage. This much facilitates the making of the first incision through the latter, as the cut is made through the denuded cartilage in plain sight, and not, as is the case where the mucous membrane incision and cartilaginous incision coincide, through cartilage hidden underneath mucous membrane, in the latter case the severing of the cartilage being done in the dark. This forms an objection which has made this portion of the resection difficult for many, and has led to crude methods of scratching and scraping a small hole through the cartilage with curettes and other half-sharp implements instead of making a well-directed ample cut with a keen knife blade, outlining a large cartilaginous flap, as is my practice.

The need of a thin-bladed sharp elevator and of other round-edged knife blades for dissection still does not seem to be appreciated by many. In those regions where the mucosa-perichondrium and periosteum are grown on to the underlying cartilage or bone, the keen blade dissects up the septal covering with ease, while a chisel-edged or blunt elevator would require forcible work in such places, leading to the possible plunging through of the instrument into the opposite nostril, and to subsequent inflammation of the bruised and stretched mucous membrane. To make a complete operation I nearly always find it necessary to use the sharp blade to uplift the covering from the septum at some part; indeed, I often literally dissect the bony base of the septum out of its envelope of mucosa periosteum, and I find that too much preference given to dull elevators does injury and makes the operation tedious, while the judicious use of the keen edge advances it rapidly and safely.

I still cut out the denuded cartilage with my three little cartilage knives, and have never felt the need of the swivel knife. The large perforations reported as due to its use are an evidence of its uncontrollability, and could not have occurred had my knives been used. Their fixed blades can be more accurately guided than a swinging swivel one, and cut in plain sight. After removing the main piece of cartilage the angular knives pare off remains of the cartilaginous deviation, if there be any, in the manner of a carver's tool. If desired, they readily exsect the

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deviated cartilage in one piece; but this, the main purpose of the swivel knife, is not an important one—in fact, to insist on denuding all of the cartilaginous deviation before removing it often retards the operation, the bared portion being in the way of sight, and, especially where the covering is adherent, making the denudation difficult and favouring perforations, while a piecemeal removal of the cartilage gives better and better access to the deeper parts with each fragment that is taken away.

There is much difference of opinion as to the best manner of removing the superior maxillary crest (crista incisiva) when it impedes respiration. It should always be taken away when it is at all in the way, for after the resection of the cartilage it supports nothing, and what seems a moderate obstruction becomes a formidable one when the shrinkage of the soft parts due to adrenalin has passed off. The chisel still has most followers in spite of its rather uncertain performances. To show how much difficulty the resection of the septal ridge has caused some surgeons, I refer here to a recent writer, who, evidently at his wits' end, has even suggested the fracturing of the incisor crest and vomer from the floor of the nose with crushing forceps applied outside of their mucous coverings, claiming that the act denudes the bone and removes it at the same time! The poverty of resources of a method that includes such acts of violence is evident. As I have never had any difficulty in cleanly and painlessly cutting away the crista with my forceps, I allow myself here to briefly describe my present method for resecting the septal ridge.

After the cartilaginous deflection and the frequently present long strip of cartilage grown on to the side of the crista and vomer described by Killian are removed, the operation may seem done, as the crista, commonly hidden in its own envelope of periosteum, may escape observation. The narrowness of the inferior meatus on the convex side and the persistence of the horizontal angle of the concavity on the other, suggest, however, the presence of a bent-over superior maxillary crest, and its existence is assured by the resistance of the hidden bone felt with a probe below the bagging mucosa of the concavity. With a round-edged knife a cut is then made down to the bone along the upper edge of the crest thus disclosed to the touch. The periosteum is scraped aside and the blade of a knife of my set called "A," bent at an angle on its edge, is pushed down the side of the crest that looks towards the concavity to the floor of the nose, the flat of the blade hugging the bone and severing the mucosa-periosteum from it. The knife is

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then drawn backwards and forwards close to the side of the crista and until on the concave side it is denuded to the nasal floor of its covering and the latter falls away from it. A perforation, so easily made in this region, is thus avoided. The convex side of the ridge is next bared and the crista is then seen to stand up naked and ready to be cut away with the forceps, the blades of the latter being crowded over the bone from above down to the floor of the nose and cutting it away piece by piece.

In many cases, especially after the resection of extensive osseo-cartilaginous deviations, there is obstruction for a period after the operation of the naris which was roomiest before it, the naris of the concavity. The obstacle to breathing is due partly to temporary sympathetic intumescence of the turbinals, but also to the swelling of the redundant mucous membrane which formed the covering of the resected deflection. This temporarily broadens the septum, sometimes very much, and the loose mucosa usually bags into the naris of the former concavity. The patient is apt to fear that the previously roomy nostril will remain permanently blocked, but he may receive positive assurance that in a few weeks both nares will be ideally clear, for the septum in time invariably becomes thin and lies in the median line.

In conclusion, I wish to call attention to a species of superficial inflammation with epithelial desquamation and consequent prolonged scabbing occasionally seen in the naris of the former convexity, and especially apt to occur in adult patients who have been subjected to previous sawing or fracturing operations, the post-operative cicatrices making it difficult to preserve the mucosa of the convexity so that its vitality becomes injured. In these cases I have the patient keep the operated side closed with a cotton pledget for some weeks to prevent scabbing, and have him cleanse his nose with a mild alkaline spray. When he begins to use his nostril for breathing he is directed to anoint its interior with lanolin, with 2 per cent. salicylic acid, to prevent the clinging of crusts. In some weeks these patients recover, and all scabbing ceases.

Discussion.

Dr. William L. Ballenger (Chicago) said the objects of the submucous resection were to re-establish normal respiration, and to allow of aeration and drainage of all the nasal meatus and accessory cavities. In about 90 per cent. of the cases of deflected septum this method best overcame the obstruction and with least shock and waste of time. He had adopted the general features of the Killian or continental procedure.

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The chief modification introduced by him was the swivel knife for the removal of the cartilaginous portion of the deviation. In selected cases he had fractured the ridge or crest of the vomer by means of Adams' forceps. Dr. Freer was wrong in stating that the swivel knife was often the cause of large perforations. The instrument had been largely adopted in Germany, England, and the United States, and seemed to meet a universal need.

Dr. HERBERT TILLEY (London) said that from an experience of over eighty cases of submucous resection he had become convinced that the thorough removal of the incisor crest was a most important part of the operation. As a matter of routine, he removed the anterior half of the inferior turbinate on the side opposite to the deviation. This body was nearly always enlarged, and if not removed it formed an obstruction when the septum was placed in the middle line. He preferred Ballenger's swivel-knife to any other instrument for the removal of the denuded cartilage. In children if the symptoms of obstruction were not urgent, he delayed operation until about puberty. It was advisable to use one long, sterilised strip for packing, instead of several smaller pieces. With practice the operation could be carried out in the most difficult cases in from fifteen to twenty minutes. He had used local anæsthesia by the submucous injection of eucaine and adrenalin chloride in a few cases, and in others by the superficial application of equal parts of adrenalin chloride and cocaine solution (10 per cent.), but in the majority of cases he preferred a general anæsthetic.

Dr. CHEVALIER JACKSON (Pittsburg, Pa.) thought that submucous resection was so satisfactory that one was tempted to do it when an operation other than septal was required. Patients did not come for the correction of deformity (except, perhaps, external deformity, which in his experience was not got rid of by this operation), but usually for the relief of symptoms due directly or indirectly to stenosis. He had been pleased at the attention given that day to the turbinals. Some ten years ago he had called attention to the turbinals as a factor in the failure of operation for the correction of septal deviations, and in the causation, not only of the stenosis, but of the deformity itself. He thought that the day of pottering at a nose in an office was past, and that intra-nasal surgery should be carried out in an operating-room.

Dr. HENRY SMURTHWAITE (Newcastle-on-Tyne) stated that he had employed local anæsthesia from the first and that this could be absolute. He applied cocaine 10 per cent. and adrenalin to the nose for half an hour, followed by the injection of beta-eucaine 2 per cent. The patient was seated upright in a chair and could immediately be lowered into the horizontal position on showing signs of faintness. In all his cases he had made the horizontal and vertical incisions, reflected the muco-perichondrium and held it back with a pad of wool so that one could clearly see the obstruction to be removed, He always used stitches.

Dr. J. PRICE-BROWN (Toronto) believed it would be unfortunate if Dr. Freer's sweeping statement that submucous resection was the best method of treatment for all cases of septal deviation received unqualified endorsement. This operation was undoubtedly the best when there was much thickening as well as deformity, but it seemed to him that simpler methods would suffice when there was merely curvature of the cartilaginous septum. He recommended two parallel incisions to be made from before backwards over the convex side about half an inch apart, with a cross-cut connecting. All the incisions should penetrate both mucous

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membranes and be made obliquely. The parts could then be pressed into the median position, the cut edges gliding on one another, and retained in position by means of a rubber splint until healing had taken place.

Dr. M. C. Smith (Lynn, Mass.) spoke from the dentist's standpoint. He thought that if the dentist fulfilled his duty to young patients there would be little need of surgical operation on the septum in later life. In children under fifteen years of age with a deviated septum and enlarged inferior turbinates a deformity of the mouth was nearly always found. The arch was narrow and V-shaped, the vault high, and the first molars were not more than an inch apart, and might come entirely within the arch of the lower jaw. Such patients should be sent to the dentist and the arch of the upper jaw widened, not by simply tilting the teeth outwards, but by a plate made of vulcanised rubber that would come down over the outer edges of the teeth so as to hold them in their upright position. Pressure should then be applied over the mucous membrane as high as possible above the gingival margin, and the alveolar process forced out bodily, so that most widening took place in the median line. Now, if the jaw were widened half an inch it would be reasonable to suppose that the anterior part of each nasal cavity would be a quarter of an inch wider, and if the inferior turbinals were drawn an eighth of an inch away from the septum space enough for breathing would be obtained unless a grave condition existed. By means of work done in the mouth it was easy to separate the inferior turbinates an eighth of an inch from the septum and to draw down the septum materially.

Dr. J. A. Stucky (Lexington, Ky.) feared that the enthusiasm for this operation was carrying them away. Sufficient time had not elapsed to prove the safety of removing so much of the septum. In the majority of cases deviation of the septum of the middle turbinate interfered with the ventilation of the upper part of the nose and drainage of the sinuses, and the removal of its anterior third gave relief. The use of crystals of cocaine and of the 20 per cent. solution would be dangerous in the South. For three years he had obtained the best effects as regards anæsthesia and hæmostasis with the following combination: ℞ —Sodium chloride 5 gr., cocaine hydrochloride 20 gr., antipyrin 20 gr., solution of adrenalin (1 in 1000) 2 drm., water to 6 oz. M.

Dr. H. P. Mosher (Boston) found that the operation took so long that it could not be used as a routine method in a large hospital clinic. In private practice it was applicable in 90 per cent. of the cases, and was the method of choice. For rapid and hospital work he expected to still use the older Gleason operation carried out by means of a horizontal and a posterior vertical incision, the fracturing of the tip of the vomer, and the buttoning over of the flap. It was important to be ready to make a flap and to abandon the button-hole incision at any moment. Cargill membrane was even better than rubber tissue for preventing adhesions, and had the advantage of helping the regeneration of the epithelium.

Dr. Wendell C. Phillips (New York) had for some years examined the septum in elderly people, especially those having no history of nasal catarrh, sinus disease or ear affection, and had been surprised to find how often a marked deflection or spur was present. He therefore maintained that their guide in deciding as to operation should be symptoms, and that an operation should never be performed unless these demanded it. The shock, depression, and suffering after the operation called for careful surgical measures in a hospital where the patient should remain for at least

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twenty-four hours. Two other operations were quite feasible, and were to be preferred in hospital cases when time was a consideration. He regarded Roe's forceps as a most useful instrument. He believed the submucous operation to be the most applicable in the average case. The incisions should vary according to the requirements. The cartilage should be removed with Ballenger's knife.

Dr. C. G. Coakley (New York) had seen in children with high and narrow palatal arches and septal deformities very beneficial results follow the use of dental splints which affected a widening of the arch. There was undoubtedly a straightening of the deflected septum and an increased patency of the nasal respiratory passages. Sufficient had not been said that day as to packing the nose in such a way as to keep the septum in the median line. Too much packing on one side resulted in a continued deviation, while too little was likely to be followed by the development of a hæmatoma between the layers posteriorly, and when this had been organised a marked bulging was found.

Dr. W. E. Casselberry (Chicago) assigned all credit to his townsman, Dr. Freer, as the originator in America of submucous resection of the nasal septum, because he had worked independently, and his publication antedated any description of the operation by their distinguished colleague in Freiburg. The speaker had operated in the past with permanently good results by the methods of Asch, Watson-Gleason, and Roe, and felt that the brusque terms of condemnation applied to them were undeserved. Still, in recent years he had substituted the Freer and Ballenger procedures with even greater satisfaction in most, but not in all, cases. Dr. Freer idealised his operation in alleging its universal applicability, but the speaker could cite offhand at least two conditions in which it was obviously not to be preferred: First, in septal deflection with external lateral deformity, the fracturing operations could be so made on the septum alone that in straightening it the external deformity was acceptably diminished; secondly, in young children the Watson-Gleason method was quite adequate, could be made in a few minutes under general anæsthesia, and left intact the framework of a developing feature. To avoid the intolerable delay of the fragmental dissection of bone from far back he adopted the following expedient in suitable cases: Having made the conventional submucous resection of the cartilage, maxillary crest, and vomer anteriorly, and having raised the muco-perichondrium of the bony concavity backward quite to its rear limit, he sawed off the projecting bony convexity. No perforation resulted, the muco-perichondrium of the concavity having been preserved, while the sacrifice of the fragment of mucosa so far back on the convex side was harmless.

Dr. Patrick Watson Williams (Bristol) thought there was too great a tendency to resort to so enticing and excellent an operation as that developed by Killian and Freer. The guide as to the necessity for interference should be the presence, not of septal and other deformities, but of symptoms demanding relief. Not very rarely there might be fairly free passages for air in the lower part of the nose, and yet owing to obstruction in the upper or physiological respiratory tract the subjective sense of nasal obstruction was marked, and attended by a certain degree of nervous or mental depression. The best method of removing the obstruction had also to be determined. Formerly the turbinals were treated rather than that resort should be had to the severe methods that preceded the introduction of submucous resection. This was the pro-

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cedure to be almost invariably adopted in operating on the septum, yet there were cases that could be rectified by partial removal of the inferior or middle turbinal or by the limited submucous sawing of a ridge. To avoid perforation while cutting through the cartilage he had found it advantageous to make a small primary puncture on the concave side well forward which would allow the passage of a long narrow muco-periosteal elevator. By means of this instrument the cartilage was bared where later it would be incised from the convex side. The swivel knife was of great service in shortening the operation, but there was danger of its breaking if the bony septum were attacked. He was nervous about doing septal resections in very young children, but in a limited experience of such cases he had only had good results after three or four years' subsequent observation.

The PRESIDENT considered the outcome of the discussion to be to the effect that there was room for judicious eclecticism in the choice of operation. The technique described by Dr. StClair Thomson was that published in detail by Killian, and was the form of submucous resection practised by himself and his colleagues. He (the President) departed from it in cases of deflection with a sharp vertical ridge, when he preferred Dr. Freer's reversed L incision as permitting of the detachment of the muco-perichondrium behind the ridge, with less risk of perforation. He then referred to a few special difficulties which he had encountered. Adhesions from previous operations were difficult, but not impossible to overcome. This was an argument in favour of making a complete resection at first. Extreme horizontal position of the upper portion of the deflected septum had given him trouble. He showed how the upper part tended to spring upwards and outwards out of sight when the middle part was divided. When this occurred he had usually to employ a small knife on a stem, as Dr. Ballenger's admirable swivel knife, which he used habitually for the removal of the bulk of the cartilage, was apt to miss it. In such cases it was necessary to exercise great discretion so as to avoid removing too little and thereby keeping the soft septum so far to the convex side as to renew the obstruction, and on the other hand, removing too much so as to take away the support of the anterior part of the nose. He made it a rule to operate on the convex side, but when there was a dislocation of the triangular cartilage into one nostril he operated on this side, making the incision along the prominent edge of the cartilage. Also, when there was a very extreme enlargement of the maxillary crest he sometimes selected this side, and extended his incision across the floor of the nose so as to detach the muco-periosteum from below upwards instead of from above downwards.

REPLIES.

Dr. STCLAIR THOMSON, in reply, congratulated himself on having been allowed to inaugurate such a highly interesting discussion. If he expressed any self-satisfaction with his own contribution, it was because the points he had purposely omitted were just those which had been so well filled up during the debate. He had intentionally said nothing as to the indications for treatment, but fully agreed with what had been stated chiefly by Drs. Wendell Phillips and Watson Williams. It was remarkable how one happened across patients with marked deviation, and yet no important symptoms could be attributed to the condition. As to shock, it was always well to keep the patient in bed, and in England one never

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operated on private patients in the office. As to technique, he preferred his long Thudichum to a Killian, and used two thin-bladed elevators and a Killian chisel and hammer. The necessity of removing the maxillary crest had been well emphasised by Freer. For anæsthesia cocaine was enough, but chloroform was quite satisfactory. Perforations were, of course, unknown as practice became perfect. The history of the operation had been touched upon. As Dr. Dundas Grant mentioned, the first case of submucous resection shown in London was his (Dr. StClair Thomson's). Dr. Tilley was in error in attributing this to Mr. Hunter Tod, who showed a Krieg-Boenninghaus case, a very different method, which removed entirely all the mucosa on one side and left a scabby and slowly healing area. In Europe they were chiefly indebted to Killian for perfecting the operation. The British rhinologists were very grateful to their American *confrères* for perfecting and popularising the method. His own outfit had been reduced to six or eight tools, but these always included Freer's elevators and Ballenger's swivel-knife.

Dr. Otto T. Freer, in reply, said that reference had been made to Killian as the originator of the submucous resection. Although Killian began operating before the speaker, the first detailed description by Killian that led others to follow him appeared in *Fränkel's Archiv* after the publication of his (Dr. Freer's) two first articles on the submucous resection. These had been printed in March, 1902 and 1903, in the *Journal of the American Medical Association*, and had induced a number of American rhinologists to follow his plan of operation. The credit of having first announced the essential principle of the method—the resection of the deflected cartilage and bone—belonged to Krieg, of Stuttgart. A number of cases in which large perforations followed the use of the swivel-knife had come to his knowledge. The hinged blade of the instrument could not be as surely guided as a fixed one, and was more apt to take its own way, so that the few minutes saved by its use were won at the expense of accuracy. The number of instruments in his set had often been criticised. Of all those displayed, not more than eight or ten were used in the average operation. The rest were reserved to meet the difficulties of unusual deflections, and without their aid he would have made perforations and incomplete operations in a number of cases. The cutting away of the superior maxillary crests with his forceps he did not find difficult. The patient sat before him while he stood and crowded the blades of the forceps downwards, straddling the ridge while they cut through it. He had never seen shock after his submucous resections. He repeated that he found the operation well suited to children, and with his instruments and method it was nearly as easy to operate upon them as upon adults. The minuteness of the operative field made very near vision imperative, and he advised presbyopic operators to use strong glasses. The lateral twist to the nose observed in many deflections he had often seen partly or wholly corrected by the submucous resection. Dr. Ballenger, he was sure, would have but few followers to his advice to break off the superior maxillary crest with forceps. Neither did he think that many would be induced to conduct the resection from the side of the concavity, as most operators who undertook this found that it added greatly to the difficulties of the operation. He regarded the Ballenger-Foster forceps shown by him as too large for use in most nostrils. In reply to the objection to the use of keen-edged elevators, he repeated that, far from creating perforations, they lessened their frequency and diminished the traumatism of the operation. The criticism of the fitness

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of his instruments was best refuted by their large and increasing sale, not only in America, but in Europe, a proof that they were satisfactory to many operators. In respect to the adherence in places of the periosteum and perichondrium, he looked up the records of thirty-six consecutive cases in his total of 178, and found that in thirty-three of these he needed sharp dissection to complete the denudation. It was impossible to cut any but the thinnest bone in the septum with a knife. He had never seen sinking of the nasal bridge following upon any of his operations. He had had great difficulty in having things which experience had taught him to be true generally accepted, notably the fitness of his mucous membrane incisions, which were only now beginning to be more widely employed. He felt sure that other recommendations which usage had led him to advocate as proper would in time win their way as operators experienced their value. He waited with confidence for time to declare what should be standard, knowing that it would discard what was popular for the moment, and establish what had merit but did not at first win favour.

THYROTOMY AND LARYNGECTOMY FOR MALIGNANT DISEASE OF THE LARYNX.

By Chevalier Jackson, M.D.,
Pittsburg, Pennsylvania.

It is not my intention to write an essay on malignant disease of the larynx. Only two phases of this broad subject will be considered, namely, the operations of thyrotomy and of laryngectomy. In addition, a few words will be said in regard to pre-operative microscopy.

It is hoped that the writer's omission of reference to the work of others will not be deemed egotistical. The opinions of, and results obtained by, the world's workers in this field—laryngeal malignancy—are so well known to you that it would be but a waste of time to review the literature. Instead, only the results of the writer's own work will be given.

Thyrotomy.

For malignant disease of the larynx I have done 15 thyrotomies, of which 3, though including portions of the cartilage, may be classed as thyrotomies.

Age.—The age varied from thirty-three to eighty-one years.

Sex.—All of the 15 cases were males.

Site.—Left ventricle, 3; right ventricle, 2; left ventricular

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