

**Anatomical researches on the deviations of the nasal septum : study of the difficulties which they occasion in operations, and especially in the catheterization of the eustachian tube, explanation of a new method for overcoming them / by B. Loewenberg.**

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VIATIONS OF THE NASAL SEPTUM.

BY

B. LOEWENBERG, M.D.

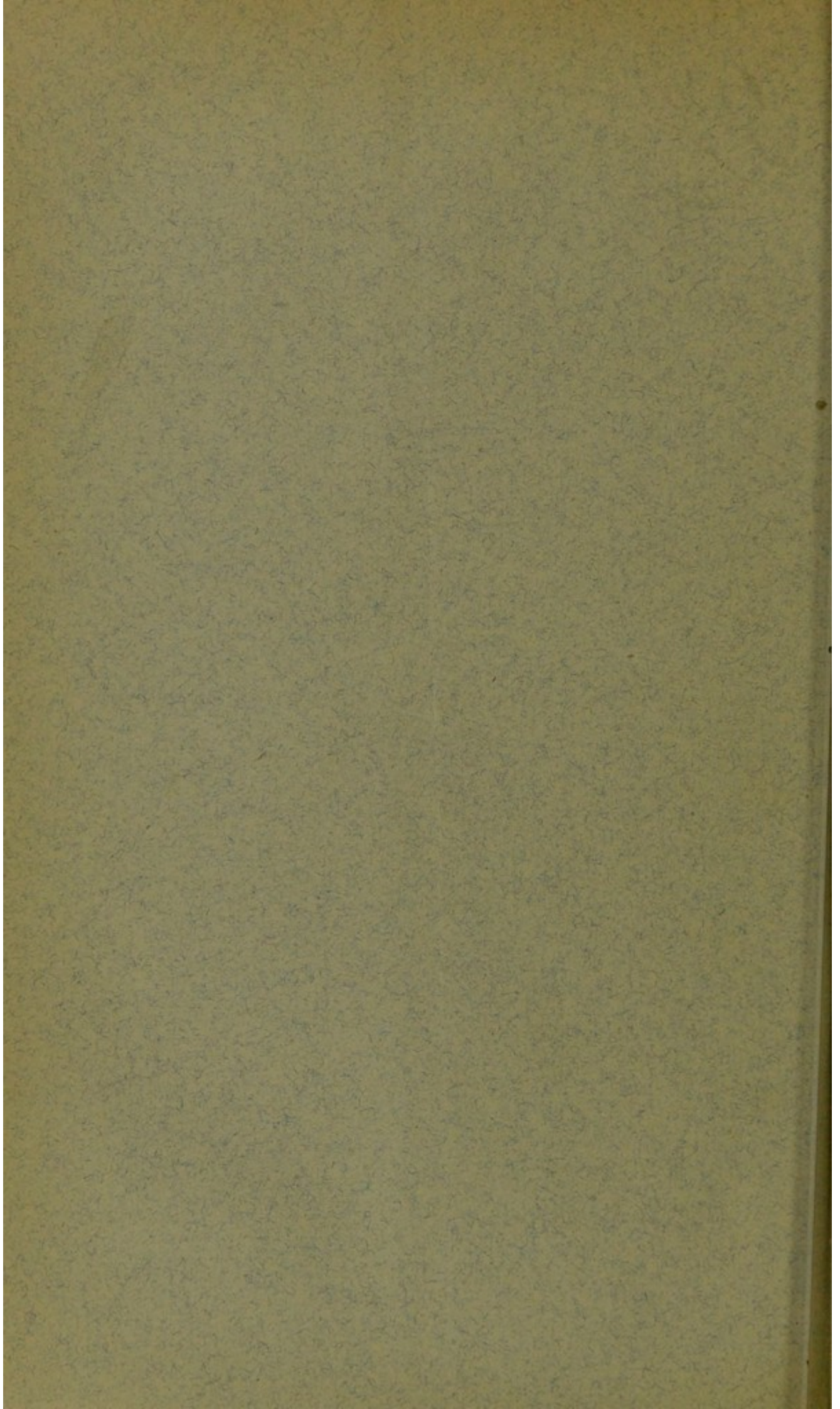
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## ANATOMICAL RESEARCHES ON THE DEVIATIONS OF THE NASAL SEPTUM.

STUDY OF THE DIFFICULTIES WHICH THEY OCCASION IN OPERATIONS, AND ESPECIALLY IN THE CATHETERIZATION OF THE EUSTACHIAN TUBE ; EXPLANATION OF A NEW METHOD FOR OVERCOMING THEM.\*

By B. LÖEWENBERG, M.D., PARIS, FRANCE.

(*With five wood-engravings.*)

I HAVE been impressed by the fact that although one may justly be preoccupied by the difficulties of introducing the beak of the catheter into the orifice of the Eustachian tube during catheterization, sufficient account is not taken, in my opinion, of the obstacles which so often interfere with the first act of this operation, that of the passage of the instrument into the nasal fossæ.

It is, however, during this period of catheterization, that the patient is liable to experience the greatest discomfort, because the instrument touches hard parts of bone and cartilage in the nose, contact with which may become extremely painful. What aurist has not seen patients so terrified by the distressing sensations occasioned in the beginning of catheterization that they interrupted the operation and absolutely refused its repetition, thus frequently making all efficacious treatment impossible?

I go so far as to think that the dread inspired in the public by Eustachian catheterization proceeds chiefly from the pain occasioned at the time of the passage of the instrument through the nose. It has, therefore, seemed to me useful

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\* The practical portion of this work was briefly communicated by the author to the International Congress of London, and published in the transactions of that Congress vol. 3, pp. 432-434. The anatomical researches were made during the winter of 1881-1882. Later articles, such as that of M. Zuckerkandl, not having been at the disposal of the author, could not, therefore, be utilized for this study.



to investigate the causes of this phenomenon more carefully than has been done up to this time, and to find out whether it be possible to avoid the inconveniences to which I have referred.

The following article contains the results of my anatomical and clinical researches on this subject.

My investigations had for their object the solution of the three following problems:

1. What is the seat and the nature of the obstacles which so frequently arrest the catheter during its passage through the nose?

2. What is their rôle in this operation, and in the therapeutics of the nasal fossæ?

3. How can one recognize the existence of these obstacles, and avoid them in a rational and scientific manner?

#### I.—SEAT AND NATURE OF THE NASAL OBSTACLE IN CASES OF DIFFICULT EUSTACHIAN CATHETERIZATION.

##### *A.—Clinical investigations.*

Long before undertaking the special researches which form the basis of the present article, I had learned by practice that, in the case in question, the obstacle is seated in the front and lower part of the nasal fossæ. It was, therefore, evidently useless to have recourse to posterior rhinoscopy, which generally only reveals to us the reflection of the back and upper part of the nasal fossæ, foreshortened and from behind.

Facts having proved this to me, I was obliged to use anterior rhinoscopy, the examination of the interior of the nose by the nostrils.

This method demonstrated that *in the numerous cases where the catheter encounters an obstacle in the nasal fossæ, this is not in the turbinated bones, as is often supposed, but in the septum.* A priori, one would be inclined to charge this either to hypertrophy of the lower turbinated bone, which is so common, or to the presence of mucous polypi; but inspection by the method which I shall explain later, shows that the much enlarged mucous membrane of the turbinated bone generally yields enough to a gentle pressure to allow



the passage of the catheter. As for the mucous polypi, they let the beak of the instrument go by, taking their original position again as soon as it is passed.

*The obstacle therefore belongs only to the septum ; it forms there the protuberances or spurs which I have described in a previous article.*<sup>1</sup> I only considered them in that place in regard to their importance in the treatment of chronic coryza by the galvano-cautery, and I merely mentioned there the part they play in the catheterization of the Eustachian tube, giving notice that I should take up the subject in a later publication. The present article is intended to realize the execution of that project.

Having recognized the seat, always identically the same, of these particular deformities of the septum, and the important part they may play in catheterization, of which we shall treat farther on, I was desirous of elucidating the *anatomical pathological-conditions* under which these malformations present themselves. In doing so I was asked to enlarge the field of study, and to consider various other points concerning the nasal septum.

B.—*Anatomical-pathological researches on the deviations of the nasal septum.*

My researches are based, on the one hand, on the dissection of more than one hundred fresh heads ; on the other, upon the study of skulls at the Orfila Museum of the Faculty of Medicine, Paris, and especially of the immense anthropological collection at the museum of the Jardin des Plantes. As the cartilaginous framework is more or less completely lacking in dry skulls, I have examined them particularly with regard to the conformation of the vomer and the perpendicular lamella of the ethmoid, while I have studied the cartilaginous septum from life and from fresh heads which I have dissected.

Knowing that the reading of dry columns of figures alarms the most intrepid reader, I refrain from presenting a detailed table of the different categories of my observations, which

<sup>1</sup> B. Loewenberg : Contribution au traitement du coryza chronique simple. In *Union médicale*, 28 Juillet, 1881.



have been made upon hundreds of skulls. I shall confine myself to stating briefly the principal results of these researches.

*Superior horizontal deviation of the nasal septum.*—It is only in about one case out of seven that I have found a septum absolutely straight in all its parts, consequently in a much smaller proportion than is generally supposed. (See treatises on anatomy.)

In other cases, which constitute, as one may see, the very large majority, one or several deviations exist. According to my investigations, these must be divided into several groups, which I shall call *vertical deviations* and *horizontal deviations*, the latter being divided into *superior and inferior horizontal deviations*.

The superior horizontal deviation pertains to the upper portion of the septum, and particularly to the perpendicular lamella of the ethmoid. Its convexity is oftener in the direction of the right than of the left, in a proportion which I have found to be from about three to five.

*Inferior horizontal deviation of the nasal septum.*—I call inferior horizontal deviation the lateral deformity of the lower part of the septum. It occurs, as I said in my communication to the London Medical Congress,<sup>1</sup> at the junction of the cartilaginous with the osseous septum; or, to express it more precisely, at the junction of the inferior posterior border of the cartilage of the septum, posteriorly, with the anterior border of the vomer, and, anteriorly, with the ridge that surmounts the line of junction of the palatine apophyses of the superior maxillaries.

It proceeds from the fact that the bony part on the one hand and the cartilaginous part on the other are not in the same vertical plane, but join under a dihedral angle projecting toward one side. When this deviation extends as far as the front extremity of the junction, it forms there the protuberances or spurs which I have described (*loc. cit.*), and which are located in accordance with what I have just said of their origin, in the lower and front part of the nasal

<sup>1</sup> Transactions of the International Medical Congress, London, 1881, vol. iii, p. 432.



fossæ, where this osseous-cartilaginous junction terminates. In cases where these excrescences are unilateral, they exist oftener at the left than at the right, as does the convexity of the lower horizontal deviation, as we shall see later.

I have studied the conformation of the lower deviations, and the protuberances which result from them, from numerous vertical and transverse sections of the septum. They have shown me that these projections could be formed in several different ways (figs. ii, iii, and iv, at the end of this paper.) In the great majority of cases it happens in this way: It is known that the two lamellæ of the vomer form between them a groove, open at the top and in front, which continues along the crest of the maxillaries, often as far even as the front and lower nasal spine. The edges or lips of this groove receive between them the lower edge of the cartilage, which here presents a very marked enlargement of triangular shape (figs. i and ii, 4). Any one examining a certain number of skulls is struck by the fact that the front part of the osseous septum is often inclined on one side in such a way as to encroach upon one of the nasal fossæ. In these cases the lip of the vomer and of the crest of the maxillaries advances toward this side, and makes with the edge of the cartilaginous septum which inserts itself there, the acute angle which constitutes the lower deviation. The angle is therefore formed by a lower osseous plane and an upper cartilaginous plane.

It is the same with the protuberances which it forms at the entrance of the cavity.

Often this projection is not confined to the entrance of the nasal fossæ, but extends all along the septum. In very marked cases the appearance in living subjects is rather singular; when dilating the nostril and illuminating far into the interior of the nose, one sees running along the septum a sort of pad or cushion, placed laterally. As one examines it from the front to the back, it is seen to rise more and more, conformably to the direction followed by the osseous-cartilaginous junction, the projection of which forms it.

Dissection and the study of dried skulls have taught me that the deviation sometimes continues beyond the car-



tiliginous part, and then inclines toward the suture which follows it ; that is to say, toward the junction of the vomer with the perpendicular lamella of the ethmoid.

In certain cases where the vomer itself presents no inclination, one of its lips may, nevertheless, advance toward one side and there form a protuberance with the lower back edge of the cartilage which inserts itself in this place.

Thus, therefore, the lower deviations and their protuberances are formed by the lateral inclination of the bone and cartilage, and both contribute usually, as sections demonstrate, to the formation of the projection. I have, however, met with subjects where one or the other, alone, was accountable for the prominence. This particularity was often due to a marked incurvation of the front and lower part of the cartilage, or to its oblique implantation (C. figs. iii and iv). Here the lower swollen edge is no longer exactly encased in the bony groove, but overruns it on one side, and forms the projection of itself. In other individuals the effect of this asymmetry is that the protuberance is formed on one side by the cartilage, and on the other by the bony substance (fig. iii), just as if the cartilage had slipped laterally upon the bone.

Figures ii, iii, and iv represent some of the most remarkable sections which I have obtained ; they show the different ways in which the substratum of these deformities is constituted in different individuals.

*Relations of horizontal deviations to each other.*—In the majority of cases I have found that the inferior deviation forms the reverse of the superior deviation ; that is to say, that the convexity of the one is turned in the opposite direction to that of the other ; for example, in the case most common, that where the septum deviates to the right in its upper part, it deviates, on the contrary, toward the left in its lower part. We have already seen that this conformation generally involves the existence of a protuberance on the side of the convexity of the inferior deviation ; here, then, is the explanation of the greater frequency of the spurs in the left nostril.

In certain persons the arrangement is still more irregular :



it is like a kind of torsion or undulation of the septum from top to bottom, by means of which the groove of the vomer and the crest of the maxillaries do not participate in the curve of the lower deviation, but deviate in their front part in the same way as the superior deviation; for example, in case of superior deviation to the right, and of inferior deviation to the left, the right lip of the vomer is projected into the right nasal fossa, and forms a protuberance there.

In the minority of cases, the convexities of the two horizontal deviations face the same way. Here the lamella of the ethmoid bulges on one side (superior deviation), and is as if arched over the vomer; the angle it makes with the latter constitutes the inferior deviation. The protuberances, when they exist, are usually found in these cases on the same side as the two convexities. Sometimes, however, they are on the opposite side, on account of a species of twist similar to that which I have described for the preceding group.

(I will add that I have at times seen something analogous, but working in a horizontal direction and on the same deviation, the direction of which then varies from the front backward; for example, an inferior deviation, the front part of which directed its convexity to the right, the back part to the left.)

*Vertical deviation of the nasal septum.*—Besides the horizontal deviation which I have described, I have found, either in the living subject or in the cadaver, anomalies of quite a different kind and which do not seem to have been appreciated according to their importance. These are deviations in the vertical direction. They are not, like the preceding, horizontal or slightly ascending projections, but *folds extending from top to bottom along the septum narium* in its front part, consequently pertaining especially to the cartilage of the septum. These folds present a convexity toward one side, a concavity toward the other. When they extend all the way down, they sometimes obstruct the inferior meatus as a protuberance proceeding from an inferior horizontal deviation would do.

In addition to the deviations which I have described,



there are in certain cases more complicated and more irregular deformities, sometimes to such a degree as to defy all description.

If horizontal deviations are manifestly due to malformations, I have, on the contrary, seen a certain number of vertical deviations which proceeded from traumatic causes, such as a fall, or a blow upon the nose dating from early childhood. Perhaps the irregular deviations which I have just mentioned may also be of traumatic origin.

## II.—RÔLE OF DEVIATIONS OF THE NASAL SEPTUM IN SURGICAL THERAPEUTICS, AND ESPECIALLY IN THE CATHETERIZATION OF THE EUSTACHIAN TUBE.

In analyzing exactly the importance of the deviations of the septum narium, it seems to me that the injurious influence which they may exercise in regard to the functions of the nasal fossæ has been exaggerated, whereas enough consideration is not given to the impediments they often occasion in the diagnosis and the treatment of affections of these cavities.

In regard to the first point, it is thought that these malformations may considerably impede respiration and phonation. On this subject, I call attention to the necessity of distinguishing between the two groups of deviations which I have established above.

If it be supposed that the horizontal deviations can oppose themselves to the passage of air, so far as to hinder these two physiological actions, it must not be forgotten that the aërial circulation, although diminished in one half the nose (by reason of the convexity of the deflected septum), is therefore all the more free in the other, on account of its enlargement by the concavity of the septum. There is therefore compensation. It is otherwise with vertical deviations; here there can be no question of compensation, for this deformity narrows one of the nasal fossæ from top to bottom, to the degree of closing it almost entirely in certain cases, without the other being widened on that account, at least at the place where the fold begins. Now, it suffices,



I think, that there should be in the whole extent of the nasal canal one single narrowed point which does not allow the air to pass in sufficient quantity under the ordinary respiratory pressure, to make respiration by the nose impossible.

(I do not insist further upon this point, having enlarged upon it in my article on adenoid tumors.)

If the influence of deviations on the physiological function of the nasal fossæ is exaggerated, the other extreme is fallen into, I think, as to their importance for the diagnosis and treatment of affections of these cavities. It is, however, evident, *a priori*,—and a long experience has proved it to me,—that the convexity of the deformity may hide from sight and screen from surgical operation, all or part of the depths of a nasal fossa, while the concavity may harbor tumors which run the risk of passing unnoticed. This is what happens with horizontal and still more with vertical deviations. We will pass summarily in review, in relation to the effect of these deformities, the pathology and therapeutics of the nasal fossæ, and terminate with Eustachian cathethrization considered from this special point of view.

#### A.—*Simple chronic coryza.*

Like many other specialists, I am of opinion that the principal part in the treatment of chronic coryza belongs to the galvano-cautery. In a former article (*loc. cit.*) I treated this point, and brought forward the difficulties of sparing the septum in cases where deviation exists. I described in the same place cauteries made specially for this purpose according to a new principle, that of the unilateral action. They are indispensable in cases of decided protuberances, to avoid burning the latter, which I consider as *noli me tangere*, because the cicatrization of cartilage wounds is extremely difficult, especially in the case in question, where the perichondrium is necessarily destroyed by the cautery. I will add briefly that I have succeeded in making these instruments much flatter still, and consequently much easier to use, by turning back the sheet of platinum upon the flat side of the cautery.



*B.—The mucous polypi of the nasal fossæ.*

In following the old methods, according to which the mucous polypi of the nose were torn away with pincers without dilating the nostrils or illuminating the nasal fossæ, the turbinated bones have often been fractured—even torn away. I firmly believe that the protuberances of the septum, often visible to the naked eye on raising the end of the nose, must have met with a similar fate. The present methods, which permit us to radically cure this formerly incurable affection, are, as is known, the use of either the cold or galvano-caustic snare, and the subsequent destruction of the pedicles by the galvano-cautery.

One can readily understand that a marked deviation of the septum may seriously interfere with this form of treatment. The vertical deviation must be mentioned here in the first place; sometimes the convex fold which it forms at the opening of a nostril masks it completely. It then becomes very difficult to recognize the existence of the polypi and to reach them with the snare. Here is a curious example of this kind, upon which I operated in 1878. The patient, aged sixty, who had long been affected with mucous polypi of the nose, presented a vertical deviation. The cartilaginous septum had deviated from top to bottom, toward the left. The right nasal fossa, which was very wide, contained an enormous quantity of tumors easily seen and taken hold of, and which I was able to extract with ease by means of the galvano-caustic snare. On the left, after having removed some polypi which came forward as far as the entrance of the nostril, I was met by the convexity of the vertical deviation. Between the projecting fold which it formed from top to bottom, and the outer wall of the nasal fossæ, there was only an opening the size of a pea, quite filled by an end of polypous excrescence. On the other hand, palpation by the pharynx with the finger showed that the whole portion of the nasal fossa back of this contraction was filled with polypous masses. The patient not being able to endure posterior rhinoscopy, and being obliged to leave Paris at once, I could not operate



upon the polypus from behind, but I was obliged to adopt the method of tearing away, which I only use in case of its being impossible to do otherwise.

I took hold of the excrescence with the snare, and gently drew out, through the small opening, an enormous and very soft polypus, having exactly the shape and size of a white worm (larva of *Melolontha vulgaris*, May-bug) arrived at full maturity. Immediately after, palpation showed that the fossa was empty. Had it not been for want of time, I could have accustomed the patient to rhinoscopy and then I could have destroyed, as I usually do, the point of implantation of this polypus by means of a galvano-cautery, bent and introduced by the pharynx under the control of the mirror; not being able to do so, I could not promise the patient that there might not be a relapse.

In the case of another gentleman whom I still see occasionally, there is horizontal superior deviation convex at the right, and horizontal inferior deviation convex at the left; the two nasal fossæ were filled with mucous polypi. After relieving the left of those which obstructed it, I finally found still another bunch of small polypi, beginning at the posterior extremity of the middle turbinated bone and niched in the concavity of the perpendicular lamella of the ethmoid, which had deviated to the right. It required persistent effort and an energetic but prudent use of the galvano-cautery of lateral action to destroy these tumors and to preserve the septum intact.

#### C.—*Epistaxis.*

I merely mention the difficulties caused by deviations in cases of obstinate epistaxis, when they hinder the search after the point of bleeding.

#### D.—*Nasal pharyngeal douche.*

I call attention very particularly to the importance of deviations of the septum in the use of the Weber douche, not only because the injection passes with difficulty into the nasal fossa which is contracted, but *because it passes too easily into the other which is widened.* Poured into the latter, the



liquid reaches the nasal pharynx superabundantly, and thence passes, behind, into the narrowed nasal fossa. The effect of the contraction of the passage is an augmentation of resistance and of lateral pressure upon the nasal and pharyngeal walls, and finally the liquid may invade the Eustachian tube and even the tympanic cavity.

If too strong a pressure be used (a syphon hung too high above the head of the patient, for example), and a liquid too cold, too warm, too concentrated, or not enough so, a violent otitis media may result from this penetration of the liquid into the cavity.

In my opinion, such imprudences as these have prevented distinguished aurists, particularly in America, from making use of this process, which I believe to be excellent, on condition of employing it according to the following directions :

Injection with gentle pressure (I prefer the use of a syringe, the stream of which can be immediately stopped or checked); tepid liquids, consisting of weak solutions; straight position of head of the patient. Necessity of thoroughly teaching the method and having the person in charge of making the injections practise it before me. In cases of considerable deviations, inject only by the narrowed side.

#### E.—*Catheterization of the Eustachian tube.*

At the beginning of this article I dwelt upon the importance of a free nasal passage for Eustachian catheterization. We have also seen that one must not be satisfied, in this matter, to speak, as many classical works do, in a general way, of "deviations of the septum"; but examining the question more closely, as we have above, we must distinguish between the different groups of these anomalies. We will now apply the results of my investigations to this special point.

We must first eliminate the horizontal deviations, which I call the *superior*. Not bearing at all upon the inferior nasal meatus, they could not impede catheterization, which has this canal for its field of operation.

On the other hand, I think I have found in inferior devia-



tions, and especially in the protuberances or spurs so often formed by the anterior extremities of these deformities, the principal cause of the diseases of the nasal passage and of the difficulties which are so common in operating through it. Examination of the museum skulls has proved to me that the inferior deviation directs its convexity oftener to the left than to the right, and that consequently the protuberances exist oftener at the left. This particularity seems to explain a fact known, but insufficiently explained up to the present time: *the greater difficulty of the catheterization of the left ear.*

I am in the habit of accompanying the notes which I take of all my patients with elementary drawings in cases which present an anomaly of conformation or any injury worthy of notice. I represent in this way perforations of the drum, exostoses of the auditory meatus, obliquity of the uvula, hypertrophy of the tonsils, deformities of the nasal fossæ, etc., etc. Now, in the majority of my drawings of the septum narium, I find the protuberance on the left. Since 1877, for instance, I have drawn twenty-eight cases where it occurred on that side, eleven where it existed on the right, and fourteen where both sides were affected. And yet I have only drawn cases of nasal obstacles developed to such a degree that they seriously hindered catheterization, and of which I wished to keep a memorandum for future use.

We will now inquire how these protuberances, which so often present the greatest obstacles to catheterization, impede the progress of the catheter. As I have often proved by means of the combined method, which I shall explain later, as soon as the beak of the catheter approaches the entrance of the nasal fossa it strikes against the protuberance which faces it, and which obstructs the width of the inferior meatus where the operation is to be performed (*vide* fig. ii, where 2 represents a slightly developed protuberance). It is then that the Schneiderian membrane, tightly squeezed between two hard substances, *viz.*: the catheter and the osseous-cartilaginous substratum of the spur, suffers a strong pressure, very painful on account of its abundance of sensitive nerves. (What occurs



here might be compared—*mutatis mutandis*—to what happens when the tibia is struck; the pain results in the same way from the compression of a thin skin between the contusing body and the underlying tissue in contact with the bone.) Thence the fact which I mentioned above, and which is known to all aurists, that many patients at the beginning of catheterization withdraw the head, and refuse the continuance or repetition of the operation. If one persist in advancing the catheter, the protuberance causes the point of the instrument to deviate; it then strikes against the lower turbinated bone, or else passes into the middle meatus. In both cases it is manifestly impossible to complete the operation, unless by an energetic downward pressure, very painful for the patient, the instrument be forcibly drawn back into the inferior meatus and force a passage while maintaining it. In certain cases of vertical deviation the fold of the cartilage continues all the way down, and may obstruct the inferior meatus as a protuberance would do.

Even Politzer's mode of procedure may become difficult on account of the protuberances occasioned by one or the other of these deviations, for their compression by the end of the balloon causes pain to certain patients. It is useful, in such a case, to employ the modification which I proposed long ago, and which, indeed, has been generally adopted: it consists in adding to the end of the balloon a little soft rubber tube, which prevents any disagreeable pressure.

I will add that the projections may make the simple examination with the nasal speculum disagreeable to the patient, on account of the tip of the instrument striking against these highly sensitive spurs.

### III.—NEW METHOD FOR AVOIDING NASAL OBSTACLES IN THE CATHETERIZATION OF THE EUSTACHIAN TUBE.

Instead of the probing, so painful to the patient, to which one is forced to resort in the frequent cases where protuberances exist, is it possible to imagine a truly scientific method to facilitate catheterization under these circumstances?



I begin by rejecting any sanguineous operation, such as the ablation of the deviated portion of the septum. In such an act of surgery, the shot would go far beyond the mark, especially taking into consideration what I said previously in regard to the difficult healing of wounds of the cartilage.

The point, therefore, is to get round the obstacle and not to remove it *manu armata*. This can be managed in many cases by a process which is known, *catheterization by the opposite nostril*. But cases where protuberances exist on both sides of the septum are not rare, as I have already explained, and then passage is hindered in both nasal fossæ, especially for catheters with a beak long enough to penetrate into the tube of the opposite side. And it is often very difficult by this method to make the instrument penetrate far enough forward into this canal and in a good enough direction to allow the air to penetrate sufficiently, much less liquid substances or bougies! For some years I have used a process which may be said to allow the catheter in all cases to pass through *the narrowed nasal fossa*, sparing meanwhile the sensitiveness of the patient. This method suggested itself to me from the habit of exploring the nasal fossæ of all my patients: it is *catheterization guided by SIMULTANEOUS anterior rhinoscopy*, which process I will now explain. Great importance is justly attributed to the exploration of the buccal and naso-pharyngeal spaces, in the study of diseases of the ear. I have insisted upon this point since 1865, and my efforts have perhaps contributed, with those of such men as v. Troeltsch and Voltolini, to calling attention to this subject.

The point now is to take another step in advance, and to join to the indispensable auxiliaries of the aurist the attentive study of the nasal fossæ, which is no less important in his specialty than is that of the pharynx. The importance of this study is obvious: the interior mucous lining of the nose is continuous with that of the entrance of the tube; the permeability of the nasal cavities influences the access of air to this canal, and finally catheterization and the system of Politzer have the interior of these cavities for their



operating ground. In considering, therefore, the importance of the conformation of the nasal fossæ for these operations and of the condition of their mucous membrane for that of the middle ear, I lay down as a principle *the necessity of exploring the nasal fossæ of every person requiring our attention for an affection of the ear*, unless the disease be manifestly confined to the external ear or to the auditory meatus (eczema, foreign bodies, furuncles, etc.). I do not go so far as to require, in every case, the practice of posterior rhinoscopy, which often necessitates a series of preparatory visits before succeeding completely. On the other hand, anterior rhinoscopy is performed with great ease and always succeeds the first time.

On dilating the entrance of the nasal fossæ by means of the speculum, and projecting (natural or artificial) light into these cavities by the aid of the concave reflector, the eye penetrates to a great depth into the interior of the nose. The first glance shows the conformation of the septum and of the inferior and middle turbinated bones as well as the condition of the mucous membrane and its secretion. We know that in certain cases of abnormal size of the nasal fossæ (ozæna) the eye may pierce as far even as the posterior wall of the naso-pharynx, and on causing the patient to make the motion of deglutition the phenomenon of the pharyngeal contraction may be observed.

In exploring the interior of the nose the glance of the observer includes particularly the anterior and inferior regions of the nasal fossæ, precisely the part where are located the protuberances which form the special obstacle to catheterization in regard to the passage of the instrument through the nose. This same glance shows the operator whether the conformation be normal or the reverse, and, consequently, whether the catheter will pass easily or with difficulty. In the case where anomaly exists, he recognizes at once the nature and configuration of the obstacle. Besides, and on this point I would lay special stress, this observation shows him at once how he can remedy these inconveniences by *my method: catheterization combined with anterior rhinoscopy*.

The surgeon would certainly be blamed who performed



an operation by sense of touch and without the aid of sight upon a part accessible to his gaze—the “*oculis subjecta fidelibus*” of Horace. As incredible a thing happens, however, daily, even in the most difficult cases of Eustachian catheterization! No one thinks of performing this operation while inspecting, at the same time, the nasal fossæ, which are rendered accessible to the sight by the speculum and lighted by the reflector. This process, the idea of which ought to come, it would seem, to the mind of every aurist, has not, to my knowledge, been indicated up to the present time. I have had occasion to explain it before numerous confrères, both at the last meeting of the International Congress of London (1881), and in Paris, and, to my great surprise, I have met no one who had put it in practice.

*Method of Operating.*—When catheterization is to be performed upon a patient, and inspection has made evident the regular conformation of the nasal septum, I take off the speculum and the reflector, and proceed according to the usual methods. If, on the contrary, there be a protuberance on the side to be operated upon, I leave the speculum in its place, and also keep on the reflector to light the operating ground. It is plain at once that in proceeding according to the usual method, that is to say, in introducing the catheter the point downward, the beak of the instrument would inevitably graze the protuberance which bars the inferior meatus to a greater or less extent in different cases (see fig. i; the drawing represents a protuberance slightly developed). But one discovers at the same time farther beyond, an interstice (fig. i, 3) having the protuberance on the inside, the inferior turbinated bone above and behind, and the floor of the nasal fossæ below. It is by this path which presents itself to view, already marked out, that the catheter is to be surely and easily directed. To do this, the instrument should first be turned around its longitudinal axis, so as to place the beak outward and to present it in face of this interstice. In advancing it will soon be possible (as soon as the protuberance is passed) to make it resume its normal position, that is, the vertical direction, for, as we have seen, the horizontal inferior



deviation rises as it progresses toward the interior, and soon lifts itself above the inferior meatus.

One then performs what is called "le tour de maître" (the master-stroke), to borrow this term from urethral-vesical surgery. But it is going a great deal too far to recommend making as complete a movement as is done in the catheterization of the urethra, that is to say, turning the instrument through an arc of  $180^{\circ}$  around its longitudinal axis. According to my experience, a rotation of from  $45^{\circ}$  to  $60^{\circ}$  generally suffices to accomplish the object, which is merely to avoid the protuberance. (Fig. i represents a small protuberance. It would suffice in such a case to turn about  $45^{\circ}$ ; where the spurs are more developed in width and height, an increased rotation is necessary.) Guided by my method one need no longer perform "le tour de maître" in an empirical and exaggerated way, but it becomes a rational process exactly proportioned to the exigencies of each case, and where the eye of the operator enables him to avoid all painful contact. In certain cases where the protuberance closes the whole width of the meatus, and where the inferior turbinated bone is very large, I have sometimes been able to manage in *another way*: As there is often in this case a little free space left below the prominence, the catheter must be made flat by turning the beak in or out, and it can thus be slipped forward. Inspection during catheterization teaches something more still: it becomes obvious at once that the opening which is before one (fig. i, 4) could not, as a rule, give passage to ordinary catheters without their causing severe pain to the patient on account of their size, their curve, and the length of the beak. I use, therefore, especially for the latter process, where it is necessary to pass below the spur, delicate catheters having a very short beak. These instruments are all the more indispensable, because in spite of every precaution the prominences sometimes press upon the longitudinal axis of the catheter, causing a deviation toward the exterior. The beak of the instrument, having passed beyond the nasal fossæ, then finds itself too near the Eustachian tube. When, therefore, under these circumstances the ordinary catheters having a



long beak are used, the point, as soon as it is turned so as to place it in the entrance of the tube, strikes against the lateral wall of the pharynx and rotation becomes impossible or, at least, very painful. On the other hand, in using a catheter with a short beak, its point only describes, in turning, an arc of a circle of small radius, and can therefore make the necessary movement of rotation without being interrupted by contact with the pharyngeal wall.

In these cases I like to use catheters of a particular kind: they are thin instruments, having a beak of only seven millimetres and a half in length, which makes *an exact right angle* with the stem. This shape not only facilitates the passage through the nose, but also the rotation of the beak in the pharynx. I had this pattern made by Luer about fifteen years ago for a person in whose case the nasal passage was extremely narrowed, probably by protuberances—I say “probably,” for I had not, at that already distant period, recognized the anomaly in question.

#### *New nasal speculum.*

There are at present several kinds of nasal specula, all more or less useful for the examination of the nasal fossæ. I used at first, in my process of catheterization, the pattern which I described (*loc. cit.*), and which is nothing more than the usual speculum, only with much thinner branches than are usually made. But all these instruments, for the method of operation which I have just explained, present the following inconvenience: when once the beak of the catheter has passed through the entrance of the nasal fossa which is narrowed by the protuberance, the further presence of the speculum becomes not only useless, inspection being no longer necessary, but even troublesome, for it interferes with the free advance of the catheter, and its fixation at the time when inspiration is required. If it be taken off at this moment, it is necessary to turn the screw of the instrument with one hand while the other secures the catheter. The speculum being no longer held in place, receives, in unscrewing it, concussions against the catheter, which are painful to the patient. I have been led, on that account, after many ex.



periments upon the cadaver (by means of a thin sheet of lead, which is easily shaped as one likes), to a special speculum, different from the old instruments and from the new model of Creswell Baber. My speculum (fig. v, where it is drawn a little too long) is a metallic tube shaped like a truncated cone, at the large end of which a sort of handle or palette is implanted almost perpendicularly to the axis of the cone. A rather wide slit extends the length of the speculum on the side opposite that which holds the palette. The instrument having thin slides is much lighter than ordinary specula, and its contact with the catheter would not displace the latter in so painful a manner to the patient as the ordinary heavy and cumbersome instruments do.

After having introduced this speculum into the entrance of the nasal fossa, the palette being above, it is held there by slightly pressing the latter with the thumb of the left hand, the fingers of which are placed against the back of the nose. The slit is in this way directed downward and horizontally so as to leave the passage free for the introduction of the catheter. When the catheter has passed the narrowed part, the speculum is taken off by turning the slit upward; it then drops off of itself, the slit making room for the stem of the catheter.

By using the combination of means just explained, I have been able to conduct catheterization successfully and without causing suffering to the patient, under circumstances where the deviation of the septum made the operation impossible or, at any rate, extremely painful by other methods. I have even succeeded where experienced hands had failed, and where, I hasten to add, I should not, certainly, have been more fortunate without the aid of my method.

In regard to the sensation experienced by the patient, the difference between the ordinary processes and mine was such in many cases that the use of the latter was loudly demanded by all who had once tested its advantages. But even in using it, it is often necessary to proceed with much delicacy and circumspection in order to guide the catheter through the two or three dangers which obstruct its way. I say "three" dangers, for the situation is again aggravated



in some cases by an elevation of the floor of the nasal fossæ, which then brings the number of obstacles up to three, counting the inferior turbinated bone and the protuberance.

*Explanation of Figures.*

I drew fig. i from life, and figs. ii, iii, and iv from sections made upon three different cadavers, selected from the large num-

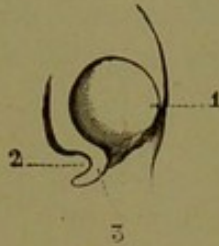


Fig. i.

Fig. i.—1 Inferior turbinated bone. 2 Protuberance of the septum. 3 Free interstice.

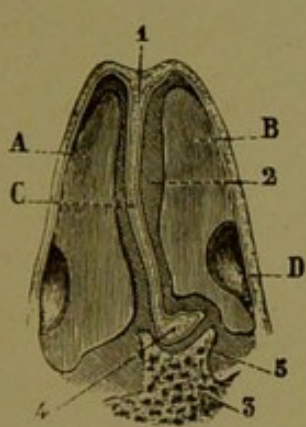


Fig. ii.

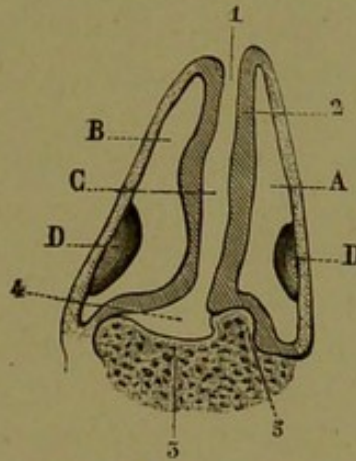


Fig. iii.

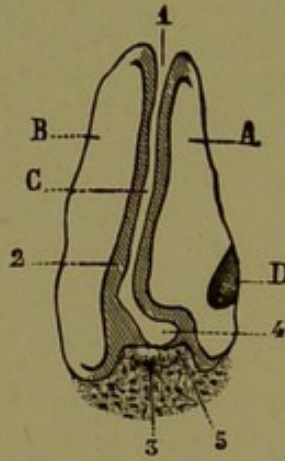


Fig. iv.

Figs. ii, iii, and iv.—Sections of the cartilaginous part of the nose. A, B, Nasal fossæ. C. Septum. D. Inferior turbinated bone. 1 Cartilage of the septum. 2 Mucous membrane. 3 Bone. 4 Cartilaginous protuberance. 5 Osseous protuberance.

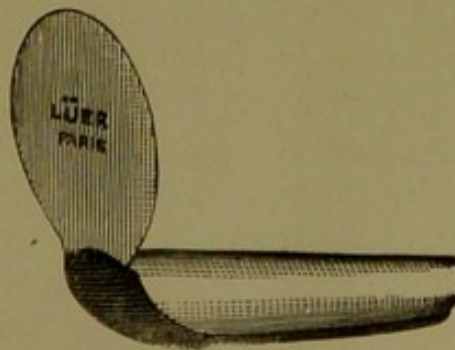


Fig. v.



ber which I have dissected for this purpose. The section was in an almost perpendicular direction from top to bottom, on a slightly inclined plane, that is to say, making with the forehead an acute angle open at the top. As it has only concerned the cartilaginous part of the nose, the horizontal superior deviation, which bears particularly upon the perpendicular lamella of the ethmoid, is not shown in my drawings ; the only traces of it are found in fig. ii, where it has partially attained the cartilage of the septum also.

Fig. v was drawn by M. Badoureau, engraver. The instrument is represented a little too long in its horizontal dimensions.