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M.D. (Berlin),

To whose advice and friendship
I owe much.

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PREFACE

THESE pages are intended to be read, as they were written, rapidly from cover to cover.

The figures, the majority of them from nature, were drawn by the author expressly to explain the text. The rather ample legends below them are inserted in the hope that they may help the reader to a familiarity with the features he is likely to meet with in practice.

I am much indebted to Dr. Bernard Potter for his kindness in correcting proofs, and to Mr. Keogh Murphy for his valuable advice and assistance.

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CHAPTER I

ANATOMY AND PHYSIOLOGY

SINCE the nose is the portal of the respiratory system it is strange to reflect that not a dozen years ago it was considered rather eccentric to take a serious interest in its diseases. Time and work have made a change, and rhinology is now an important element in medicine. Nevertheless the nose remains a very special region, and not one man will express a confident opinion upon its condition where fifty will deal successfully with an eye or a bladder.

The organ is easy to examine, and many of its diseases are easy to deal with, and it is an injustice to the public that the profession at large should neglect a branch of study at the cost of serious distress to a very large section of the community.

That this is no exaggerated view comes out clearly in the special department of a London hospital, which is largely filled by poor patients who must needs take long country journeys to seek relief, and who report that one and another of their neighbours suffer as they do, but cannot afford to come up.

Practitioners and senior students are already over-burdened with practical and literary work, and have no time for a serious study of more than one special department of medicine. Nevertheless, one is constantly meeting the man who regrets his total inability to deal with the nose, and who yet has neither the opportunity nor the inclination to make a complete study of rhinology.

It is to such an one that these chapters are addressed. They are written *currente calamo* and without any reference to authorities, in the hope that expressing what comes uppermost in the mind of one constantly engaged with the organ, they may succeed in representing in true proportion, just what

is most essential in daily practice. If they succeed in engaging his attention the reader will be easily rewarded for his trouble, for he will meet with a nasal case almost daily in general practice, and many of these he will relieve with less trouble than it takes to test the urine. And since rhinology is young, he will have many opportunities of gaining the confidence of his neighbours by detecting the secret of some long undiagnosed case. He may cure the subject of chronic bronchitis of twenty years' standing, by draining an antrum, or an able man condemned to "pulmonary tuberculosis," by removing a bleeding polypus. He will see a man have his appendix removed and be at death's door afterwards, who will be restored to health by washing out the frontal sinus. Moreover, he will find almost daily opportunities among the children of putting them in the way to proper breathing, thus enabling them to grow up with well developed chests, capable of dealing with the tubercle bacillus. Let him forget that the nose is the organ of smell, and remember

that it is the natural air inlet and capable of spoiling the whole person.

A large proportion of his cases of nerves, of headache, of deafness, of bronchitis, of gastritis, and of mere want of development of body or mind, are nose cases, and they cannot be neglected.

Some readers will, it is to be hoped, take a serious interest in the subject and study one of the excellent text-books which are being published every six months in this country; the rest may get the salient practical points here and perhaps fix them in the mind by a short course in the out-patient department of a hospital.

ANATOMY.

You must face the fact that it is impossible to take an intelligent interest in what you see there or render any service to the patients, without a fair knowledge of the anatomy and physiology of the organ, and since you possibly do not remember

what you got up about a region which does not figure largely in anatomy examinations, it may be worth while to recall the chief points.

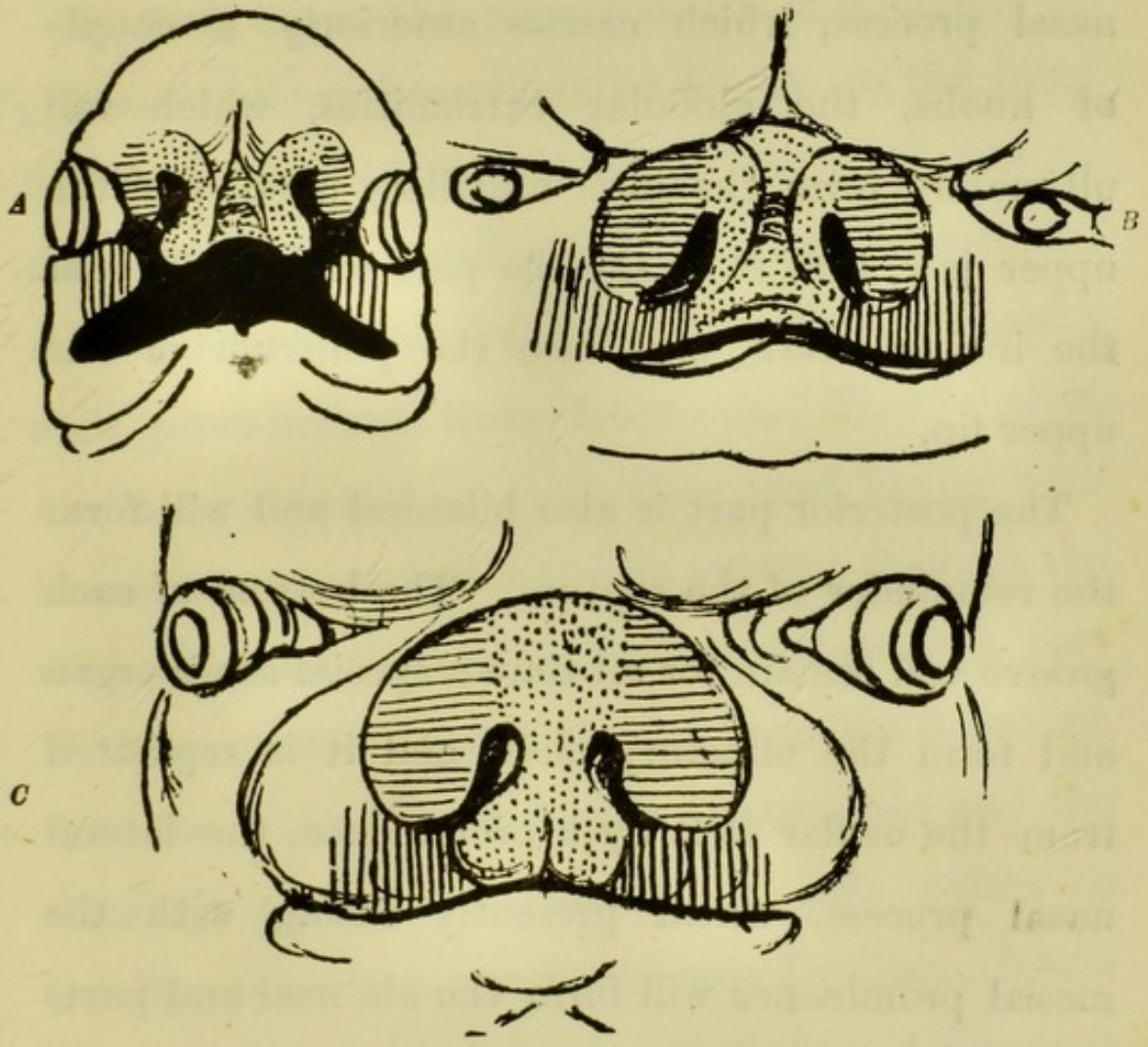


FIG. 1.—The Human Embryo (after His).

The mesial nasal process is indicated by dots, the lateral by horizontal shading. Vertical shading indicates the maxillary process. The mesial with it, globular extremities forms the septum, premaxilla and centre of the lips while the laterals form the alæ nasi. The mesial and lateral coalesce with the maxillary processes to divide the nares from the mouth.

In the human embryo the nose first makes its appearance as an indentation of special epithelium

on either side of the middle line in front of the stomodæum. Two grooves are thus formed, between which projects a prominent ridge, the mesial-nasal process, which carries anteriorly a couple of knobs, the globular extremities, which will ultimately form the inter-maxillary portion of the upper jaw, that is to say the part which will bear the incisor teeth, and also the philtrum of the upper lip.

The posterior part is also bilateral and will form the remainder of the septum. The bottom of each groove will remain for all time a special sense organ and form the olfactory cleft, and it is separated from the ocular cleft by a prominence, the lateral nasal process, which presently fusing with the mesial prominence will form the ala nasi and parts about it. The prominence forming the outer boundary of the ocular cleft and separating it from the first gill cleft, will grow to large dimensions and form the superior maxilla and its accessories, and it will fuse with both the mesial and the lateral

element of the nose. The lower part of the ocular cleft between the maxillary process and the lateral mass of the nose persists as the tear duct.

At first, then, the nose consists of a couple of grooves running from the stomodæum to the front of the head. As they become deeper thanks to the downward growth of their lateral boundaries, their side walls cease to be smooth and simple, and a shelf grows inwards from either side. These shelves are the rudiments of the palate, and fusing with the nasal septum and with one another they cut the nose off from the mouth and constitute it a part of the respiratory canal distinct from the digestive. Sometimes this fusion does not take place and the result is one of the varieties of cleft palate or harelip with which you are already familiar. There is no difficulty in comprehending these deformities if it is remembered that the incisor-bearing inter-maxillary bone is part of the nasal septum, and this knowledge will prevent you making the mistake, which I have seen made, of describing

a scar down the middle of the philtrum as the result of a successful harelip operation.

The nasal passages are now formed, but they are not simple tubes, for the surface of their outer

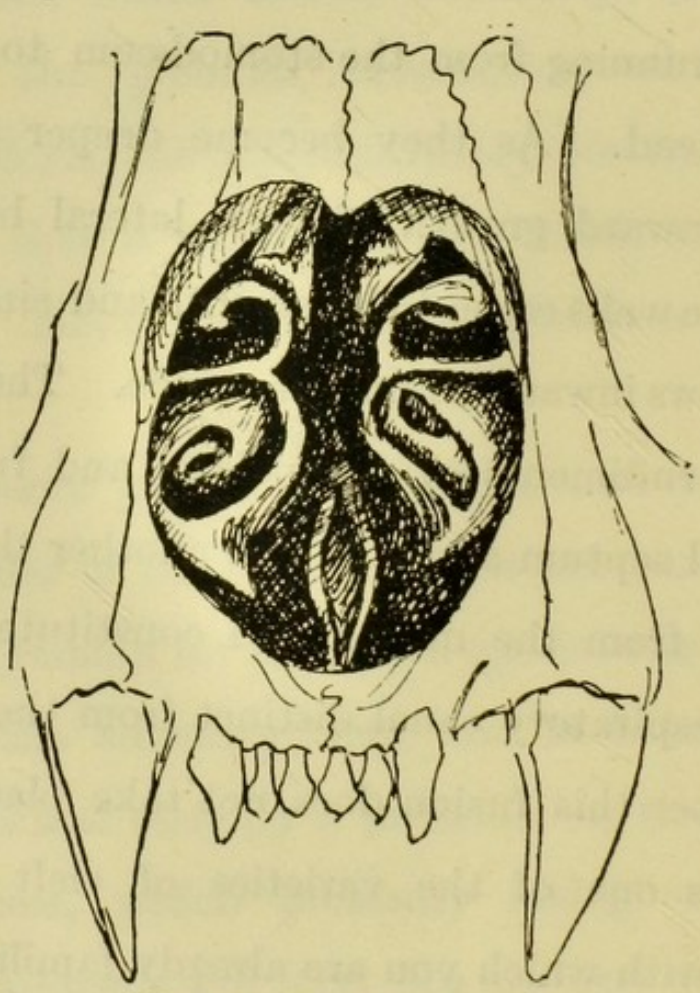


FIG. 2.—Leopard's Nose.

The elaborately scrolled turbinals are seen and the ridge-like naso-turbinals above them. The vomer is very deeply grooved, showing its bilateral ossification.

walls is increased in area by the formation of a series of crests, some of which will become the turbinate bodies. In the human species these are few and simple, but in many mammals which have

better use for olfaction than man, they are much better developed. In the sketch of the leopard's skull, the scrolled turbinals are shown, and in various other animals the scrolling is far more complicated, and represents an enormous area of mucous membrane.

Now recall the gross anatomy of the nasal fossæ. They are separated by the septum, which articulates above and behind with those portions of the cranial capsule formed by the ethmoid and sphenoid, while in front it meets the frontal bone and the nasal bones and its cartilaginous portion is intimately blended with the soft structures in the middle line, the columella and philtrum, and also with the premaxilla which, like it, is formed from the mesial-nasal process. Below it articulates with the hard palate and the sharp posterior edge of the vomer is free and forms the division between the two choanæ. (Fig. 3.)

The septum, of course, varies greatly in size and shape in skulls of different form, but roughly

speaking it is divided into two parts, an antero-superior and a postero-inferior, by an oblique line running from the rostrum of the sphenoid to the anterior nasal spine. This line corresponds

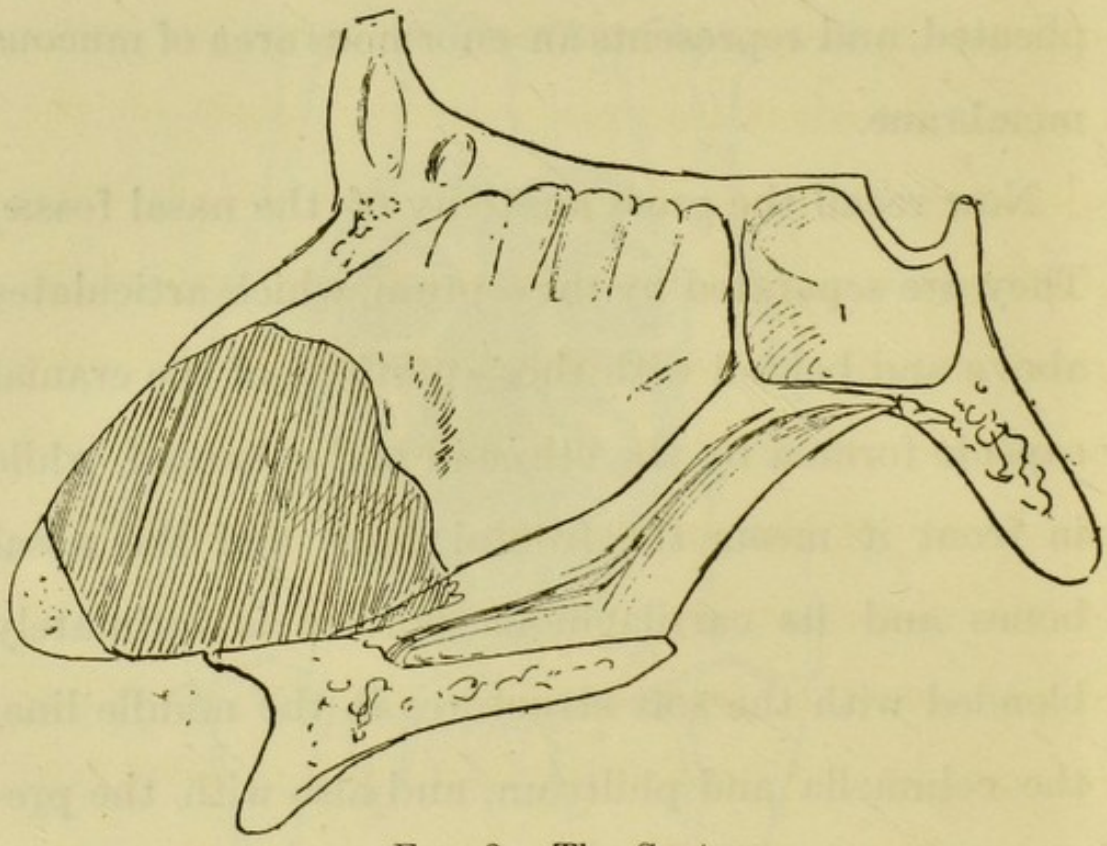


FIG. 3.—The Septum.

The pit is formed by the alar cartilages and fibrous tissue between them. The quadrilateral cartilage is shaded. The perpendicular plate of the ethmoid is bounded above by the floor of the anterior cranial fossa, below by the thickened upper edge of the vomer, and behind by the perpendicular anterior wall of the sphenoidal sinus.

with the upper edge of the vomer, and is often marked by a prominent ridge of cartilage and bone, the vomerine crest.

The upper portion of the septum is again divided

into an anterior cartilaginous and a posterior bony section. The relative proportions of these vary considerably and depend upon the extent to which the originally cartilaginous septum has been invaded by ossification from above. The bony portion is called the perpendicular plate of the ethmoid; it fuses below with the vomer, while anteriorly it articulates with the frontal and in the great majority of cases also with the nasal bones. As a rule, one-third of the latter extends beyond the limits of the articulation. The anterior edge of the perpendicular plate meets the upper edge of the vomer to form an angle, and the unossified remnant of the septum in front of it is known as the quadrilateral cartilage. Upon the development of this cartilage largely depends the shape of the organs seen in profile, but the actual tip is formed by the alar cartilages.

One may say that the anterior part of the septum, together with the anterior nasal spine of the superior maxilla, constitutes a kind of jurymast,

to each side of which is attached an incomplete ring, the alar cartilage. This secures for the nose an air inlet which is permanently open and in a horizontal position. The ring is indeed far from complete, the cartilage consisting of a short inner limb buried in the tissue of the columella and a long outer limb which is broken up into several segments. These two limbs meet anteriorly to form a cupola, the resiliency of which is important as maintaining the patency of the nostril. It should not be impaired by rough use of the handkerchief.

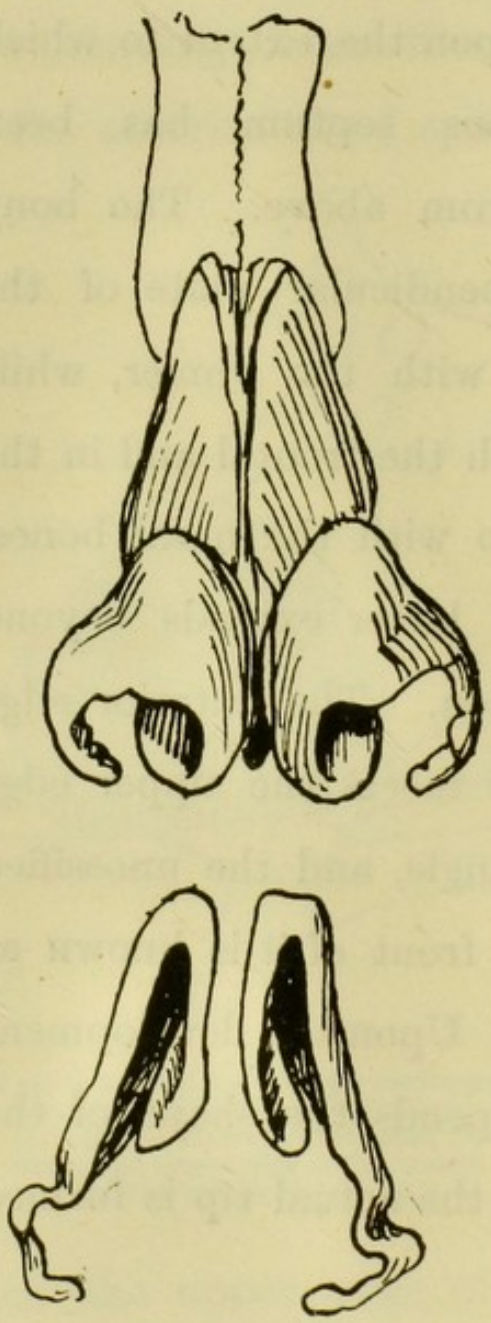


FIG. 4.—The Alar and Triangular Cartilages (after Zuckerkandl).

Note the inner and outer limbs of the former; the outer limb overlapping the lower edge of the triangular cartilage.

Filling the space between the alar cartilage below and the nasal bone above, is the triangular cartilage which is firmly welded to the quadrilateral plate in front. The triangular cartilage serves to keep the airway open, but where the feature is of the narrow prominent type, it collapses against the septum during inspiration, unless aided by muscular action. Its lower edge lies under cover of the alar cartilage and corresponds to a curved ridge, the plica vestibuli, upon the outer wall of the vestibule which bounds the narrowest part of the airway. The so-called compressor naris muscle, a thin sheet of fibres running across the bridge from side to side, when in action prevents collapse of the triangular cartilage—or rather does so in conjunction with the elevator, depressor and dilator muscles of the alæ nasi, which serve to fix and expand the alar cartilages.

More will be said of this later, and we will turn to the more important and more interesting structures of the outer wall of the nasal fossæ

Nothing much is gained by describing in words what is rather a complicated piece of anatomy, and trouble will be saved by reference to the figures.

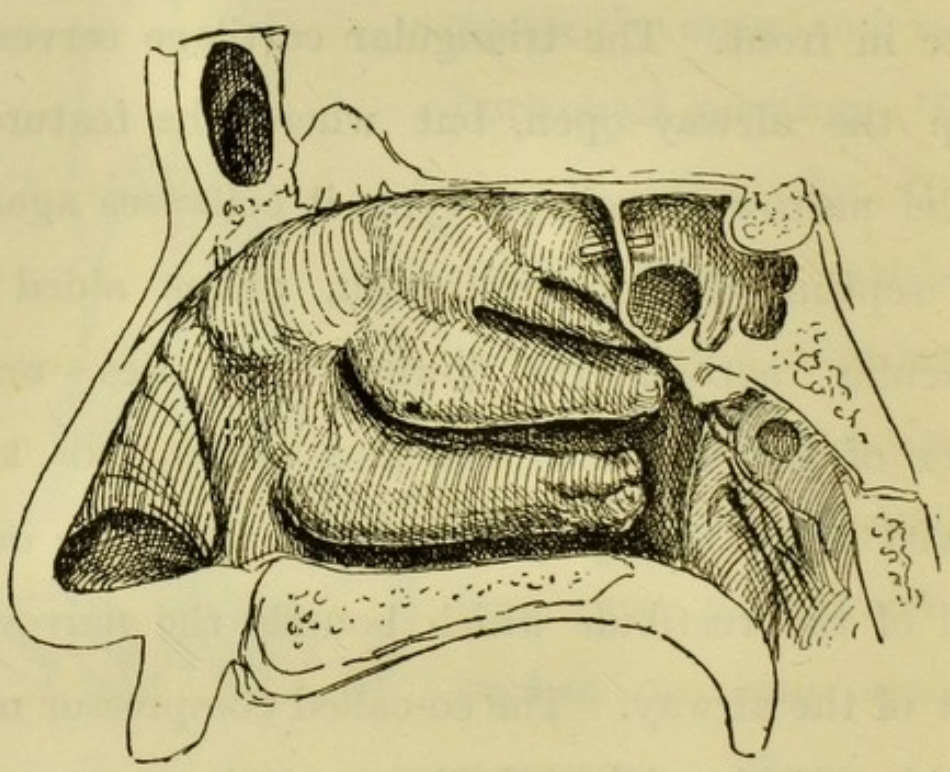


FIG. 5.—The Outer Wall in an Adult Male.

The columella is seen in section and above it the cavity of the vestibule bounded above by the curved plica vestibuli. The edge of the pyriform orifice of the skull shows as an almost vertical line. Behind this is a smooth area in the form of an inverted triangle. This is the outer wall of the atrium and it is bounded above by a slight eminence, the agger nasi. The inferior meatus is occupied by the inferior turbinate, the mucous membrane of which is corrugated posteriorly. The middle meatus is occupied by the middle turbinate, and above this body is seen a superior and a supreme turbinate, overhanging clefts into which the posterior ethmoidal cells open. The sphenoidal sinus, excavating the basisphenoid, is seen to have a thin perpendicular anterior wall, and a straw indicates the position of its ostium. The pituitary body occupies the sella turcica. A fragment of the vomer has been left adhering to the sphenoid and a mass of adenoid tissue containing a dilated bursa pharyngea, partly hides the eustachian orifice.

Beside the general boundaries of the nose, notice the plica vestibuli, the edge of the bony pyriform orifice above it, the choana posteriorly, the

plain flat anterior portion of the outer wall, the two mussel-like turbinates—the inferior and middle: then the line of attachment of the inferior turbinate, bowed up anteriorly where the tear duct enters the nose.

That portion of the nasal cavity which lies below the level of the attachment is called the inferior meatus, and the space between the attachment of the inferior and middle turbinates forms the middle meatus.

You will observe, though this will come out more clearly when we examine a transverse section, that the cavity of the nose above the attachment of the middle turbinate is very much narrower than any other part; indeed the olfactory cleft which exists between the septum and the other wall is often exceedingly narrow. One may say that the postero superior portion of the outer wall of the nose has been bulged inwards by the lateral mass of the ethmoid. This portion of the lateral mass shows a deep groove overhung by a shell of bone, the

superior turbinate, while above that another similar groove is sometimes seen, overhung by a supreme

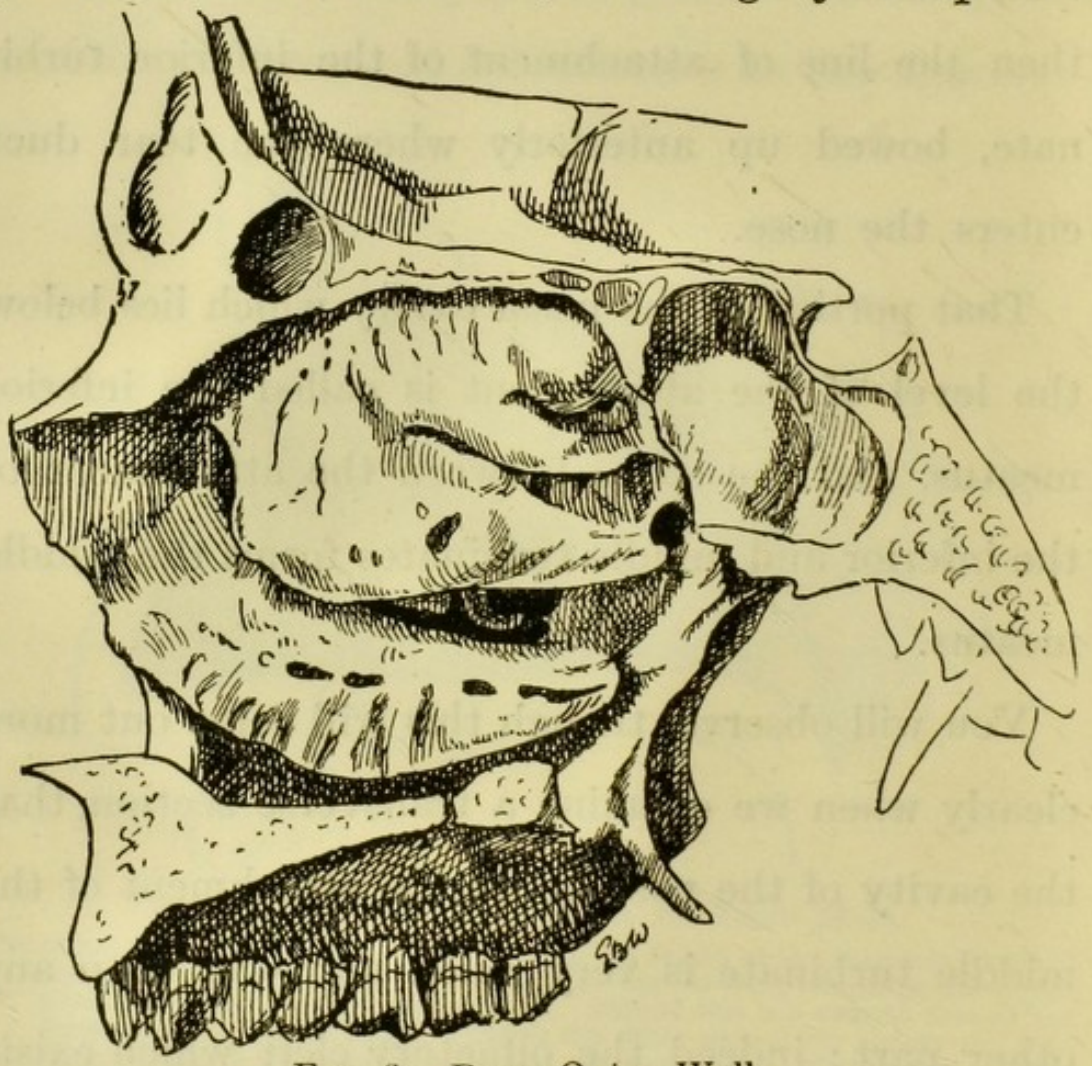


FIG. 6.—Bony Outer Wall.

Above the sharp anterior nasal spine of the premaxilla is seen the edge of the pyriform opening. The inferior turbinate projects like a mussel shell into the inferior meatus; its line of origin is higher in front than behind, and its surface is corrugated for the attachment of the cavernous organ and its substance tunnelled by blood vessels. The middle turbinate hangs vertically from the lateral mass of the ethmoid; its anterior half is full and bulbous, while it fines off posteriorly, forming the floor of a deep recess which is overhung by the superior turbinate. Beneath the middle turbinate the hook-like posterior extremity of the unciform process is seen imperfectly separating an anterior and posterior fontanelle leading into the cavity of the antrum. The true ostium is hidden by the middle turbinate. The foramen for the spheno-palatine artery is seen just above the posterior extremity of that body. The cavity seen in the sphenoid is the sinus of left side, upon the floor of which the right sinus presents as a round bulla. The right ostium sphenoidale is not seen, and is situated immediately behind the small supreme turbinate. The cavities in the frontal region belong to the sinus of the right side.

turbinate. A groove again marks off the ethmoid from the body of the sphenoid.

If now we remove the middle turbinate by an incision carried along its line of attachment, we

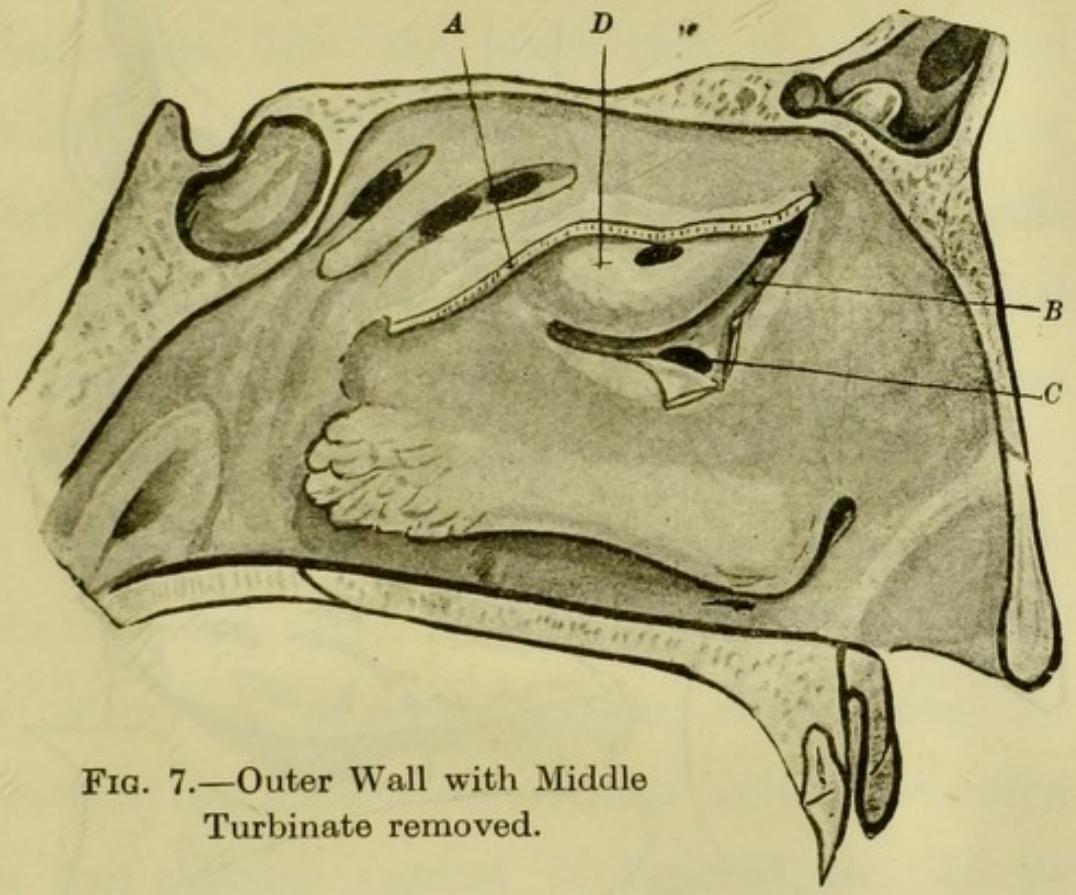


FIG. 7.—Outer Wall with Middle Turbinate removed.

A Line of attachment of middle turbinate.
B Hiatus semilunaris ending above as a cupola upon the floor of the frontal sinus and bounded below by the sharp edge of the unciform process which has been cut through, and above by the belly of the bulla ethmoidalis (*D*).
C Ostium maxillare.

find that the outer wall of the middle meatus hidden beneath it, is by no means a simple concave surface such as you find behind the inferior turbinate. On the contrary, you see a curved slit running

downwards and backwards from the frontal region. This slit is bounded above by the belly of a conspicuous globular swelling, the bulla ethmoidalis,

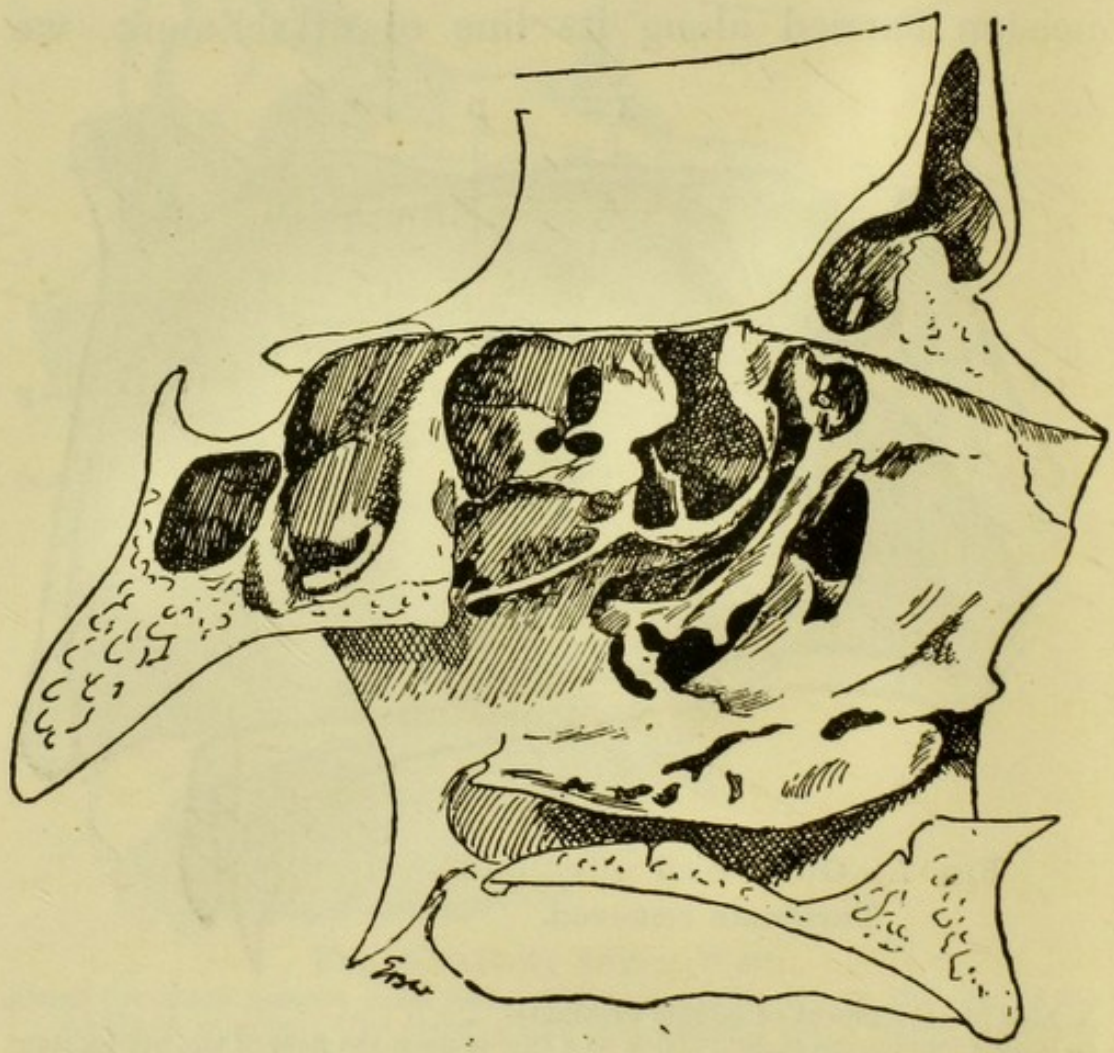


FIG. 8.—Outer Wall (bony) with Middle Turbinate removed and ethmoidal labyrinth exposed.

The middle turbinate has been removed to expose the hiatus semilunaris which opens above into the frontal sinus. Two anterior ethmoidal cells open into its upper third and the ostium maxillare is seen in its lower third. The scimitar-shaped unciform process forms part of the inner wall of the antrum. The channel for the nasal duct, which conducts tears under cover of the inferior turbinate, has been opened up. The inner wall of the lateral mass of the ethmoid has been removed to expose the large posterior ethmoidal cells and also the cell of the bulla ethmoidalis, which extends from the roof of the hiatus semilunaris to the floor of the anterior cranial fossa. The large sphenoidal sinus is almost divided in two by an imperfect septum. The sphenopalatine artery has divided, and enters the nose by a foramen both above and below the attachment of the middle turbinate.

and below by the fairly sharp edge of a sickle-shaped ridge in which you will recognize the unciform process of the dried skull. (Figs. 7 and 8.)

This slit is the orifice of a deep groove, the hiatus semilunaris, into the lower part of which you find the ostium maxillare opening. Into its upper portion open three or four anterior ethmoidal cells and it ends above either by entering the frontal sinus or as a blind cupola which often encroaches upon the cavity of that sinus.

The turbinal bones themselves are thin shell-like structures tapering off posteriorly. The inferior is somewhat dome-shaped anteriorly, and for practical purposes constitutes a solid obstruction to the entering current of inspired air. In its middle part the lower edge is much inturned and indeed may show something of the scroll form which is seen so well developed in the cat's turbinal. The middle turbinate is thinner and more brittle in build than the inferior; its anterior end is seldom dome-shaped but rather presents a

vertical free border, and at the angle where this meets the horizontal lower edge there is often found a solid mass of bone, roughly speaking the size of a pea, though not spherical in shape. This is the so-called operculum which is important surgically. It sometimes contains a pneumatic cell and this occasionally leads to the formation of a large mucocele.

You will notice that the cavity of the nasal fossae as a whole is broadest at the centre and becomes narrower anteriorly and posteriorly.

We shall, of course, go carefully into the anatomy of the accessory sinuses at another time, but it is very desirable that you should get a general idea of their relation to the nasal cavity and become familiar with it before getting up the details. One may say that the accessory sinuses of the nose are hollow air-containing outgrowths from its cavity, and that they invade those parts of the skeleton of the face which lie between the various essential organs. They form, as it were, a

kind of parenchyma or padding, to fill up the corners which exist between the brain, the orbits, the mouth and the nose.

If you look at the transverse section of the head of a newborn infant you will see that there is no need and scarcely any room for such a padding, and as a matter of fact the only sign of the accessory

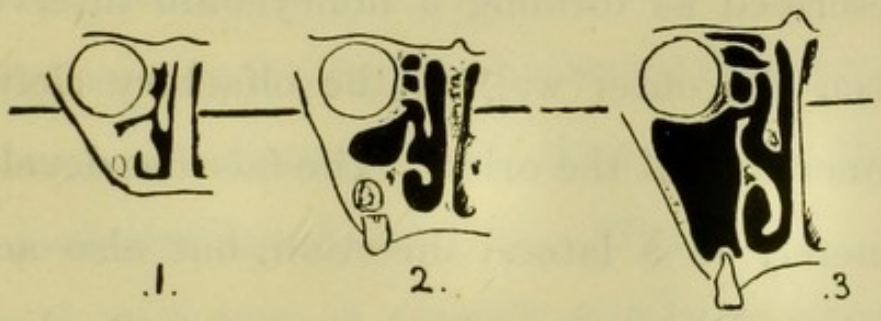


FIG. 9.—Transverse Sections carried through the Ostium Maxillare in the Infant (1), Child (2), and Adult (3).

In all three this ostium is situated at the level of the floor of the orbit. The cavity of the antrum is a mere slit in (1), pyriform in (2), while in (3) it has developed *pari passu* with the departure of the mouth from the eye. In (2) and (3) ethmoidal cells are seen forming a parenchyma between the organs of sight and smell.

sinuses present, is the minute slit-like antrum situated immediately in the angle between the nose and the orbit. But as the face develops and on the one hand the interoccular distance increases, while the teeth travel away from the orbits, a change takes place. It is clear that Nature would

be departing from her law of economy if the spaces between these organs were taken up by solid, heavy bone, where massive strength is not needed. Consequently the facial skeleton becomes hollowed out by these pneumatic cavities. At the sixth or seventh year we find an antrum of considerable size and well developed ethmoidal cells which may be described as forming a honeycomb intervening between the outer wall of the olfactory cleft and the inner wall of the orbit. The face has developed, not merely in a lateral direction, but also antero-posteriorly, the jaw making room for the development and eruption of the molar teeth. This process has, as it were, thrown forward the anterior confines of the nose and we now find the angle between it and the forebrain occupied by the cavity of the frontal sinus. The basisphenoid also becomes hollowed out to form a sphenoidal sinus on either side of the middle line.

A transverse section of an adult skull shows the cavity of the antrum, usually pyramidal in form,

its base formed by the outer wall of the nose below the orbital floor, while above this level the extensive ethmoidal labyrinth intervenes between the orbit and the olfactory cleft.

An antero-posterior section made some little distance from the middle line shows the backward and forward extension of this labyrinth into the sphenoid and frontal bone respectively. The extent of these cavities is very much greater than you may imagine; considerably more than double that of the nasal cavities themselves. (Fig. 8.)

But I wish you at present merely to glance at this general arrangement, and we will now go back to the nose proper.

With regard to its lining:—The vestibule is of course lined with ordinary skin furnished with hairs, which are much more abundant and stiff in men than in women. The epithelium gradually changes its character as you pass inwards and the pavement variety is soon replaced by the columnar ciliated epithelium with which the whole of the

mucous membrane is covered with the exception of the olfactory area.

In this latter area, as you know, it is replaced by a special sense epithelium consisting of tall columnar supporting cells and much elongated cells, each ending in a short rod and possessing a large oval nucleus. The extent of the olfactory membrane is much smaller than used to be taught, and is now known to occupy an area the size of a threepenny piece, which does not reach beyond the lower border of the superior turbinate and the corresponding level on the septum. This fact will explain why it is that we find it much easier to appreciate the flavour of food than to smell inhaled perfumes, for this extreme postero-superior corner of the nose is well out of the general airway utilized for inspiration, while as you will readily see later on, it communicates quite freely with the post-nasal space.

The mucous membrane other than the olfactory, varies in thickness in different parts from, say one-twenty-fifth to a quarter of an inch where it is

thickest upon the prominent edge of the inferior turbinate. Its fibrous stroma is dense in the deeper parts and forms the periosteum. The attachment to the bone is not at all firm and it is quite easy to peel it off except upon the inner surfaces of the turbinates, and even here you will find that it is only too easily peeled off if certain operations are not neatly performed.

It contains adenoid tissue both diffuse and in the form of follicles, and it is well supplied with glands which in the front parts are large enough to be seen with the naked eye. Numbers of goblet cells, secreting mucus, are interspersed among the ciliated cells.

The main arterial supply comes by the sphenopalatine artery, a branch of the internal maxillary, through the foramen of that name which you will find is immediately behind the posterior end of the middle turbinate. The artery at once divides into the nasopalatine branch, which passes inwards to the septum, and the posterior nasal branch which supplies the important structures of the outer

wall. The chief branches of the latter run forward, one along the inferior border of the middle turbinate and one along the centre of the inferior turbinate and right into the prominent part of the nose.

Two ethmoidal branches from the ophthalmic anastomose with the sphenopalatine supply. The nasopalatine branch after giving off a twig to the

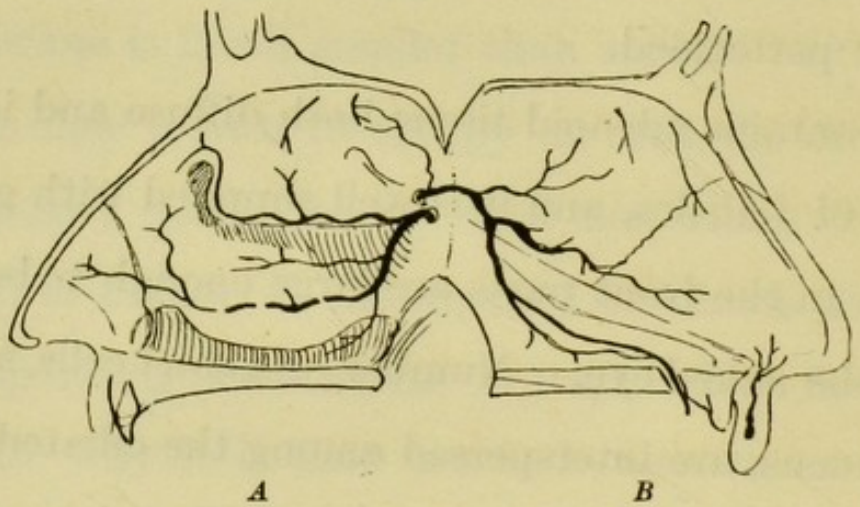


FIG. 10.—Arterial Supply of the Outer Wall (*A*) and Septum (*B*).

olfactory region runs across the body of the sphenoid and may be injured when the floor of the sinus is removed. It divides into an upper branch for the ethmoidal region of the septum and a lower for the vomerine, and an inferior division of the latter pierces the palate by the anterior palatine foramen, marking the division between the maxilla and premaxilla.

The network formed anastomoses in front with that of the artery of the septum from the superior coronary. In this anterior region of the quadrilateral cartilage of the septum the blood supply is poor and degeneration of the mucous membrane is apt to occur under certain circumstances.

Of the venous circulation it is only necessary to say that it communicates with the veins of the pia mater through the cribriform plate and with the ophthalmic vein through the orbital wall—the chief venous flow being backwards both in the sphenopalatine region and in the inferior meatus.

The so-called erectile tissue of the inferior turbinate is a very definite structure and may be termed an organ. It is not an erectile tissue in the same sense as is that of the penis. No direct communications can be made out between the arterial and venous system, and the swollen organ is easily compressible, there being, as far as is known, no muscular action preventing the exit of blood. It is composed of a cavernous venous plexus, the

walls of which are well supplied with muscle fibres. Swelling of the part is due to relaxation of the tonus of these fibres. A similar tissue is present in a less developed degree along the lower edge of the middle turbinate and at its posterior end. It cannot, I think, be said that the function of this tissue is understood in its entirety. The condition of engorgement is always present —that is to say the application of drugs, such as cocaine or adrenalin, will cause shrinking of the mucous membrane.

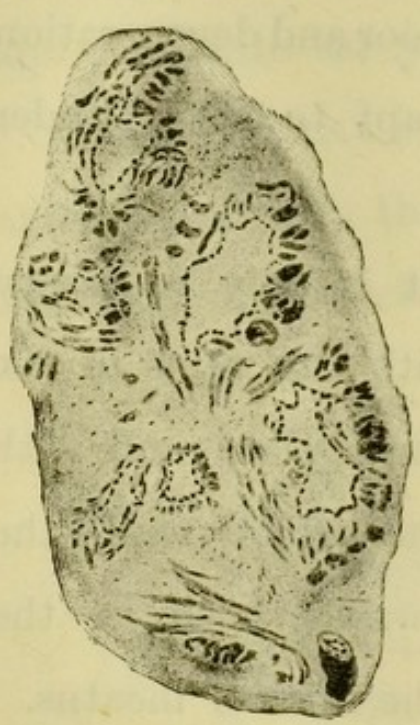


FIG. 11.—Microscopic section of cavernous tissue of the inferior turbinate, showing the large veins surrounded by bundles of unstriped muscle fibres cut longitudinally and transversely.

The degree of engorgement varies under different circumstances and is certainly dependent, among other influences, upon mere hydrostatic conditions. You will, however, see later on the important rôle which this variable erectile tissue plays in the physiology.

With regard to the lymphatic system, it is closely connected with that of the palate, the main vessels passing back to the choanal region and draining into the hyoid glands and into those in front of the cervical vertebræ.

It is important to remember that fluid injected into the subarachnoid space of freshly killed animals, finds its way along the sheaths of the olfactory nerve fibres into the nasal mucosa, and it is said that channels exist in the epithelium giving rise to actual communication with the cavity of the nasal fossæ. This has not been demonstrated in man, but several cases have been reported with discharges of cerebro-spinal fluid from the nose.

The nerve supply of the nasal mucosa in general is from the fifth. A large branch from Meckel's ganglion supplies the greater part of the fossæ, but a branch from the superior dental supplies part of the inferior meatus anteriorly and the ophthalmic sends a branch which, after actually traversing the cranial cavity descends to supply the anterior

region of the middle meatus. A branch passing below the edge of the nasal bone reaches the skin of the tip of the nose. You have, no doubt, experienced in days past, a tingling in the area supplied by this branch as a preliminary to excessive lachrymal secretion ; and you certainly will occasionally feel pricking and tingling there at the outset of a cold in the head.

FUNCTIONS OF THE NOSE.

The nose is formed by the separation of the stomodæum into an upper and lower portion, by the appearance of a horizontal division between the two. While the lower passage forms the entrance to the alimentary canal the upper constitutes the lobby of the respiratory system. It is a mistake to call it the organ of smell, for in man the olfactory epithelium is found merely in a small out of the way corner on either side, and does not constitute a twentieth part of the whole mucous surface.

The main function of the nose is to relieve other parts of the respiratory tract of the necessity of

warming and moistening the inspired air before it reaches the pulmonary alveoli.

Often enough respiration is carried on through the mouth, and no obvious damage is done to the delicate lung tissue. Experiments have even shown that the mouth and pharynx are capable of warming and moistening the air almost as well as the nose. It does this, however, at the expense of great effort and only for a short time. If you will sit still and imitate the rapid respirations of a man running a race, you will find, after the first dozen inspirations, that the air impinges colder and colder upon the palate and oro-pharynx, and after fifty inspirations these parts feel dry and stiff. In the nose nothing of the kind takes place. You may occasionally feel a sense of cold in the nasopharynx, but this is when you have, so to say, taken your nose unawares by a sudden deep inspiration. If you put the organ on its metal by taking a series of rapid inspirations, you will find that it proves quite equal to the task and you will be unable to detect any sense of coldness

in the pharynx or any drying of its surface. The point about the nose is that it is an organ which is automatically adjustable to every variety of atmospheric condition. A mouth-breather may do well enough in a favourable climate, and even one who breathes through a tracheotomy tube may escape winter bronchitis if he is careful, but a man who breathes through a healthy nose is entirely indifferent to the severest extremes of heat and cold, dryness and humidity. The nose is in fact capable of creating a climate, the atmosphere of which is fit to come almost in contact with the blood in the walls of the pulmonary alveoli. It not only is perfectly efficient but it is an exceedingly compact, well-devised apparatus. It is best to look upon each nostril as a dilatation of an imaginary tube, the section of which is represented in front and behind by the anterior and posterior nares. Being flattened from side to side it presents a large area of wall relatively to the cubic contents. Moreover, this area is considerably

increased in extent by the presence of the turbinate bodies.

The *vis a tergo* which creates the draught of inspiration is, of course, the general atmospheric pressure. Thanks to the effort of the thoracic muscles, inspiration is commenced by an increase of the cubic capacity of the lungs and a decrease in the pressure of the air which they contain, and equilibrium is established as quickly as may be, by the injection of air through the anterior nares.

The course which the inspired air takes in the nose is interesting and very much what, on consideration, one would expect; for although when we distort the nares with the speculum we look straight along the inferior meatus, it must be remembered that that orifice lies naturally in an almost horizontal plane, and it is not surprising to learn that, the inspiratory current shoots up in an almost vertical direction. The best method of studying the air stream is to make a clay model, copying it from a post-mortem room specimen or from a reliable

drawing, remembering that the turbinates are considerably plumper in life than in death. The place of the septum is taken by a sheet of glass and the model is painted black. A rubber tube half the size of the trachea is hermetically connected with the post-nasal space, and an open cardboard box is connected with a compartment in front of the

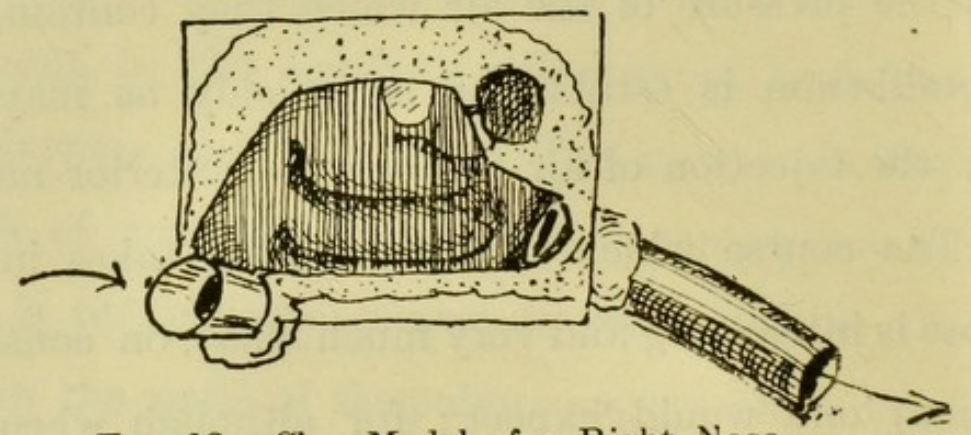


FIG. 12.—Clay Model of a Right Nose.
The septum is made of glass. A rubber tube is fixed in the postnasal space and a cardboard box for the collection of smoke, in front of the anterior naris.

anterior naris. Warm the glass over a spirit lamp, fill your mouth with cigarette smoke, apply it to the rubber tube, and blow a quantity into the box through the model. Now inhale, imitating the pace at which air normally enters the nose in quiet breathing. You must do this several times before you quite catch the direction

of the currents. They are difficult to depict on paper, because it is impossible to represent the fact that a portion of the stream which has, say, a square millimeter section at the narrow anterior naris,

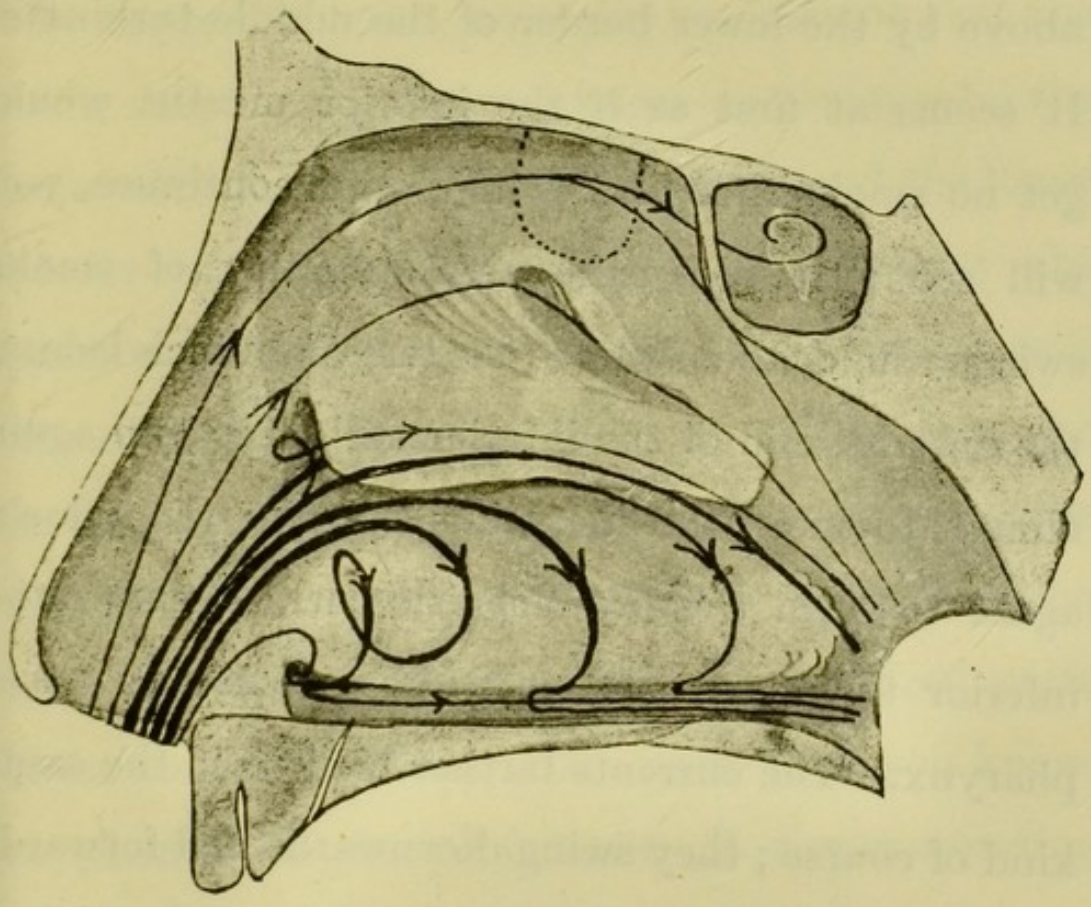


FIG. 13.—The Inspiratory Air Stream.

The principal currents shoot up towards the anterior end of the midde turbinate and sweep in a semicircle through the middle meatus to the centre of the choana. Others hug the inferior turbinate, forming a swirl behind its anterior extremity and swing over its inner surface to pass back along the floor of the nose. Less important currents pass more slowly into the olfactory cleft and leave an eddy in the sphenoidal sinus.

fans out to ten times that section as it enters the large cavity of the nose; moreover the streams which run close to the glass take a different course

from those influenced by friction against the complicated outer wall. Certain points, however, come out clearly. The main stream sweeps up into the middle fossa and runs along the channel bounded above by the lower border of the middle turbinate. It seems at first as if the inferior meatus would get no smoke, but as the inhalation continues, you will see that a considerable quantity of smoke swings round, about three-quarters of an inch behind the anterior end of the inferior turbinate ; up again almost to meet the incoming stream ; then down again to form a more sluggish current under the inferior turbinate, and so passes on to the naso-pharynx. The currents farther back take the same kind of course ; they swing downwards and forwards but fail to make a complete whorl before they get to the inferior meatus ; but you will notice how all this principal part of the stream is delayed, caught as it were by friction upon the inferior turbinate. A thin web of smoke travels much more slowly than the rest, up into the olfactory

cleft, past the smelling area, some of it entering the sphenoidal sinus where it hangs as a stagnant coil. This part of the stream is very much increased if you take a rapid deep breath like that of a sniff. The important point, however, to notice is that the main inspiratory stream hugs, so to speak, the inner surface of the inferior turbinate and the lower border of the middle. These are precisely the parts which are supplied with the special cavernous tissue, which is found in the nose and nowhere else in the respiratory system, and which may in fact be regarded as constituting an organ, whose function it is to prepare the air for the unspecialized parts of the respiratory tract. This tissue is, as you know, supplied with an abundance of serum-secreting glands, which are capable of pouring out hot water so rapidly, that by the time the inspired air reaches the pharynx it is absolutely saturated with moisture and raised very nearly to the body temperature. Moreover its blood circulation is so active, that in the interval between two respirations the loss of

heat from evaporation is made good, and even a rapid series of breaths fails to produce an appreciable lowering of temperature. This warming and moistening of the air is the fundamental and important function of the nose in man, and in your treatment of its diseases this fact must always be present in your mind. It is essential to remember that the organ is constructed to perform this office under all circumstances, and though I doubt if the experiment has been tried, it is only the man with both inferior turbinates intact who can go on a polar expedition, or drive a motor at fifty miles an hour. Under the influence of cold air the inferior turbinate swells and so increases in a very distinct degree the intranasal friction by narrowing the available airway. Even in a perfectly healthy person this may create a sense of suffocation when he goes from a warm room into frosty air; while the man who is habitually troubled with a cramped nose and a slight impediment, feels a sense of freedom when summer begins and gives him moist warm air to

breathe. Unfortunately this organ has the defects of its qualities, and a number of people who can scarcely be called diseased, suffer with an ill-timed engorgement of the nose under the influence of constipation and excessive eating and drinking, while others who have, as one may say, been deceiving their nostrils by cigarette inhaling, into a kind of tolerance of irritants, suffer when motor driving by illtimed patency and consequent dryness of the post-nasal space and eustachian cushions.

Thanks to the slowing of the stream of air after its entry into the nose, dust particles gravitate and adhere to the moist surface of the mucous membrane. The larger masses are caught in the hairs of the vestibule, but it is difficult after observing the smoke experiment, not only in the model but in the living subject, to believe that the majority of the finer particles do not escape into the pharynx. It has, however, been shown by St. Clair Thomson and Hewlett, that whereas the front of the nose contains numerous micro-organisms, none are to be found in

the posterior regions in 80% of normal noses ; or more strictly, none which are capable of growth upon the ordinary laboratory media. It is, however, interesting to observe that, when dealing with a morbid nasal secretion a smear preparation of which is almost solid with well stained micro-organisms a cultivation gives quite a countable number of colonies upon an agar plate ; and this fact seems to bear out the contention that nasal mucus is inhibitive to the growth of micro-organisms. This fluid is peculiar inasmuch as it is in a state of constant motion under the influence of the ciliated epithelium which lines practically the entire nose and which sweeps the thin layer of mucus towards the posterior choanæ. It is not unlikely that this constant fluid circulation, divorcing the bacteria from the toxins which they have produced, robs them of their destructive power and even of their faculty of reproduction.

For practical purposes at all events, one may say that inspired air which has passed through the nose is clean as well as warm and moist, and that a

healthy man possesses in that organ a protective apparatus which relieves his lungs of all sources of danger, so far as the breath of his nostrils is concerned.

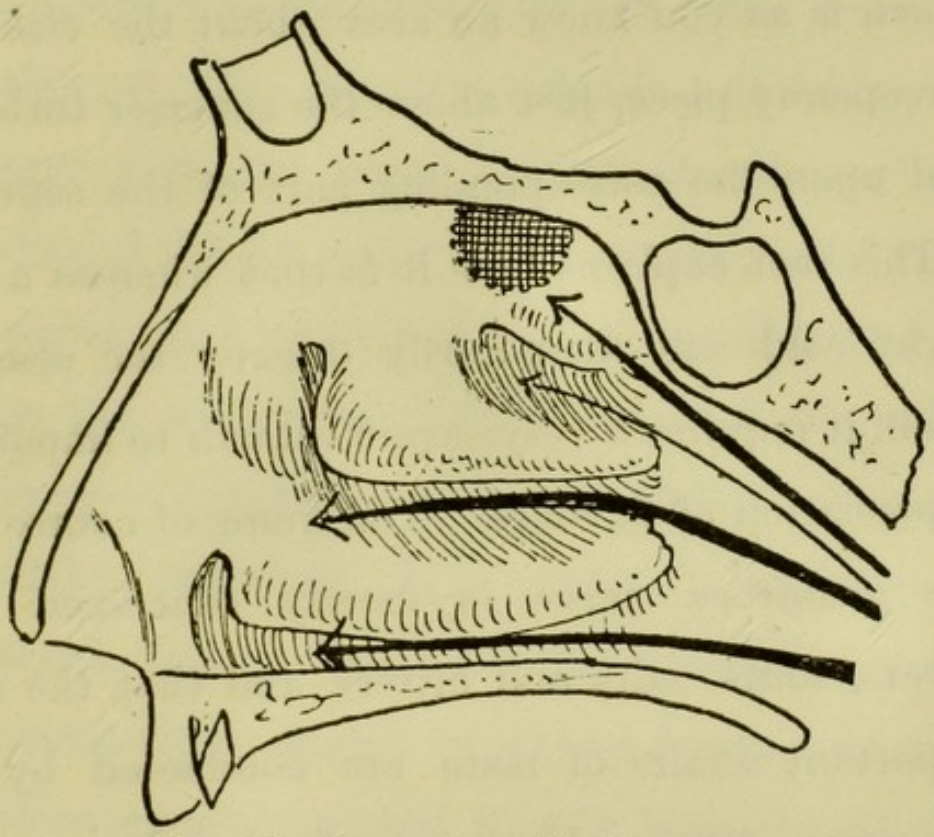


FIG. 14.—Expiratory Air Stream.
The main currents pass through the middle and inferior meatus, but a conspicuous one enters the olfactory cleft.

To return to the model. It is noticeable that expiration is a much simpler affair than inspiration. The expiratory stream merely fans out into the various fossæ. Two thick currents pass out along the middle and inferior meatus respectively, and a very

considerable one passes up into the olfactory cleft. This latter stream is a much more prominent feature than that which reaches the olfactory area in inspiration. It impinges directly upon the smell organ which is as you know an area about the sizė of a threepenny piece, just above the superior turbinate and upon the corresponding part of the septum.

This fact explains how it is that whereas a very slight cold will temporarily destroy the sense of smell, it requires a very severe catarrh to impair the appreciation of flavours. You know of course that the gustatory nerve is merely concerned with sweets, sours, salts and bitters, and that the more important affairs of taste are conducted by the olfactory nerve. During expiration, savours are brought in contact with the nerve endings through the posterior end of the olfactory cleft, and this is particularly the case when the movements of the palate during deglutition, force slow gusts up into this region, which are well laden with the vapours or particles which belong to the meat and drink

you are swallowing. The people of the eastern hemisphere have for centuries recognized the importance of these savours, and rightly attribute to them a special value, which we in the scientific West describe as stimulants to the reflex secretive faculties of the digestive glands. Outside the olfactory area the nasal mucous membrane and also that of the accessory sinuses is supplied by the fifth nerve, and its end-organs are capable of conveying the appreciation of what may be called pungency—the quality of vapours such as ammonia and that of mustard. It is interesting to notice in the model, that the coil of smoke which enters the sphenoidal sinus cannot be stirred by any amount of violent exhalation, but that it is easily diluted by rapid inhalation. This readily explains the homely custom of sniffing a piece of bread when mustard has caused a sense of discomfort in the nose and eyes. This illustrates too the fact that lachrymation follows nasal irritation, for the centres are at times unable to discriminate between a con-

junctival and a nasal stimulus, both of them arriving through the fifth nerve.

The nose is, then, an appreciative organ, able to apprise you of what is good and bad in the air which passes through it; but always remember that its main function is not critical but constructive, and that though it is able to warn you of the "frosty pepper" of a winter's morning, it is capable also of converting, almost in a moment, the rawest air into a bland moist atmosphere which the lungs may inhale with impunity. Keep this fact constantly before you in practice. Of necessity in a short book such as this, the writer quickly turns from the use of sprays to the performance of operations; but in daily life there must be careful thought before anything irrevocable is done which in any way destroys the mucous membrane upon which the value of the nose depends.

CHAPTER II

EXAMINATION

You will make nothing of the examination of the interior of the nose until you have mastered the use of reflected light.

The mirror is an absolute necessity for the examination of the deeper parts of all narrow cavities such as the nose and ear. The mouth has so large an orifice that the patient can stand facing a window or lamp, and give the observer a good view, but if you attempt to examine the nose by this method you will find that your own head has completely blocked out the one source of light which would have been serviceable. This at once suggests to you that your head, instead of casting a shadow, should be made a source of illumination. This is actually done by the use of the small head lamps used by some surgeons.

These are small electric lamps giving from four to sixteen candle power, mounted behind a lens which collects the rays into a more or less narrow pencil. If you actually try them you will find that they are not really very serviceable for inspection of the deeper parts, and it is obvious that the upper part of your field of vision, will be in the shadow cast by the upper border of the orifice of the nostril. This, of course, does not apply in a shallow open cavity like the wound in a mastoid operation. The ideal arrangement is that the line of sight and the line of the illuminating beam should coincide, and this ideal is attained only by placing the eye behind the centre of the source of illumination. This can be accomplished in practice by looking through the hole in the centre of a concave mirror upon the surface of which a strong light is falling. I mention this so that you may not get into the habit of tilting your mirror up on to your forehead, as is sometimes done by those who have not learnt to use it to full advantage.

I urge you to take great pains in mastering the use of the mirror, for until you have done this you will have no pleasure or even comfort in your work, and you will be quite unable to learn or do anything worth knowing or doing.

The only real difficulty in learning the use of

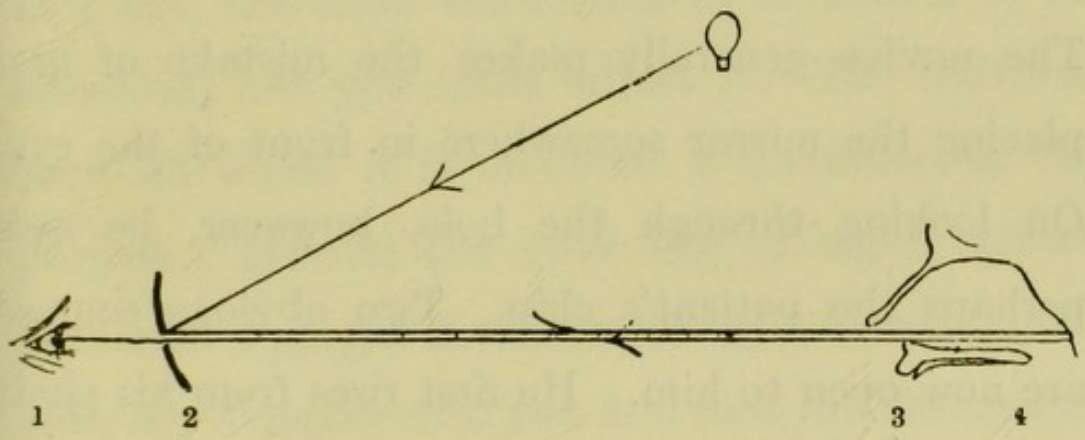


FIG. 15.—Diagram illustrating the two cardinal rules for illumination.

(*a*) Place the eye (1), the hole in the mirror (2), the anterior naris (3), and the object (4) in one straight line.

(*b*) Tilt the mirror until the reflected beam corresponds with that line.

the mirror is that the beginner, as a rule, allows the instrument to play the rôle of master. You will see what I mean when you first use it. There are just two principles involved—first that the eye, the hole in the mirror, the orifice of the nose, and the object for examination must be in

one straight line. The second is that the beam of light must correspond with that line. With regard to the first point, it is easy by moving the patient's head to bring the anterior naris, the object and your eye into line. Now bring down your mirror so that you can look through the hole in it and see the object, or at all events see the naris. The novice generally makes the mistake of first placing the mirror somewhere in front of the eye. On looking through the hole, however, he sees perhaps the patient's chin. Two obvious courses are now open to him. He first rises from his chair until he sees the nasal speculum and the naris, but his line of sight proves to be directed merely towards the floor of the nose. He attempts to rectify this by dislocating the patient's head upon his cervical spine. The more humane student resumes his seat and by tilting back his own head manages to bring his eye into line with the hole in the mirror and the nose. He sees the latter, it is true, but it is at the expense of immense effort on the part

of the ocular muscles and those of the occipital region, and when successive parts have to be looked at, at the back of the nose, it is very pretty to see the extraordinary contortions which an altruistic observer will make. Of course under these circumstances no real work can be done. You must, as I say, not allow the mirror to be master of the situation, but you must adjust it. The universal joint on which it is mounted is intended for this purpose. Having got your line of sight correct, you must now get the beam of light to correspond with it. Suppose now you find that the illuminated area proves to be a couple of inches from the nose, do not, I beg, try to remedy the matter by moving your head. Success by that means is a physical impossibility. If by turning the head you illuminate the object, your eye must be out of line, and if the naris is illuminated and in the field of vision the object must be out of line. This is what usually happens with the beginner and is very apt to lead to that dreary form of untruth, whereby we say

we have seen something which is invisible, so that we may save trouble. The proper method of getting over the difficulty is to twist the mirror without shifting the position of the hole in the centre. The two things then to do are, firstly to look at the thing you wish to see through the hole in the mirror, secondly to twist the mirror until it throws the beam upon that object. What I have said will show you that it must always be more or less of a farce for a student to attempt to see anything by looking over the surgeon's shoulder.

If you make use of a bull's eye lamp, throwing a narrow beam, another element of difficulty is introduced, for having first of all arranged your own person so that your orbital region is in the light, you must not move, and that is sometimes troublesome with very young or unruly patients, for you cannot follow their movements. A naked light is much more serviceable for a beginner, and particularly so when he is operating and likely to need to change the field of vision.

The Nernst lamp is good on a 200 volt current and gives an intense white light; an ordinary thirty-two candle lamp is very efficient, but the incandescent gas mantle is as good as any, so far as its light-giving qualities are concerned. The Bohm lens electric lamp is very good, the corrugated form of the glass collecting the light into a broad conical beam.

Here in England the lamp is placed close to the patient's left shoulder and the surgeon makes use of his right eye. Binocular vision is impossible in the nose, except quite in the anterior parts. Both eyes are shaded from the glare by the mirror, and if the room is darkened the illumination of the part will prove more effective. The patient sits with knees together and the surgeon with knees apart—this enables him to shift his position while keeping a firm seat. This is a very important matter where delicate work has to be done.

With regard to the nasal speculum, I have no doubt that Thudichum's is the best from the point

of view both of the surgeon and the patient. It consists merely of two almost flat metal blades connected by an U-shaped wire spring. Both during and after introduction, the spring arch should be held in the left hand between the first and second fingers, which compress it according to the needs of the moment, while it is steadied by the thumb. The only discomfort experienced by the patient is the stretching of the skin at the front of the nostril. Consequently the spring should be compressed when the surgeon turns away to pick up instruments. It is not self-retaining, and a self-retaining speculum is not desirable for ordinary use, for the surgeon's hand should always control the spring, and it should also keep in very firm touch with the patient's head. Except in very well trained patients it is impossible to do delicate work, such as the passage of frontal and sphenoidal cannulæ, without causing some pain, unless the

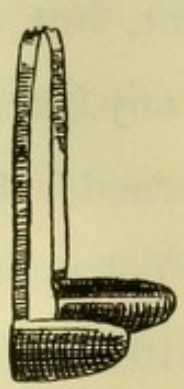


FIG. 16. Thudichum's Nasal Speculum (½ size linear).

left hand is in contact and serving to apprise the surgeon of small changes of posture on the part of the patient, which are scarcely perceptible to the eye. It requires no training for the surgeon's

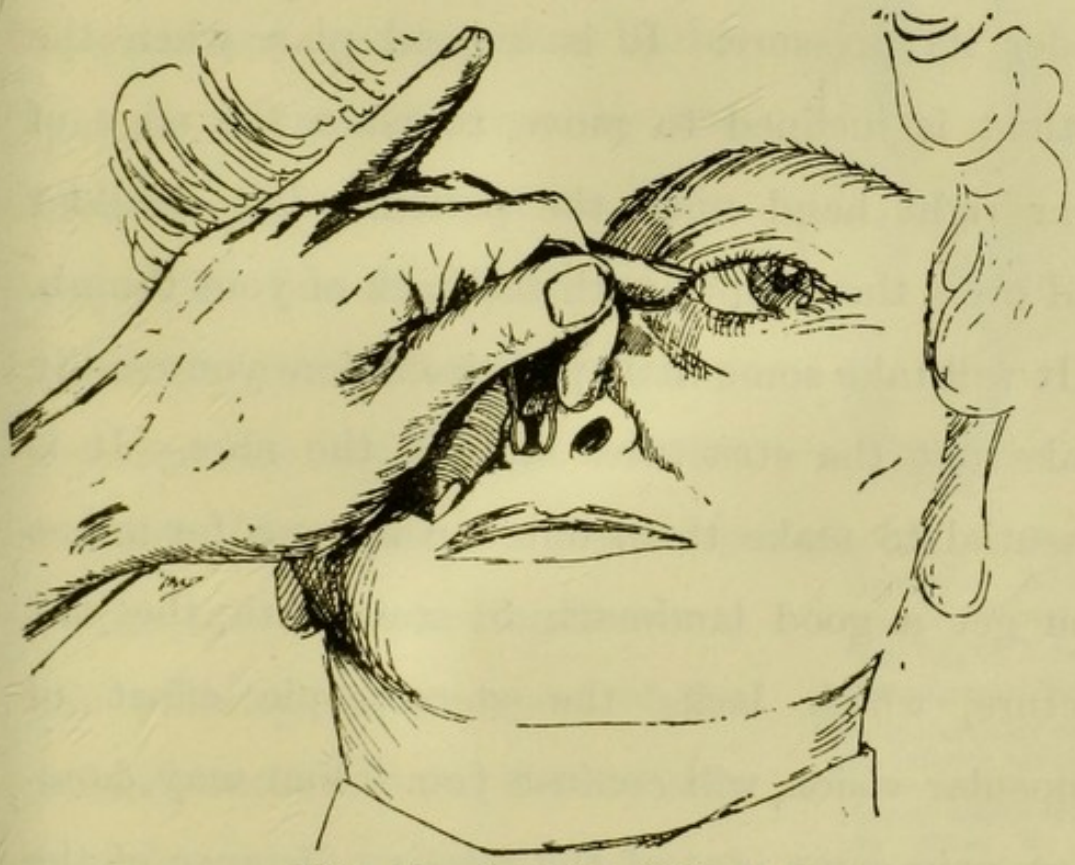


FIG. 17.—Anterior Rhinoscopy.

Observe the spring of the speculum compressed between the palmar surface of the index and the dorsal surface of the second finger; the thumb steadies it. The third finger rests on the bridge of the nose and the sensitive palp of the little finger, pressing on the forehead, serves both to support the hand and warn the surgeon of slight movements on the part of the patient.

two hands to act in unison, automatically. The contact with the patient's head is made by resting the extended third finger transversely upon the bridge of the nose, while the palp of the little finger

touches the forehead. With these two fingers the patient's head can be turned in all directions, including flexion upon the neck, the third finger gaining a considerable grip when the skin wrinkles under its pressure. It is a good plan when the patient is inclined to move, to place the edge of your right hand upon the patient's left shoulder and press the occiput with the back of your thumb.

It will take some little practice before you readily make out the structures seen in the nose. It is essential to make them out one by one, for unless you get a good landmark to start with, the flat picture, which lacks the stereoscopic effect of binocular vision, will confuse you. You may, however, gain some idea of the relative distance of the various objects in view, by slightly moving your own head from side to side.

First make out for certain the outline of the inferior turbinate and by moving the patient you must see all that is to be seen of it. In the normal adult nose it will appear as a smooth glistening

pink body, comparable in size and shape to one of the patient's little fingers. It is attached above and in front to the outer wall of the nose close to the end of your speculum blade, and is bounded above by the broad middle meatus or main air-way. Its line of attachment is made the conventional boundary between the middle and inferior meatus. The latter is made up of the space intervening between the rounded inner aspect of the inferior turbinate and the septum, together with the cavity between the outer wall of the nose and the concave outer surface of the turbinate. You can see the dome-shaped anterior end of the inferior turbinate overhanging this latter portion.

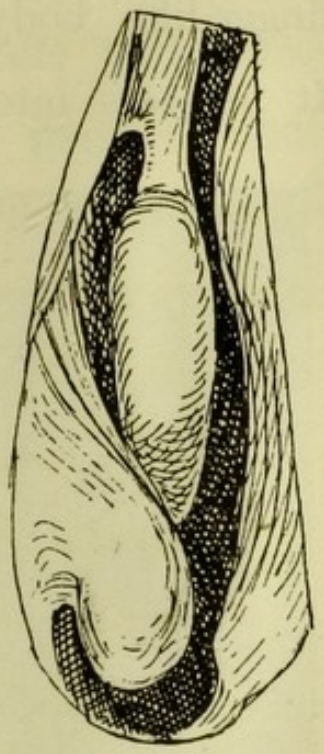


FIG. 18. — Normal Anterior Rhinoscopic View of the Right Nose in a woman of forty.

Note the anterior end of the inferior turbinate below, with the finger-shaped middle turbinate above it. No structure can be seen in the shadowy cleft under the latter body. The slight eminence in the top left-hand corner of the picture is the agger nasi. The septum (right of picture) shows a slight vomerine crest below and a tumescence, the tuberculum septi, above. The shaded strip between the septum and the turbinates represents the inferior and middle meatus and the narrow olfactory cleft.

Now looking higher you will see a second rounded finger-like body which is the middle turbinate. It projects into the middle meatus somewhat as the inferior turbinate projects into the inferior meatus, but you will notice that its line of attachment is in reality nearer the middle line of the head than is that of the inferior turbinate, and that its inner aspect is flatter and more vertical than that of the latter body. The narrow cleft between this inner side and the septum leads to the olfactory cleft. The latter appears as a dark broad line, in other words it is not possible to see its roof nor the superior turbinate. In front of the middle turbinate you will see the smooth outer wall of the vestibule of the middle meatus with the slight mound of the

FIG. 19. — Another healthy Right Nose, but abnormal as affording a view of the superior turbinate, seen as a narrow strip to the mesial side of the middle turbinate.

agger nasi. One cannot normally see much of the structures under cover of the middle turbinate. The septum seldom proves to be a perfectly flat vertical surface in adults. It is very common to find a ridge, the vomerine crest, passing obliquely upwards and backwards from the anterior nasal spine, upon which your speculum is resting. This corresponds with the upper edge of the vomer. Observe that if your patient is a nervous person the inferior turbinate may shrink perceptibly in size, even during the few seconds occupied by the examination.

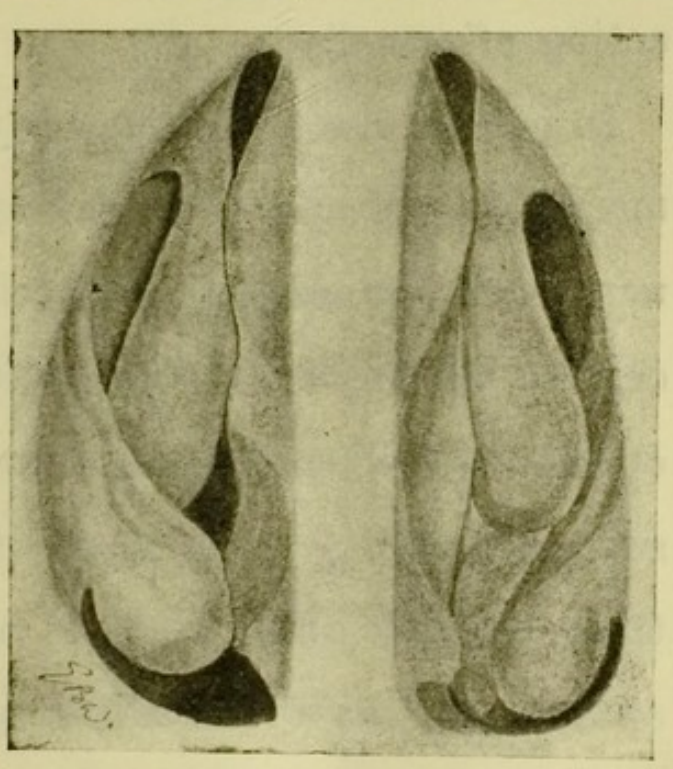


FIG. 20.—Normal Nose in a Woman of twenty-five.

A perfectly healthy and comfortable organ in spite of slight irregularities of the septum. The light has been thrown through the left inferior meatus so as to illuminate the choanal arch and nasopharynx.

As you withdraw your speculum, notice the vestibule of the nose and see if the alar cartilage is

acting successfully in keeping this orifice open. Remember that the lower edge of the triangular cartilage will be sucked in during inspiration, and may even touch the septum unless the muscles are acting effectually.

In actual practice it is always advisable to commence the examination by inspecting the posterior nares with the mirror. Posterior rhinoscopy is difficult to accomplish if the patient is either nervous or has a sensitive mucous membrane, and you will succeed best if you can catch him before he has had time to think about what is occurring. If you fail at first, you can return to this part of the examination after he has settled down and composed himself.

Posterior rhinoscopy is practised by arranging the line of vision and of illumination to fall upon the uvula. The back of the tongue is then depressed well with a spatula, and a small mirror, bent almost to right angles upon its stalk, is passed along the spatula and into the oropharynx without touching either the uvula or the pharyngeal wall.

The important point is deep, firm depression of the tongue. Unless it is firm the patient often cannot, with the best intentions, control the involuntary movements of that organ. In old patients

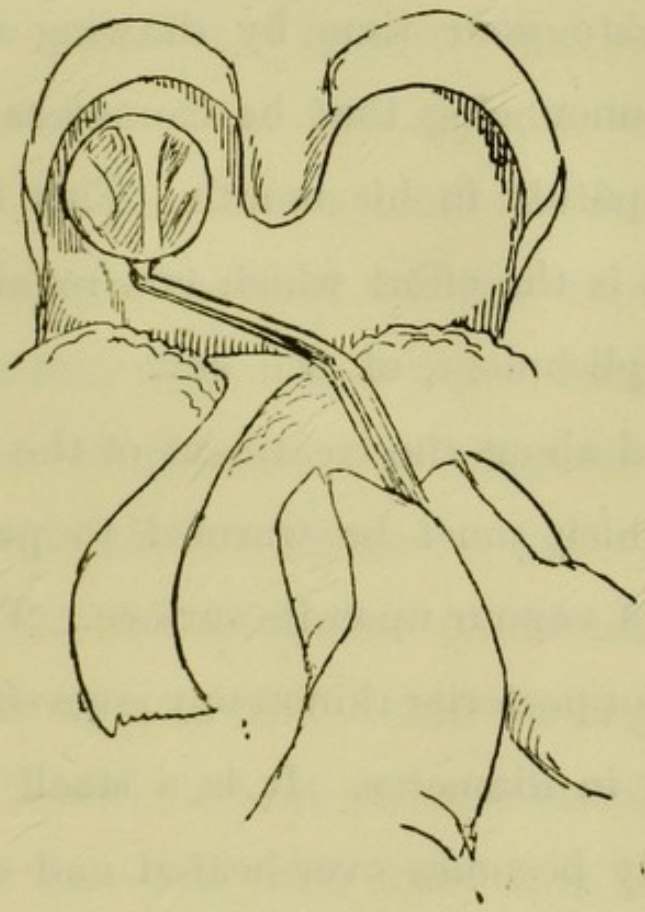


FIG. 21.—Posterior Rhinoscopy.
Tongue depressor and mirror in position.

and in trained singers the tongue is often kept in position without any spatula at all and merely by the effort of will. The soft palate must hang more or less vertically and flaccid if the view is to be a good one, and you may need to make the patient

inspire through the nose or attempt to say "hang" or the French "en," all of which efforts bring the velum to a vertical position. Warn your patient that you are going to make this request, otherwise he will waste your time by drawing away from you and announcing that he cannot say "hang" with the spatula in his mouth. This is perfectly true, but it is the effort which you require and not the accomplishment of the act.

One word about the treatment of the mirror, the glass of which must be warmed to prevent condensation of vapour upon its surface. That usually employed for posterior rhinoscopy is seven-sixteenths of an inch in diameter. It is a small object and very readily becomes over-heated and spoilt when held over a spirit flame. Remember, therefore, always to heat it face downwards with the glass to the flame, holding it there until the water of combustion which condenses upon it, has evaporated. If you heat the instrument face upwards, the glass will not become sufficiently hot until the

silvered back has become much too hot, and it will readily be spoilt by this very common practice. In the absence of a lamp, a mirror may be heated in water and quickly dried, or you may dip it in 10 per cent. solution of lysoform and shake off the excess, or rub it after the application of a wax pencil. These two latter methods do not really prevent the condensation of the vapour in the breath, but they cause the water to form a uniform film instead of a number of droplets. The film after a short time ceases to be quite uniform in thickness, and then distortion of the image results. Some good mirrors will stand boiling a certain number of times, but in no case should a mirror be plunged into cold fluid when it is hot. Water is drawn into minute air spaces in the silvered back when this is done. A very important consideration is that you should not forfeit the patient's confidence for all time by burning him. If you do, he may make up his mind to forgive and forget, but his soft palate will never do so, but will shrink for

protection to the back of his pharynx whenever you go near him. Make it an invariable rule, therefore, to test the temperature of the mirror yourself by pressing it upon the back of your hand. The skin over the metacarpal of the index finger is very sensitive to temperature and may be used for this test. If you are dealing with an extra sensitive patient, or one who contends rightly or wrongly that you use your mirror too hot, lay it against his cheek before introducing it into the pharynx. The shaft of the mirror should be slightly bent near the handle so as to bring the fingers out of the line of vision. They may be kept out of this line when a straight shaft is used, by bringing the latter close to the angle of the mouth, but then you will find that the hand is apt to intervene between the lamp and the forehead mirror. Hold the handle lightly but very firmly between the thumb and first two fingers so that you can rotate it easily. The mirror has to be slid along the tongue depressor and should then be held to one side of the uvula.

It must not touch either pharyngeal wall or soft palate, otherwise retching may be caused. Sometimes it is necessary to press it firmly upon the

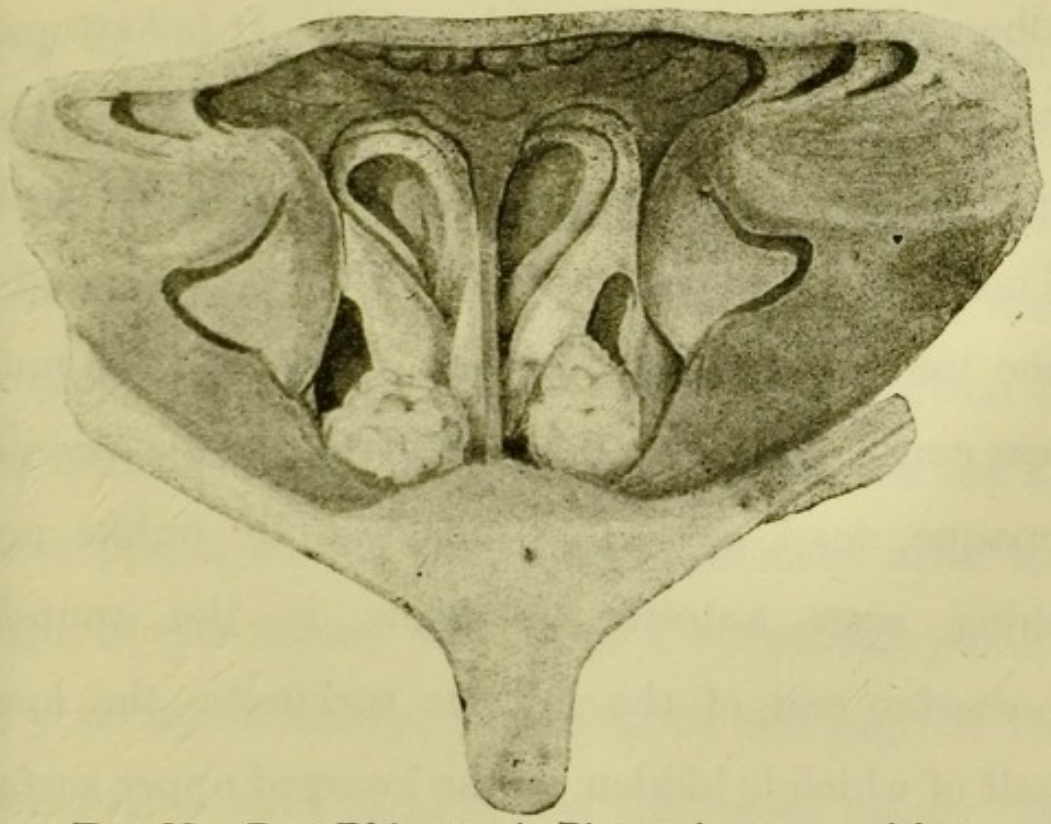


FIG. 22.—Post Rhinoscopic Picture in a man of forty.

Note the choanæ divided by the straight edge of the vomer. On either side the pale, brightly illuminated middle turbinate with a narrow superior turbinate immediately above and a darker mammillated inferior turbinate below it. The large Eustachian eminence with its pale trumpet-like orifice. In the vault of the nasopharynx some remnants of adenoids. Cicatricial bridles extend from the posterior wall of the nasopharynx to the posterior surface of the Eustachian cushions, cutting up Rosenmüller's fossa into a number of pockets. This is pathological. The right surface of the septum (left side of picture) is seen, partly because the rhinoscopic mirror is held (as in Fig. 21) to one side of the uvula, and partly because the septum is deflected into the right nose. Note the wide entrance to the olfactory cleft and the olfactory area of the roof of the nose.
Fig. 25 is the same case viewed with the mirror held more horizontally.

base of the tongue but it must never touch the pharynx.

Now look for the image of the vomer—this is

the landmark to make for at once—and then follow the line up to its attachment to the sphenoid. This part is hidden where adenoids are present. Observe the choana on either side. It is extremely rare to find any inequality in their size. Then inspect the structures of the lateral nasal walls. The most prominent object is the posterior end of the middle turbinate, and both this and the much less conspicuous superior turbinate, have a peculiar opaque, dead, grey appearance wholly unlike anything seen anteriorly. Below is the rounded posterior end of the inferior turbinate, the lower half of which is hidden by the humped upper surface of the soft palate. This posterior end is mamillated and of a greyish purple colour. The posterior edge of the vomer is perfectly straight and quite narrow, but just within the choana you will often see a prominent pad of soft tissue on the septum upon either side, and still further in you may see on one side the posterior end of a vomerine ridge; for this structure often ends as a conspicuous bony eminence

projecting into the middle meatus. The mucous membrane of the nasopharynx is of a full red colour, contrasting markedly with that of the dull grey of the posterior part of the nose, and with the triangular, whitish-yellow anterior wall of the Eustachian trumpet, surmounted by the smooth, red Eustachian eminence. The latter structure may project well into the cavity and hide a portion of the choana. In a small mirror you cannot see all these points at one moment. You must alter the angle of the mirror and make a composite picture in your mind, always returning to the edge of the vomer as a landmark, if you lose your place. Do not, however, prolong the examination much over five seconds. You will find that this gives you ample time in a routine examination.

Let me emphasize two facts. One is that you are quite certain at first to find posterior rhinoscopy difficult; and secondly that once you have acquired the knack (the correct line of vision and light; the firm left and the delicate right hand and the quick

comprehension of the picture), no real barrier stands between you and the expert manipulator.

The best plan is to attempt it on every case coming into the out-patient room. At first you will learn nothing, because you allow the dorsum of the tongue to rise, are slow in getting the mirror into place, or touch the pharyngeal walls with it, or because when you have the instruments fairly in position you spend your few seconds staring at the Eustachian tube instead of quickly finding the vomer. Of course in a good many cases posterior rhinoscopy is impossible. You will find various instruments for holding the velum forward out of the way, but they are seldom used. Perhaps the best retractor is a small red rubber urethral catheter,

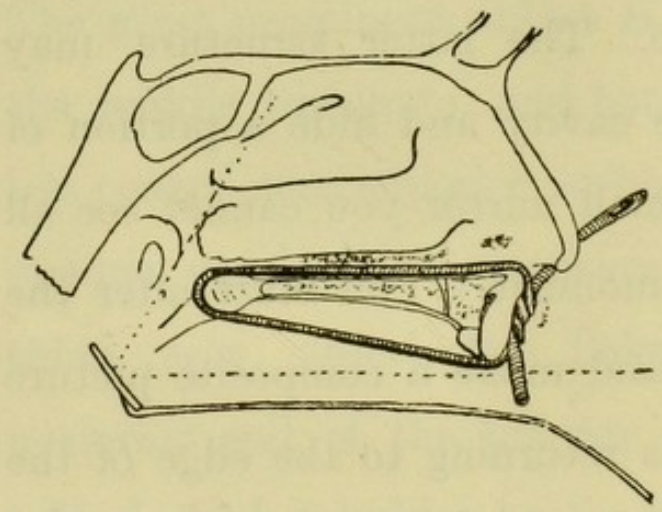


FIG. 23—Red rubber Urethral Catheter used as a Palate Retractor.
The figure also shows a faulty position of the rhinoscopic mirror, which should be farther back, higher up and in a more vertical plane.

passed along the floor of the nose after cocainization, brought out at the mouth, and the ends tied in a half-hitch over the lip. The catheter is sufficiently yielding to allow of retching without pain, while its elasticity brings the velum back into position when the muscles have quieted down.

But it is very rare to find the adult who cannot quickly be educated to the ordinary examination. Not so with children. In the majority even of little children one may have a snap view by using the mirror in conjunction with a finger employed as a tongue depressor. About one in three small children allow of a proper posterior rhinoscopy, and it should always be attempted. In children suspected of adenoids who cannot tolerate the mirror, digital examination of the nasopharynx must be resorted to. This manipulation may be robbed of half its unpleasantness if you slide the palp of the right forefinger along the face of the right tonsil. If this is done there is no stretching or damage of the velum. If you attempt to pass the finger along

the middle line you will find that it is not easy to bring the velum forward without scratching the posterior wall of the oropharynx with your finger nail. You must steady the head under your left arm against your ribs, while with your left index

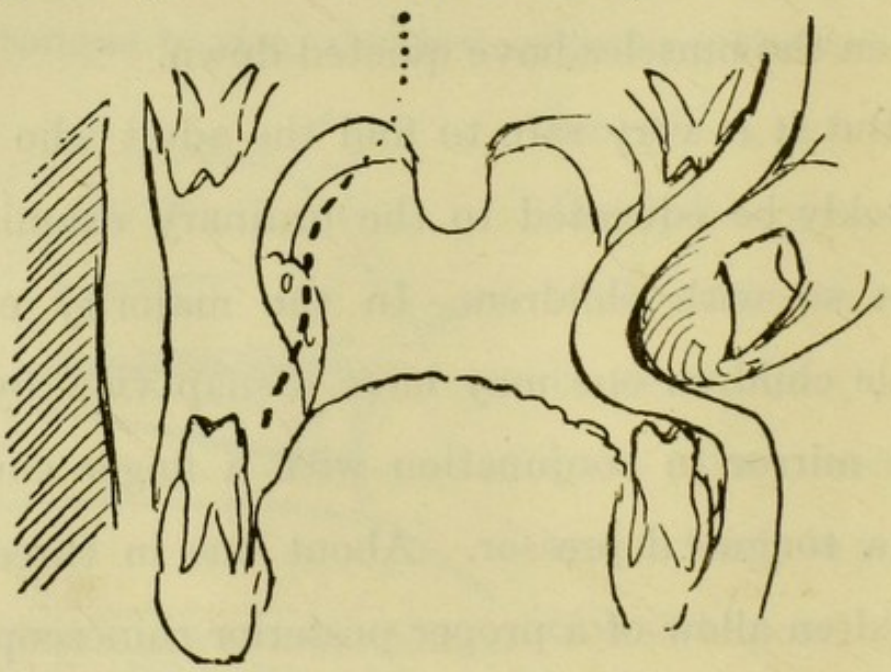


FIG. 24.—Digital Examination of the Nasopharynx.

Schematic view from the front, showing the left cheek thrust in between the teeth by the left index finger. The dotted line indicates the path across the face of the right tonsil taken by the palp of the surgeon's right index finger. The right cheek is pressed against his chest.

finger you press the cheek in between the teeth. This prevents the patient closing the jaws, and the grip against the chest gives you complete mastery even over a powerful man, who at the last moment thinks better of his determination to sit quiet. If he rises from his chair he merely lifts you without

altering your relative positions. If he is powerful enough to drag your right hand from his mouth, he may cut the back of your index finger against his lower incisors. If the head is flexed forward on the neck, the tip of the finger will feel adenoids as it ascends. Adenoids are stated to feel like a bag of worms, but you will have many more opportunities of becoming familiar with the former than the latter, and you will soon be able to distinguish the leaf-like form of the large florid adenoids and the firmer texture of those which are shrinking. This, however, is another subject. By practice you should gain some familiarity with the feel of the choanæ and of the posterior end of the inferior turbinates, but remember that these parts are very sensitive and must only be touched very gently with the palp of the finger. Let me advise you to have all these examinations practised upon your own person, first by an expert and then by a novice. You will have learnt a lesson invaluable to your patients.

CHAPTER III

ADENOIDS

On commencing work in an out-patient throat department you will notice the preponderance of cases complaining merely of nasal obstruction, and in a large proportion of these you will find yourselves confronted with a peculiar condition of development known as the adenoid facies. Before going into the details of this condition you must for a moment consider the subject of adenoids, their natural history and the consequences of their presence.

I need not tell you that adenoid growths consist of lymphoid tissue and that they are produced by the overgrowth of a normal deposit of that tissue, which is present in the vault and posterior wall of the nasopharynx. In all essentials these growths

are comparable to the enlarged tonsils which you have often examined, but they have anatomical features which are peculiar and which, without any other knowledge of the matter, would convince you that they are really produced by hyperplasia of

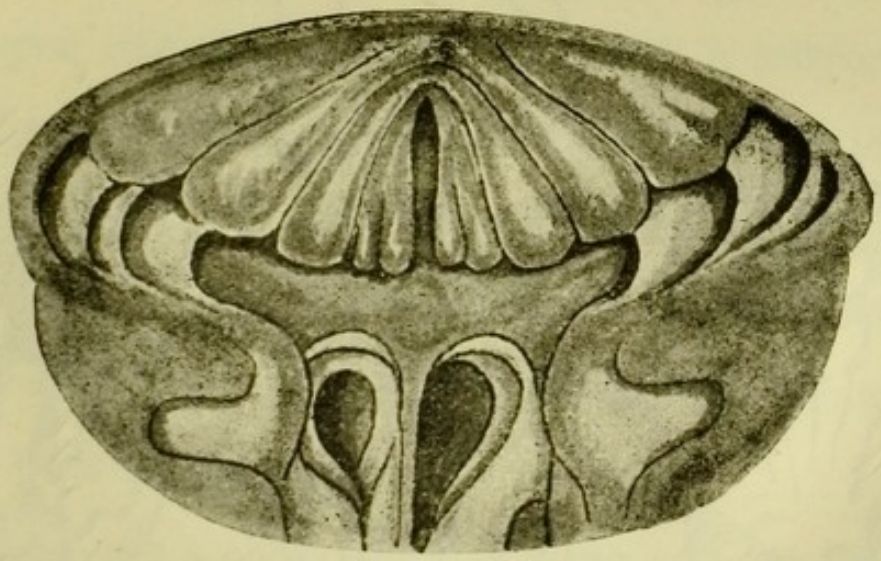


FIG. 25.—Remnants of Unoperated Adenoids in the vault of the Nasopharynx of a man of forty.

Their perfect symmetry shows that they are in no sense 'new growths,' but the results of hypertrophy in a normal lymphatic organ. Rosenmüller's fossæ are cut up into a series of stalls by the presence of cicatricial bridles.
From the same patient as Fig. 22, but with the post-rhinoscopic mirror held almost horizontally.

some normal structure and that they are not in any sense true tumours. If you will get a dozen consecutive adenoids which have been removed *en masse* by one sweep of a broad curette, you will find that they conform to one type and that in a greater

or less degree, their appearance resembles that of a half walnut with the shell removed. On close examination you find that the mass is made up of a number of leaves separated by deep clefts which are arranged vertically and obliquely. The number

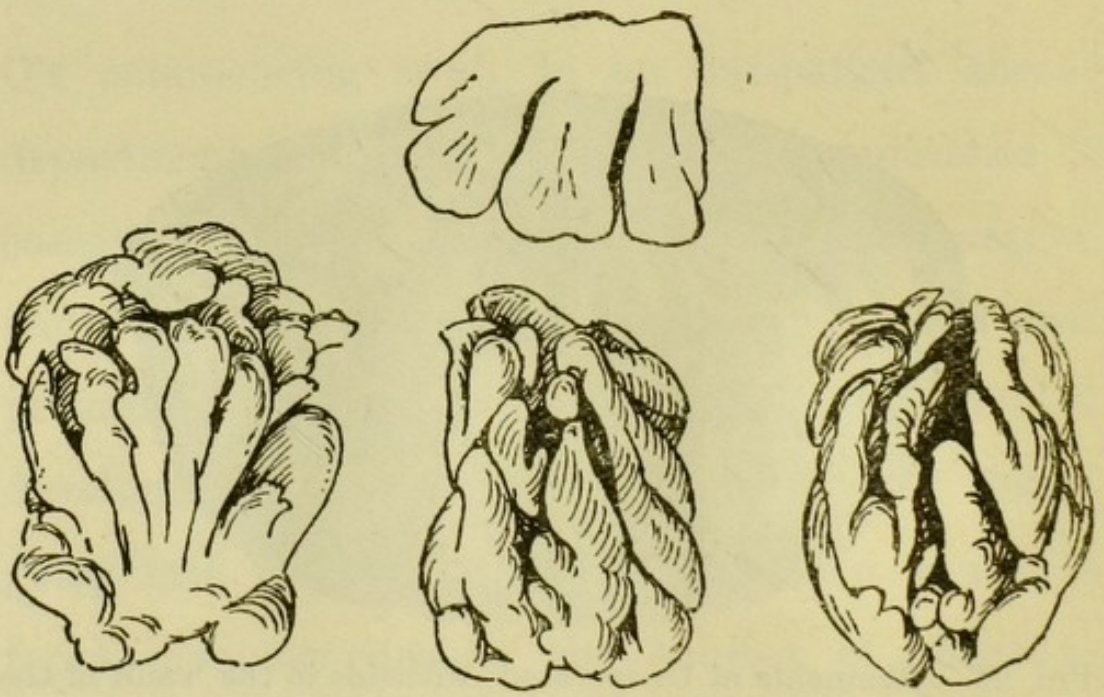


FIG. 26.—Typical Adenoids.
One in section. Shrunken by preservation in formalin and thus showing the clefts unduly gaping.

varies from six to ten, the most prominent being those near the centre. You will, of course, find variants from this type; in the early cases the leaves are replaced by mere ridges and the appearance is rather that of a half chestnut, while in the late cases where involution has commenced after

the period of puberty, you may find an almost smooth semiglobular tumour. Looked at with the rhinoscopic mirror, only the lower ends of these leaves are to be seen, consequently a description more suitable for some kind of papilloma has often been given in text books. Let me say in passing that when you examine for adenoids with a mirror, you can always detect a well developed growth in one instant, if you will obey the rule of looking first for the posterior edge of the vomer. Where adenoids of any size are present, they hide from view the upper part of that structure.

If you have a chance of watching an adenoid case you will find that the growth varies in size very considerably week by week, and that if it is not already large enough to cause the secondary effects to be mentioned later, it will greatly diminish in size on the advent of warm dry weather. When the child is said to have a cold, you will find the adenoids much swollen, extremely soft to the touch, sodden in appearance and discharging a quantity

of muco-pus from their clefts. One may then say that these growths merely represent a normal mass of lymphoid tissue in a state of inflammatory hyperplasia, and the particular inflammatory phenomenon of which their presence forms a part, is chronic or recurrent nasal catarrh.

Our knowledge of this peculiar and widespread disease of nasal catarrh is at present rather scanty, and those of you who are bacteriologists will understand why I say as little as possible with regard to the pathology of acute coryza, for only last year the subject produced a controversy in the journals which led to no definite conclusion, while on the other hand the results of investigations upon the flora of the healthy nose, vary very considerably with the methods employed by different observers.

Two points come out clearly. One is that you can find in the upper posterior regions of the normal nose, exceedingly few micro-organisms capable of growth upon the ordinary nutrient media; the other is that the discharge of an acute coryza,

even the watery discharge of the first few hours, teems with micro-organisms.

Acute colds are caught in two distinct ways, and are said to be due either to infection or to chill.

Sometimes a cold definitely runs through a household and one must suppose that the essential element here is the actual virulence of the micro-organism. Closely allied to these cases is the class which is presumably due to a relative virulence of the source of infection. You will have noticed that it is very common for colds to be caught immediately on your return to London after the holidays, and you have possibly heard of the Ben Nevis cold which regularly attacked members of the astronomical observatory staff when, after their three months' term of duty and isolation on the top of the mountain, they returned to the more sociable conditions at its foot. Our growing knowledge of immunity and of vaccination, suggests that these occurrences are connected with a general shortage of protective substances, and that the bacterial dangers of city

life, demand the daily inoculations which accompany them. One may add, by the way, that you will find it worth your while to spray your nostrils with a weak antiseptic (say gr. i. of ac. carbolic with gr. iv. of sodae bicarb. to the ounce of water) when you are exposed to these sources of infection.

But the onset of acute nasal catarrh is much more commonly the result of chill and exposure. One may gain some idea of the nature of this affair by a personal experiment. Choose a moment when your nose feels perfectly well, to commence it. Sit down in an overheated room in your indoor clothes with thin socks upon your feet and no boots ; open the window to the raw winter evening's air and arrange for a draught slowly to chill the lower part of your person. You probably at first experience no discomfort at all, but after an interval you will find your nose feeling unduly dry and patent. After an hour or so you will find the nose becoming blocked and a sense of dragging weight is felt about the eyes. A little later your nose will begin to run

clear fluid, and if you examine this you will find that it contains micro-organisms in small growing clumps.

It would seem that by sitting in the cold you have upset some local protective mechanism in the nose, and allowed the bacteria, which are of course always being deposited from the inhaled air, to gain a foothold and to multiply. Where the breakdown in the protection occurs has, I understand, still to be worked out. We may presume that it concerns in part the cilia which, when active and constantly sweeping the film of fluid covering the mucous membrane back into the throat, allow the bacteria no abiding place. It is, at all events, certain that once the cold has started, the cilia are unable to keep the excessive fluid moving backwards. On the other hand the condition of the blood supply may be the most important element. You may have observed during your experiment that sitting still in the cold you have a natural tendency to take very shallow inspirations, with

the chest walls more or less rigid. This fact has probably a good deal to do with the engorged condition of the nasal mucous membrane, for if you will now take a dozen slow, deep inspirations, using all the ribs as well as the diaphragm, you will find that your nose has again become clear and pervious. Whether or no this is due merely to increased thoracic aspiration I do not know, but it is certainly a point worth remembering that if you will make a practice of deep breathing, you may undergo prolonged exposure, say, while sitting in an open motor after working in a hot room, without catching cold. It may be that the quickened nasal circulation brings a more effectual supply of protective substances into the required region ; it may merely be a mechanical effect preventing the occurrence of conditions in which the cilia are unable to do their work. Whatever the explanation, you will learn that the common cold of exposure may be prevented, and even cut short in its initial stages, by deep breathing, and better still by violent exercise

such as running. You will find that many middle-aged people who formerly complained of repeated nasal catarrh, have been cured by adopting some routine form of gymnastic exercise.

Children of sedentary habits, and particularly those who are allowed to spend part of their day in overheated, ill-ventilated rooms and other parts of it loafing about the streets without sufficient clothing, are the special victims of chronic nasal catarrh and of adenoids, and you will soon convince yourselves that the essential preventive of this widespread disease is good domestic hygiene, coupled with incentives to constant muscular exercise. It is singularly interesting to go into camp with a volunteer corps composed of men leading a sedentary city life and having none of the appearances of exuberant health. While under canvas and doing hard physical work they may be wet through day after day and sleep in the mud, but you will never see a man showing the least sign of a cold in the head. Under favourable climatic conditions there

is, of course, not the same necessity for hygienic precautions ; during a Christmas walking tour through Cornwall I scarcely saw a single child with a cold or with the evidences of adenoids, and in a pretty careful inspection of a large convent school in Florence, I saw only two or three instances of the adenoid facies.

It has been said that the disease is hereditary, and that it is racial, and even that it is one of the stigmata of a racial degeneracy. It would be a difficult task to prove that these influences are not at work, but it is much more important to bear in mind that the common cause of adenoids is repeated nasal catarrh, and that the latter is mainly due to imperfect domestic and personal hygiene. Well-ventilated homes and schools, good clothes and regular exercises, as well as the active playing of games, will of course not entirely prevent the occurrence of colds in children. When they do occur it is quite worth while to bring them to a speedy end by confinement to bed for two or three

days and the administration of quinine and strychnine. It is well to take this opportunity of teaching children how to blow their noses effectually. It is an abnormal act and does not come instinctively to a child who, as a rule, uses his handkerchief as a cloak for sniffing. Needless to say the only effectual method of blowing the nose is to close first one, then the other nostril, expelling what was collected in the inferior meatus by a prolonged blast through the free nostril.

As all these small familiar points become recognized as really important, the disease of adenoids will become less prevalent, and the proper attitude of the profession towards it, will be one of preventive medicine.

Meanwhile we are confronted with an enormous number of cases, and the important point to bear in mind is, that a child who is permitted to go through the period of the second dentition with nasal obstruction, will bear the marks of this neglect throughout his life. The duty of the profession which lies next

to that of prevention is to educate all mothers and nurses into a recognition of the early stages of the disease—for as a rule the children are brought to the hospital only when some secondary effect frightens the mother.

Let it then be understood that a child, however young, who has constant or frequent running from the nose and who habitually sniffs, probably has early adenoids. More pronounced symptoms are mouth breathing during the day, sleeping with the mouth open with the resultant dry mouth in the morning and the desire then for "a drop of water," dry deposit about the teeth, a tendency to inflammation of the tonsils and possibly enlargement of the cervical glands.

During sleep these children breathe through the nose, the open mouth being used occasionally for a deep inspiration. It is this attempt at nasal breathing which is so mischievous in producing deformity of the chest. The thoracic apparatus is engaged in drawing the air with great difficulty

through the obstructed nasal passages, and as a result the yielding anterior parts of the thoracic skeleton become permanently altered in shape. The deformity consists in the presence of a shallow groove upon either side of the sternum, turning outwards below to follow the line of the costal cartilages and thus producing pigeon-breast or something short of it. Where the nasal obstruction commences after the early years of childhood are over, you will find merely a flat ill-developed chest with well marked indrawing of the lower segment of the sternum. Mothers should be taught to watch the chests of their sleeping children and not wait for the arrival of deformity.

In the later years, night breathing is carried out more and more through the mouth. In very young children the respiration is almost entirely nasal, and the defective oxygenation which results may be responsible for convulsive attacks with laryngeal stridor. In older children enuresis occurs and the patient is restless in his unrefreshing sleep and often

wakes in terror from evil dreams. This lack of peaceful sleep perhaps accounts for his inability to profit by the morning's lessons, while the efforts of his teachers are largely thrown away upon a listless inattentive pupil; for most of these children are subject to a mental condition in which prolonged attention seems to be impossible; and to this state of so-called aprosexia, there is often added the handicap of actual deafness; and it is probably no exaggeration to say that a large part of the expense and effort of the School Board is entirely wasted, thanks to the existence of adenoids.

All children who are in the least deaf, or who ever suffer with earache, should be brought for inspection.

In the early stages, nasal obstruction only becomes marked on the advent of a fresh catarrh or during the engorgement which accompanies sleep and recumbency. As increase takes place, the nasal resonance of the voice is lost; "em" and "en" cannot be clearly pronounced. The nose is no longer used for respiratory purposes, and the small muscles

which normally keep the nostrils open by their action upon the alar cartilages, lose their tonus and allow the lower edge of the triangular cartilage to fall in against the septum, and the alar cartilage to drop. As a result the cartilaginous portion of the nose looks unduly small, narrow and dimpled at the side, and this condition coupled with the half-opened mouth and tired vacant eyes, gives rise to the well-known stupid, sullen appearance.

Much of the engaging look as well as quality of childhood is lost, and this no doubt leads to further neglect from parents and teachers, and adds to the terrible responsibility of our profession, which is allowing quite a large section of the community to grow up into defective specimens of humanity.

With regard to the treatment of adenoids, it should be said that operation is only necessary when a vicious circle has been set up, through the induction of a permanent catarrhal condition of the nose by the actual presence of the obstructing adenoids and the infected clefts

between their folds. Surprising results are sometimes seen when adenoid children are taken to a climate like that of Egypt, where the vicious circle is presumably cut by the influence of climate upon the nasal catarrh. Early cases of adenoids are undoubtedly cured by hygienic measures of which regular exercises form a part; but where large masses of adenoids already exist, cure by this means, if it is obtained at all, takes so long that it is impracticable and wastes valuable time.

In well marked cases, nasal respiration must be restored at once by operation, and then the exercises will be invaluable in removing the original cause of the trouble as well as many of its effects.

In the majority of well marked cases of adenoids you will find enlargement of the tonsils, and an operation should always include their removal. A general anæsthetic should invariably be employed, for children often receive a serious mental shock where cocaine anæsthesia is employed and almost invariably come to regard the surgeon as their

natural enemy. One case is on record where a child fell dead in fear, when confronted with the surgeon a few days after operation without general anæsthesia. Again it is a very serious matter to witness the terror of children who have 'come to' prematurely during an operation under gas, and although one nitrous oxide administration gives more than enough time for the successful removal of adenoids and tonsils by those used to the operation, I will strongly urge you, during your early days in private practice, either to employ chloroform lightly administered, or else the ACE or CE mixture. It is easy when bleeding is at all brisk, to send the child back to bed with a tag hanging in the pharynx, and this accident may at the least lead to loss of reputation and self-confidence, apart from the fact that the unfortunate child must suffer a subsequent removal

If possible the operation should be performed in the morning, the child remaining in bed until the arrival of the operator. The previous night

should not be broken by the administration of a violent purge, and the patient should know nothing of the matter until the actual moment, and no preparations should be made in his presence. He should have ordinary wholesome meals, free from indigestible matter, such as the skins of fruit, on the previous day. On the morning nothing at all should be eaten or drunk, but if the operation must be at midday or later, a light breakfast of bread and milk, or fish and toast may be taken, followed by a cup of plain beef-tea not later than four hours before the appointed time. Wax, if present, must be removed from the ears. If this is not done you may cause unnecessary pain by having to syringe during a post-operative otitis media.

The child, properly undressed and ready for bed, and with both shoulders free from any garment, and the hair enclosed in a towel, should be placed upon the operating table, his head resting upon a pillow over which is spread a macintosh sheet. The head of the table should be near a window unless artificial

light is employed, for the operation must be controlled by reflected light from a forehead mirror.

With regard to instruments let it be said that the use of antique and imperfect patterns is inexcusable, and that the cost of an adequate set will be met by the first few operations performed. I would advise the purchase of :—

1 Mason's gag.

2 Mackenzie guillotines. Smallest and middle sizes. Reeded metal handles.

1 large size Gottstein's curette, of square form and furnished with hooks to retain the detached mass.

1 small square Gottstein curette.

2 sponge holders.

1 Jurasz's adenoid forceps. Small size.

These forceps are useful to remove tags hanging in the pharynx, but during your first few dozen operations you should avoid their use during the operation in chief. A scalpel and cricothyrotomy tube on a guide should be prepared for all throat

operations. As soon as anæsthesia is established the pillow is removed and the patient's occiput rests upon the table. If there is any difficulty in inserting the gag between the teeth the patient can always

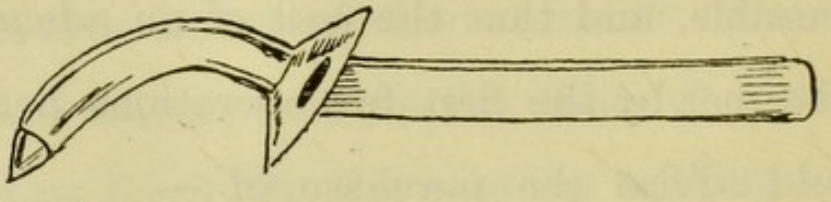


Fig. 27.—Cricothyrotomy Tube and Guide.

be made to gape by touching the posterior pharyngeal wall with a probe passed between the teeth. Commence by isolating the tonsils if necessary from the anterior faucial pillars. This is comfortably done with the blunt edge of the smaller curette. Engage the ring of the guillotine round the smaller and more difficult of the two tonsils, controlling by sight as well as with the finger. Inward pressure from the neck is not necessary if you will make sure to pass your guillotine well downwards towards the larynx, then draw it upwards so as to engage the somewhat pendulous tonsil; press well outwards by a turn of the wrist and finally drive the blade

home with the thumb. Bring the tonsil out between the instrument and your left index finger. If the guillotine is merely introduced into the fauces and pressed outwards against the tonsil, it is very likely that you will fail to remove the lower third altogether.

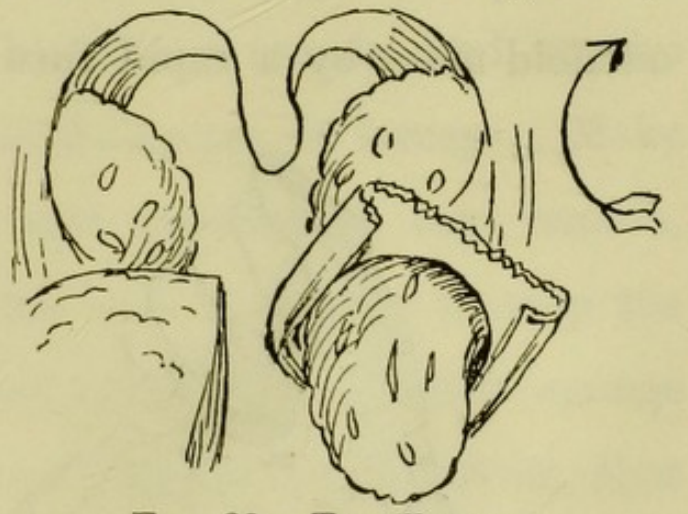


FIG. 28.—Tonsillotomy.
The threading of the tonsil-tail through the fenestrum of the guillotine, which will presently be rotated into the vertical plane to engage the base of the tonsil.

After removal of both tonsils, and this may necessitate changing the gag over from side to side, examine the post-nasal space with the finger, make out the limits of the growth and make sure that there is no abnormal backward prolongation of the septum, a rare condition, but one which may cause embarrassment. Examine the choanæ with the finger and learn to recognize the normal size by touch. Introduce the large curette, carrying the blade right up to the attachment of the vomer. This instrument is not in any sense intended for

scraping but rather is to be regarded as a sharp cutting instrument. The handle must be firmly gripped in the fingers, and the blade made to sweep through the whole attachment of the adenoid mass by a rapid turn of the wrist. It is

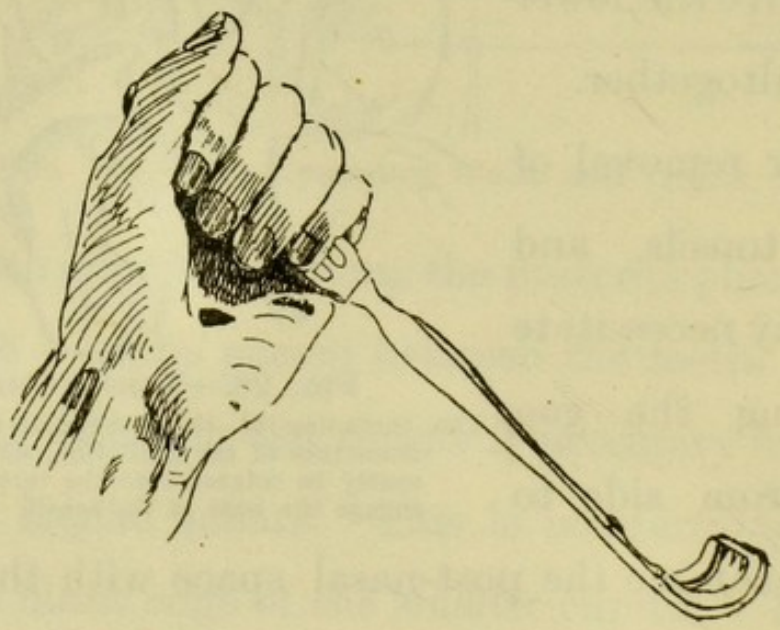


FIG. 29.—Adenoid Curette firmly gripped in the fingers.

By a quick turn of the wrist the shaft of the instrument is approximated to the ulna, the blade sweeping through the attachment of the adenoids. In the sketch the stroke is more than half completed. The right hand is usually employed.

essential that this sweep should be carried well through and down into the oropharynx, otherwise the semi-detached mass may remain hanging in the fauces. It is also essential to keep the shaft of the instrument quite perpendicular, for of course if

this is not done, the growth will not be cleanly removed on one side. The patient will immediately be turned into the semi-prone position if bleeding is at all brisk, while the finger searches carefully for any portions which may remain and require removal with the small curette or forceps. Make a final examination and see that no tags remain, and in order to do this you may need to mop the pharynx with a piece of loose honeycomb sponge the size of a tangerine. Remember, however, that more bruising of the palate and pain are caused by the vigorous use of sponges on sponge holders, than by the operation itself. Severe hæmorrhage after this operation in children is exceedingly rare. Among the many thousands of cases with which I have come in contact in hospital practice, I can recall only two or three instances of troublesome hæmorrhage, and in all of them the cause has been an incomplete removal of the growths.

As a matter of routine, inquiry should always be made concerning hæmophilia, and if doubt exists

on this point, the coagulability of the blood should be tested, and if necessary be raised by the exhibition of calcium or magnesium salts.

The patient should be kept in bed for three days. Nothing should be given by the mouth until the child demands it, and then he should have beef-tea or jelly. It is advisable to withhold milk during the first twenty-four hours, for if blood has been swallowed the addition of milk will cause nausea. As a rule the child vomits the swallowed blood as soon as he is moved from the operating table; the upper parts of the bed should therefore be covered with macintosh and a large basin put in readiness. If nausea continues, give a pint of hot water by the mouth in order to get the stomach speedily emptied. If the operation has been performed without bruising of the parts, the patient suffers no pain whatever and feels perfectly well within twenty-four or even six hours. It is, however, a valuable routine to insist upon bed for three days, for now and again otitis media occurs if this

rule is not observed. The sucking of ice or iced drinks is, I am sure, entirely uncalled for and often has a very depressing general effect.

Having removed the adenoids, and restored nasal respiration, remember that it is now your duty to see that the whole vicious circle is not in a few months time reconstituted. The condition of affairs which in the first place induced the nasal catarrh must be gone into and changed. The question of open windows, uncrowded schoolrooms, active games, suitable food and raiment, and especially warm hands and feet must be remembered. Periodical courses of cod-liver oil and iron, change of air and so forth, I need not speak of.

It is, however, necessary to say that re-education to nasal breathing is essential in all but the youngest cases. If convenient, by all means let them practise the more elaborate and excellent exercises which are now in vogue, but a simple and very successful method is to swing the arms slowly round the shoulders, with the mouth shut, inspiring deeply

through the nose as the arms go forwards and upwards, expiring as they return to the side. This has a particular value in that the forcible expansion of the thorax makes a demand for a large and rapid inspiration, which demand cannot be met without the active cooperation of the muscles of the alæ nasi. It is, I believe, in the restoration of the involuntary action of these muscles that the special value of breathing exercises resides, and it is not until they have been re-educated that quiet nocturnal nasal breathing will be regained.

This simple exercise done fifty times night and morning, will in a few weeks, restore good nasal breathing in all cases in which the secondary effects upon the nose have not advanced too far; and these cases will be dealt with in the next chapter.

A

B

PLATE I

A Typical Adenoid Facies in a boy of twelve. Dropping of the ill-developed lower jaw with dragging of the upper lip and alae nasi.

B Comparatively recent fracture of the nose, causing nasal obstruction and mouth breathing, but the development of the jaws is normal.

CHAPTER IV

THE ADENOID FACIES

THE removal of adenoids and careful after treatment does not restore the patient to nasal respiration and health in all cases, for in a certain number an abnormal development of the facial skeleton has already taken place. The traces of this maldevelopment will persist, and more or less serious troubles will result from it, throughout life. It is this fact which impresses us with the vital importance of dealing with adenoid cases in their early stages, and unless this impression bears fruit a very large section of the community will continue to fall far short of their natural development both of mind and body, and our hospital outpatient departments will continue to be filled with men and women complaining of small ailments in their throats and ears.

The typical adenoid facies is not seen until the age of seven, when the profound changes which accompany the second dentition have got under weigh. At this time the alveolar arch has to expand to make room for the growth and eruption of the large permanent teeth, and notably of the molars. At the same time, in those races of mankind characterized by long narrow faces, the permanent change from the short, chubby, infantile physiognomy commences and makes such rapid progress, that any interference with it will leave a very obvious mark in a short space of time.

We do not understand the nature of the impulse which produces the elongated adult face, but we cannot fail to recognize that a number of influences are at work, and that the removal of an important factor from the equation must upset the balance and alter the result.

You who are in the habit of using the tongue-depressor will recognize the fact that the tongue is an organ of remarkable muscular power and of untiring

A PLATE II *B*

A Typical Adenoid Facies in an adult, showing the open mouth, the dropped jaw and dragging of the upper lip. Inactive compressed nostrils.

B The same patient, showing the narrow alveolar arch and distortion of the teeth. One lateral incisor absent and one set back behind the general line.

[*To face page* 98.

energy. Allow an infant to suck your finger, and if the experience is new, you will be surprised at the force which these muscles can exert even in the first months of life. At your next meal please notice that it is your tongue which does most of the work in mastication, pressing your food out between the teeth and crushing it against the hard palate. The tongue is indeed the dominant organ of the face, the jaws being the junior partners in the firm.

Take notice now of your own tongue in rest. It does not lie flaccid upon the floor of the mouth in the attitude in which we often see it when examining a patient. On the contrary, you will observe that it is in a state of tonus, and that it is closely applied to the inner side of the teeth and alveolar arch, pressing firmly against them and against the anterior part of the palate.

It is not difficult to realize how very important a factor this constant pressure must be in moulding the growing bones. Now, in the adenoid child the mouth is held open during the greater part of

the twenty-four hours, and there is no longer contact between the tongue and the upper jaw. A tremendously important factor is therefore removed from the field of action, the normal equation is upset and deformity results. The latter is exactly what you would expect. In the normal skull you will see

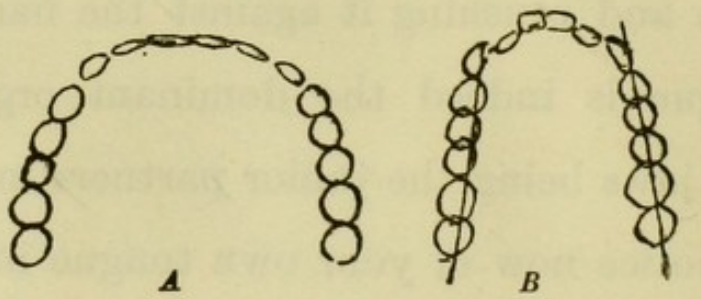
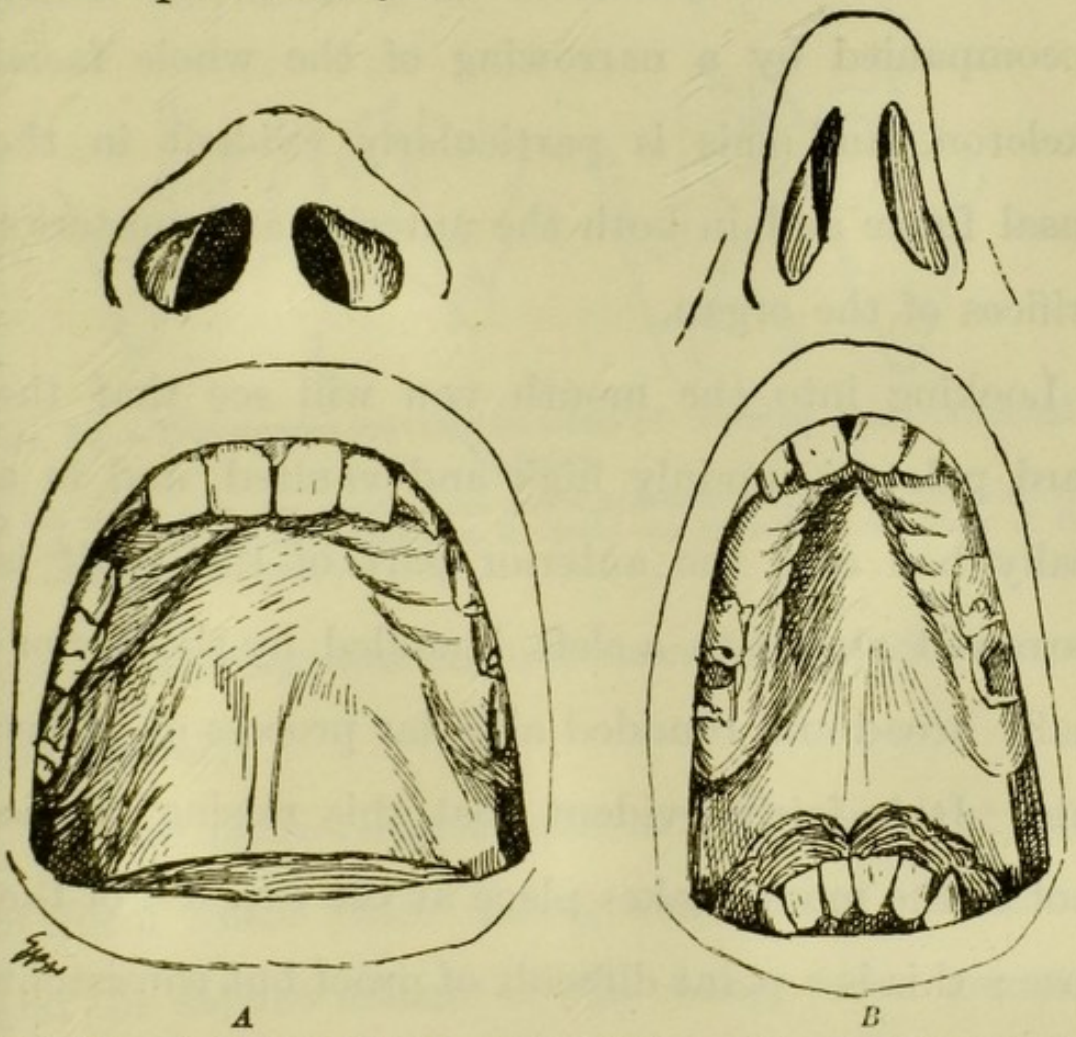


FIG. 30.—Diagram of (*A*) Normal, and (*B*) 'Adenoid' Alveolar Process.

In (*B*) the line from the canine to the wisdom teeth is almost straight. Room is lacking for the teeth and the lateral incisors are displaced within, and the canines without, the general outline.

that the plan of the alveolar arch is that of a horseshoe, but in the adenoid face the outward pressure of the tongue has been lacking, while the inward pressure of the tissues of the cheek has persisted and has even perhaps been increased by the dropping of the lower jaw: as a result the arch has lost its proper lateral expansion. In place of a full curve you find a straight line between the first premolar and the second molar. Sufficient room

is lacking for the natural eruption of the teeth. This is particularly noticeable where the central



A B

FIG. 31.—*A* A healthy girl of ten with a well-expanded palate; showing the horseshoe-shaped alveolar process and normal nostrils.

B A boy of eleven, the subject of neglected adenoids; showing an unexpanded palate with a deep anterior recess and distorted alveolar process. The teeth are displaced and decayed and the lower incisors project. The nose is blocked and the ears are suppurating.

incisors meet at an angle, while the laterals and the canines erupt behind and in front respectively of the normal line. Food is apt to collect in the angles

between the irregular teeth, and to lead to caries.

The lateral compression of the alveolar arch is accompanied by a narrowing of the whole facial skeleton, and this is particularly evident in the nasal fossæ and in both the anterior and posterior orifices of the organ.

Looking into the mouth you will see that the hard palate is unduly high and vaulted, and in a really bad case the anterior part of the vault is narrowed almost to a cleft, bounded by the abnormally broad and rounded alveolar process on either side. It is fairly evident that this raising of the roof of the mouth takes place at the expense of the nose ; this is a point difficult of proof but consistent with the fact that the nasal cavities appear unduly small in all their dimensions.

It is this disproportionate size of the nose which chiefly concerns us, and very early in your studies you will become familiar with the cramped nose, unduly filled by the normally developed turbinate bodies ; an organ which can scarcely be accused of

disease and yet one which is constantly giving trouble and leading to secondary defects such as

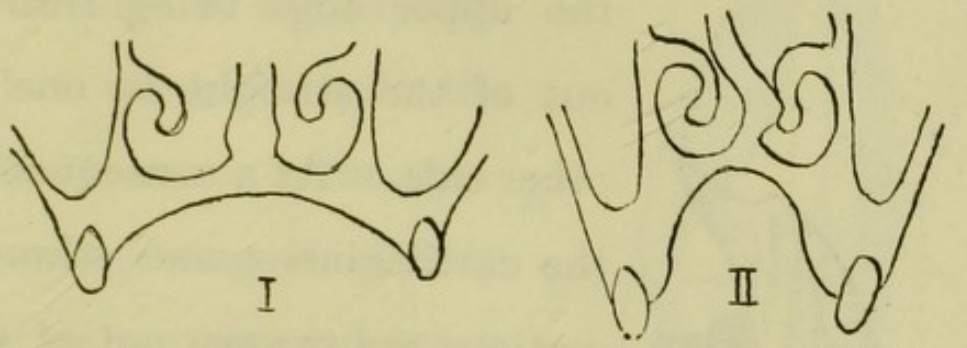


FIG. 32.—Transverse vertical sections of Normal and 'Adenoid Palates.

In the latter both the mouth, nose and antra lack lateral expansion and the growing vomer is crumpled as it meets the unyielding resistance of the narrow arched palate.

loss of hearing and chronic catarrhal conditions of the throat.

In the narrow-faced races a very rapid change of form takes place during the second dentition, and the salient feature of the change is an increase in the distance between the body of the sphenoid and the anterior nasal spine ; for practical purposes along a line corresponding with the upper edge of the vomer. Possibly owing to the abnormal resistance which it meets in the vaulted palate of the adenoid face, the vomer fails in its proper development. It would seem that the growing

bone instead of aiding in the moulding of the face is itself mastered and distorted, the upper edge being thrown out of the straight to one or other side. As a consequence, the cartilaginous and ethmoid sections are thrown out of the middle line, and as growth proceeds, one side of the nose becomes increasingly blocked by the deviated septum. In a good many instances you will find that the cramped vomer has taken on an S-shaped curve and that one nostril is blocked anteriorly and the other near its posterior end. The actual posterior end of the vomer is never deviated and this is not surprising, as it takes no part in that extremely rapid phase of development of which we have been speaking.

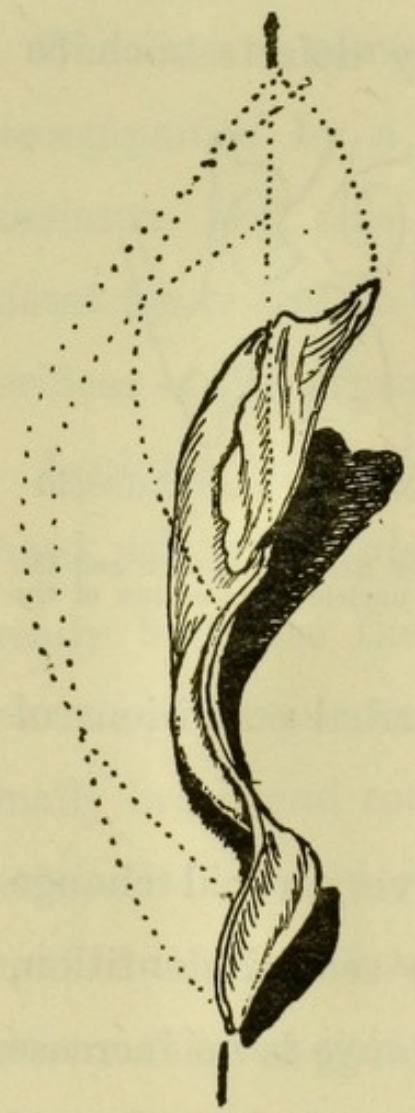


FIG. 33.—Sigmoid lower edge of the Septal Cartilage. Fragment from a submucous resection operation.

The dotted lines indicate the planes of the septum which blocked the anterior two-thirds of the right, and the posterior one-third of the left, nose. ♂ c. 30.

Consequently it is very rare to see any inequality in the size of the choanæ.

It is otherwise with the anterior nares. The pyriform opening is already unduly narrow and when the quadrilateral cartilage is thrown to one side, it may come almost in contact with the bony margin. Moreover, the alar cartilages are often ill-developed and their muscles inactive, so that the triangular cartilage falls in contact with the septum and a useless nostril is the result. A nose blocked in this manner is never properly cleared of the

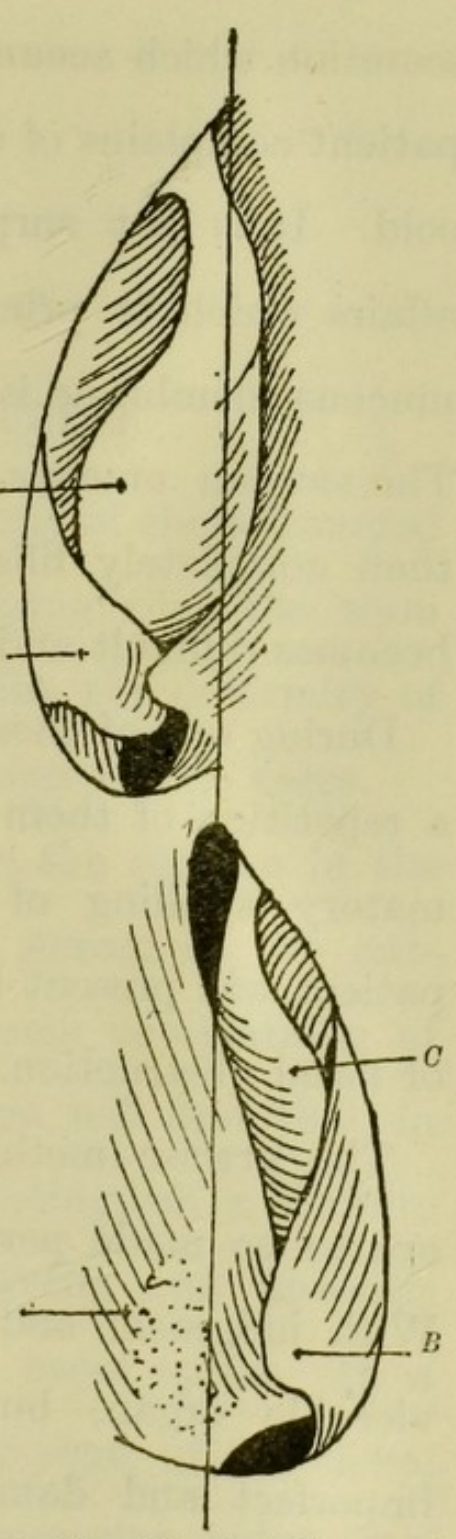


FIG. 34.—Typical Cramped Nose in a woman of forty-five.

R and L = Right and left nose. The middle line is indicated.
A Septum with vomerine crest.
B Inferior turbinate.
C Middle turbinate.

secretion which accumulates upon the floor, and the patient complains of chronic or constantly recurring cold. It is not surprising to find in a state of affairs which is primarily due to rhinitis, that the mucous membrane is subject to frequent catarrhs. The swollen mucous membrane of the turbinates then completely fills the narrow fossæ, drainage becomes difficult and recovery is slow.

During one of these prolonged colds, or else when a repetition of them has induced a chronic inflammatory swelling of the mucous membrane, the patient will present himself for treatment as a case of nasal obstruction.

The precise method by which his air passages are to be made pervious will be dealt with later. With judgment and care you will give him a serviceable organ, but he will always remain an imperfect and damaged article with a deformed nose, and mouth, and chest. The neglect of his adenoids in childhood has robbed him of the chance of ever developing into the man he might have been.

CHAPTER V

THE VOMERINE CREST

You will not have examined many of these cramped adenoid noses without discovering that the term deviation, does not fully describe the deformity of the septum in a large proportion of the cases.

If you will carefully examine the septum in the first hundred noses you come across in the out-patient room, whether they come complaining of nasal trouble or otherwise, you will find that in quite half of them you can distinguish a definite ridge running obliquely backwards and upwards from just behind the anterior nasal spine. In a large minority, probably 30 per cent. of the cases, this so-called lateral crest or vomerine ridge is a very definite structure and frequently it ends posteriorly in a well-marked pointed spur which

projects far out into the middle meatus just below the posterior third of the middle turbinate. The width of this shelf of cartilage varies greatly, and so does its length, and it may extend right back to the posterior attachment of the vomer. Sometimes you will see a long crest upon one side of the septum and a short one on the other. This short second crest never extends farther back than the posterior edge of the quadrilateral cartilage. You will remember that the nasal septum in the embryo is developed from a bilobed mass, the mesial-nasal process, and when during the second and third months of foetal life, the lower part of the cartilaginous partition commences to ossify and form the vomer, the bilateral character is for a time retained. When the two sheets of bone unite, a deep groove is left between their upper edges.

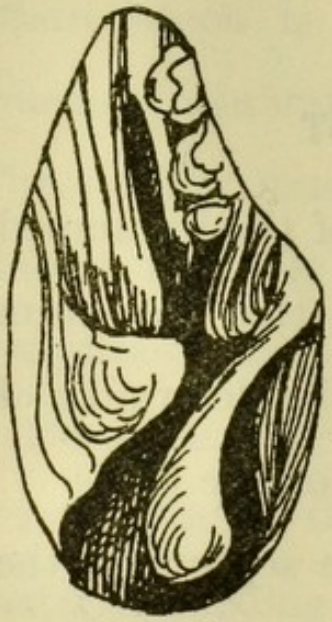


FIG. 35. — A Sharp Spur well within the limits of the normal — revealed by an extensive operation for accessory sinus disease.

The cartilage contained within this vomerine groove has been described as the vomerine cartilage, and it extends the whole length of the bone. Thanks to want of symmetry in the growth of the lips of

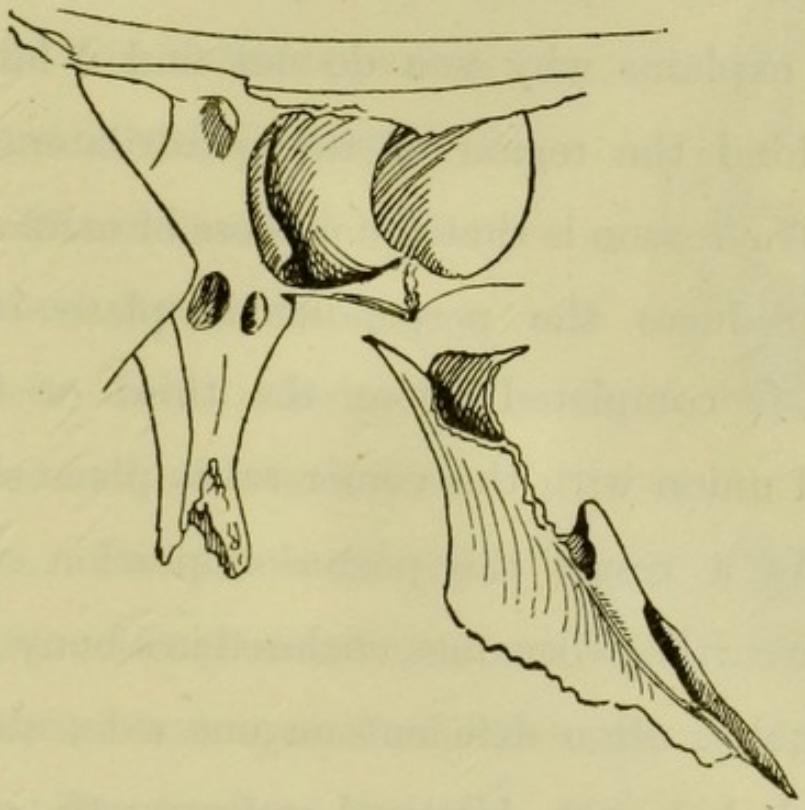


FIG. 36.—Vomer, showing deep groove and tube which contained the unossified portion of the septum in this region.

the groove, in a good many cases the edge of the cartilage is not fully imprisoned, and during the rapid development which takes place at the time of the second dentition, overgrowth occurs upon the open side. Sometimes where no groove at all has been

developed, the overgrowth is bilateral. It is interesting to notice that you will never see a genuine well-developed crest in children below the age of six. The fact that this somewhat exuberant growth of the septum takes place at and after this age, explains why you do not find a bilateral crest behind the region of the quadrilateral cartilage. The reason is that the process of ossification, which produces the perpendicular plate of the ethmoid, is completed about the third or fourth year and union with the vomer takes place shortly after. As a result the posterior portion of the vomerine cartilage becomes enclosed in a bony canal. This canal is often deficient on one side, allowing unilateral but not bilateral overgrowth of the cartilaginous strip. (Fig. 37.)

The prominence, both of the crest throughout its length and of its spur-like posterior extremity, varies very greatly, and even when the septum is perfectly straight, important obstruction to one air passage may result from its presence. Sometimes

the spur is so well developed as actually to penetrate the outer wall of the nose and enter the antrum, and it is quite common to see the anterior portion of the ridge press against and indent the inferior turbinate.

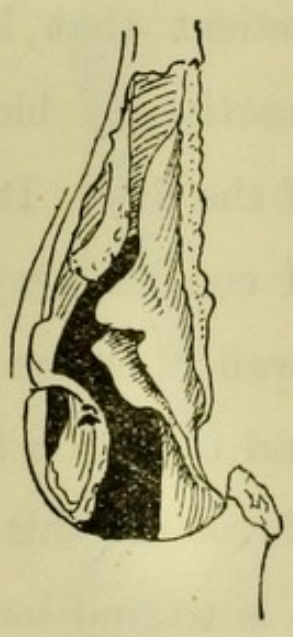


Fig. 37. — Dry specimen showing open tube in the posterior region of a vomerine crest or spur.

When the anterior part of the crest is well developed, it often forms, in combination with the inferior turbinate, a complete dome, closing the anterior end of the inferior meatus. Patients with this condition, come complaining of constant mucopurulent discharge in the throat and inability to clear the nose. The casual observer looking in, will see nothing of note, the condition of the airway above the crest appearing almost normal.

Let me say here that you must never be content, where nasal symptoms are complained of, to dismiss a nose as normal until you have made an examination after shrinking the mucous membrane.

This is done most effectually by painting the inferior and middle turbinate with adrenalin, but I advise you not to do this without warning your patient that he may experience a good deal of reactionary blocking and rhinorrhoea for the rest of the day. It is safer to use a 5 per cent. solution of cocaine very lightly painted with a small wool swab, upon the anterior ends of the inferior turbinate, and then in a few moments upon the parts behind. If you do this you will be surprised how common it is to find large crests and spurs of which at first you had no suspicion, and you will learn also how commonly these structures are present, causing no symptoms and calling for no interference whatever at your hands.

Their importance, one may almost say, only comes into being when they are associated with deviation of the septum such as was described in the last chapter.

The crest is always found upon the convexity of the deviation, and its presence in all probability

determines the direction in which the septum shall bend. So it comes about that a comparatively slight deviation with a crest superadded, becomes a serious source of obstruction and calls for surgical interference. You will often find a deep groove upon the concave side corresponding to the position of the crest.

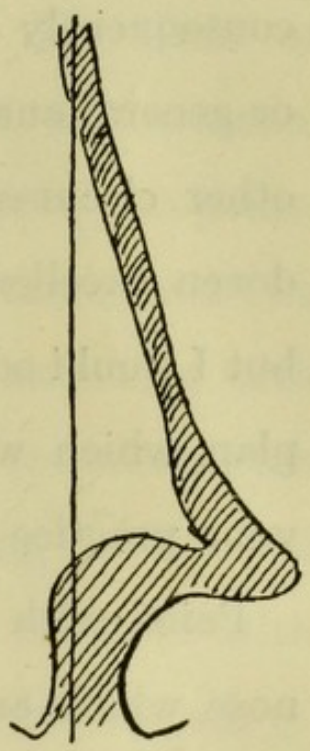


FIG. 38.—Diagram of vertical section of Deflected Septum.

Escape of the lower edge of the cartilage from the vomerine groove, subsequent growth causing the development of a deep groove on the concave and a ridge on the convex side.

In dealing with nasal obstruction, you may take it as a general rule that the mucous membrane of the inferior turbinate should be interfered with as little as possible; and consequently when that body and a septal deformity together cause serious obstruction, it is the latter which must go and not the former. Where the septum is deviated you should not touch the crest unless you are sure that, by its removal alone, you can give an adequate airway.

Where the septum is quite or almost straight, the

removal of a really troublesome crest is both an easy and a valuable proceeding. It is hardly ever necessary to operate except upon adults, and you may consequently determine whether you will use local or general anæsthesia, according to the morale and other circumstances of the patient. There are a dozen excellent ways of performing the operation, but I would advise you at first to adopt the following plan which will serve as a useful introduction to your practice of nasal surgery.

Paint with 5 per cent. cocaine all parts of the nose which are likely to be touched, and also the opposite side of the septum; for where there is a deep groove on the concave side, you may need to displace the mucous membrane lining it.

Now paper the accessible parts with gauze strips soaked in $\frac{1}{1000}$ adrenalin.

By this time the mucous membrane of the septum will be sufficiently anæsthetic to permit you to introduce a needle and make a submucous injection of cocaine or eucaine and adrenalin. The point

of the needle must go right down to the cartilage and you will know that your injection has reached its goal by a definite pale swelling making its appearance. The injection should be made at least half an inch within the nostril, as the muco-perichondrium is too adherent in front of this point. The exact spot chosen is of no importance, and two injections give quite a sufficiently extensive area of anæsthesia. The operation will commence ten minutes after the injection, and during the interval the vestibule should be thoroughly cleansed with spirit and the hairs if necessary may be clipped.

The instruments required are as follows :—

Thudichum's speculum.

Flat nasal probe to be used as a wool holder.

Ordinary fine sinus forceps or angled spring forceps.

A tenotome and a small narrow elevator.

A nasal saw, Goldsmith's pattern. Fix it in the handle so as to cut downwards and with the smooth surface against the septum.

Small scissors.

Commencing at the apex of the spur posteriorly, carry an incision forward along the edge of the crest right to its anterior end. You must feel your knife reach the bone of the spur and the cartilage of the crest. With the elevator quickly detach and throw up the mucous membrane of the upper surface. It is unnecessary to preserve that below the crest or behind the spur. Introduce your saw and, keeping it as near the middle line as possible, cut downwards, remembering the proximity of the sphenoid. The number of strokes which you have to make will depend mainly upon the degree of ossification of the spur, and you must continue sawing until the instrument comes through com-

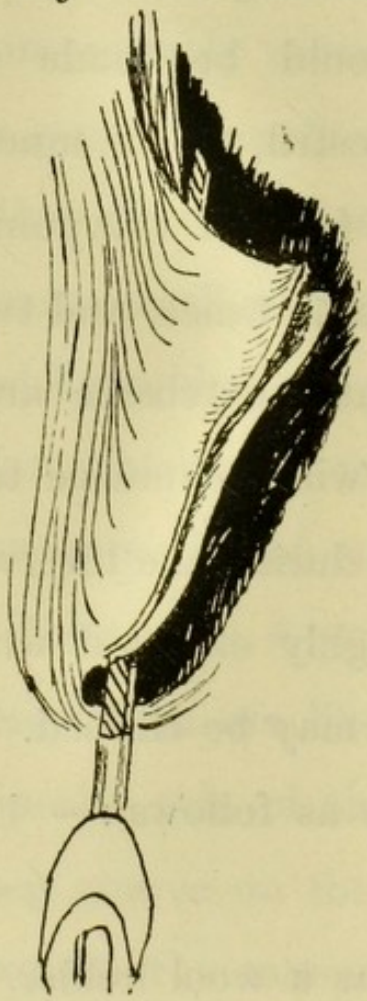


FIG. 39.—Removal of a Vomerine Crest with Goldsmith's saw.

The mucous membrane has been incised and elevated. The saw-cut may be made either from above or below.

pletely. One sometimes sees a student who is not aware that these spurs are often composed of cartilage encased in bone, leave the lower half of a bony shell unsevered. Remember also that a small lip of bone may project from the vomer and form the lower part of the crest. Remove the fragment with the sinus forceps, clipping the mucous membrane if it has not been completely detached.

If the saw-cut has been made properly along the attachment of the crest, you will find that the flap of mucous membrane amply covers the wound, with the exception of the extreme posterior end, where post-operative crusting need not be feared.

I strongly advise you to make it a practice, from which you depart only on special occasions, to avoid the packing of the nose after operations. It is quite unnecessary, and I believe that nearly all cases of septic complication after nose operations are due to the practice. During the past five years, since giving up what was formerly the routine rather than the exception, I have seen but two

cases in which fever suggested sepsis, and in both of them packing had been employed. Complete antiseptic preparation of the nose is quite impossible, and indeed it is unnecessary, thanks to the admirable drainage which is afforded naturally.

Send your spur-patient home without any packing, tell him to lie upon a sofa with the shoulders raised for the remainder of the day. Warn him that reactionary bleeding will probably commence within an hour or so, and order him to instil with a dropper, about 10 minims of hydrogen peroxide (vols. 10 strength) every two hours, when awake, during the next forty-eight hours.

The peroxide is a powerful hæmostatic besides being an antiseptic. Its effervescence, moreover, breaks up and clears away blood clot. I have only once seen the necessity of post-operative packing and application of adrenalin since adopting this routine, and in that case alcohol had been administered. This should never be done, and sal volatile should be kept at hand in case of faintness. If a

dose of this drug is given, cocaine can be used more freely than without it.

The patient will keep the anterior naris blocked with a loose wad of wool during the first week, in order to prevent crusting over the wound. The latter will, in fact, heal perfectly well under a crust, but its presence is apt to induce the patient to make improper use of his finger-nail and this act may introduce septic organisms. Erysipelas starting from the region of the nostrils has been attributed to this habit, but I have seen no case of post-operative erysipelas for many years.

CHAPTER VI

FRACTURE OF THE NOSE—OPERATIONS FOR DEVIATED SEPTUM—HÆMATOMA AND ABSCESS OF THE SEPTUM

FRACTURE OF THE NOSE

In this country where noses are prominently developed and boxing is a recognized pastime, you will see a large number of cases of nasal deformity due to traumatism.

The parts affected by a blow upon the nose are the quadrilateral cartilage, the nasal bones and the perpendicular plate of the ethmoid. The last-named is rarely broken and hardly ever much displaced. The vomer is never broken. The damage chiefly falls upon the quadrilateral cartilage, which is often fractured along a vertical line about the level of the pyriform opening, or else along an oblique

line roughly parallel to the upper edge of the vomer.

Both with and without fracture, the lower edge of the cartilage may be dislocated from the vomer. This is particularly the case with the extreme

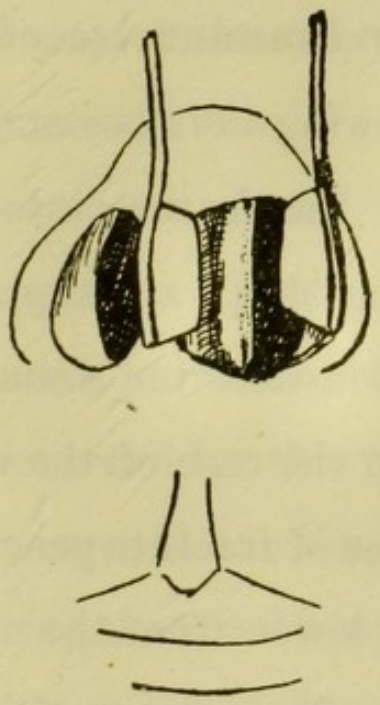


FIG. 40.—Dislocation of the anterior edge of the Quadrilateral Cartilage into the left vestibule.

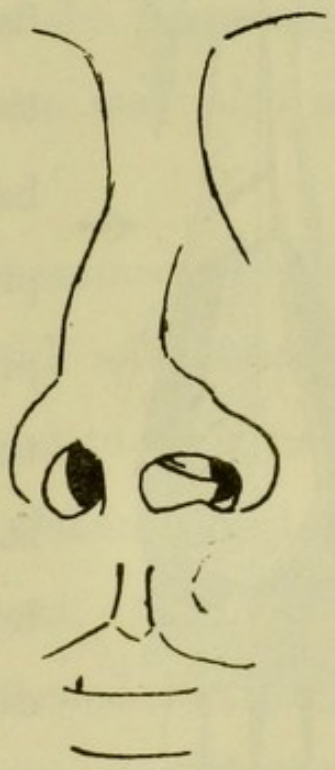


FIG. 41.—Vertical fracture of the Quadrilateral Cartilage at the level of the pyriform opening in a young girl. The anterior fragment blocks the left nostril.

anterior portion, and it results in such a marked displacement of the anterior edge that the latter projects into and blocks the vestibule. The obstruction created by this deformity is increased

by the necessary displacement of the inner limb of the alar cartilage.

Deviation of the cartilage accompanied by deformity of the bridge, is probably always due to traumatism, though the constant use of one hand in blowing the nose and the pressure of the feature into the pillow during sleep, are supposed to be responsible in some instances. In the case of the nasal bone, the line of fracture generally divides the lower from the upper two-thirds. The upper third is firmly supported by the underlying frontal bone, while the middle third gains strength from its articulation with the perpendicular plate of the ethmoid, which in nine cases out of ten does not reach beyond that level. The commonest event is for the nose to be

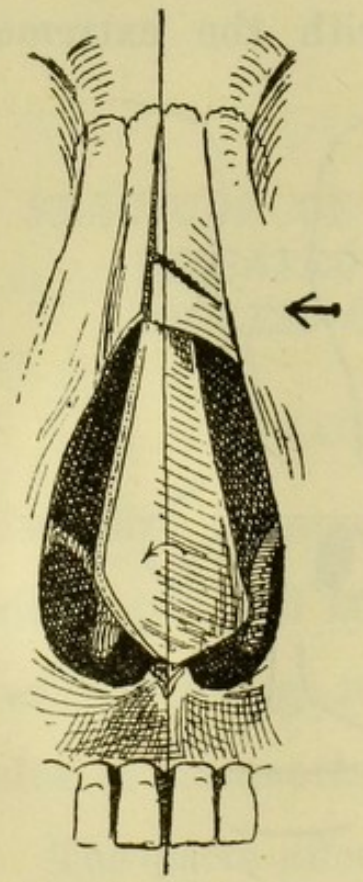


FIG. 42. — A common form of fracture in boxers.

The nasal bone is fractured in its lower third and the quadrilateral cartilage is fractured vertically just within the pyriform opening. The anterior fragment is driven into the nose and the tip of the organ is rotated towards the right cheek.

flattened upon the face, that is to say the quadrilateral cartilage is deflected towards one cheek, while the nasal bone of the opposite side is fractured and the fragment deflected in the same direction. (*v.* Fig. 42.) Fracture and dislocation of the perpendicular plate and of the other nasal bone may also occur at the same time.

These cases should be treated immediately after the accident. Under nitrous oxide anæsthesia, the displaced parts should be restored to their natural position, and for this purpose Walsham's or Adam's forceps are the handiest instruments. Commence by replacing the nasal bone of the flattened side, grasping it between the blades of the forceps, one of which is in- and one outside the nose, taking the precaution of covering the outer blade with rubber tubing lest it should damage the skin. The dislocated or fractured cartilage may not remain in position without some artificial support, which must be left in place for eight days. For this purpose Lake's rubber splints are valuable. You are probably dealing with a

compound fracture, and it is therefore desirable to use instillations of peroxide of hydrogen to prevent both hæmorrhage and sepsis. Pain will be relieved by cold external applications.

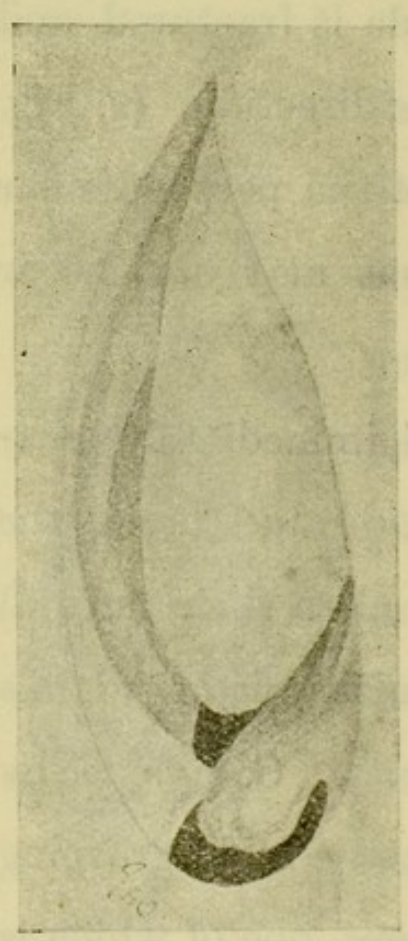


Fig. 43. — Very large left middle turbinate bending the Septum over to the right side. Woman of sixty with headaches and rhinorrhœa spasmodica. Tissues shrunk with cocaine.

If these traumatic cases are left uncorrected for a few weeks, they can seldom be restored without a cutting operation. Deflections of this character occurring in young adults, undoubtedly become more marked as time goes on and growth proceeds, and this remark applies to the external as well as to the internal deformity.

Another type of deflection of the septum mainly concerns the perpendicular plate which is bowed over to one side by an unduly large middle turbinate. This may need surgical interference should disease

occur in the ethmoidal bone of the narrower side.

Learn to recognize the so-called tuberculum septi, a tumescence of the septum about the size of a sixpence, in the neighbourhood of the anterior end of the middle turbinate. Here the cartilage, the bone and the mucous membrane are much thicker than in the surrounding area. (*v.* Fig. 20, *p.* 57.)

OPERATIONS FOR DEVIATED SEPTUM

It is only in quite a small minority of cases of deformed septum that any interference at all is required, and you must exercise all your judgment in deciding whether the nasal obstruction produced, is worthy of serious consideration.

When a septum has been deviated for any length of time, you will find that the inferior turbinate of the larger nostril has become unduly voluminous, and it will cause obstruction unless it is reduced in size, either by cutting at the time of the septal operation, or by galvano-cauterization a week or two beforehand.

There are many operative methods for dealing with the deflected septum, and good results can be obtained with any of them under favourable circumstances.

Two points must be borne in mind. One is that the patient who undergoes an operation, deserves a really adequate airway and a permanent result. The second is that a perforation must not be left in the anterior half of the nose, otherwise crusting and constant discomfort may ensue.

Far back in the nose there is no danger of this inconvenience, and where you have a deflection of the vomer and perpendicular plate in this region surmounted by a spur, you need not hesitate to use a saw and cut the deformed parts away, although this may entail perforation.

Deflections of the quadrilateral cartilage may be effectually treated by a very simple method devised by Moure. With a special form of button-hole scissors, a cut is made right through the cartilage and the mucous membranes, about 1½ inches in

length, both above and below the deflected portion.

The latter is then forcibly displaced towards and beyond the middle line, and kept in position either with a hollow metal splint designed for the purpose, or with a rubber splint. This must be retained for at least fourteen days while the parts are firmly uniting in their new position. This operation can be performed under nitrous oxide anæsthesia in a few seconds. As a rule a good immediate result is obtained, but in a considerable number of instances the deformity has gradually returned.

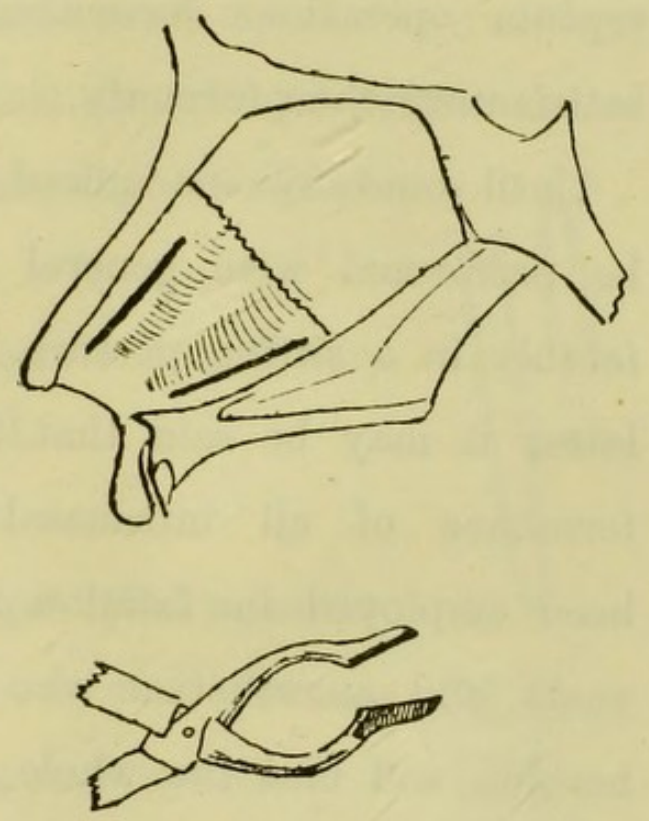


FIG. 44.—Moure's Operation, showing button-hole cut above and below the deflected area.

In all cases of marked obstruction, and particularly in the adenoid nose where the whole cavity is unduly small, it is very much better to remove

the deformed part altogether, leaving the mucous membrane for practical purposes intact.

We are indebted for this method of submucous resection to Freer and Killian, and since its adoption during the last two or three years, the results of septum operations have been very much more satisfactory than formerly.

Until some skill is acquired, this operation should be performed with general anæsthesia and preferably in a sitting posture. With regard to the latter it may be said that it facilitates the performance of all intranasal operations. It has been employed in London for fifteen or twenty years, and anæsthetists who regard it with apprehension will find the whole matter discussed and full directions given, in the works recently published by Hewitt and by de Prenderville.

The nose is prepared in the manner described for the lateral crest operation, with the exception that the submucous injection upon either side consists of adrenalin and salt solution, one in four,

and may be given when the patient is half under the influence of the general anæsthetic.

When the operation is to be done under cocaine, the injections of adrenalin and cocaine will be made as previously described.

The necessary instruments are :—

A tenotome and small dissecting forceps.

A small elevator somewhat sharp at the edge (Freers).

A broader blunt-edged elevator or the handle of a scalpel.

Swivel knife.

Nasal punch forceps (Hartmann's smallest size).

Small gouge with square cut end.

Mallet.

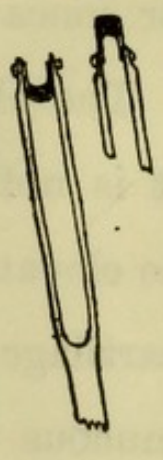


FIG. 45. Ballenger's Swivel Knife (reduced one-half).

Dressing forceps (strong).

Adam's or Walsham's septum forceps.

Thudichum's speculum.

Thudichum's speculum with long blades (St. Clair Thomson).

The operation consists in removing all the distorted cartilage and bone, through a straight incision involving the mucous membrane of one side only. This incision is about one inch in length and is generally made upon the convex side. At Killian's Clinic the left side is attacked for the sake of convenient manipulation whether it be convex or concave.

The chief difficulties concern this incision, for if it is not deep enough it will be found impossible to elevate the muco-perichondrium cleanly from the cartilage, and if it is carried through the opposite mucous membrane, perforation will result.

The depth of the incision is best controlled by ocular inspection of the intact side. The incision should be carried at once right through the cartilage. The point of the knife will just pucker the concave mucous membrane and thus allow its course to be watched and directed. The cut edge of the cartilage is now thrust by the finger towards the convex side, and well into view so that no

mistake can be made as to the line of union between it and the muco-perichondrium. The latter is now elevated, with some difficulty at first and with the sharp-edged instrument, but the posterior parts are

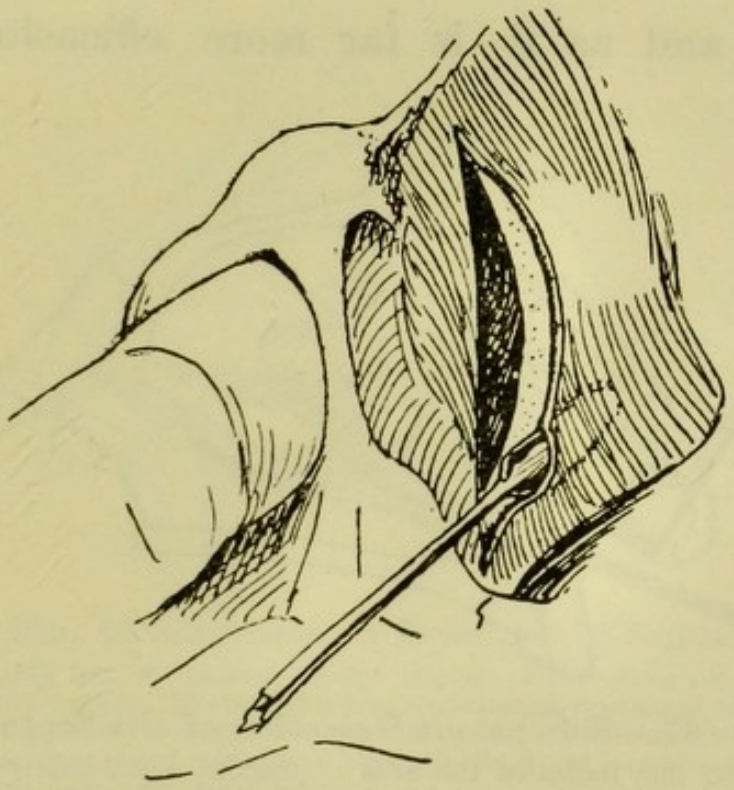


FIG. 46.—Submucous Resection of Septum.

Incision from the left side carried through the mucous membrane of that side and the cartilage. The cut edge of the cartilage has been thrust into the left nostril with the finger, and the mucous membrane is easily elevated from it.

raised perfectly easily with the blunt elevator. The cartilage, cleared on both sides, is now readily removed with the swivel knife, the mucous membrane meanwhile being held aside with the long-bladed speculum. A strip at least one-third of an

inch in breadth should be left to support the bridge of the nose.

To this point the operation has been perfectly painless and has occupied not more than five minutes, and as it is far more efficacious than

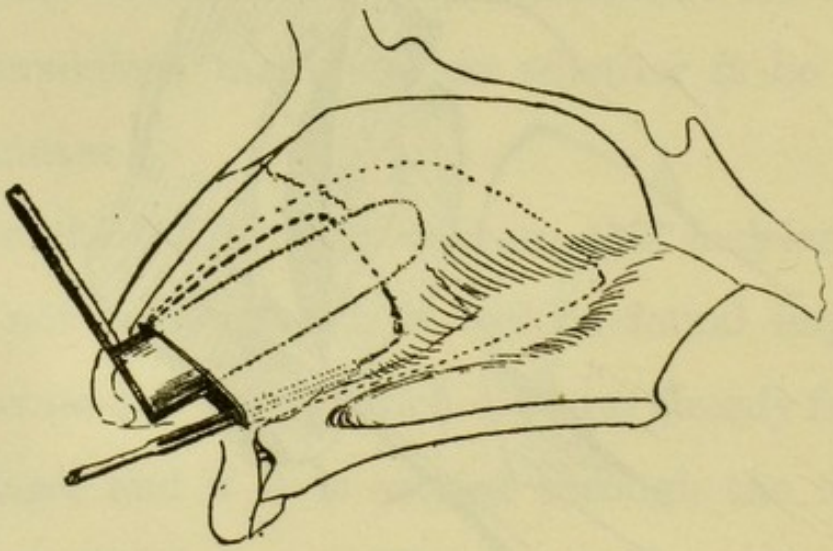


FIG. 47.—Submucous Resection of the Septum.

The fine dotted line indicates the area of mucous membrane elevated. The cartilage, embraced between the limbs of St. Clair Thompson's speculum, has been cut through by a sweep of Ballenger's swivel knife along the heavy dotted line.

Moure's operation and requires no subsequent splinting or after treatment, and as there is no chance of recurrence, it should, I think, be employed in all cases of simple deflection of the cartilage which need any interference.

Where there is in addition bony deformity, the

muco-periosteum is elevated from both sides of the perpendicular plate of the ethmoid, and from the vomer except from that part below the edge of the lateral crest.

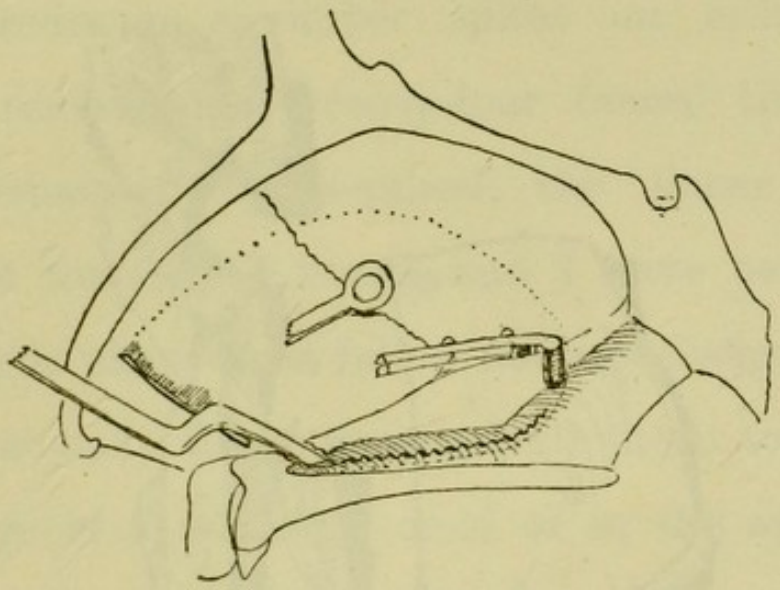


FIG. 48.—Submucous Resection of Septum.

Diagram showing line of fracture of the vomer. Carwardine's forceps cutting through the vomer. Hartmann's punch removing portion of the perpendicular plate and chisel cutting through the anterior attachment of the vomer. These instruments are introduced through the linear incision carried through the mucous membrane of one side.

Portions of the perpendicular plate are clipped away with the punch forceps until the middle line is reached.

The attachment of the vomer to the anterior nasal spine is now cut through with the gouge and mallet. The blades of the septum forceps are then introduced on either side of the vomer. The latter,

including its mucous membrane, is firmly gripped and with a turn of the wrist is cracked from its inferior attachment, and is easily removed with the dressing forceps through the wound, leaving

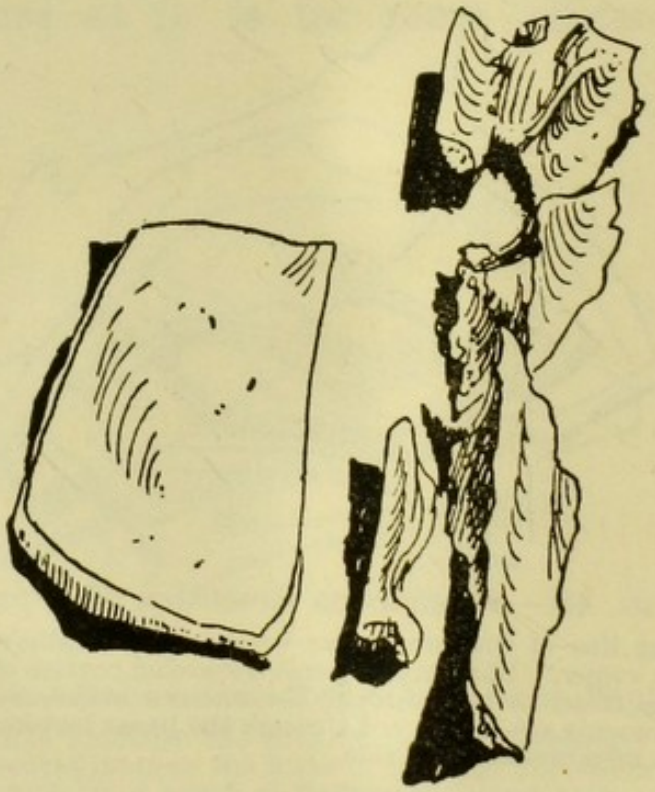


FIG. 49.—The main fragments from a Submucous Resection of the Septum.

The square portion of cartilage removed with the swivel knife. Portions of the distorted vomer (natural size). See also sketch on page 104 of fragment from another case.

the mucous membrane untorn. Occasionally some mucous membrane comes away upon the posterior surface of a spur, but this causes no trouble and will not lead to perforation. Care must be taken

to remove all spicules of bone from between the two mucous membranes, which are then simply allowed to fall together, and require no stitching. Accumulation of blood between them is prevented by introducing a rubber splint on either side, to be removed in twenty-four hours' time. No after treatment is required, the linear wound heals in forty-eight hours, and I have never seen any septic phenomena follow nor any disfigurement.

Occasionally the mucous membrane is torn along the edge of a vomerine crest or in the apex of a concavity. Under these circumstances peroxide should be instilled for a few days and a wool plug worn in the vestibule for a fortnight to prevent crusting.

In cases of dislocation of the anterior edge of the cartilage into the vestibule, the operation is a little more difficult, but the result is very satisfactory. The incision is made directly over the edge which at once projects into the wound. A small dissection must now be made with a sharp knife until the

more loosely attached perichondrium is reached, when the operation proceeds as above, but through a somewhat narrower opening.

The removal of this vestibular part of the displaced cartilage is in itself a valuable little operation.

HÆMATOMA AND ABSCESS OF THE SEPTUM

Hæmatoma of the septum follows a blow and is seldom seen except in children. The nasal passage on either side is found completely blocked anteriorly by a smooth red globular swelling

FIG. 50.—Hæmatoma of the Septum, two, fifteen and thirty days after a fall. Child of 2½ years.

springing from the septum, and to be differentiated from a swollen inferior turbinate by the use of the probe.

The blood may be absorbed and the swelling subside without treatment. Suppuration is, however, very apt to take place, and it is most important to

take the temperature daily. On the first appearance of fever, a free incision must be made on either side and the contents washed out; otherwise the cartilage may necrose and permanent cicatricial deformity result.

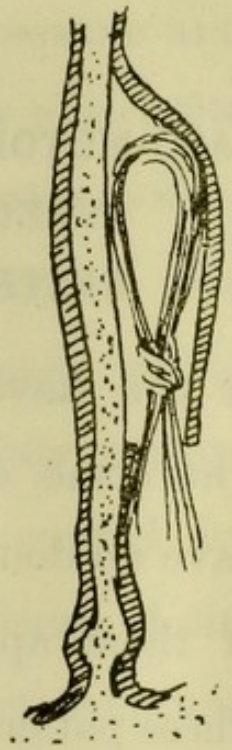


Fig. 51.— Loop of Horsehair maintaining drainage in abscess of septum following hæmatoma.

On incision, the mucous membrane will be found unexpectedly thick and the lips of the wound readily reunite so that pus reaccumulates. The incision must therefore be kept open with some self-retaining drain. A tube or tissue strip is quickly extruded. A few loops of horsehair tied as in the figure, will be found efficient and painless. The parts should be kept clean with peroxide of hydrogen.

CHAPTER VII

VASO-MOTOR OBSTRUCTION—CAUTERIZATION—SYNECHIÆ — OPERATIONS FOR NASAL OBSTRUCTION

If you have been examining all the out-patients who come complaining of nasal obstruction, you have no doubt been struck with the fact that many of them appear to have perfectly normal noses. These patients are generally rather delicate, anæmic young women, who say that they are unable to sleep in comfort with the mouth shut, that they wake unrefreshed and with dryness of the tongue and throat. Others say that they go to sleep breathing through the nose but wake in the morning with the dry throat of a mouth breather, and these often complain of the gradual onset of deafness and tinnitus. After breakfast and exercise the nasal passages seem to clear, and there is no question but that during an examination made at ordinary

working hours, they are perfectly patent. If these cases are seen early in the day you may often notice strings of mucus stretching between the septum and the inferior turbinates, showing that they have quite recently been in contact, and these latter bodies may even visibly shrink under your eyes. Not uncommonly the turbinates look abnormally pallid and ischæmic, leaving the passages unduly roomy.

The obstruction in these cases is caused by excessive distension of the cavernous tissue of the turbinate mucous membrane, quite apart from any catarrh or inflammation, the result, it would seem, of a lack of tonus in the muscular system of the part, and the condition may be described as vaso-motor obstruction.

The statement of the patient that her nose is blocked at night, can always be verified by looking at the septum, where you will see the imprint of the swollen turbinates upon the surface of the mucous membrane, and the limit between that of the inferior and middle turbinate is marked by a

sharp distinct pressure-ridge. You can assure yourself with a probe that this ridge is merely a feature imprinted upon the mucous membrane and not a true permanent structure.

As a rule these cases quickly clear up with the internal administration of strychnine and iron.

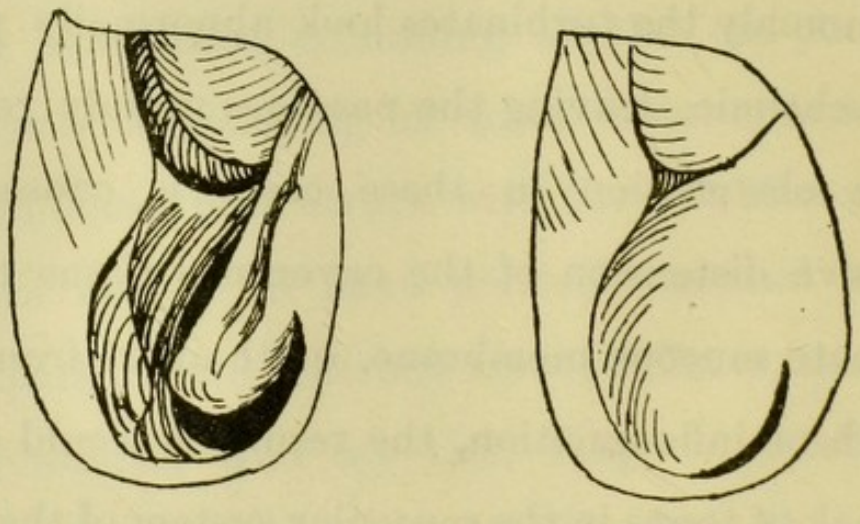


FIG. 52.—Case of Vaso-motor Obstruction in a woman of twenty-two, showing pressure ridge upon the mucous membrane of the septum when the mucous membrane of the turbinates has been shrunken with cocaine.

Change of air to a bracing climate, cold sponging and vigorous exercise are desirable, and the patient should sleep with rather a high pillow and avoid the excessive use of blankets.

In hospital out-patient practice where domestic hygiene cannot well be carried out, it is desirable

to prevent the turgescence by direct means, and the simplest of these is the scarring of the part with the galvano-cautery. Remember that the object is not to burn away tissue which in after years may be missed, but to create cicatrices which, stretching through the thickness of the cavernous tissue, will form a mechanical obstacle to excessive swelling.

With regard to the galvano-cautery, the source of the electricity must be a matter of personal consideration; it is of no surgical importance except that the supply to the hand instrument must be controlled by an adjustable resistance. The most useful form of handle is that of a galvano-cautery snare with a good trigger-contact of large size which will not readily burn. Nasal cautery points are supplied both flat and pointed, and the latter form is required in the present instance.

The mucous membrane of the turbinate—for one side only should be done at a sitting—is lightly painted with a wool swab soaked with 20 per cent. solution of cocaine. After two minutes a second

painting is made, this time the part being firmly rubbed, and then a delay of four or five minutes is made. This will give a perfect surface anæsthesia and is preferable to spraying and to the application of wool packings which are left in position, for the use of both of these is sometimes followed by toxic symptoms, which, although they may not be of serious importance, cause delay and destroy the confidence of the patient.

Having ascertained that the parts are anæsthetic by touching them with the cold instrument, instruct the patient to breathe by the nose in order to expel the smoke which otherwise obstructs your view, and if any pain is experienced to give you warning with the voice but to make no movement which might possibly cause burning of the septum or of the tip of the nose. The electric current must be adjusted to bring the cautery point to a bright red colour. With a very dull red the metal adheres too much to the tissues, while an excessive temperature causes hæmorrhage. Remember to hold

the speculum correctly, keeping touch with the patient by the proper use of the ring and little finger (*v.* Fig. 17, p. 53).

Place the cautery point, cold, upon the posterior end of the turbinate, turn on the current, and cut a deep groove in the tissue from back to front, keeping the field of operation under inspection all the time. One, two or three strokes are required and a good routine pattern is that depicted, for the burning of one side ought to be completed at one sitting under ordinary circumstances.

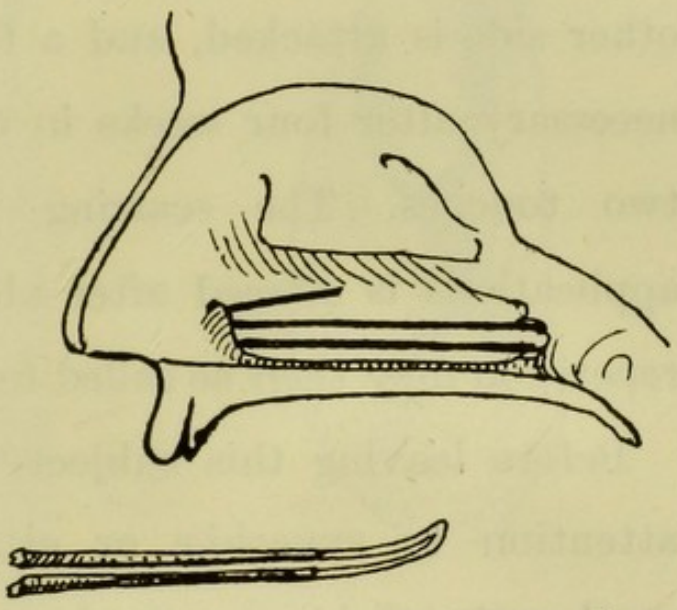


FIG. 53.—Three Routine Cautery Cuts on the Inferior Turbinate.
A Fine Cautery Point (natural size).

The incisions are painted with acid carbol. in glycerine (gr. viij. ad ʒi,) and if the weather is very inclement or dusty, wool should be placed in the vestibule. Some reactionary swelling with exces-

sive secretion may be observed during the first four days, and it is as well to warn the patient of this though it seldom causes trouble, for one of the advantages of this method is that the ordinary duties of life are not interrupted.

An interval of ten days should elapse before the other side is attacked, and a third sitting may be necessary after four weeks in order to add one or two touches. The scarring produced by these applications is effaced after about four years and repetition may then be called for.

Before leaving this subject I would draw your attention to synechiæ or cicatricial bands connecting the turbinates to the septum, for they are commonly caused by improper use of the galvano cautery. Union very readily takes place between two intra-nasal wounds which can come into contact when the tissues are swollen. If through want of skill you touch the septum with the hot cautery point, the chances are in favour of a synechia forming, which will create a permanent, in place

of a periodic obstruction, and the same result may follow if the septum is merely scorched by undue proximity of the hot wire. For this reason it is necessary that the point should be carried deeply

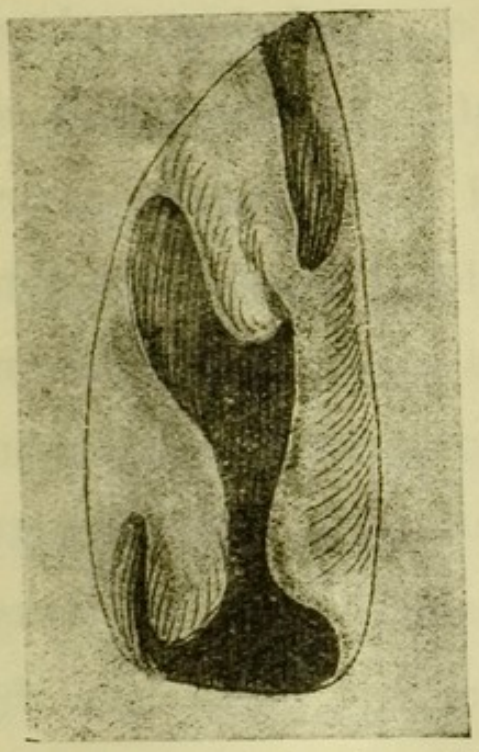


FIG. 54. — Small Synechia between Middle Turbinate and Vomerine Crest, requiring merely an incision with tenotome.

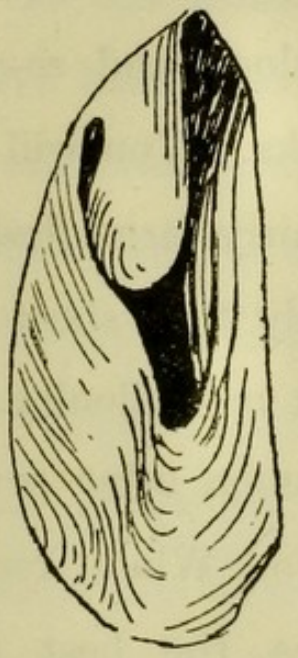


FIG. 55. — Extensive Synechia between Inferior Turbinate and Vomerine Crest, requiring resection. Right nose, woman of fifty.

into the turbinate tissue and not merely dabbed upon its surface.

When opposed wounds are unfortunately created either by burning or by a cutting operation, proper healing may be secured by introducing a thin sheet

of rubber or celluloid between them. These are, however, very uncomfortable and difficult to keep in place and it is not easy to know how soon they should be removed. Unless the synechia is certain to be a very large one, it is best to leave it alone and re-examine after an interval of six weeks. You will often find that what was at first a fairly large fleshy union has become a comparatively thin sheet or even a series of bridles, and that no difficulty will be experienced in preventing re-union after severing them with a small sharp knife. When really extensive union has taken place, the best plan is to resect the synechia and so large a strip of the turbinate with it, that the reactionary swelling will not bring the wounded surfaces together during the period of healing.

In some nasal obstruction cases you will find that the cause of the trouble is merely or mainly that a disproportion exists between the turbinate bodies and the nasal fossa. This is of course the

common condition in the adult adenoid face, and the variety in the degrees of the disproportion met with, probably depends both upon the date and the duration of the adenoid obstruction and also upon hereditary influences, according to the extent to which, as one may say, they have been thwarted.

This disproportion may be observed even in children, and in them it is especially apt to cause undue occupation of the posterior choanæ by inferior turbinate tissue. Children of eight years of age and upwards with adenoids should be examined from this point of view before operation; an anæsthetic will then be chosen which will give you time, if necessary, to snip off a portion of the inferior turbinate at the time of the operation. For this purpose a small guillotine devised by Lake may be used, but punch forceps will do well. The neglect of this apparently unimportant piece of practice is the source of many of the disappointments which follow adenoid operations.

Sometimes it is necessary to cut a fringe of tissue

from the entire edge of the inferior turbinate which is sagging upon the floor of the nose and causing the retention of secretion in the inferior meatus.

In adults it is more often the narrow anterior end of the nose which suffers from the disproportion

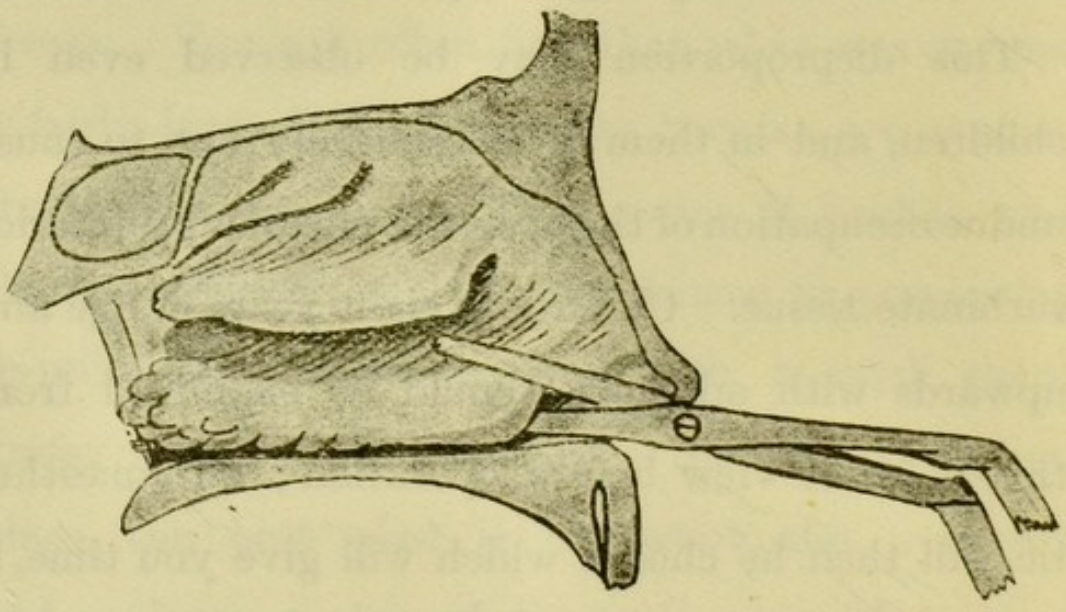


Fig. 56.—Anterior Turbinotomy, Scissor Cut.

and calls for removal of the anterior extremity of the inferior turbinate. This is very successfully and easily met by the small operation of anterior turbinotomy devised by Lake. After thorough cocainization, cut through the attachment of the inferior turbinate for about three-quarters of an inch

with a pair of scissors, then remove the semi-detached portion with a snare, the loop of which you will engage in the scissor cut.

In purchasing a snare you will find that there are a number of excellent patterns, each having its

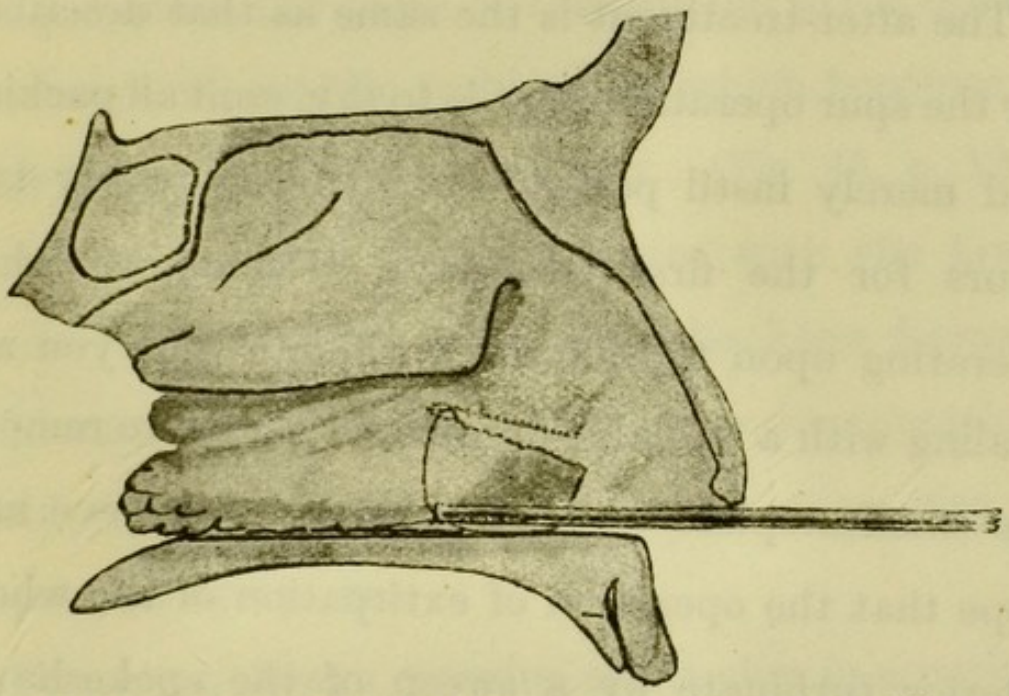


FIG. 57.—Anterior Turbinotomy, Adjustment of Snare.

special good points. A simple and wholly satisfactory pattern is that of Lermoyez. The loop is tightened at will, either by a simple sliding movement or, when a tough piece of bone has to be severed, by the action of a screw.

The most suitable size of piano wire to use is

No. 5. Be careful when you have fixed them in the vice upon the handle, to cut the ends long. If they are cut short enough to be stiff they will prick your fingers. Have at your side two or three spare barrels ready threaded with wire.

The after-treatment is the same as that described for the spur operation, that is to say, omit all packing and merely instil peroxide of hydrogen every two hours for the first two days. Remember when operating upon the inferior turbinate that you are dealing with a valuable organ, and therefore remove the smallest piece which will serve. I believe and hope that the operation of extirpation of the whole inferior turbinate by a sweep of the spokeshave, has been entirely abandoned, for when the stenosis is of great antero-posterior extent it is practically always unilateral and demands rectification of a deformed septum.

The middle meatus is often blocked by over-growth or disproportionate growth of the middle turbinate. In these cases although respiration may be

comparatively easy, the patient complains of a sense of obstruction with intense discomfort and weight in the head. In addition to mere overgrowth you will often see undue rotundity of the shell of bone. This is generally unilateral, and causes deflection of the perpendicular plate of the ethmoid to the opposite nostril, the middle turbinate of which becomes in turn the subject of compression. (Fig. 43, p. 124.)

At the junction of the anterior with the lower border of the middle turbinate, the bone forms a solid mass and when this is actually or disproportionately excessive in size its pressure gives rise to important symptoms.

You must always examine this region in a patient who complains of constant or frequent headache which appears to take its origin in the side of the nose and in the orbital region. There is often marked tenderness over the exits of the infra- and supraorbital nerves, and slight ocular defects are apt to be credited with the causation of these headaches, which are sometimes of the severest possible type.

You will learn to recognize a large class of patients, often middle-aged women with narrow faces, who give a history of life-long martyrdom from headache which no physician or oculist has succeeded in relieving. In some of these cases you will find the operculum closely wedged in a recess made at the expense of the septum and outer wall, of the nose, while in others, pressure and even contact with the walls only occurs when the mucous membrane is swollen. Immediate, though temporary, relief may be given in these latter cases by the application of cocaine or adrenalin and even with menthol vapour. The proper treatment is amputation of the part, and there is perhaps no operation in surgery by which so much is gained with so small an expenditure of pain and trouble, as is done by this very simple little proceeding.

It is performed in exactly the same manner as the anterior turbinotomy, but it is desirable to use scissors of a special make, such as those devised by Butlin. When the snare loop has been engaged

in the scissor-cut, carry the point of barrel well backwards so as to cut the body through obliquely. I have sometimes seen delay in healing where the wound has formed part of a prominent angle projecting into the main inspiratory airway.

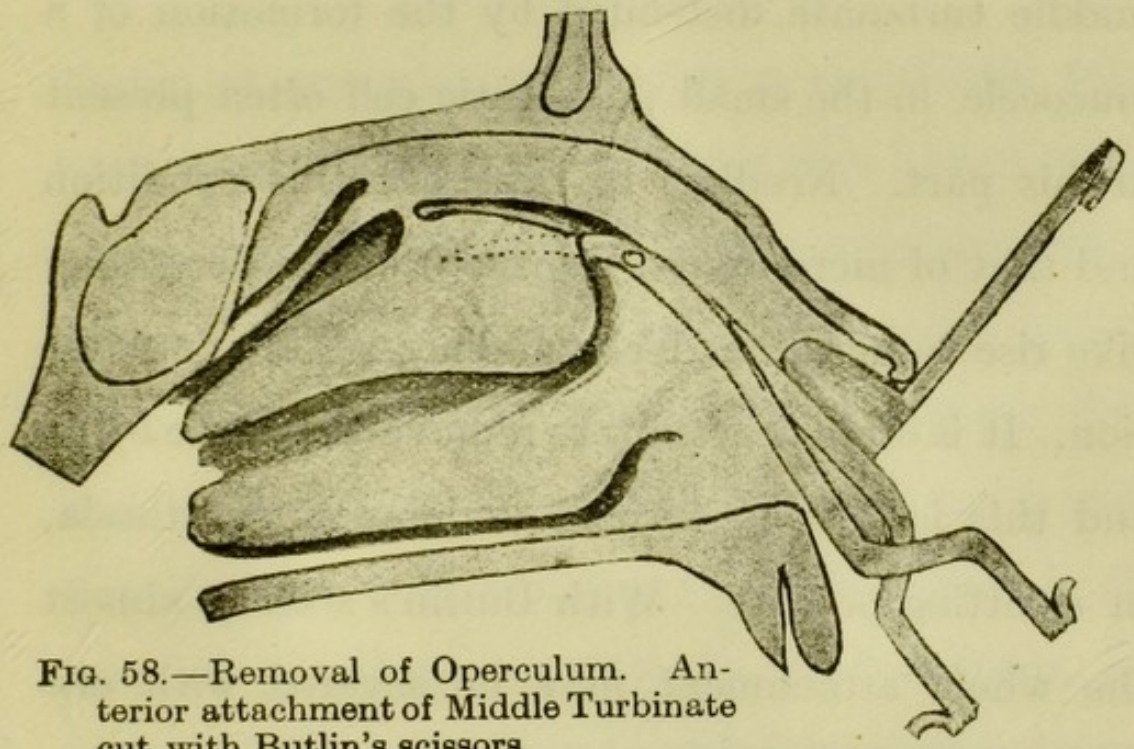


FIG. 58.—Removal of Operculum. Anterior attachment of Middle Turbinate cut with Butlin's scissors.

Where there is excessive narrowness anteriorly, you may find the scissor-cut impossible and the punch-forceps must then be used to make a more or less vertical cut behind the operculum, while the barrel of the snare is placed at the anterior extremity of the attachment of the bone.

It is specially important to cocainize the septum very thoroughly, and as the surface here is sometimes inaccessible you may need to make a submucous injection of cocaine.

Sometimes you will find the anterior end of the middle turbinate distended by the formation of a mucocele in the small pneumatic cell often present in this part. Needless to say both this condition and that of mere excessive growth of the bone, may give rise to nasal headache and necessitate amputation. It is often necessary to remove the whole bone, and this is best performed under gas anæsthesia, in a sitting posture. With Butlin's scissors almost the whole attachment may be severed with one cut, and the bone is then seized with dressing forceps and with a twist of the wrist downwards and inwards the detachment is completed and the bone brought away entire. If neatly done this is followed by surprisingly little hæmorrhage if neither cocaine nor adrenalin are used.

CHAPTER VIII

CHRONIC RHINITIS—LUPUS

CHRONIC RHINITIS

THOSE of you who are reading a systematic text-book upon rhinology may wonder why I have introduced to your notice all these operative procedures without so much as mentioning the term chronic nasal catarrh. I have done so for a purpose, for I wish to emphasize the fact that in a large proportion of those cases which are loosely entered in the hospital case-book as chronic nasal catarrh, the catarrhal element in their trouble is secondary to and merely a phenomenon of, mechanical obstruction; and if you give him a good airway, the patient will be permanently cured of his catarrh without the use of sprays or the change of habits or climate.

There are, however, other cases in which the nose is anatomically perfect, but in which the

mucous membrane is in a state of chronic inflammation. Chronic catarrh concerns chiefly the mucous membrane of the turbinates, which is seen to be hyperæmic and swollen. In the early stages the hyperæmia and swelling temporarily disappear under the influence of cocaine, adrenalin and even of menthol.

In the majority of cases there is a history of repeated acute attacks of catarrh, the result of defective personal and domestic hygiene, which follow each other at shorter intervals until the sufferer complains that he is never without a cold. It is for this state of affairs that the patient with the adenoid face is usually induced to seek advice. There is an excessive amount of secretion which is mucopurulent, crowded with micro-organisms, and which collects upon the floor of the nose until it is expelled into the handkerchief, or sniffed into the nasopharynx. During the summer months and with change of personal habits it may cease to give trouble.

In certain persons the protective mechanism is inadequate, they are said to be catarrhal and to require very special treatment. It is, however, interesting to observe how many well-to-do persons for whom a winter in the Riviera or in Egypt used to be necessary, have been restored to perfect health by the adoption of some simple "rules of life" concerning their exercise, their food and drink, their clothes and houses. The public undoubtedly owes much to the various systems of physical training now in vogue and possibly something of the kind is a necessary part of busy city life.

Chronic rhinitis may be caused by a local irritant such as the dust and fumes inseparable from certain trades, and a degree of it is common in those who pass cigarette smoke through the nose.

In middle-aged men of plethoric habit you will see a bright red hyperæmic condition of the turbinate tissue which requires rather special treatment. It is often accompanied by injection of the mucous membrane of the pharynx, upon the lateral walls

of which organ you may often see a definite ridge of swollen mucous membrane, running down just behind the posterior faucial pillar. Evidences of gout elsewhere are to be found, and one may speak of the affection as gouty pharyngitis and rhinitis. If the galvano-cautery is employed in these cases the wounds will take long in healing and it is certainly wiser to regard these throat and nose conditions as the index of a general unhealthy state, and to treat them as such. If you see the patient when the symptoms are distressing, you may convince him that the remedy is largely in his own hands if you can induce him to abstain from alcohol and excessive eating for a fortnight. A blue pill twice a week and a dose of citrate of lithia gr. x. every night will hasten his relief. It is rash to speak of curing these cases, for with the return of the cause the diseased condition is almost certain to recur. Habitual visits to a foreign spa, with regular diet and exercise, are invaluable for these cases.

Needless to say the treatment of chronic

rhinitis should consist in removing the cause, and it is in ascertaining this that you must exercise your acumen, but you will not go far wrong in ordering a cleansing nasal lotion for your hospital cases. The lotion must be employed at body temperature and will contain, when diluted for use, one grain of carbolic acid and four grains of bicarbonate of soda to the ounce. The safest and most effectual plan is to snuffle this from the palm of the hand, about ten handfuls night and morning. It is, I think, undesirable to put lotion in bulk into the nose, either with a boat or through a douche, for it is apt to be injected into the middle ear or into the posterior part of the olfactory cleft if an inadvertent act of swallowing is made.

You may add glycerine or sugar or one of the aromatics to your lotion, but the nature of the lotion is of no great importance so long as it is sufficiently dilute. Normal saline acts perfectly well, but the salt sometimes creates a sense of dryness.

In private practice you may as a routine, order

the nose to be cleansed with the alkaline lotion by means of a strong coarse spray. This method is pleasanter than the snuffling but it is useless if the apparatus is not a good one.

When the rhinitis has existed any length of time hypertrophic changes take place and you will find that the application of adrenalin no longer shrinks the tissue to its normal dimensions. In a case of very well marked hypertrophic rhinitis the greatly thickened mucous membrane of the inferior turbinate stands in folds upon its inner aspect and gives a mammillated appearance to the anterior end, while a festooned fringe may hang from the lower edge of the body. These hypertrophies are best removed by judicious use of the punch forceps, scissors and snare. In many cases where the anterior parts still appear merely swollen and smooth, you will find that excessive hypertrophy

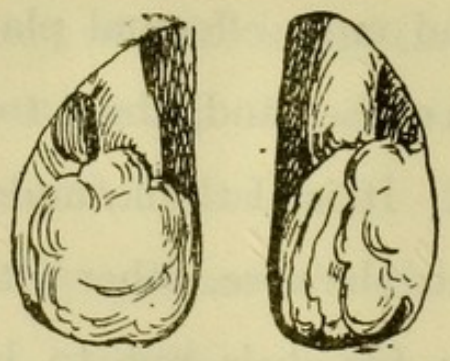


FIG. 59. — Hypertrophic Rhinitis in a boy of sixteen.

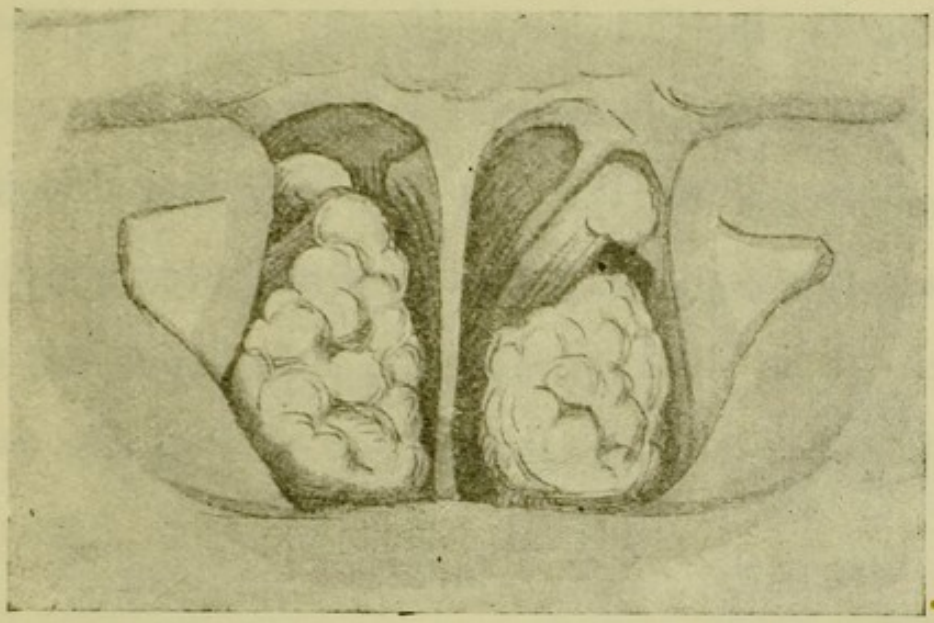


FIG. 60.—Moriform Hypertrophies of the posterior ends of the Inferior Turbinates, somewhat shrunken by cocaine. ♂ 25.

has occurred in the posterior extremity. Posterior rhinoscopy will reveal the choana more or less blocked by a purplish white mammillated body much resembling a mulberry. This moriform body is best removed under cocaine, with the snare provided with a screw action. There is seldom difficulty in en-

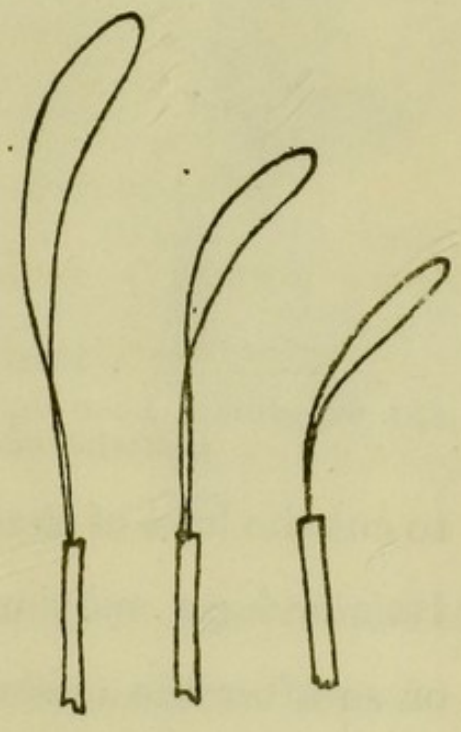


FIG. 61.—Snare Loop bent out of the flat plane and turning over as it is drawn into the barrel.

gaging it in the loop, if the wire, instead of lying in one plane, is bent into a curve upon the flat. Thus bent it is easily introduced between the septum and the turbinate body, but when it is half withdrawn into the barrel it stands out almost at a right angle. Be careful

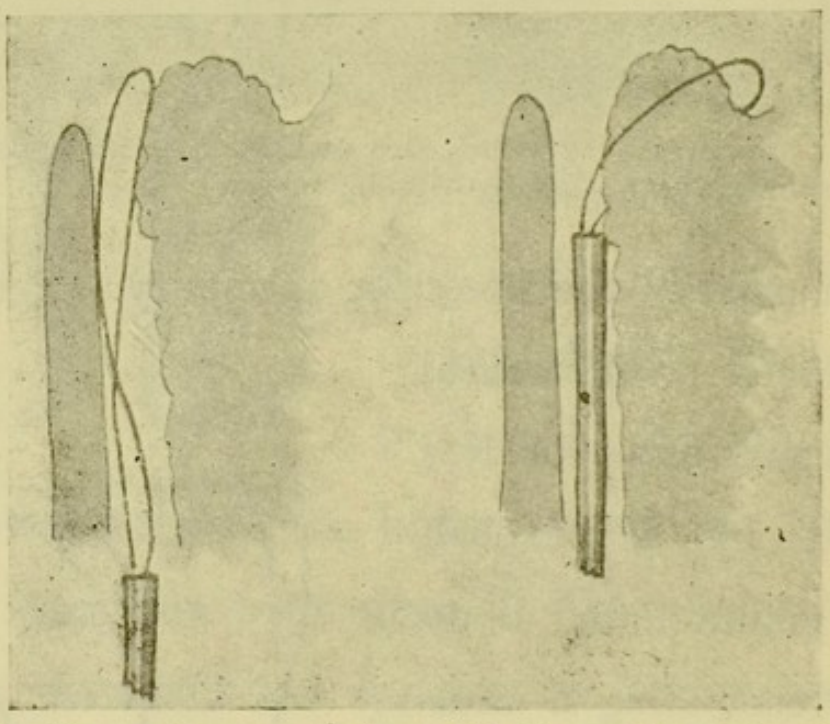


FIG. 62.—Snare Loop engaging a Moriform Hypertrophy of the posterior end of Inferior Turbinate.

to cut the base of the outgrowth completely through. Hæmorrhage may come on fairly briskly an hour or so after the operation and the injunctions mentioned on page 118 must be insisted upon.

In the cases of cooks and others who live in an

overheated dry atmosphere, you will observe an extremely uncomfortable type of rhinitis, characterized by excessive dryness. Upon the prominent part of the middle turbinate, dust collects and a thin film of dried mucus covers all parts exposed to the inspiratory current. This is especially the case with the mucous membrane of the anterior portion of the septal cartilage which is subject to a degenerative change which may be due to defects in its blood supply, coupled with the fact that dry inspired air impinges directly upon it. The ciliated character of the epithelium is lost and dust adheres to its surface. Irritation is experienced and the habit is formed of introducing the finger nail. Submucous hæmorrhages and breaches of the surface result, and a chronic ulceration leads to destruction of the

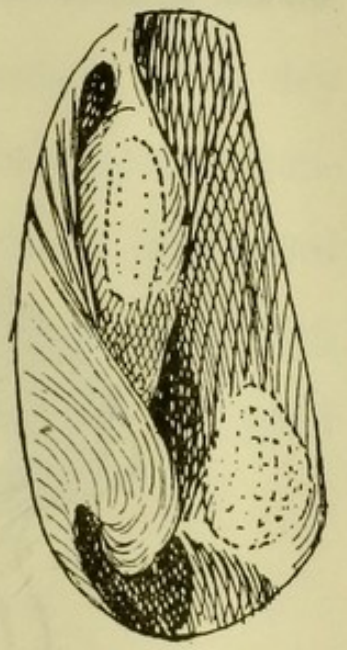


FIG. 63.—'Dry Spots,' common in cooks, etc., upon the anterior end of the Middle Turbinate and the anterior region of the Septum.

underlying cartilage. The final stage is that of a round or oval perforation of the cartilaginous septum just within reach of the finger nail. The edge is perfectly healed and thin, and in some cases mucus accumulates and forms crusts upon

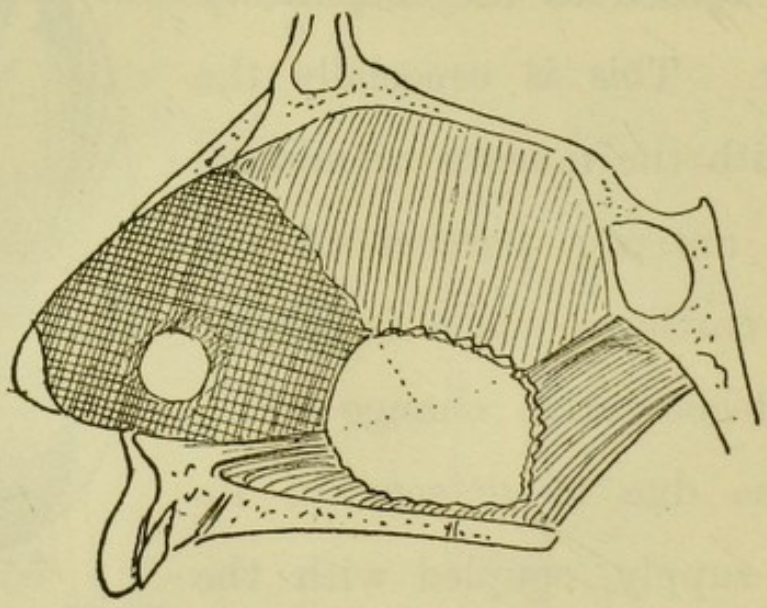


FIG. 64.—Nasal Septum, showing (*A*) perforation due to simple 'perforating ulcer.' (*B*) Perforation due to syphilis and involving bone as well as cartilage.

it, causing much discomfort; in others no trouble whatever is experienced.

The treatment in all cases consists in preventing the desiccation of the part and the irritation which ensues.

An ointment such as the Ung. hyd. ox flav, dil. should be spread upon the part with a swab by the patient, three times a day. The habit of using the finger nail must be rigorously excluded, and for a few weeks, thick woollen gloves should be worn at night to prevent its unconscious practice. The dry condition of the remainder of the nasal mucous membrane is best treated by the frequent use of a nasal oil spray, whereby the parts are kept covered with a film of oil which prevents evaporation. A good formula is—

Parolein	℥ i.
Pinol	♏ x.
Benzoin Aquol	♏ x.

Where the habit of picking the nose has been formed, epistaxis may be constantly occurring from the small vessels which are to be seen coursing under the thin and damaged mucous membrane at the front of the septum. These vessels should be touched with a galvano-cautery point heated to an almost invisible red. The epistaxis of boxers

and gymnasts commonly occurs from the same area and needs the same treatment.

It is from the vessels of this anterior portion of the septum that hæmorrhage occurs in the great majority of cases of spontaneous epistaxis. Such bleeding also occurs from both the inferior and middle turbinates, but far less commonly. The cause is to be traced either to chemical abnormalities in the blood such as occur in hæmophilia, alcoholism, scurvy and the zymotic diseases; or to increased blood pressure dependent upon heart-disease and arterio-sclerosis, and the phenomenon is frequently observed in cases of scirrhosis of the liver.

Young people at the age of puberty and women just before the menstrual period, are apt to bleed from the nose. In this latter category, where the neurovascular apparatus is the chief factor—and also in the type dependent upon high blood pressure, it is generally undesirable to adopt any treatment *ad hoc*. The blood diseases proper require very

special therapeutics and in respect to hæmophilia the works of Sir A. E. Wright upon the increase of coagulability by the exhibition of calcium, magnesium and oxygen, should be consulted.

Cases of really serious hæmorrhage as seen by the rhinologist, are almost always the sequel to an operation, and generally follow it by a few hours or occur at all events during the first three days. Almost without exception, in my experience, a prominent feature in such cases has been mental agitation with quickened heart beat, and I am confident that the most important element in the treatment is the composure of the patient by reassurance and the hypodermic injection of morphia. Where in rare cases this does not succeed, the nose must be cleared of clots and very carefully and firmly packed throughout with ribbon-gauze soaked in peroxide of hydrogen. This packing cannot with safety be removed until thirty-six hours have passed and the removal is most safely and painlessly accomplished by injecting peroxide into the inter-

stices of the ribbon as it is slowly withdrawn. Belloc's Sound should not be employed, as the blood imprisoned by its means enters the accessory sinuses and may lead to empyema.

In all cases the patient should lie perfectly quiet with the shoulders raised, while iced applications are made to the entire face and the nape of the neck. Half a drachm of lactate of calcium may be administered to raise the coagulability of the blood, while alcohol, which produces the opposite result, should be strictly avoided. A brisk purge is not out of place as a rule.

Where a bleeding spot can with certainty be made out, hæmorrhage may sometimes be arrested with the cautery point at a dull red, or by local packing with gauze soaked in peroxide or adrenalin; and the latter is particularly applicable to the anterior septal region, where it may be kept in apposition by pinching the nostrils between the finger and thumb. In all cases of recurrent epistaxis the presence of malignant disease and of bleeding polypus

of the septum, must be excluded by careful examination.

LUPUS

In the vast majority of cases of lupus of the face and upper air passages the disease will be found upon the anterior end of the septum just within the vestibule, and it seems very likely that it commonly commences here, possibly at the site of a finger-nail wound.

Where the external nose is affected, it is useless to attempt treatment without attacking the interior of the organ also. The disease usually assumes the form of small fleshy granulations which are covered with crusted secretion and occupy sites upon the anterior part of the septum, the anterior ends of the inferior turbinates and extend back along the floor of the nose.

After a time the septum is pierced by the infiltration, and ulceration and perforation take place.

The best method of attacking these cases is to

put them under chloroform with a nasal packing of gauze, soaked in adrenalin. The diseased tissue will be seen standing out red against the ischæmic background and its exact limits must be made out before commencing its removal, which must be done with scrupulous care by means of a sharp ring knife, while the anterior end of the inferior turbinate may with advantage be removed with a punch. Special attention must be given to the nasal floor and to the anterior concavity of the vestibule.

The patient is instructed in the use of hydrogen peroxide drops and a nasal lotion, while crusting is prevented by the use of dilute oxide of mercury ointment and the use of a wool plug in the vestibule. The discharge and crusts are best removed by immersing the nose in a basin of warm lotion which is snuffled in and out. Within a month the nose must be carefully examined, when any doubtful spots will be destroyed by deep galvano-cautery puncture. Arsenic should be prescribed and a regular visit every three months should be enjoined.

It is easy to get one of these cases nearly well, but it is precisely at this point that special pains must be taken if complete and lasting cure is to result.

Some persons are prone to the occurrence of small boils connected with the hair follicles of the nasal vestibule. Their recurrence may become so frequent and the external swelling and redness which accompanies may at times be so great, as to make you fear the presence of lupus.

In addition to the general treatment which you adopt in all cases of furuncle, a local antiseptic should be used. The dilute yellow oxide of mercury ointment rubbed in freely with a wool swab twice a day serves well, but it must be used continuously for six weeks, if recurrence is to be avoided.

It is well to show your patient how to make a firm and efficient wool swab. Flatten out a piece of wool about the size of a postage stamp ; at one edge of it and projecting halfway across it, place the end of a wooden match dipped in water. Twist the match and it will pick up the wool. A few

more twists with the wool rotating between the finger and thumb will give a perfectly safe and tightly mounted swab. This little piece of instruction is rather important, for almost all laymen

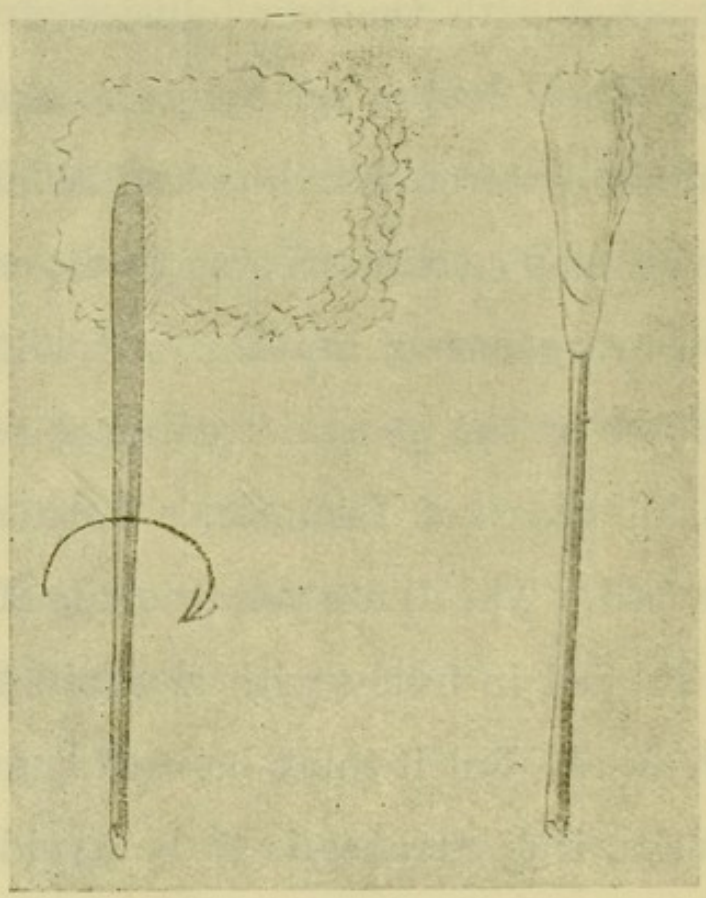


FIG. 65.—Swab made by catching up the cotton on the rotated probe.

attempt to make a swab by twisting the wool round the match, with the result that it takes no firm hold, and the wooden end is apt to slip through and scratch the mucous membrane.

CHAPTER IX

ATROPHIC RHINITIS—SYPHILIS—FOREIGN BODIES

ATROPHIC RHINITIS

Atrophic rhinitis, which in common parlance is simply called ozœna, is a very peculiar disease and much has still to be learnt of its pathology. The merest outline of the subject will be given here. It is characterized by the formation of crusts in the nose which have an unmistakable penetrating odour. The latter is unlike that of dead bone, it reminds one of the odour associated with the decomposition of cutaneous products in the unwashed.* The nasal cavities are short and

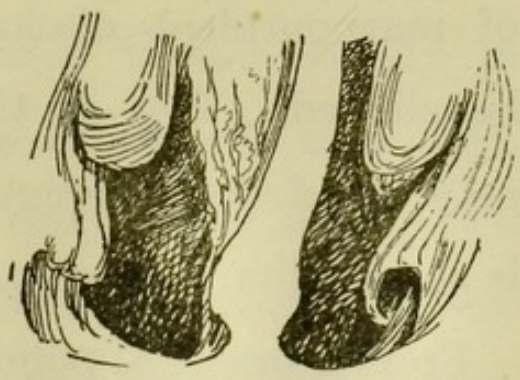


Fig. 66. — Case of worn out Atrophic Rhinitis in a woman of thirty-seven.
Inferior turbinates represented by small ridges. The sketch is reduced two-thirds linear and therefore does not represent the undue breadth of the nasal fossæ.

* The sense of smell is lost and the patient is unaware of this odour.

unduly patent, thanks both to their shape and to the very small size of the inferior turbinates, which scarcely project from the lateral walls. The mucous membrane is pallid and thin, though some œdema may exist in that covering the middle turbinates, which seem large in comparison with the shrunken inferior turbinates.

The affection is much more common in women than men and complaint is seldom made of it until after the age of puberty. Not only may the disease be detected in children but in almost all cases a history of mucopurulent discharge during childhood can be elicited. Two or three members of a family may be affected, though there is no proof that it is an hereditary disease.

From a practical point of view it should certainly be regarded as a communicable disease, and it will not be surprising if future investigations prove that the ætiology lies in the communication of a septic mucopurulent catarrh, to a nose of a particular anatomical type. It is hardly ever seen in faces of

the long narrow shape and possibly the difficulty of expelling discharges from a very broad open nasal fossa may have some causative influence. Whether it is by heritage or acquisition, the antero-posterior development of all the elements in the nasal skeleton is defective, and as a consequence the anterior nares look not downwards but somewhat forwards. Microscopical examination of the mucous membrane shows not only a deficiency in the vascular apparatus, but the replacement of the ciliated by the squamous variety of epithelium.

The mucopurulent discharge is seen chiefly in the middle meatus and crusts continue to form here, when at about the age of forty, their appearance has ceased in other parts. In older persons one may see a typical atrophic nose free from crust, and in which the glands seem to have ceased to yield an abundant secretion. What proportion of the cases reach this stage it would be difficult to say, for the death roll from tuberculous and other pulmonary diseases is very heavy. (Fig 66, p. 173.)

Nothing conclusive is known of the bacteriology. Various methods of curing atrophic rhinitis have been described, but there is no evidence that a restoration of the ciliated epithelium has ever taken place in an advanced case. The treatment consists in preventing the formation of crusts and washing the nose clean. If this is properly done the odour is abolished and the patient lives in comfort, while in early cases a real cure may come about.

According to circumstances the nose must be thoroughly syringed either twice or three times a day by means of a Higginson's syringe, a large quantity of warm normal saline solution being used, followed by a few ounces of alkaline lotion. No pain is caused, as the mucous membrane is comparatively insensitive. The patient may then swab the interior of the nose with a 50 per cent. solution of ichthyol, an antiseptic pigment which excites active secretion of fluid. During the earlier period of the treatment, a plug of wool should then be inserted in the nostrils and this should be made a

habit at night. In some cases a cure may be obtained by packing the nose with gauze strips, while expulsion of discharge is facilitated and the sense of comfort increased, if an artificial anterior stenosis is created by the injection of paraffin under the mucous membrane.

SYPHILIS

In tertiary syphilis the nose may be filled with crusts, but you cannot confound this disease with atrophic rhinitis, for on cleansing the cavity you find, not a pale atrophic surface but ulceration, bare bone and loss of bony structures.

The disease commences as a gummatous infiltration which may or may not cause external swelling. A typical syphilitic ulcer with a yellow base may be seen later, and finally death of the underlying bone can be detected. Practically any part of the organ may be involved and you will frequently find under a mass of crusts, the greater part of the vomer or of a turbinate, lying necrosed and sequestrated among

granulations. When a large portion of the floor of the nose is destroyed a permanent opening into the mouth may result, and these perforations together with septal perforations in the bony portion of that structure, are practically pathognomonic of tertiary syphilis. (Fig. 64, p. 164.)

The treatment consists in removing sequestra and keeping the nose clean and free from crusts, at the same time exhibiting potassium iodide and mercury. Many of these cases refuse to clear up under potassium iodide alone, and I have seen instances which rapidly improved under very large doses of that drug, though small doses had caused so much distress as to suggest the possibility of erroneous diagnosis.

When the septum has been extensively involved, the cicatrization which ensues is apt by its contraction, to drag in the bridge of the nose below the level of the nasal bones, which stand out and overhang an ugly transverse depression. These disfigurements may be rectified by subcutaneous injections of paraffin.

The posterior wall of the naso-pharynx is often the seat of a tertiary syphilitic ulcer which is apt to pass undetected unless the posterior rhinoscopy is

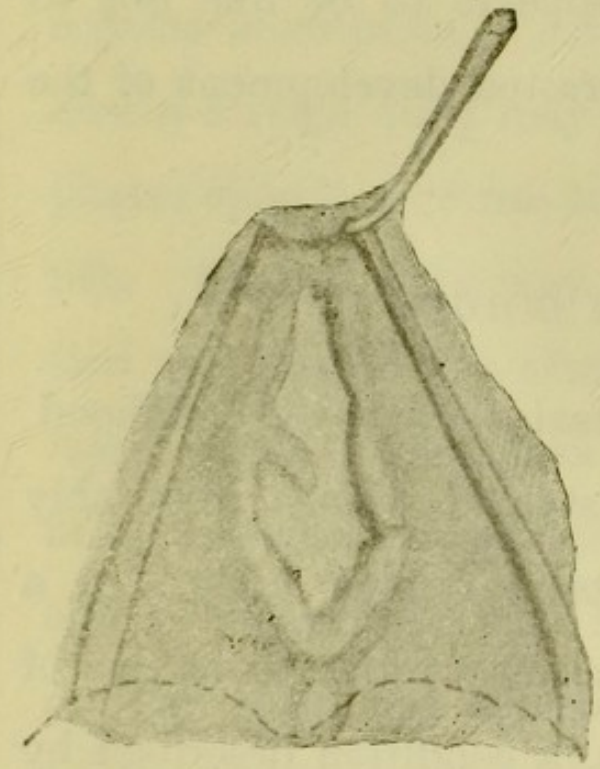


FIG. 67.—Tertiary Syphilitic Ulcer of the posterior wall of the Naso-pharynx, exposed by retraction of the soft palate, the normal position of which is indicated by the dotted line. Only symptom, pain in the ears on deglutition. Woman of forty.

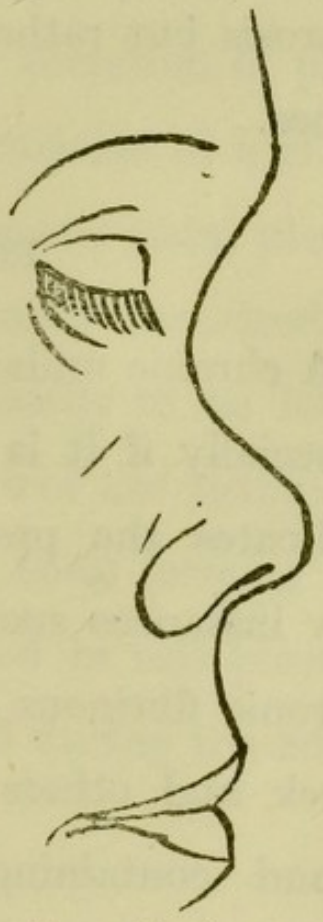


FIG. 68. — Typical Congenital Syphilitic Profile. Girl of thirteen.

practised as a routine. Such ulcers occasion pain in the ears which is increased by the act of swallowing.

The subjects of secondary syphilis rarely if ever complain of nasal trouble.

Hereditary syphilis may cause extensive destruction of the nose in young people, but the extreme depression of the bridge of the nose which is characteristic of this disease, appears to be due not to necrosis but rather to arrested development of the bones.

FOREIGN BODIES

A chronic unilateral nasal discharge in childhood, especially if it is blood stained, almost invariably indicates the presence of a foreign body. In a few instances such a case may prove to be one of chronic fibrinous rhinitis, a condition described by Lack and others, in which a false membrane is found containing virulent Klebs-Lœffler bacilli, although the child is not seriously ill and never suffers with paralysis. In all such cases a search for a foreign body should be made, if necessary under a general anæsthetic. The commonest object to find is a boot button, and this is readily removed, thanks to the metal loop upon it, but the

removal of articles of less convenient form, especially when embedded in granulations, may cause a good deal of distress and terror if attempted under cocaine anæsthesia. After a long sojourn in the nose a foreign body may by the accretion of phosphates upon it, give rise to the formation of a rhinolith. Such a body may cause severe pain, ulceration and obstruction after remaining unnoticed for many years. Rhinoliths are usually to be found in the inferior meatus under cover of the turbinate, and I believe that the foreign body forming the nucleus, often has become wedged in this position by forcible expiratory efforts and during the act of vomiting.

CHAPTER X

POLYPI

NASAL polypi are pendulous masses of œdematous mucous membrane and not true neoplasms. They vary in size from small just perceptible buds to large lobulated bodies two or three inches in length. Some take the form of a flattened sheet or fringe, others hang by a slender pedicle. Both in the nose and upon the table they have the translucent appearance of the sea mollusc from which their title comes. Portions of old polypi directly exposed to the airway are red and opaque upon the surface, thanks to the formation of a close network of blood vessels. Under the microscope the appearance is that of a very loose œdematous fibrous tissue. Glands are present and portions of these may always be found distended to form cysts. Sometimes a large retention cyst forms the main

bulk of the polyp which collapses on puncture. The fluid contents may be quite clear, turbid or purulent. The epithelial covering of the polypus is always thin and often consists of a single layer of ciliated cells.

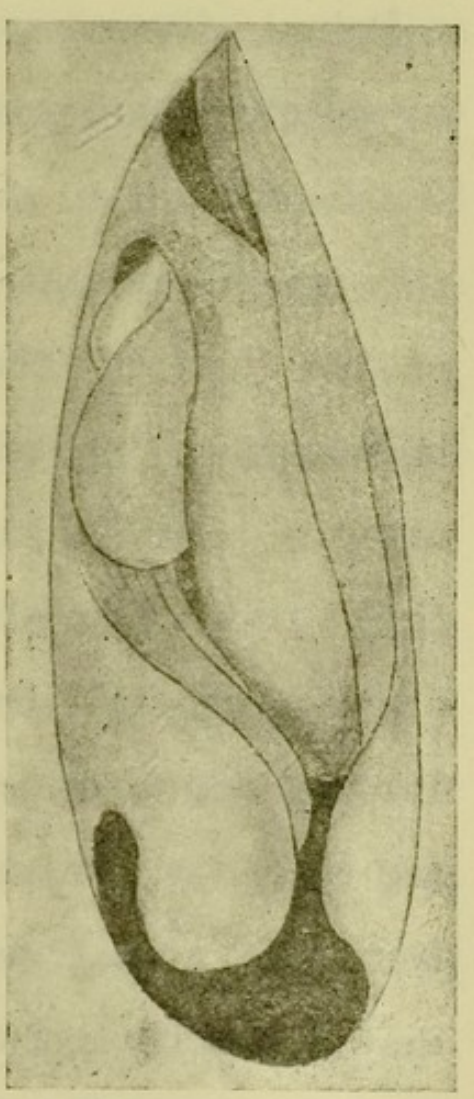


FIG. 69.—Two Polypi, one red and one white, projecting from below the middle turbinate in a man of fifty. The type which may suitably be treated with the snare.

Polypi grow exclusively from the upper parts of the nose or accessory sinuses and gravity no doubt plays a large share in their production.

The ætiology of nasal polypi is the subject of much discussion, but you may feel safe in considering them as secondary to and evidence of some other primary disease. When malignant disease occurs in the nose polypi indistinguishable, both macro- and microscopically from

the ordinary type, will be found springing from the surrounding parts.

Polypi are very frequently associated with suppuration in the accessory sinuses, and it is at all events difficult to disprove that they do not arise through the irritation of the mucous membrane of the nose by the overflowing pus. The fact is, however, very striking that comparatively few cases of chronic empyema of the maxillary antrum which can be traced to dental disease, are complicated with the presence of polypi. Probably in a certain number of cases the polypi are secondary inflammatory phenomena, resulting from the actual suppuration, but with the large majority it is otherwise, and this is especially true of the typical bilateral cases, where the whole of the upper regions of the nose are blocked and even distended by them.

The polypi may very conveniently be removed with the nasal snare, and if you will attack one of these extensive cases with that instrument you

will learn a valuable lesson. You may cut away a dozen or more and make the middle meatus comparatively clear, but in a fortnight's time complete recurrence will have taken place and you will very likely find on inquiry that the same sequence of events has taken place many times before. The patient, convinced of the futility of this method, must now be persuaded to undergo an operation of an adequate character.

When such an operation has been performed, carefully examine the fragments removed. You will find that the middle turbinate has lost its normal rigidity and can be quite easily bent and the bone crumbled between the fingers. You will also see that fragments of softened bone are adhering to the bases of the polypi.

This bone under microscopical examination is seen to be in a state of rarefying osteitis and cut up as it were by the inroads of immense numbers of osteoclasts. In some parts these cells are seen lying in small cups indenting the surface of the

bone, in others the bone appears to have been almost completely eroded, only small isolated masses remaining embedded in a soft tissue, which is continuous with that of the polypus. You will see in the intimate connexion between the polypi and the underlying diseased bone, an explanation of the speedy recurrence of the growths after your snare operations.

Many years ago it was pointed out by Edward Woakes, that the ethmoid bone was subject to a form of chronic osteitis, which in its initial stages appeared clinically as a general swelling of the lateral mass and of the middle turbinate and which finally resulted in caries of the bone and suppuration in the ethmoidal cells. The disease finds no parallel elsewhere in the human skeleton, and this fact is not surprising when you remember that the conditions of the ethmoid bone are unique. Nowhere else do you find thin plates of bone coated on either side with periosteum which is protected from atmospheric and bacterial influences, merely

by a thin delicate epithelium. In spite of this consideration Woakes' ethmoiditis was not generally accepted until quite recently, although those who adopted it as a guide to treatment had proved its value in the permanent cure of their cases.

The ætiology of ethmoiditis is not known. Not uncommonly it is found in two or three members of one family, but whether this fact points to some common source of irritation, bacterial or otherwise, or to some inherited vulnerability of the mucoperiosteum is not in the least understood. It is bilateral, commences as a rule in young adult life, and varies very greatly in the rapidity of its progress. Patients in whom polypi are detected for the first time in middle age, will often give a history of intranasal pressure-symptoms which have existed in an increasing degree for many years, and for which no other explanation than that of ethmoiditis is to be found. In other instances the progress of the disease is very rapid. I have recently observed the case of a boy of sixteen who came fourteen months

ago giving a history of recurrent periorbital pain during the previous four months. The posterior third of each middle turbinate was slightly bulged towards the middle line, just touching the septum. Nine months later the mucous membrane over these bodies was pale and œdematous and small polypi could just be seen under one of them.

A little later pus was observed in the middle meatus of the right side. Operation showed the right lateral mass of the ethmoid replaced by polypi and soft crumbling bone with suppuration in the central portion. On the left side the posterior ethmoidal cell region also had undergone polypoid degeneration.

As far as one can tell the disease passed from its initial to its final stage in the course of fifteen months. So rapid a progress is unusual and the disease generally takes some years for its development.

The radical operation for the removal of this disease is quite successful, if careful after-treat-

ment is carried out. The operation consists in the removal with punch forceps (and for this purpose Woakes' original patterns are excellent) of all the affected bone; and for practical purposes one may say, of the whole lateral mass of the ethmoid. When the disease is very far advanced this can be done quickly and efficiently with the ring knife originally designed by Mayer for the removal of adenoids, controlled by the sense of touch (Lack). You must not, however, attempt this operation until you have acquired a thorough knowledge of the anatomy and of the feel of the parts; you will be moving in dangerous country, and unless you are confident of making a thorough removal, you had better resort to slower methods under cocaine and controlled by vision. The recovery after such an operation is remarkably

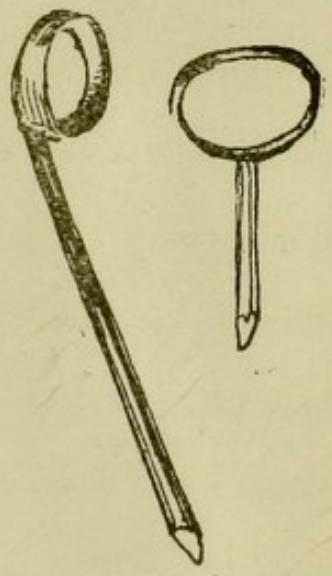


FIG. 70. — Mayer's Ring-knife (natural size).

rapid, but it is essential that the patient should be carefully examined every two months for at least a year, so that on the appearance of small polyp buds, the underlying bone may be snipped away. I have seen recurrence take place two or three times from the region of the unciform process in one of these cases, but a permanent cure followed the removal of the anterior ends of the healthy inferior turbinates, which were causing nocturnal stenosis of the somewhat narrow nostrils. It is probable that anterior nasal stenosis and the suction which the difficult nasal inspiration entails, may have an important influence upon the course of the disease.

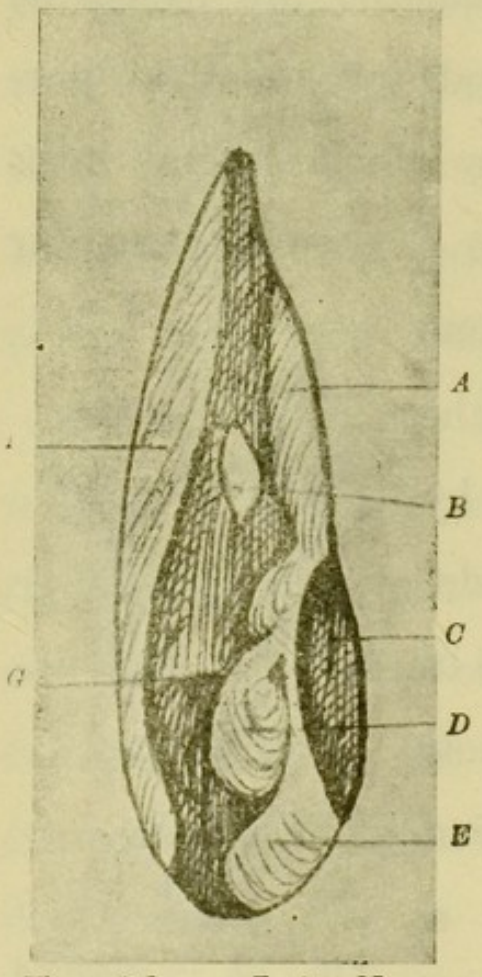


FIG. 71. — Left Nose cured of suppurative ethmoiditis by erasion.

A Ethmoidal region.
B Sphenoidal ostium enlarged.
C Antrum freely opened.
D, E Posterior remnants of middle and inferior turbinates.
F Septum.
G Arch of the choana.

It occurs, however, often enough where there is no stenosis whatever.

You must not by any means suppose that erasion of the ethmoid is called for in all cases of nasal polypus. You will see a number of persons about or past middle age, with two or three polypi depending from the edge of the middle turbinate, or more commonly from one of the lips of bone under cover of that body, or projecting into the choana from the region of the superior turbinate. Such polypi may be removed, one by one, under cocaine with the snare, but you must be careful not to cut through their attachment with the wire. The loop should be passed up over the polypus to a point as near its attachment as may be accomplished without hurting the patient, then tightened, and the growth brought away by a quick twitch of the wrist. If this is done you will often find attached to the pedicle, a fragment of diseased bone, which may possibly be the only portion undergoing active disease at that spot and at that time. Many cases

treated in this way remain perfectly well, but they must be carefully examined every six months if disappointment is to be avoided. It is probable that if no recurrence takes place during the first two years it will not occur later, but this point would be difficult of proof upon a large scale. The operation of snaring polypi is entirely painless if cocaine is applied to the healthy parts which will be touched by the instruments.

CHAPTER XI

THE MAXILLARY ANTRUM

ANATOMY

THE maxillary antrum is merely a pneumatic offshoot from the nose, and as we have seen in a previous chapter, buds off from that cavity immediately below the level of the orbit. (Fig. 9, p. 21.) It may be described as a pyramidal figure of which the base is formed by the antro-nasal partition, and in which may be distinguished a superior or orbital, an anterior or facial and an external or zygomatic wall.

You will gain the best idea of the limits and general features of the cavity by making a dissection, after hardening in formalin. As the result of that method of preparation, you will find it easy to remove the bone piecemeal, leaving intact the

mucous membrane which has become hardened and resilient and which will perfectly retain its original shape if kept in the solution.

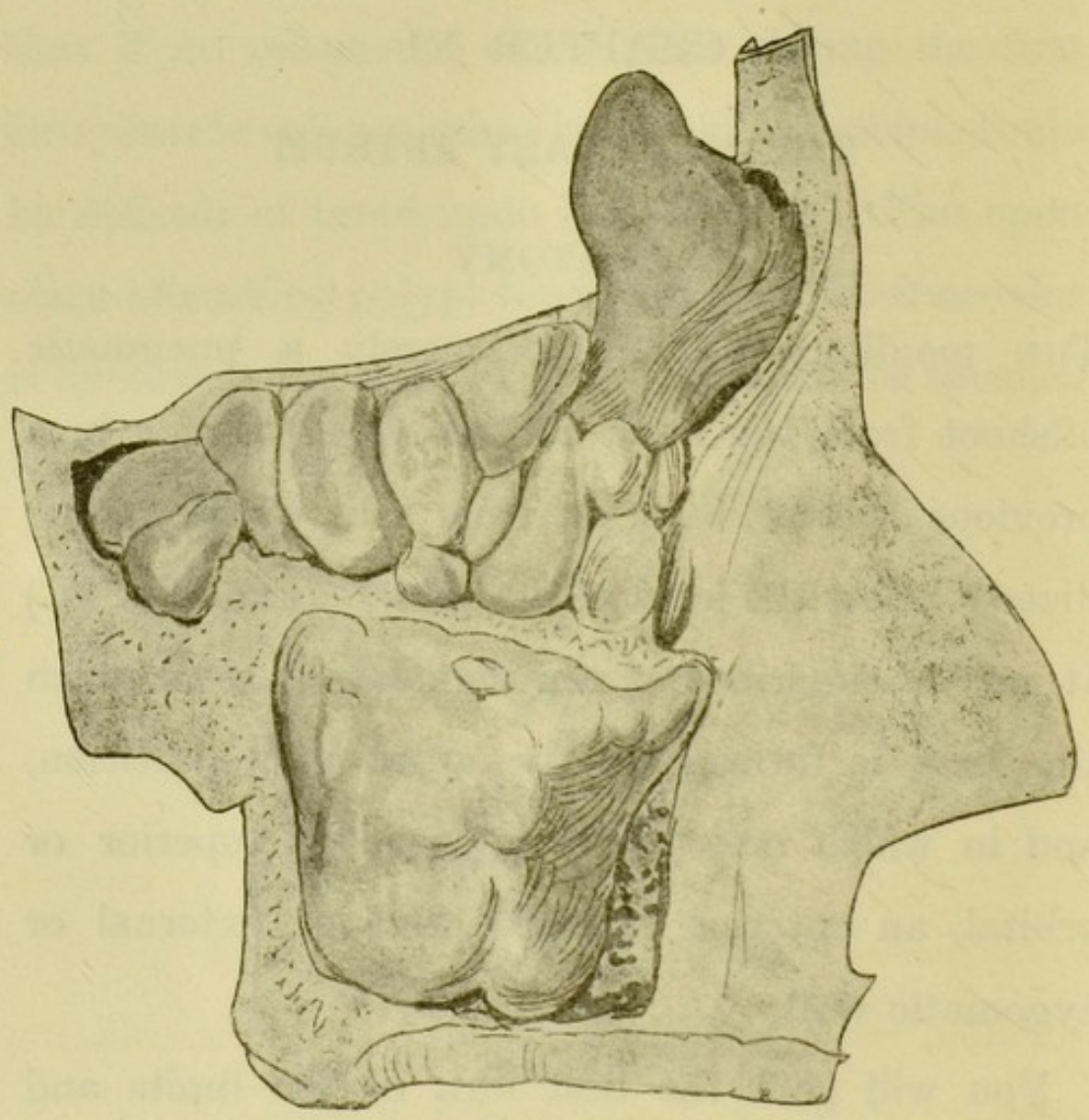


FIG. 72.—Specimen hardened in formalin. Bone removed to show an antrum with small malar and prelachrymal recesses, also the sphenoidal sinus and ethmoidal cells and a frontal sinus which is unusually small. From an edentulous old woman.

If you examine a number of skulls you will find that the limits of the cavity vary a good deal in

extent, and this is even the case on the two sides of the same skull. Complete absence is extremely rare. When the cavity is small you will always find it situated immediately below the floor of the orbit, and the size of an antrum may be said to depend upon the degree in which it has, during development,

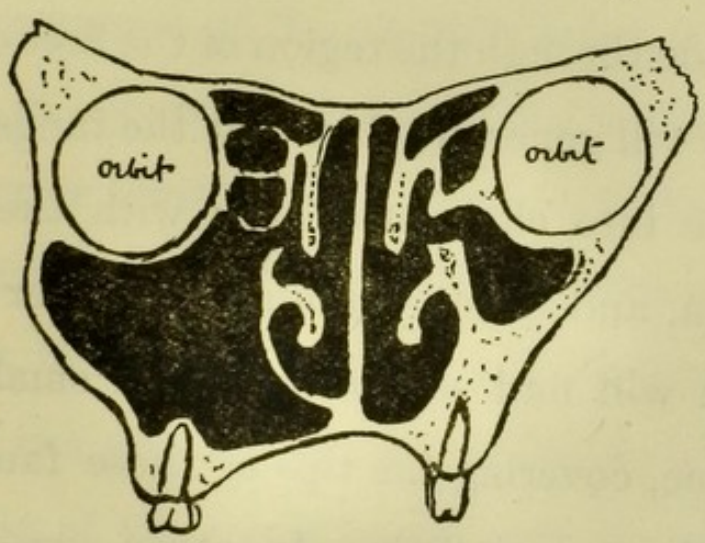


FIG. 73.—Diagrammatic transverse section showing on one side a small maxillary antrum immediately under the orbit and far removed from the teeth; on the other side a large antrum excavating the alveolar and malar regions and undermining the nose.

invaded those portions of the superior maxilla which are farther away from the point of origin; and this point is for all time marked by the position of the ostium. The cavity may extend outwards into the malar process, forwards in front of the lachrymal groove towards the fronto-nasal process,

backwards under the orbital floor and downwards into the alveolar process.

The degree to which downward development takes place is the most important, for you will at once see that this determines the relationship which the cavity will bear to the teeth. In a transverse section made through the region of the first or second molar, you will generally find that the fangs of these teeth come into close proximity with the floor of the antrum, and if you examine a number of specimens you will find several in which small cupulæ of thin bone, covering the tips of these fangs, stand up from the antral floor. In other specimens the fangs are far removed from the cavity; you find in fact a solid alveolar process which has not been invaded by an alveolar recess of the antrum. A convenient method of examining skulls in your possession, which you may wish to keep for other purposes, is to cut a window in the posterior or zygomatic wall, a structure which is of no importance for your studies.

As a general rule you will find that the alveolar recess approaches within a very short distance of the fangs of the first molar and that it seldom extends in an anterior direction in front of the second premolar fangs. Needless to say, the shape of the face largely determines the distance between this point and the bony margin of the anterior nares, but you must always, in surgery, act upon the assumption that the anterior limit of the antrum is at least as much as an inch posterior to the bony orifice of the nose.

When the alveolar recess is fully developed, the floor of the antrum will be found on a lower level than that of the nasal fossæ, and occasionally you may find it turning towards the middle line and burrowing into the hard palate and undermining the nose.

The density of the anterior and posterior walls varies a good deal, but there is always a strong buttress of bone running down from the malar process to the alveolus and forming the artificial boundary between the two sections of the facial wall.

The superior or orbital wall is always thin. It is traversed by the canal, sometimes defective, for the infra-orbital nerve. From this canal thin buttresses of bone are seen passing to the sides of the cavity and containing the canals for the dental nerves. These crests of bone may often be seen almost dividing the cavity of the malar recess and a similar recess in the posterior superior region, from the general cavity, and sometimes quite a number of such crests are present and clearly show their origin as the divisions left between the tips of contiguous digitations of the cavity as it excavated the maxilla.

Their presence when much developed is of importance surgically, as it is the source of hindrance to proper drainage. This is particularly the case when they occur in the dental region.

The antro-nasal wall must be looked at carefully from the outer side as well as from the inner. It is formed of two very distinct portions, an upper and a lower, the boundary between them corre-

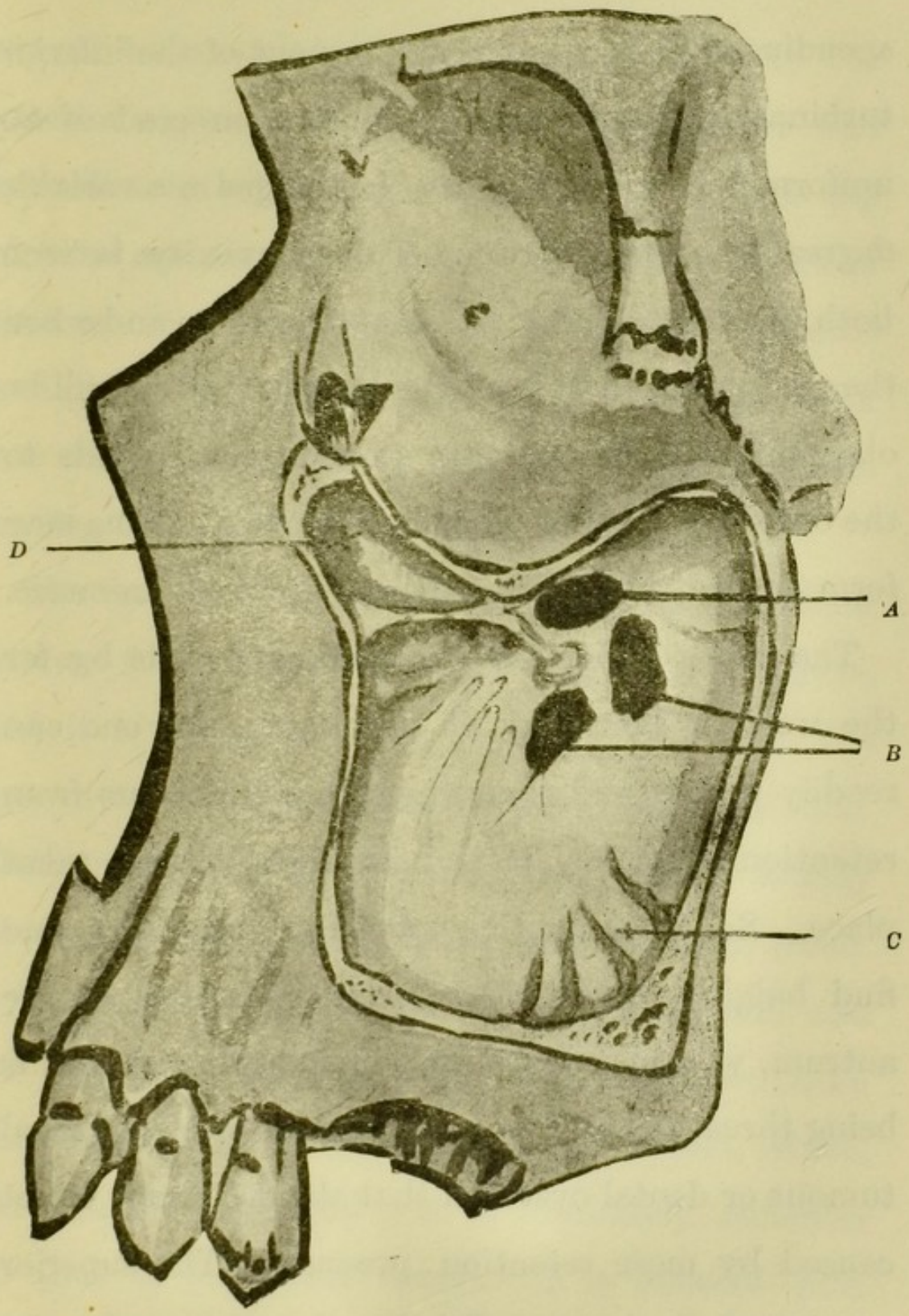


FIG. 74.—The inner wall of the Antrum showing (*A*) ostium immediately below the orbit, (*B*) fontanelles, (*C*) bony septa, (*D*) prelachrymal recess.

sponding with the line of attachment of the inferior turbinate. The lower segment is composed of an uniform firm sheet of bone which bulges in a variable degree into the antrum. This convexity is seen both in vertical and in horizontal sections and when the wall is looked at from the antral aspect it will be observed that the anterior portion corresponds to the outer wall of the lachrymal groove and thus may form a very conspicuous semi-cylindrical eminence.

The superior portion of the inner wall is by far the weakest boundary of the cavity, and one can readily understand that when pressure occurs from retention of fluids, it is here that bulging takes place. So much is this true that whenever you find bulging of the outer or facial aspect of the antrum, you may feel confident in saying that it is being thrust forward by the growth of an intra-antral tumour or dental cyst and that the deformity is not caused by mere retention pressure. The superior portion of the inner wall is largely made up by the unciform process of the ethmoid, a scimitar-shaped

slip of bone, attached above and in front to the anterior region of the ethmoid. Parts of the wall immediately below the lower extremity of this slip of bone are composed merely of the two layers of mucous membrane back to back, the so-called fontanelles (*v.* Fig. 83, p. 234), and farther back you will sometimes see a so-called accessory ostium leading directly into the middle meatus.

The grooved upper surface of the unciform process forms the floor of the hiatus semilunaris, and it is at or near the lower extremity of this groove that the true maxillary ostium is situated. This orifice may be oval or round, and is usually about one-third of an inch long and one-sixth broad.

The mucous membrane lining the antrum and its recesses, is thin, pale and easily stripped from the walls except in the region of the ostium, where, through the fontanelles, it is intimately adherent to that of the nasal fossæ. It is covered with ciliated epithelium and well supplied with glands.

EMPYEMA

Severe acute nasal catarrh sometimes produces so much swelling of the mucous membrane lining the hiatus semilunaris, that the cavity of the antrum is cut off from that of the nose. This depends upon anatomical conditions and can only take place when the groove is deep and narrow; but a large minority of persons suffer with a sense of heaviness in the face and neuralgic toothache during a severe cold. These symptoms are probably caused by the absorption of the air in the closed antrum, which results in a reduction of the atmospheric pressure, producing hyperæmia of the mucous membrane and of the dental nerves, for the latter are not always contained in complete bony canals. It is impossible to say if this phenomenon is a frequent forerunner of acute inflammation or whether the catarrhal infection results more commonly from simple extension, by continuity, from the nose into the antrum.

Acute catarrh of the antrum occurs after severe nasal catarrh, but it has enormously increased

in frequency during the recent epidemics of influenza. It may be accompanied by very severe unilateral pain which is quickly relieved on the escape of discharge, though a sense of weight may remain. More commonly there is no pain and the patient merely feels ill and complains of the inability to throw off a troublesome unilateral cold which requires the excessive use of the handkerchief. The temperature shows a slight elevation at night, and I strongly advise you, whenever you find a patient who is scarcely ill but who shows an evening rise of temperature for two or three weeks, to make a careful examination of his nose. I have personally known more than one patient suffering in this manner, who has been sent away as a case of tuberculosis, after the discovery of a "suspicious spot" in the lungs.

Patients suffering from chronic antral suppuration commonly date the onset of their trouble from a severe catarrh or an attack of influenza, and it is probable that these acute cases do become chronic.

It is, however, certain that if they are treated during the first fortnight or three weeks, the prognosis is very good, and though I have seen a large number, I cannot recall a single instance in which a case, treated during the initial period, has, to my knowledge, become chronic; and I have little doubt that a large number get well without any treatment at all.

Of the diagnosis we will speak later, and say now that the treatment in the early stage, aims at the removal of the discharge so that spontaneous recovery of the mucous membrane may take place.

The patient must be put to bed and given light diet, aperients and a tonic of quinine, iron and strychnine. He will inhale by the nose for five minutes during every hour of the day, the vapour of menthol, obtained by dropping ten minims of a 50 per cent. solution of menthol in spirit, upon a pint of hot water at 140° F. Immediately after inhaling he must lie down in such a posture that the ostium comes to be the lowest point of the antrum. You

of course remember that this orifice is situated immediately below the roof of that cavity; consequently he must lie with his head almost inverted, the superior parietal region of the sound side resting upon the mattress while the shoulders are raised upon pillows; and he must as far as

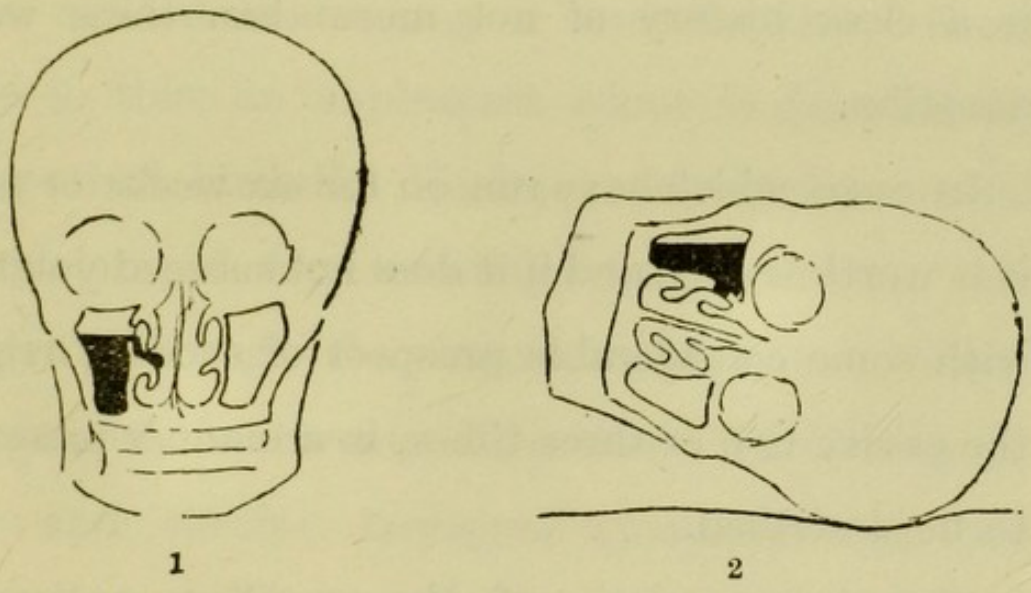


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FIG. 75.—(1) Empyema of the Antrum. (2) Drainage posture employed in early cases.

possible spend his day in this attitude, dividing his attention between the two sides, if the disease is bilateral. At first no discharge may come away, but later it will run out freely and the nose may be cleansed with warm alkaline lotion. If the time is beguiled by reading a good novel the un-

natural posture is easily tolerated, particularly as you may assure your patient that it shall not be persisted in for more than two days. As a rule the nose feels perfectly comfortable by the middle of the second day and no reaccumulation takes place. Indeed I have never seen this method fail, when there is a clear history of not more than three weeks duration.

In cases which have run on for six weeks or more it is worth trying, and if it does not succeed you may with some considerable prospect of success, irrigate the cavity two or three times, in a manner presently to be described.

Chronic empyema of the maxillary antrum is a very common disease and certainly no morning in the out-patient room will pass without an opportunity of studying it. In the older text-books of general surgery a type of this disease in which there were no prominent symptoms, such as local swelling and tenderness, was described as latent empyema. As a matter of fact prac-

tically all the chronic cases are latent and the epithet is unnecessary.

The patient usually comes complaining of a unilateral nasal discharge which causes him discomfort and necessitates frequent blowing of the nose. The discharge is free in the morning and is often noticed on stooping to wash the face. From time to time an unpleasant odour is detected by the patient himself. He frequently makes special complaints of the trickling of matter into the pharynx through the choana, calling for constant clearing of the throat. The throat itself may be sore and chronic laryngeal symptoms are not uncommon, while nausea and loss of appetite point to the existence of gastric catarrh.

Occasionally you will meet with a subject of this disease who appears perfectly well, but as a general rule the patient looks sallow, ill-nourished and miserable. A good many persons who are never very well and who periodically have a neurasthenic breakdown, are suffering with antral

disease, and it would seem that the nervous and mental depression to which these people are subject is the result of a slight toxæmia, for it is often dissipated, for the time being, by the mere cleansing of the cavity by syringing.

Heaviness of the side of the face is experienced and headache is a common feature. The peri-orbital pain which was mentioned when dealing with pressure from the middle turbinate, is often present and is probably due to the fact that the middle turbinate is inflamed and swollen; nasal obstruction is sometimes the only symptom. From time to time, after the catching of a cold or exposure to draughts, an acute exacerbation may occur, with pain, external tenderness and rise of temperature. Possibly these symptoms are due to blocking of the hiatus semilunaris by extra swelling of the mucous membrane, and it is not unlikely that such attacks are sometimes due to a breakdown in the protective apparatus of the blood.

Often enough the disease exists for many years

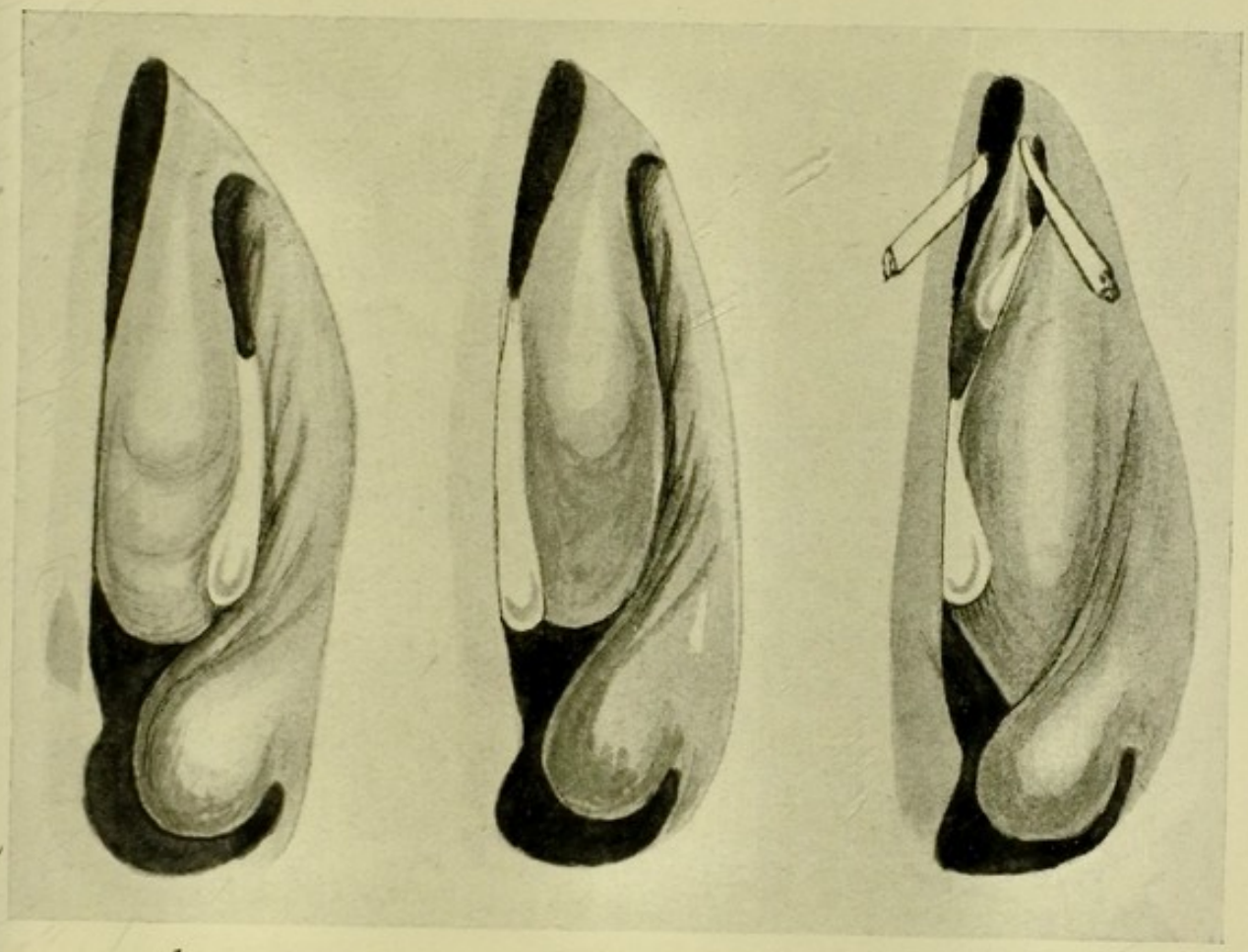

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Plate III

1. Pus from under the Middle Turbinate, indicating Empyema of the Frontal Sinus, Anterior and Middle Ethmoidal Cells or Maxillary Antrum.
2. Pus from above the Middle Turbinate, indicating Empyema of the Sphenoidal Sinus or posterior Ethmoidal Cells.
3. Much enlarged unciform cushion, simulating the Middle Turbinate. Exposure of the true Middle Turbinate by the use of retractors.

[*To face page* 208.

without causing serious trouble; it is, as it were, tolerated, but at the expense of the vitality which might have been enjoyed in its absence. I have seen an old gentleman in whom a foul empyema had evidently existed for twenty-five years and who seemed to be in good health, complaining merely of pharyngeal discomfort and neuralgia. After the cure of his antral trouble, however, he affirmed that he had never before known the meaning of good health.

FIG. 76.—Case of Antral Empyema seen by anterior rhinoscopy. Pus coming from under the middle turbinate.

These patients are often said to be subject to frequent and severe bronchitis, and the mucous membrane of the trachea certainly suffers.

In the typical case, on examining the nose you

will see a line of pus occupying the cleft between the lower edge of the middle turbinate and the outer wall of the nose. In order to make sure that this is not the muco-pus which is seen in the middle meatus during the course of an ordinary cold, you must lightly swab it away. If it definitely returns

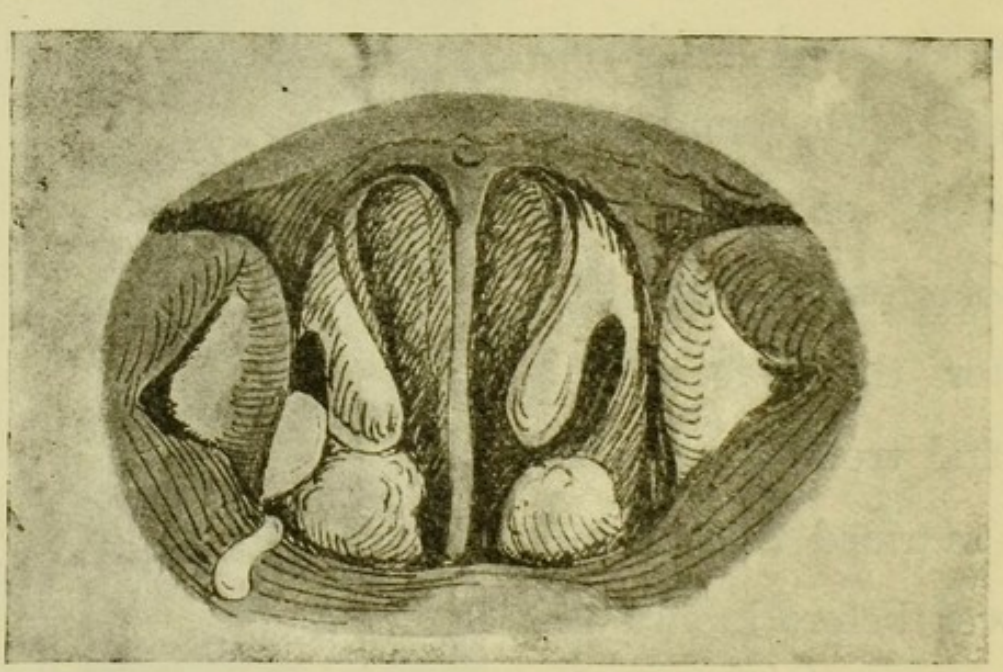

FIG. 77.—Case of Antral Empyema seen by posterior rhinoscopy. Pus trickling from under the middle turbinate of the right side.

on two or three occasions, you may be sure that you are dealing with a source of pus somewhere under cover of the middle turbinate, and anatomical knowledge will inform you that it must come either from the antrum, the anterior ethmoidal cells or the

frontal sinus. If after the swabbing, the pus does not return in a definite manner, you must apply cocaine and adrenalin and invert the antrum by placing the patient's head in a suitable position upon your knee. While in that position let him exercise suction in the nose, by pinching the nostrils while attempting to inspire through them.

After one or two minutes re-examine and you may see a quantity of pus issuing from under the middle and streaming over the inferior turbinate. This stream may at times be seen by posterior rhinoscopy when nothing can be detected from the front.

You must be on the look out for a certain rather deceptive appearance. Sometimes, especially in narrow noses, a line of pus is seen between what appears to be the edge of the middle turbinate and the septum, suggesting the presence of posterior ethmoidal suppuration.

The probe, however, shows that this apparent middle turbinate is in reality nothing more than a roll of swollen mucous membrane covering the

uniform process. On shrinking the part with adrenalin the edge of the middle turbinate is seen at a higher level. When any doubt exists, the presence of the middle turbinate can be verified by the fact that a probe can be passed far up under cover of it.

The increased flow on posturing is fairly good evidence that the pus is coming from the antrum and not only from the frontal and anterior ethmoidal cells. By transillumination you may get corroborative evidence.

An antral transilluminator is merely a small electric lamp which is placed in the mouth set in a metal shield or glass tube to prevent scalding of the tongue. It should give a powerful light —at least six candle power. As good a form as any is a bulb-lamp about three-quarters of an inch in diameter, mounted in a teaspoon. This can be made in ten minutes for the cost of a florin. It is fixed into the cautery holder so that the current can be conveniently turned on and off, and of course the latter must be controlled by some form of resistance.

A black velvet cloth is thrown over the head both of the patient and surgeon. The lamp is introduced into the mouth, and the patient, after removing an upper tooth-plate if he has one, closes his teeth and lips completely on the shaft of the instrument. On turning on the current the cheeks are of course illuminated with a lurid glow, but the point to which you must direct your attention is the under eyelid. Normally the light coming through the floor of the orbit shows as a distinct crescentic glow or lunula, which is especially bright at its inner end but quite distinct throughout when a strong light is used.

When pus is present in the antrum this lunula is absent, and when the disease is unilateral there is no mistaking the difference in the transillumination of the two sides. In addition you will notice that in a good many cases the pupil of the healthy side shows as a red disc which is not to be seen on the affected side, while the patient may himself be aware that more light is entering one eye than the other.

In the cases of quite recent acute antral empyema this method of examination is specially valuable, for as the cavity is emptied of pus and the case clears up, the lunula speedily returns. This is not the case when chronic cases are drained, and they may remain permanently dark to transillumination long after they are cured.

The method has, therefore, only a limited value in the diagnosis of pus. The degree of brightness of the lunula depends upon the thickness of the bone and especially upon the degree in which the alveolus has been invaded by the antrum during its development. Where a small antrum is present, far removed from the palate, the transillumination will be dark, and if the other antrum is well developed you may be led into error.

Occasionally a lunula is seen in spite of the presence of pus, and it may vary in intensity from day to day.

When the diagnosis remains in doubt, it may be made quite certain by washing out the cavity.

The position of the ostium, deep in the groove and under cover of the middle meatus, renders it difficult of access, and the pain and trouble entailed by introducing a hooked cannula through it is not worth while.

Where the nose is fairly roomy it is quite easy to pierce the antro-nasal wall with a bent cannula

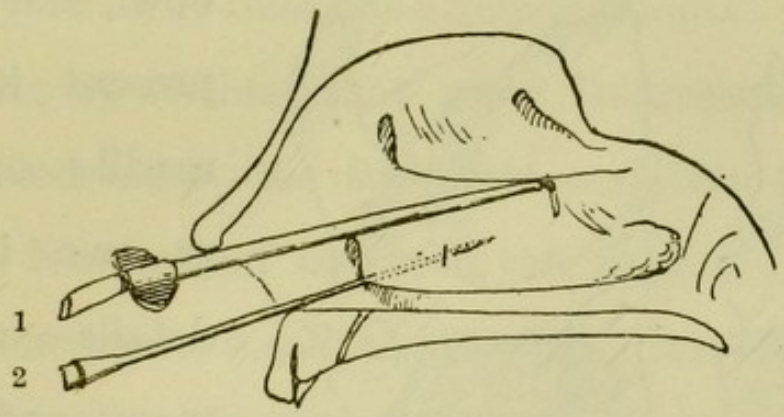

FIG. 78.—1. Exploratory puncture of the Antrum with Killian's needle through a fontanelle.
2. Lichtwitz's Trocar and Cannula piercing the outer wall of the Inferior Meatus.

(Killian's) below and behind the ostium, where the bone is exceedingly thin or else deficient (fontanelles).

But the method which you had better adopt at first is that of Lichtwitz. A long fine trocar and cannula is used, and after thorough cocainization of the inferior turbinate and the outer wall of the

inferior meatus, the point of the instrument is thrust through into the antrum ; the trocar is then withdrawn and warm boric lotion injected through the cannula with a syringe. The fluid which returns through the natural ostium should be allowed to run into a black or glass bowl, and if pus is present it will be readily seen. One or two important details must be mentioned. First, recall the anatomy of the antrum ; remember that the anterior limit of it is probably a full inch posterior to the bony margin of the naris and in a long thin face the distance may be much greater ; remember also that the outer wall of the inferior meatus has a very well marked antero-posterior concavity, that

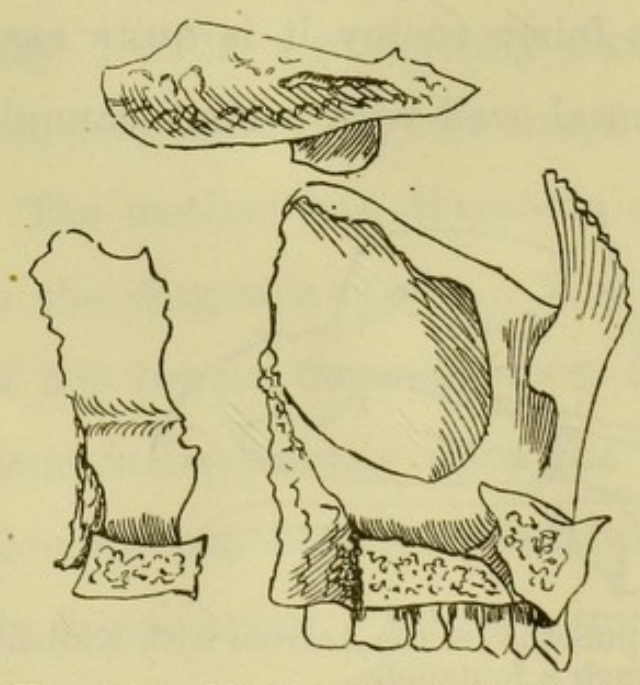

FIG. 79. — Nasal aspect of Superior Maxilla, Palate Bone and Inferior Turbinate, to show area of firm bone to be avoided in exploratory puncture of the Antrum.

is to say, the front part shelves away from you and will give the point of your trocar no bite; the lowest part of the wall is fairly thick and should be avoided. Your instrument is a straight one and has to be thrust obliquely into the antrum and left there for an appreciable time; therefore warn your patient that the flexible part of the organ will necessarily be bent over for a few moments. Make quite sure, by vision, that your instrument has really passed below the turbinate and into proper position. Now stand up, rest the patient's head against your chest, steadying it with your left arm. Then with a gentle rotary movement pierce the antro-nasal wall. These little points concerning control, make all the difference to the patient who will experience no pain whatever: whereas if his head is free he may make an involuntary movement which will cause pain and necessitate repetition. When the trocar is withdrawn the cannula remains firmly wedged in an oblique position. If it turns freely into a sagittal direction, you may know

that you have not carried your instrument far enough through. Make a rule in syringing, to squeeze the ball very gently once or twice to test the resistance. I have seen exquisite pain caused by the forcible injection of fluid into the tissues of the cheek, which had, by an error of judgment, been entered by the trocar. Blocking of the natural ostium is never sufficiently complete to cause a sense of obstruction when the syringe is squeezed. I may mention that you will find that the most efficient instrument for all work of this kind is a well-made seamless Higginson's syringe, and preferably one with Wyatt Wingrave's pulse-valve which renders regurgitation impossible. It can be boiled several times a day, for many weeks, without much deterioration. Half a yard of flexible rubber tubing should always intervene between the cannula and the Higginson; otherwise the movements conveyed by the more or less unyielding rubber will hamper delicate manipulations.

Either Lichtwitz's or Killian's method of washing

the antrum may with advantage be used in the treatment of antral empyema of short duration. Occasionally a cure may be obtained by repeating this process two or three times. I have recently seen a bilateral post-influenzal case of six weeks' duration in which one antrum proved to be quite clean at the second sitting, while the other required an operation for its cure.

The treatment of chronic antral empyema will naturally be directed by the nature of its cause. Unfortunately it is not always possible to determine whether the disease is of dental origin or not. Caries of the teeth is so universal a complaint that its presence is in itself no sure guide; moreover it is difficult to disprove that a dead tooth has not been destroyed by the influence of antral disease upon its roots.

The only sure proof that the empyema is definitely due to dental disease, is its speedy cure on the removal of the tooth. In many cases this happy result follows within a few days of the

operation, and I believe that when this result is to follow, you will find an absence of muco-purulent strings in the washings from the cavity; the pus is exceedingly foul, intimately mixed with the lotion, from which it separates as a sandy deposit upon the bottom of the bowl. That pus of this character always foretells an immediate cure is by no means the case.

The teeth likely to communicate with the antrum are the first molar, the second premolar and the second molar. In cases where there are good grounds for the diagnosis of a dental origin, the carious teeth will be removed and drainage established through an opening in the alveolus.

The operation can be performed under gas anæsthesia, and consists in the extraction of all the carious teeth and the drilling of a hole through the empty socket of one of them. The best drill is one with sharp cutting wings, which ensure the removal of the bone and not its mere crushing and displacement. The largest hole consistent with

the breadth of the alveolar process should be made, and before the patient leaves his anæsthesia you should insert a rubber plug and make sure that the hole is large enough to take it easily. Take care that a flake of bone is not elevated off the antral

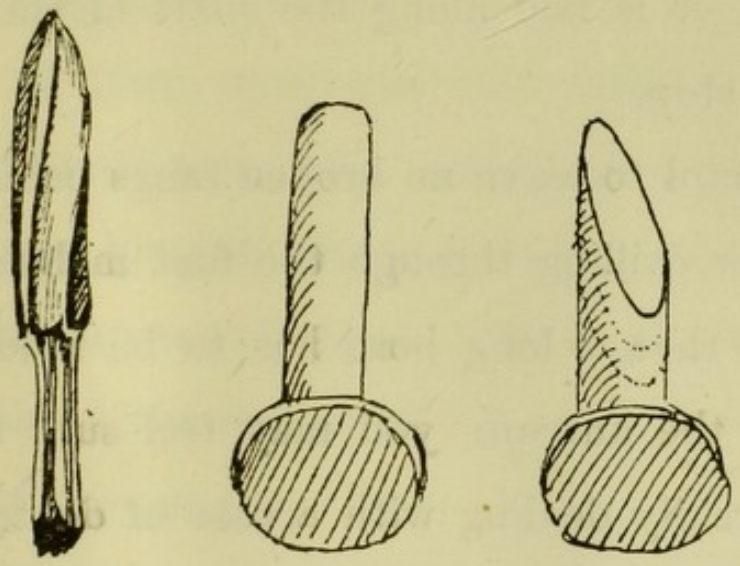

FIG. 80.—1. Drill for alveolar puncture of the Antrum. Spiral cutting wings.
2. Red rubber plug.
3. Method of slicing the plug at the termination of the treatment. (Natural size.)

floor, which must be cleanly cut away with the drill; and, if you have time, search for and cut away an osseous crest if present and likely to be touched by the plug. Where a choice is possible, it is well to avoid piercing through the site of the second molar, for a solid transverse crest is more common here

than elsewhere. It is, of course, quite possible to damage the cheek or enter the nose if the drill is not held in a relatively vertical position, and if the head is not steadied during the operation.

The orbital floor may be damaged unless the index finger is laid along the shaft of the drill to act as a stop.

Be careful to leave no broken fangs behind.

If, when drilling through the first molar alveolus, you find that a long bore has to be made before reaching the antrum, you may feel sure that you are not really dealing with a case of dental origin.

I would recommend ether or chloroform anæsthesia for your first few alveolar punctures, so that you may take time and ascertain with a probe that you have properly entered the cavity.

After the operation the patient is instructed to take out the plug and syringe the cavity through a large metal cannula which should, if necessary, be made to fit the puncture closely, by slipping a drain tube over it. During the first few days peroxide of hydrogen

should be injected to break up masses of cheesy pus, in addition to the regular syringing with boric lotion, which will be employed at first three times and then twice a day. When the secretion of pus seems to have ceased, the antrum must be tested by allowing it to remain unsyringed for increasing periods of time—one, four and eight days respectively. At the termination of a second eight-day rest the surgeon himself should syringe, and if satisfied, allow the puncture to close. This it will readily do and without the danger of the entrance of food, if pieces of the plug are cut obliquely away day by day until the antral end of the puncture has closed.

During the treatment, the patient may, several times a day, remove the plug, and by blowing the nose eject collected secretions into the mouth. Instruct him that should the base of a plug become detached, he should blow out the remainder of the plug in this manner, and not by the clumsy manipulation of forceps, thrust it up into the antrum.

Before performing this alveolar operation always

warn the patient that if it does not produce cure in a few days, the syringing will probably have to be carried out for many months; and where stringy pus is present and particularly when polypi are seen in the nose, warn him that, although he may obtain speedy relief from his symptoms, he may need to retain the plug permanently.

The reason for saying this is, that when the disease is not limited to the region of the teeth, there can be no certainty of ever cleansing, by alveolar syringing, a deep recess such as a malar or prelachrymal recess, which may be almost shut off from the main cavity by a screen of bone or mucous membrane.

Many cases get perfectly well after some months' syringing and under good climatic conditions and freedom from attacks of nasal catarrh, the cure is sometimes hastened by the use of dilute astringents such as chloride of zinc grs. ij. ad. ℥ j.

In any case the patient greatly benefits by the removal of a gross septic focus.

When, in spite of syringing, a copious secretion of pus continues and there are no indications of an approaching cure, a radical operation may be recommended.

This operation may be effectually performed entirely through the nose, but this should not be attempted until experience has been gained by an easier method.

The special instruments required are :—

Gouge and mallet.

Large rose-burr or Jansen's bone-cutting forceps.

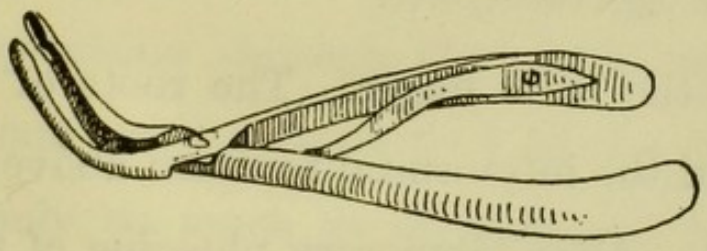

Fig. 81.—Jansen's Bone-cutting Forceps.

Scissors and snare for anterior turbinotomy.

Hartmann's conchotome or Grunwald's punch forceps.

Ring knife, small, with curved shaft.

The operation consists in incision, elevation and

retraction of the buccal mucous membrane to expose the anterior wall of the antrum. This is pierced with the gouge and mallet and an opening is made with the bone forceps or rose, large enough

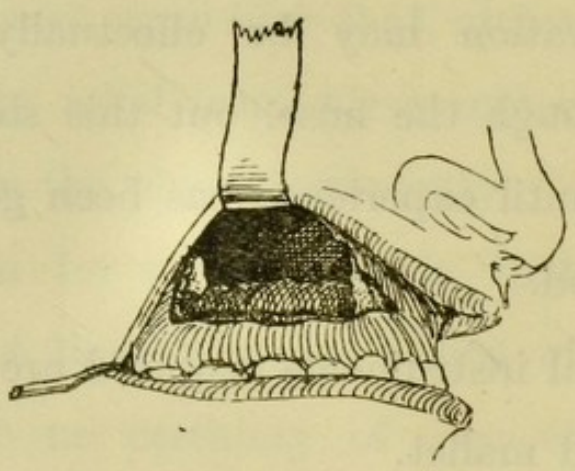

FIG. 82.—Radical operation for Chronic Antral Empyema. The buccal wound showing removal of the outer wall of the Antrum and the wisdom tooth erupted into the cavity. Woman aged twenty-five.

to admit the little finger. The roots of the teeth below and the infraorbital foramen above, must be respected. After temporary plugging of the cavity with gauze soaked in adrenalin, a careful survey of the walls may easily be made.

The polypoid, or boggy, purple, swollen mucous membrane, may be carefully removed with the ring knife and all recesses scraped, but it is not wise to remove the entire mucous lining; for, though

this may be done with impunity so far as the life of the bone is concerned, it entails delay in healing. The aim should be the removal from the antral walls of all recesses which may harbour septic secretions. Occasionally patches of carious and even of necrosed bone are found and these will, of course, be resected.

After another temporary packing of the antrum, the greater part of the antro-nasal wall is cut away. Anterior turbinotomy is first performed and then an opening having been made with a gouge introduced through the nostril, the punch forceps, controlled by vision through the antral wound, are used to cut away a large part of the inner wall, leaving only so much as is necessary to support the inferior turbinate. The mucous membrane of the upper part of the inner wall is often polypoid, and it is well to cut this away together with the lower portion of the unciform process. The region of the lachrymal groove and of the infraorbital nerve must be carefully avoided.

The cavity is finally cleansed with peroxide and no packing at all is introduced. The buccal wound is allowed to close and the cavity is syringed through a curved pewter tube introduced by the nose. If the antrum alone is diseased and if all the recesses have been carefully opened up, these cases do exceedingly well and require practically no after-treatment beyond a daily syringing by the patient for a few weeks.

A large mass of granulation tissue sometimes grows in through the buccal wound and this may cause retention of secretion and delay in healing. This trouble is avoided and the patient saved some pain and swelling of the cheek, if the operation is conducted entirely by the nasal route as suggested by Lack. Access to the recesses is rather more difficult and inspection of them is impossible.

CHAPTER XII

THE FRONTAL, ETHMOIDAL AND SPHENOIDAL SINUSES

ACUTE nasal catarrh affects not merely the antrum but all the other accessory cavities of the nose. The pneumatic absorption phenomenon often occurs in the frontal sinus, and one may localize the sensation of the air passing up and relieving the supraorbital heaviness and pain which accompanies a severe cold. No doubt the other cavities, but certainly the frontal sinus, are subject to acute catarrh, and you frequently hear a history of frontal pain with local tenderness which has been relieved by the sudden discharge of a quantity of yellow fluid, the relief in these cases may be hastened by inhaling menthol vapour or shrinking the tissues with cocaine and adrenalin.

Fortunately, chronic suppuration in these cavities is not so common as in the antrum, and this is, no

doubt, due to the fact that their drainage system is more efficient and allows acute catarrhs to end in early spontaneous cure, much more frequently.

The facility for drainage naturally depends upon the shape of the cavity and the relations of its ostium; you must therefore go a little into the details of the anatomy. You will get the best idea of it by continuing the dissection of the formalin specimen, removing piecemeal the inner orbital wall and chipping away the bony covering of the frontal and sphenoidal sinus. When you have done this you will not fail to recognize that these two larger cavities as well as the ethmoid cells, are nothing more than outgrowths budding off from the nasal cavities and burrowing into the neighbouring bones. (*v.* Fig. 72, p. 194.)

So far as the ethmoidal cells are concerned, one may say that they have honeycombed the lateral mass of that bone so completely, that merely thin shells remain, separating them from one another and from the orbital contents.

The large sphenoid and the frontal bone furnish almost limitless regions for invasion, with the result that immense variations occur in the size of the sphenoidal and frontal sinus in different skulls and even upon the two sides of the same skull. In this connexion you must take notice that the bones are never 'blown out,' so to say, by the excessive development of the pneumatic cavities: the latter, on the contrary, creep in where they can find room. Remembering this point you will feel no surprise in observing that though the sphenoid and frontal bones may have a perfectly symmetrical appearance, the cavities hidden within them may be asymmetrical and widely divergent in size.

As a rule the corresponding cavities of the right and left side approach one another as closely as possible, leaving merely a thin intervening partition. The septum so formed is said to be thrown over to one or the other side when there is disparity in the size of the right and left sinus.

In the typical negro skull with prominent brows, like those of the gorilla, the frontal sinuses are extremely small. Where, on the other hand, the frontal lobes of the brain are more fully developed, an angle is created between the large anterior cranial fossa and the orbit. This corner of bone is, in accordance with the natural law of economy, hollowed out by the frontal sinus, which in the smooth intellectual forehead of the European with his large forebrain, reaches its fullest development.

The clue to the arrangement of the frontal and the other accessory sinuses, is to be found in a study of the comparative anatomy and embryology of the ethmoidal region. Such a study makes it clear that we have not to deal with a mere haphazard labyrinth of cells, but with a definite system of clefts intervening between turbinate bodies, which are more numerous and more elaborately disposed in the mammals which are lower in the scale than man. Those who are interested in the subject may consult Killian's works in the Archiv

für Laryngologie 1895–6 ; it will suffice to say here, that in the human embryo four frontal clefts are to be distinguished, and that either one of these, or else the upper end of the hiatus semilunaris itself, may invade the frontal bone and develop into a frontal sinus.

So it comes about that considerable variation exists and that in some skulls, perhaps in 50 per cent., the ostium opens into the upper end of the hiatus semilunaris, while in other cases it is separated from that groove by a vertical crest of bone. There is but one constant point in the anatomy of this region and that is the fact that the anterior attachment of the middle turbinate invariably lies to the mesial side of all the fronto-ethmoidal system of cavities; in a word it covers over and hides from view the orifices of all of them. As a consequence it is quite impossible to know the exact anatomy of the various ostia in any case without making use of the probe. Even that instrument may deceive you, for often enough

one of the smaller cells encroaches as it were upon the cavity of the frontal sinus in chief, and although your probe has passed a considerable distance

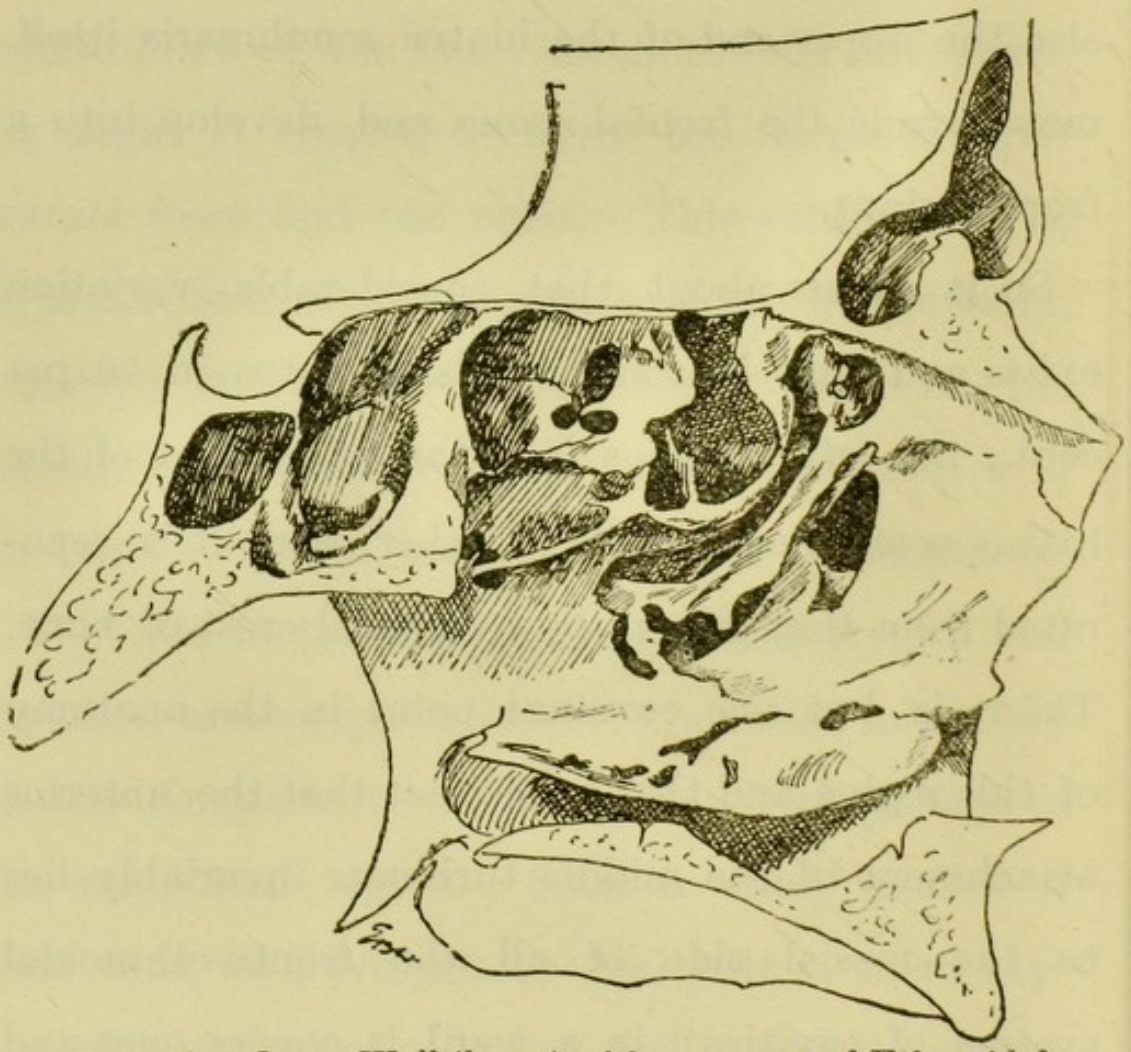

FIG. 83.—Outer Wall (bony) with exposure of Ethmoidal Labyrinth.

The middle turbinate has been removed to expose the hiatus semilunaris, which opens above into the frontal sinus. Two anterior ethmoidal cells open into its upper third, and the ostium maxillare is seen in its lower third. The scimitar-shaped unciform process forms part of the inner wall of the antrum. The channel for the nasal duct, which conducts tears under cover of the inferior turbinate, has been opened up. The inner wall of the lateral mass of the ethmoid has been removed to expose the large posterior ethmoidal cells and also the cell of the bulla ethmoidalis, which extends from the roof of the hiatus semilunaris to the floor of the anterior cranial fossa. The large sphenoidal sinus is almost divided in two by an imperfect septum. The sphenopalatine artery has divided, and enters the nose by a foramen both above and below the attachment of the middle turbinate.

outwards over the orbit, there may nevertheless exist a true frontal sinus in front of the cavity which it has entered.

Clinically one may arrive at a fairly safe conclusion as to the position of probe so introduced by 'reconstructing' its position after removal, and an ingenious instrument of the nature of a calipers has been devised to aid in this method. It is composed of two limbs, one a silver probe, the other an indicator of equal length. To the latter is attached a quadrant marked with an arbitrary scale, and the two limbs are united by a hinge joint. After opening the hinge the probe is introduced. Then the index limb is brought into contact with any given external point and the position noted upon the quadrant. The angle is opened and the probe withdrawn, and when it is returned to the mark upon the quadrant the distance between its tip and that of the index is readily appreciated.

Probably the most valuable information is

obtained by determining the position of a probe with the aid of X rays.

The posterior ethmoidal cells open under the superior and supreme turbinate if both are present, while the sphenoidal sinus communicates by an oval or round ostium about one-eighth of an inch in diameter, at the posterior end of the olfactory cleft.

You have these facts about which there can be no possible confusion. Discharges from the sphenoidal sinus and the posterior ethmoidal cells drop down between the middle turbinate and the septum. Discharges from the frontal sinus, the fronto-ethmoidal cells, the cells of the bullar region and the maxillary antrum, are seen emerging between the middle turbinate and the outer wall of the nose. (*v.* Plate III, p. 208.)

Chronic suppuration of the ethmoidal cells and of the frontal and sphenoidal sinuses, may undoubtedly exist for many years without giving rise to serious symptoms and without producing very easily recognized physical signs in the nose. So

much is this the case that caution must be observed in giving a prognosis when antral suppuration is detected, for not infrequently the pus contained in an antrum proves to have trickled into it from above. The sloping trough-like form of the hiatus semilunaris enables it to conduct pus from the frontal sinus and fronto-ethmoidal cells directly to the ostium, and when an antral suppuration has been readily cured by operation, while a discharge persists from the upper regions, you may suspect that the cavity has merely served as a reservoir.

In the majority of cases, however, the patient not only complains of the constant necessity for ejecting pus from the nose, but is subject to attacks of periorbital pain and severe headache which may involve almost any region of the head. There is, in addition, the same general ill-health which is observed in chronic antral suppuration, and from time to time acute exacerbations occur. These exacerbations seem to be due to the accidental blocking of the ostia, and they sometimes show a

periodicity; a definite phase of twenty-four hours or of four or five days' duration occurring, in which pain gradually increases and is almost suddenly terminated by the discharge of pus and relief of suffering.

From time to time also symptoms occur suggestive of acute osteitis of the bony capsule and accompanied by slight redness and swelling in the orbital region. During one of these attacks an abscess in the orbit may be formed, and this fact will forcibly impress upon your mind that suppurative disease in this region is often progressive and that it not merely causes destruction of the bony partitions but may at any moment infect the cranial contents. The danger of intracranial complications is specially true of the ethmoidal cells, while a good many fatal cases both of frontal and sphenoidal empyema occur. You will find the literature of forty-two fatal sphenoidal cases collected in a paper by St. Clair Thomson (Medical Society, 1906), and doubtless an immense number

have not been reported. You must therefore not allow the difficulty of these cases to persuade you to leave them untreated.

From a practical point of view you may assume that wherever you have frontal disease you have also disease of the fronto-ethmoidal region, and wherever you have sphenoidal disease the posterior ethmoidal cells are involved. It is quite certain that until you act upon this assumption your results will be very disappointing.

When pus is coming from the anterior or the posterior ethmoidal regions you should endeavour to find out if the frontal and sphenoidal sinuses respectively are involved. The diagnosis of frontal empyema is not by any means easy. Evidences if periostitis, that is to say, redness and swelling, are sometimes seen in the orbital region above the inner canthus. It is in this situation that the wall of the sinus is always thinnest, and firm pressure here with the finger will elicit tenderness. Supraorbital tenderness is of no

diagnostic value and may be made out in all persons by pressing upon the supraorbital nerve. Moreover you will find marked tenderness here and also below the orbit, in cases where pressure exists between the anterior end of the middle turbinate and the septum.

Transillumination is practised by applying the orifice of the instrument to the portion of the orbital wall above the inner canthus. A transilluminator may be made by enclosing a small electric lamp in a wooden tube with a terminal orifice about one-third of an inch in diameter. The light must be directed upwards and backwards and well within the limits of the orbit. If it is directed merely upwards, or if the spot chosen is too far forward, a quantity of diffused light will be

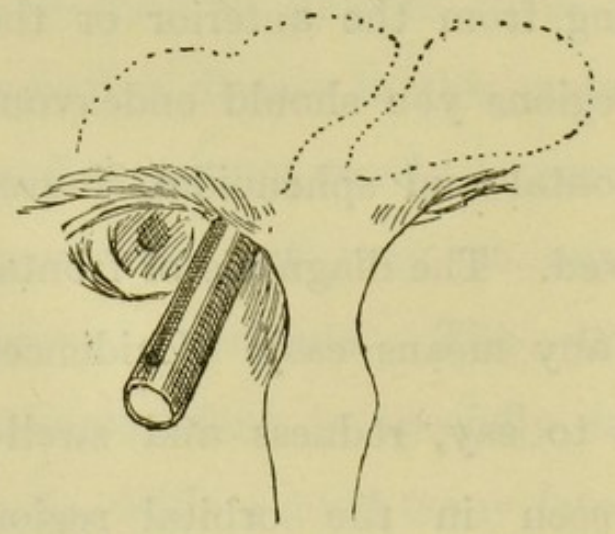

FIG. 84.—Position of Frontal Transilluminator directed backwards and upwards above the inner canthus.

emitted from the soft tissues, and vitiate the examination.

With a powerful and small instrument it is possible under the velvet cloth to make out very clearly the outlines of a healthy frontal sinus. Sometimes when the bone is thick or the sinus small, nothing of value can be determined. In cases of chronic suppuration the sinus is generally dark to transillumination and the evidence is of value when the limits of the sound side can be clearly seen.

The X rays also furnish valuable evidence, especially in corroboration of the transillumination results. In cases of long standing, the outline of the sinus as seen in a radiogram is less well defined than that of a healthy sinus, and here again the value of the evidence is enhanced if a distinct contrast can be made out between the sound and the suspected side. In order to get reliable results the patient should lie prone with his forehead applied firmly and squarely to the photographic plate, while the head is kept in position by an apparatus; for if the movements of

respiration are communicated to it, a really firm outline is not secured. The X ray apparatus should be a powerful one, so that a long focal distance may be employed.

Just as in the case of the antrum so in that of the

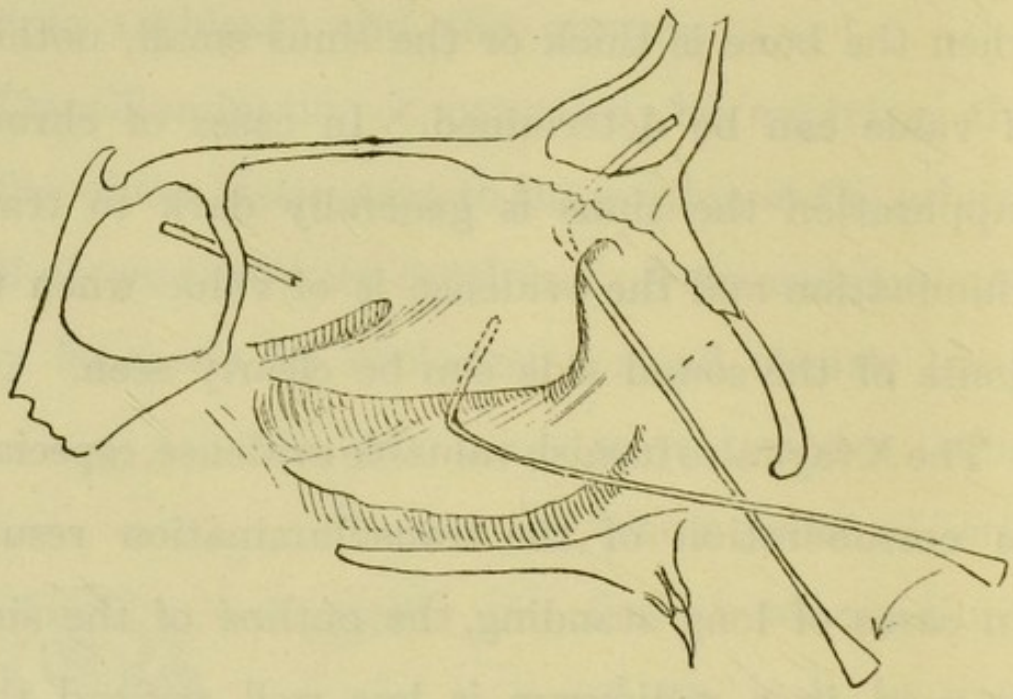

FIG. 85.—The passage of a Cannula into the Frontal Sinus in a Normal Nose.

Note the curve of the instrument and its position near the midpoint of the nose at the commencement of the manipulation. The direction taken in Sphenoidal Cannulization is also indicated.

frontal sinus, the only absolute proof of suppuration is obtained by cannulization. Where there is external abscess or fistula needless to say this remark does not apply.

In a certain number of cases it is not difficult to

pass a cannula up into the frontal sinus. A long narrow flexible silver tube should be employed, and a curve given to it suitable to each case. Examination of the skull will convince you that the curve required is a full one, and in the majority of cases the tip will be directed at a right angle to the shaft. After cocainization it is carefully introduced under the middle turbinate at the posterior end of its anterior third, or even farther back than this, and then carried upwards and forwards along the assumed line of the hiatus semilunaris. On no account whatever must any force be used, and if the tip appears to be stopped, attempt to disengage it and pass it up in a slightly altered direction. Sometimes you may satisfy yourself from the lie of the instrument that it has well entered the frontal sinus, and you may at times absolutely verify the position of the tip close behind the anterior wall by means of the X rays. The matter is largely one of patience and skill, but in a considerable proportion of specimens you will see

that the sinus is quite inaccessible to the probe.

When you have satisfied yourself that the tip has entered the cavity, inject air from a bellows. If pus comes away the diagnosis is sure, but remember that you have to exclude the possibility of your cannula being in an ethmoidal cell. Such a cell extending over the roof of the orbit may be of great size and contain a drachm or more of pus.

Auscultation with a binaural stethoscope applied over the outer half of the supraorbital ridge during the practice of inflation, may be of some little service. It must, however, be said that a frontal sinus which has been long diseased ceases to be a pneumatic cavity and is almost completely filled by its greatly swollen mucous membrane.

Having made the diagnosis, the question of treatment arises. This is a difficult and thorny matter and one in which you will do well not to exercise your own judgment until you have had considerable experience.

There are certain points upon which all surgeons

agree. No one would hesitate to perform an external operation in the presence of external abscess, fistulation or evidence of definite necrosis of bone threatening cerebral complications.

But in the large majority of cases of chronic frontal sinusitis, violent symptoms are absent; there is no necessity to hurry at once to an external operation, and no harm is done by attempting cure by intranasal methods.

Commence by amputating the anterior end of the middle turbinate, and then carefully remove with the small punch-forceps the thin curtain of bone which overhangs and conceals the upper portion of the hiatus semilunaris. After this has been done, it is generally quite easy to introduce a cannula into the frontal sinus. The skull sketched on p. 234 would have readily lent itself to this method. Occasionally the restoration of good drainage in this way may be followed by speedy cure. An intelligent patient easily learns to introduce the cannula and wash out the cavity once or twice a day with

a mild antiseptic lotion. Just as is the case with the antrum, so with the frontal sinus, a great bar to successful irrigation is the presence of crests of bone and mucous membrane more or less separating various recesses from the main cavity. When such recesses exist, and especially when the mucous membrane is greatly thickened and polypoid, the chance of absolute cure by this method is remote. Nevertheless, I strongly urge you to make trial of it, for the reason that the patients are almost immediately relieved of unpleasant symptoms, the pus greatly diminishes in quantity after a few days' treatment, and in a certain small number of cases the patients claim after some weeks, to be quite cured, having seen no pus in the washings. On the advent of winter weather, or on catching cold, the discharge usually, I believe, returns, and I would urge you not to allow your patients to relinquish syringing.

I have seen one bilateral case treated in this way in which the cavity could be inspected by means

of a small mirror. The case appeared to be cured, nevertheless crusts formed about the orifice from time to time, and probably the trouble in this, as in other cases, is that the ciliated character of the epithelium has been permanently lost in consequence of prolonged suppuration.

In conjunction with all treatment of the frontal sinus, whether by intra- or extranasal methods, it is absolutely essential to drain thoroughly all suppurating ethmoidal cells. If this is effectually done by snipping away their walls with the punch-forceps, local cure will result. To do this properly in the anterior region will exercise all your skill and patience. The sketch on p. 234 shows an unusually easy ethmoid. In a long narrow nose the anterior region is not so accessible, and in many cases it is quite impossible to obtain a good view of the recesses which extend over the orbital roof. Where extensive ethmoidal suppuration is present, the wisest course is to operate under general anæsthesia in the manner described when speaking of polypi and

ethmoiditis. In some cases however of ethmoidal-cell suppuration there is little or no degeneration of the bone and the ring knife cannot be used with ease and advantage, and must be replaced by the punch-forceps. The patient should be warned that such an operation is not necessarily a radical and final one, and it is of the utmost importance to insist on periodical inspection during subsequent months. These visits, however, should be at intervals of not less than four weeks, so that the reaction following the previous manipulations may have entirely subsided. Special care must be taken of the lachrymal groove, and violent blowing of the nose must be avoided as it may produce surgical emphysema. It is essential to remove all sources of anterior nasal obstruction.

External radical operation upon the frontal sinus may be urgently required when there are serious symptoms which cannot speedily be relieved by drainage and irrigation. In the general run of cases however the patient may be allowed to

exercise a choice in the matter, but it always should be urged upon those about to live in uncivilized countries away from surgical assistance, and sailors ought to be included in this category.

No purpose will be served by entering into the details of various external operations, all of which have their merits. It is essential above all things that the safety of the patient should be considered, that the operation should be truly radical and final, and that as little disfigurement should be caused as the two first considerations permit.

It is important that a very large opening should be created in the floor of the sinus by the removal of all the anterior portion of the ethmoid bone.

The danger of the operation lies in the fact that the diploe of the frontal bone may become affected with a slowly advancing septic inflammation, which usually leads to a fatal termination. This accident occurs only when the skin wound is closed at the time of operation.

Should you, under circumstances of emergency,

undertake one of these cases, do not fail to keep the inner angle of the wound freely open until all discharge has ceased, even though this advice may mean the retention of a drain tube until a radical operation can be performed. On the whole, I

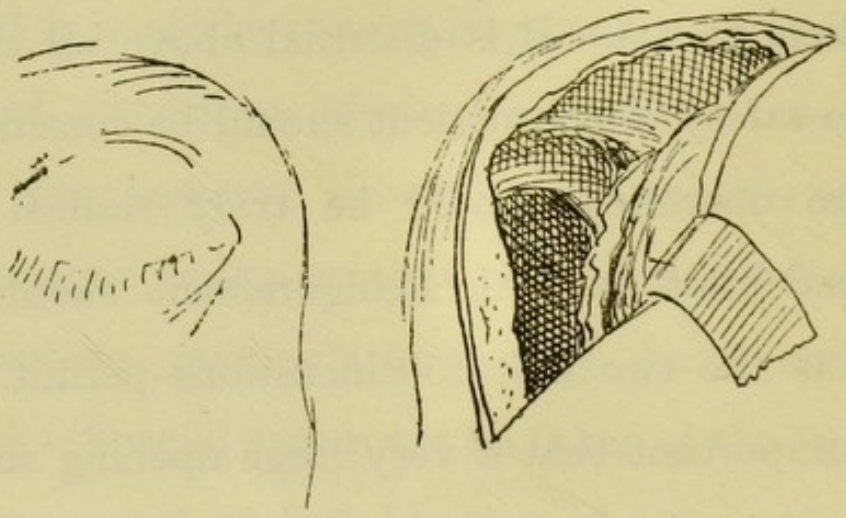

FIG. 86.—Chronic Frontal and Ethmoidal Empyema with Orbital Abscess. Rapid operation removing the floor of the frontal sinus and anterior ethmoidal cells. Man aged twenty-five.

think the safest operation to be performed in an emergency is such a one as that depicted above. Ethmoidal and frontal suppuration in a man of thirty became complicated by the formation of an orbital abscess. As an external wound was called for, advantage was taken of it to remove the inner

wall of the orbit, with of course the diseased ethmoidal labyrinth, and at the same time the floor of the frontal sinus. In this case the mucous membrane of the frontal sinus was not much diseased, and it was left *in situ*, the large passage down into the nose being kept free by packing and nitrate of silver touches.

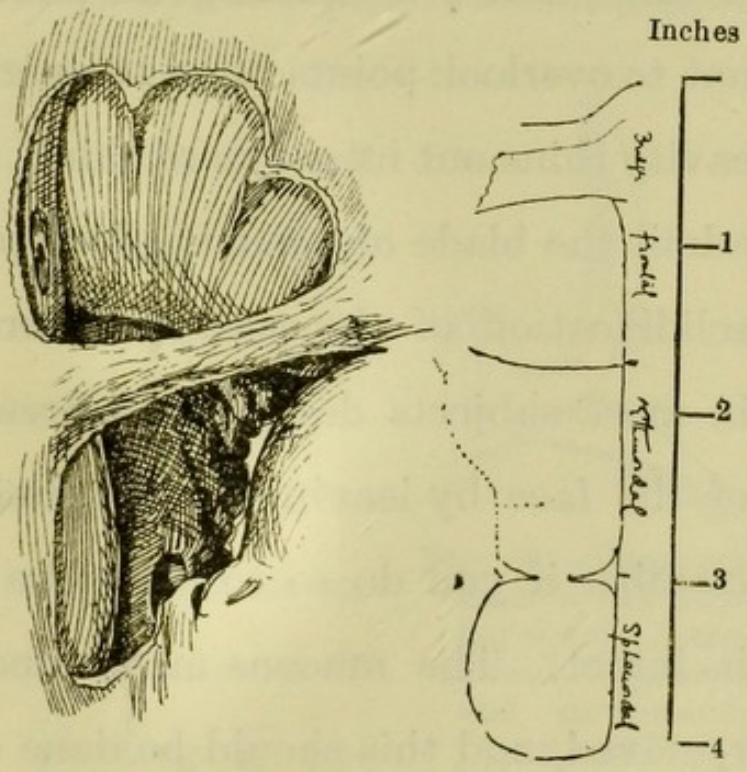

FIG. 87.—Killian's operation for Chronic Left Frontal Empyema in a man aged thirty. (Reduced half linear from sketch made immediately after operation.)

All the ethmoidal cells and much of the orbital wall have been removed, exposing an opening previously made in the suppurating sphenoidal sinus. Loss of bone in the septum between the sinuses and minute artificial puncture into the opposite sinus, which proved to be healthy. Consolidation in five weeks. The right-hand figure shows the horizontal measurements.

When a chronic frontal empyema is attacked deliberately, after discussion with the patient respecting possible disfigurement, length of after-treatment and so forth, it is probably

always wisest to make certain of a permanent cure by completely obliterating the cavity. This entails removal, not only of the entire floor, but of the whole of the anterior wall, and great pains must be taken not to overlook points upon the periphery where the cavity thins out into a mere chink, far too narrow to admit the blade of a cutting forceps. Although the solidification of the cavity is thereby delayed, it is in most subjects desirable to preserve the contour of the face by leaving the superciliary ridge. Remember if you do so to leave the periosteum upon it intact. The mucous membrane is to be entirely removed, and this should be done not by scraping, but by carefully lifting it off the bone. Presumably a patch of epithelium cannot be left behind without considerable risk of a disappointing result. The anterior ethmoidal cell region must now be carefully removed, the orbital wall and frontal process of the superior maxilla being in part removed in order to give perfect access. The lachrymal duct must be respected, but detachment of the trochlear

pulley causes no diplopia after the first few weeks.

The whole of this operation can be readily carried out through a curved incision following the lower border of the eyebrow and sweeping round and down along the inner contour of the orbit. All but the outer and lower extremities of this wound must be kept widely open by packing during the first week.

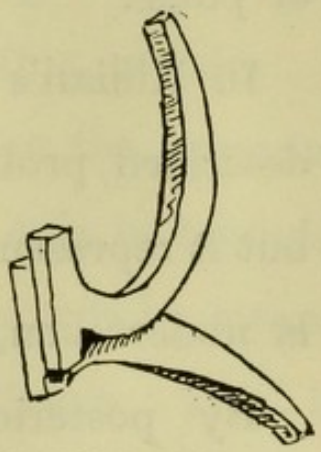

FIG. 88.—Plugs cut from a red rubber sheet. Introduced upwards and downwards respectively through the wound near the inner canthus. The upper one is reduced in size daily until consolidation of the frontal sinus is complete.

The whole frontal sinus can be daily inspected, and as soon as the bone is covered by a crop of granulations the packing is reduced in quantity, and the soft tissues of the forehead are allowed to fall in and unite with them. Great care must be taken to prevent pocketing. Immediately under the bridge and near the septum the deep cavity takes some time to fill up with granulation tissue, and the after-treatment is undoubtedly tedious. In the case here

depicted the sinus was not completely solidified for five weeks, but during the latter half of this time the patient was no longer an invalid and merely needed the gradual curtailment, first of packings and later of plugs.

In Killian's operation, which I have here briefly described, probably the last word has not been said, but it represents the fact that where a big operation is undertaken, it ought to be thorough and final.

By posterior rhinoscopy, pus from the sphenoidal sinus is seen running down from the sphenoethmoidal recess at the posterior end of the olfactory cleft and empyema of this cavity is really present in many cases which are regarded as instances of a mere post-nasal catarrh. Very often the posterior ethmoidal cells are affected in conjunction with the sphenoidal sinus. Besides the general symptoms of nasal suppuration the patient from time to time complains of pain which is often exquisite in its intensity, and is stated to be located in the middle of the head and radiating

into the ears. Immediate relief may follow spontaneous discharge or surgical interference, and the symptom is probably due to blocking of the orifice. You may familiarize yourself with the position of the sphenoidal ostium by examining cases of old atrophic rhinitis, in which it is often visible.

In the normal nose it is hidden by the posterior part of the middle turbinate and can only be brought into view by pressing that body outwards by means of a long speculum, such as Killian's. This is a painful process even under cocaine.

A line drawn from the centre of the anterior naris across the centre of the lower border of the middle turbinate is the guide to the ostium, and as a general rule it is necessary to remove the posterior half of the body if any operative work is to be done upon the sinus. When the sphenoidal region has been brought into view, very often no orifice can be detected by the eye, and this is especially the case just when it is most necessary to find it; for where empyema exists, the mucous

membrane around the ostium is generally swollen and completely closes the orifice, so that a diligent search must be made with the probe. An instrument with a flattened extremity should be employed, and when the tip has slipped into the sinus, it should be rotated so as to expand the slit-like orifice and allow the pus to escape. I have several times seen pus almost leap out of a sinus explored in this way, although no objective signs of empyema had been previously visible.

If mere probing does not establish a diagnosis you must introduce a fine straight silver cannula and inject air through it; and if the question remains still in doubt the cavity must be washed out with a lotion. This must be suitably warmed and non-irritant in character. Boric lotion does well. I have seen the injection of 1 in 10,000 solution of perchloride of mercury cause exquisite pain.

If pus is found, the anterior wall may be pulled away by means of blunt hooks and cutting forceps. A small sliding punch similar to that

used for the middle ear, but much longer is, I think, a better instrument, for it can be passed in through the natural ostium and used with much less distress to the patient. A larger sliding punch may then be used, and a considerable portion of the anterior wall removed. The partition separating the sinus from the posterior ethmoidal cell must be cut away, whether that cavity be septic or not. Unless this is done the opening is very likely to become unduly narrow when healing takes place.

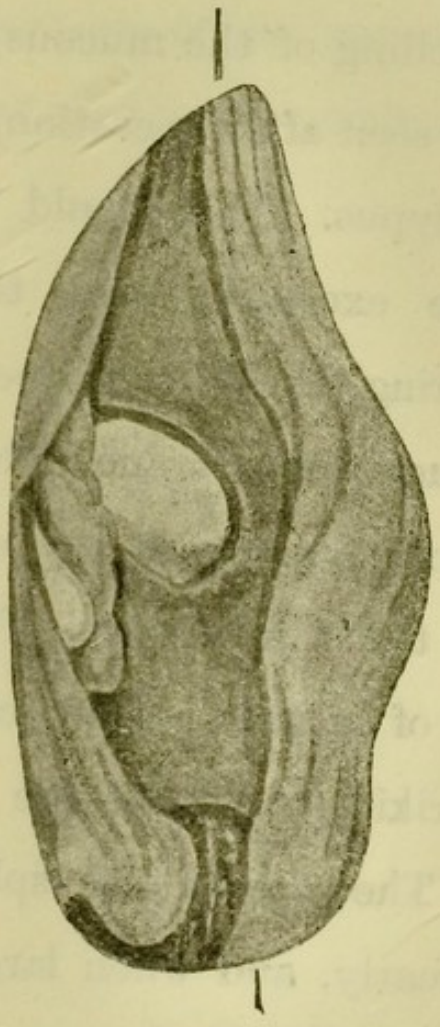

FIG. 89.—Sphenoidal Empyema cured by removal of part of the anterior wall some months previously. The very large middle turbinate, which has caused permanent distortion of the septum, has been removed together with the posterior ethmoidal cells. A drop of pus is seen trickling from the region of the frontal sinus. Male aged twenty.

It is of the utmost importance to avoid interference with any but the anterior wall of this cavity; where

intracranial complications have occurred after operation, this rule has not been observed. Great swelling of the mucous membrane of the roof may be seen after operation, and give the appearance of polypus. This should be left entirely alone, with the exception that the cavity may be gently syringed. When a free opening has been made, the mucous membrane quickly returns to the normal; more quickly in my experience than that of any of the other sinuses. The normal mucous membrane is of a pale yellow colour, and shows out very strikingly against the surrounding parts.

The size of the sphenoidal sinuses varies very greatly, and when largely developed these cavities may completely undermine the sella turcica and come into close proximity with the optic nerves. In all cases of unexplained blindness they should be explored.

The bony wall which separates the cavity from the cavernous sinus may be exceedingly thin or absent in places; and the examination of a few

specimens will put the operator upon his guard against interfering with any part but the anterior wall, for septic thrombosis of the cavernous sinus or fatal hæmorrhage may easily result from transgression of this rule.

CHAPTER XIII

NEW GROWTHS AND NEUROSES

TRUE neoplasms are distinctly rare in the nose and accessory cavities. Every variety of tumour is however seen from time to time, and their behaviour presents little that is characteristic of their nasal origin. There are, however, one or two points of a general character worth remembering. New growths, whether benign or malignant, find little resistance to their expansion in the fragile skeleton of the upper face, and they commonly give rise to a distortion of the physiognomy known as 'frog face,' in which a peculiar flat appearance is produced by unnatural prominence of the lachrymal bones. The distortion may be unilateral, and when it is coupled with epiphora, perhaps redness of the skin, and nasal obstruction of rapid progress, it is more than suggestive of malignant disease of the ethmoid region.

It is worth remembering that malignant disease in the upper regions of the nose is often marked by the presence of ordinary nasal polypi; that is to say, by prominent œdematous swellings of the neighbouring mucous membrane. The tumour itself may present in the nostrils in the form of a polypus, more red, it is true, than the ordinary. Incautious removal of such an outgrowth may be followed by copious hæmorrhage.

External deformity of the antrum, particularly if it involves the palate, will always arouse suspicion of malignant disease. So-called mucocœles of the antrum, which are probably in all cases derived from dental cysts, may cause uniform bulging of the cavity, and must be diagnosed either by their translucency or by exploration. It is in these cases that eggshell-crackling is observed, but this phenomenon is extremely rare.

Ethmoidal cells may give rise to mucocœles of sufficient size to cause external deformity of the orbit and displacement of the eyeball.

A peculiar form of tumour known as bleeding polypus of the septum may arouse serious suspicion of malignant disease by the constant epistaxis which it causes, and by its deep red fleshy appearance. It is, however, cured by removal and cauterization of the base, and may be classed from its microscopical appearance as an angeiofibroma.

All these are rarities and do not form a prominent part in the routine work even of an out-patient room. The same remark applies to a class of phenomena which may be called the nasal neuroses. Cases are of course occasionally seen there of hay fever, asthma and paroxysmal sneezing, but they belong essentially to the more highly strung sections of the community.

The whole subject of these neuroses is one of intense interest and worthy of close study and pursuit, but my advice to those who are not prepared to expend their energy in this direction, is that they should, until the matter has been thrashed out and put upon a secure basis, abstain from

energetic treatment of these cases. I think this advice is important for the reason that if your treatment is not followed by amelioration it may result in severe aggravation of the symptoms. No class of person is more critical and bitter than the asthmatic and the hay fever patient, and it is not worth while to lose the confidence of your neighbours by adopting an assured attitude where experts are widely disagreed. As I feel strongly upon this point, I shall abstain from any critical survey of these subjects, advising readers who intend to go deeply into the matter to consult a longer treatise where all sides of the questions involved, can be gone into at some length. Even when this is done it is impossible to arrive, at the present time, at secure conclusions, for reasons which will be mentioned presently.

All three affections, rhinorrhœa spasmodica, hay fever and asthma, commonly occur in the same individual, and are doubtless different expressions of the same instability of the nerve centres, which

in varying degrees and divers manners are set in motion by nasal stimuli. Many of the patients exhibit other abnormal nervous phenomena, and a noticeable proportion give a neuropathic family history.

It is an interesting fact that the intense rhinorrhœa and sneezing which follows in a few hours the application of adrenalin to the nose, is rarely seen in hospital patients, whilst it is common enough in private practice.

Rhinorrhœa spasmodica usually occurs in persons of middle age, and affects both sexes about equally. The subjects commonly complain of the onset of violent sneezing with copious discharge of clear fluid, soaking five or six handkerchiefs between breakfast and lunchtime. Others commence the attack in the afternoon, others again are wakened by it in the early morning. These attacks last three or four hours, are generally daily in their occurrence, and are more severe and distressing during periods of mental strain. I have seen one case

definitely commence in a lady of fifty at the time of a great bereavement.

In my experience the nose is, as a rule, anatomically, well within the limits of the normal, and the patients have had no definite nasal symptoms previously. When examined during the attack, the middle meatus is seen quite blocked by great swelling of the mucous membrane of the middle turbinate which often has a pale appearance, suggestive of œdema of the superficial layers. A quantity of clear fluid is seen streaming from it.

Cocaine and adrenalin procure but a very fleeting relief and do more harm than good by reason of the reactionary turgescence which follows their application. It is a safe rule to administer tonics, including strychnine, and to give careful rules as to over-fatigue and so forth.

It is not by any means certain that the abnormal vasomotor phenomenon which is the immediate underlying factor, arises from a nasal stimulus in all cases, and I have not had any considerable

number of favourable results from the cauterization of peculiarly sensitive spots in the nose. A good many cases have been definitely relieved for a considerable length of time by directing into the nose a stream of air, heated by passage through the small electric apparatus employed by dental surgeons for drying the teeth. It is, however, very undesirable to offer statistics upon these cases, for it has been the humiliating fortune of a surgeon to meet one of his successful cases at a dinner party, exhibiting a well developed attack; and it is not too much to say that it is extremely difficult to collect data upon this whole class of neuroses, for the reason that it is impossible to pursue private patients with questions after they have ceased to consult you and are perhaps undergoing treatment at other hands, although they may have been entirely relieved for a few weeks.

I have, for instance, seen a lady who has been "cured" of asthma by four entirely different treatments in the course of twenty-four months,

and who is now being "cured" by general massage.

In view of the œdematous appearance of the middle turbinate during the attack I have recently administered calcium lactate internally, with the idea of altering the condition of the plasma, and in view of the beneficial effect which the drug exerts in this way in cases of urticaria. Some of these cases have done remarkably well, but statistics would be premature.

In a large majority of cases marked temporary and in some, I believe, permanent, benefit is to be obtained by the internal administration of atropine and strychnine.

The best formula is that of Lermoyez :—

Liq. Atropine Sulph. . .	ℿix.
Liq. Strych.	℥iss.
Syrup Aurant. . . .	ℨx.

ℨ½s pro dos. One dose after breakfast for 10 days, and if well tolerated, one after breakfast and one after lunch for a second period of 10 days. This may be repeated after an interval of two or

three weeks if symptoms return. Permanent cure sometimes follows this treatment.

Rhinorrhœa spasmodica is an affection which occurs at all times of year, without the existence of any recognized source of irritation. The same set of symptoms, usually accompanied by conjunctival injection and very acute misery and lassitude, is induced in certain people at the time of the flowering of the grass, and is known as hay fever. The researches of Dunbar show that something in the grass pollen-grains, and not a mere mechanical irritation, is an essential factor in the causation of the disease. The same symptoms are produced by the pollen of a considerable variety of flowering plants, and notably of roses. Some subjects are unable to drive behind horses without an attack.

In a hay fever patient there is definite evidence that the phenomenon is reflex to a local stimulus, and an attack may be induced by the application of the pollen to the nasal mucous membrane or to

the conjunctiva, while cocaine gives temporary relief. It is probably safe to say that in these cases the mucous membrane as well as the nerve centres are hypersensitive. It is probable that the abnormally irritable condition of the centres is the more important element in the affection, but this state may in part result from the constant reception of an abnormal stimulus from the nasal nerve endings. I have seen one case of long standing hay fever which has remained definitely cured since the removal, eleven years ago, of a small pendulous mass springing from the middle turbinate and rubbing against the posterior part of the septum.

In most cases of hay fever one may, by gentle probing, detect areas of the mucous membrane which are exquisitely sensitive. These are most commonly found in the extreme antero-superior corner of the septum. It is good practice to damp the sensibility of these spots by superficial cauterization, and it is probable that the disappointment which frequently follows this method of treatment,

initiated some years ago by Greville Macdonald, arises from a misapprehension. A great many cases complain that they are not cured thereby, although they have been relieved for a time. For the reasons previously stated I will not give figures, but I believe that a very large proportion of patients may go through the hay season with perfect comfort if these spots are cauterized a month or two before it commences. During the following year they will have symptoms in a mitigated form, and the next year they will be as bad as ever. It is therefore desirable to apply the cautery every year in March or April, and the very slight distress which two cauterizations entails, is infinitesimal compared with the misery of a well developed attack of hay fever. It would, however, be quite erroneous to promise relief from such treatment, for it entirely fails in a good many cases, though I have no experience of its causing aggravation. Patients should therefore be warned that it may fail, and that if it does so, trial should be made of Pollantin. This

is an antitoxin produced by Dunbar by the innoculation of horses with pollen extract. Experiments have shown that an attack induced by pollen may be cut short by the local application of the drug to the nasal mucous membrane and the conjunctiva, and perhaps 50 per cent. of patients state that they obtain relief with this remedy, which generally must be applied several times a day as well as before rising in the morning. They should be asked to follow the instructions sent out by Dunbar with the preparation, and they should be advised to make trial both of the solid and liquid forms before abandoning it as a failure.

Some patients find no treatment of service short of escape from the pollen on board ship or on a small ocean island. Heligoland has an old-standing reputation in this respect.

In some hay fever patients the reflex phenomena overflow from the nose and eyes, as one may say, and spread to the bronchial apparatus to constitute hay asthma. The majority of cases of asthma have

of course nothing to do with hay, and many of them appear to be dependent upon disorders of the digestive organs. Nevertheless it may be said with certainty that asthma and nasal phenomena are very often associated, and it is fairly safe to add that afferent impulses from the nerve endings in the nose, can produce in abnormal nervous systems, a reflex effect which takes the form of spastic contraction of the muscles of the bronchial tree.

Brodie and Dixon showed four years ago at the Pathological Society, curves indicating contraction of these muscles, induced by stimulation of the nasal septum in the lower animals, and which followed stimulation of no other mucous surface in the body. It is probable that the constant flow of impulses either from hypersensitive nerve endings in an otherwise healthy nose, or from irritation of normally sensitive nerve endings by unnatural structures such as polypi, induce in certain neuropaths a kind of reflex nerve storm, which takes the form of bronchial spasm.

Treatment should therefore take two directions, which, except for experimental purposes, may well go hand in hand. On the one hand the efferent or spastic part of the phenomenon may be met by drugs such as lobelia and stramonium, which certainly have an immediate effect in many cases of cutting short an attack; and it may be added that some cases remain free from attacks while they are taking small doses of potassium iodide, which is the main or sole active ingredient in some asthma nostrums which are undoubtedly successful.

On the other hand the efferent element appeals more to the rhinologist. Sometimes this proves to be a most evasive and, at present, incomprehensible matter, and seems to depend upon what, in our ignorance, we may call vague climatic influences. Every one has heard of the patients who find relief only in the underground railway, and others who have found Seven Dials the one habitable spot. I have known a man who has been through a rigorous winter campaign in Chitral and residence in various

torrid parts of India without an attack, and who finds a visit to Holland or return to his home at Southsea, certain to bring on his trouble, though he is well in many other seaboard and inland places.

There is, however, a class in which the nasal reflex is more tangible. It is beyond doubt that many asthmatics who have definite nasal disease, such as polypi, synechiæ, marked hypertrophies of the turbinates and pronounced septal deformity, have their asthma removed by the cure of these conditions. It is equally beyond question that now and again operative interference in the nose is followed by definite aggravation of the symptoms, and herein lies the need for great caution in giving a prognosis. Nevertheless it is, in our present state of knowledge, a duty to treat such conditions if they are really well marked and if the patient thoroughly understands beforehand the uncertainty of the issue.

More commonly no gross lesion is present, and yet cocainization of the nasal mucous membrane

gives immediate relief in an attack, and the patient resorts with temporary benefit to spraying up the nose, a nostrum containing that drug.

In the treatment of these cases, success has been claimed by the application of the galvano-cautery to various parts of the nose, and at various times and by different authorities almost every part has been regarded as that essentially important.

Francis has reported a large number of successful cases in Australia and this country after applying the cautery to the posterior region of the septum, the part found by Brodie and Dixon to give the bronchial-spasm phenomenon in the lower animals. Although many rhinologists have observed striking immediate relief to the symptoms following cauterization of many different spots, the anterior and the posterior parts both of the turbinates and the septum, experience shows that these results are often deceptive, and it is not too much to say, that owing to the difficulty of collecting data in private practice, one and the same case may figure in

one set of statistics as a success, in another and subsequent set, as a failure. At the present time it is very desirable to be extremely cautious in giving a prognosis, more especially as aggravation of symptoms is far from uncommon.

One point is fairly clear. Whenever an operation is performed for a gross nasal lesion in an asthmatic, it is almost certainly followed by a period of immunity from attacks. This period may not extend beyond three or four weeks, but the phenomenon is, in itself, a source of encouragement, suggesting that the nose, an easily accessible organ, is largely responsible for this serious malady, and gives us hope that patient and careful record of cases observed over long periods, will ultimately lead to some secure method of dealing with it.

Finally, let it be said that wherever mechanical nasal obstruction co-exists with any of these neuroses, the symptoms are rendered much more endurable by its removal.

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