

loosen the coagulum that fastens about the positive pole. The current should, however, be reduced to zero before the switch is changed to reverse it, otherwise it will cause the patient a good deal of pain. Meningitis has followed this operation and the cribriform plate has been carelessly perforated. Vertigo, syncope, and orbital neuralgia sometimes follow. Excellent results have been obtained by this treatment in some cases, but in others it has proven useless. Injections of diphtheria antitoxin have been tried but without avail. Vibration massage has also been employed with, it is claimed, good results.
E. Fletcher Ingals.

NASAL CAVITIES, DISEASES OF: CONGENITAL AND ACQUIRED DEFORMITIES.—I. DERMATOID CYSTS AND FISTULÆ.—These conditions are congenital or are noticed shortly after birth. They appear at the junction of the nasal bones with each other and of both with the frontal, as rounded tumors (in case of cysts) of variable size, not freely movable but rather adherent to the deeper tissues. They are covered with normal skin, and the centre line is generally on a level with the canthi of the eyes. A trauma of the mass may lead to a fistula or the latter may be congenital. The mode of origin of these conditions is thus explained by Bland Sutton: The rudiment of the nose in the embryo is represented by that process of the primitive skull, known as the fronto-nasal plate, which is separated from the lateral portions of the face by the orbito-nasal fissures. The rounded angles of these plates are known as the globular processes, each one of which forms a portion of the ala of a nostril and the corresponding præmaxilla. These processes fuse in the median line, giving rise to a central piece (philtrum) of the upper lip. Dermatoids are invariably situated in the line of the internasal fissure and are in all probability due to incomplete fusion of the globular processes.

According to Witzel dermatoids in this situation are not to be regarded as "sequestration" growths—*i.e.*, formed by a squeezing off of tissue when the lateral halves of the body coalesce,—but result from the imperfect apposition of the two tuberosities which, projecting from the centre of the face, arising on both sides of the median nasal furrow and approaching each other to complete coalescence, ought to form the cartilaginous nose and septum.

Strictly speaking, a dermatoid tumor is composed only of tissues found in the skin and mucosa. The cysts variously contain sebaceous material, cellular debris, fat crystals, and hairs. Unstriped muscular fibres may appear in the cyst wall. The fistulæ are lined with a fibrous material covered with sebaceous matter. The walls are covered with typical pavement epithelium, while the subepidermoidal tissue shows scattered aggregations of round cells. The deeper layers show connective tissue of low grade, scattered mucous glands, and giant cells.

Symptoms may be wanting, the swelling being noticed only as something objectionable from a cosmetic point of view. Fistulæ generally give off a constant or intermittent discharge of sebaceous or muco-purulent matter, which causes an excoriated area on the surrounding skin.

Treatment calls for the laying open of the cyst or fistula, with excision of the entire fistulous tract by means of a raspatory or sharp spoon. If the fistula branches off the top and burrows beneath the nasal bones, this tract may be cauterized with the galvanocautery. The whole is then allowed to heal from the bottom. The fistula may reopen after it has once healed. Sometimes a plastic operation may facilitate recovery.

Cysts are rare. Birkett, writing in 1900, reported two instances and collected six others from various sources. Since then Krieg has reported two more. Fistulæ, however, are by no means uncommon. The x-ray may help to clear up a doubtful diagnosis.

II. CONGENITAL OCCLUSION OF THE NARES.—Complete congenital occlusion of the anterior nares is an extremely rare condition. Jarvis reports two cases, and claims that they are the first on record. One of his patients was a boy of eighteen, who presented, instead of the dark out-

lines of the nares, cup-shaped depressions about 4 mm. in depth, the barrier being of membranous consistency; one side admitted a very fine probe while the other was absolutely impervious. The other case was that of a girl of sixteen, in whom the inferior meatus on both sides was blocked by bony growths of ivory hardness. At times she had been able to expel a little air through the nose. Krieg has reported a case—probably of syphilitic origin—in a boy of three years.

Congenital occlusion of the posterior nares is by no means uncommon. The barrier may be either membranous or bony (the former being far more common), complete or partial. According to C. H. Knight, the condition may result from (1) exostosis or simple hypertrophy of the osseous structure of the middle or inferior turbinate; (2) a ridge or exostosis from the vomer; and (3) an adventitious bony plate springing from the floor of the nose or from its outer cavity. However, in most instances which belong strictly to this category, the bony plate spreads like a web over one or both choanae, being directly continuous with the palate bone, of which it forms an integral part. Sometimes the obstruction is a deflected vomer which enlarges one choana at the expense of the other. Luschka believes that the bony plate is a continuation of the free border of the horizontal plate of the palate bone; Kündrat, that it is an extension of the vertical portion; both conditions are possible. In some cases the central portion of the barrier appears membranous, surrounded by an irregular fringe of bony spicules projecting inward from the periphery; such cases are naturally attributable to hypernutritive changes. Ingals believes that membranous closure in this region is not congenital, but always the result of syphilitic, diphtheritic, or other disease processes.

Symptoms.—These naturally vary according to the degree of obstruction. If the latter is complete at birth, the chances of survival are very few. Difficulty in nursing may be the first thing to call attention to the possibility of the existence of the lesion. If the obstruction is partial, the patients grow up, laboring under all the disadvantages of nasal occlusion, both in its local manifestations and the distal disturbances to which it may give rise. In unilateral occlusion there is often a partial lack of development of the corresponding side of the face and of the vertebral column. By animal experimentation Ziem has shown that these effects are directly due to nasal occlusion of the corresponding side. In infants there is "not only the inability to suckle and the consequent difficulty in obtaining sufficient food, but also the exposure of the bronchial tubes and delicate air cells of the lungs to the constant irritation of air insufficiently moistened, filtered, and warmed." The nose generally secretes moisture, but the secretion is apt to accumulate in an annoying manner. From mouth-breathing the oropharynx is generally dry. The voice lacks its normal resonance. The sense of smell is in abeyance while that of taste may persist though impaired for its finer qualities. The effect on hearing is variable. This function is often perfect. Toynbee contended that under these conditions the act of swallowing would cause a constant suction on the Eustachian tube and thus lead to a depression of the membrana tympani, but such a sequel is by no means constant. In many instances the ease with which the patient will sustain impairment of these three special senses is quite remarkable, and, as Knight observes, in notable contrast with the disturbance following a similar acquired post-nasal obstruction.

Treatment.—The barrier must be pierced, the opening enlarged, and the patency thus acquired maintained. In patients of fortitude this may be done under cocaine. For membranous occlusions the galvanocautery will suffice; bony barriers require the trephine or chisel and subsequent enlargement with revolving burrs. The openings should be made as large as possible. Much difficulty may be experienced in keeping them pervious. For some time after the operation pledgets of oiled gauze should be inserted, and after healing has taken place bougies and dilators should from time to time be passed.

III. MALFORMATIONS.—Several cases of congenital median fissure of the nose have been reported; also cases of nasal hemiatrophy. In one instance of the latter the right half of the organ was normal. The median portion was covered with skin, but instead of the left half there was a body 1.5 cm. long by 0.75 cm. wide, and in shape like an elephant's trunk. This process was extirpated, leaving a permanent fistula. The patient was a child of five years. Such cases are among the curiosities of medicine, and each one can be considered only in the light of the problems which it presents.

Malformations of the ala may be congenital or they may result from disease. Various plastic operations have been suggested. One devised by Koenig merits special mention. He takes a flap made up of the entire substance of the auricle and sutures this in place of the defect in the ala. As this flap contains cartilage it heals well.

Outside of the various alar deformities resulting from tissue destruction, especially from syphilis, there may be a simple collapse of the alar cartilages, so that insufficient air reaches the interior of the nose, and the impact of the inspired air tends still more to close the nasal entrance. The condition appears at times to be merely an accentuation of a congenital condition, or it may result from lack of development, or from inactivity of the nasal wings. The whole ala may be affected, or merely the plica vestibuli—*i.e.*, the outer border of the inner nasal opening. There may be a laxity of the entire nasal wall with defective action of the dilator and levator muscles. In the congenital cases it will be found that the part principally at fault is the band of tissue at the junction of the lower lateral cartilage and the bony margin of the anterior nares, its position being noted externally by the depression usually seen immediately above the lower expanded part of the nose. If the middle turbinate becomes enlarged, the entrance to the nares is apt to become smaller.

The main symptom of the condition is nasal obstruction leading to mouth-breathing.

The condition in old persons may often be relieved by the wearing of a delicate tubular spring within the nares to hold the ala in position, or a flat metallic band may be inserted. A similar procedure is often of great benefit in the temporary collapse seen in typhoid fever, pneumonia, etc.; also in tuberculosis involving the larynx. The increased air supply is very grateful to the patient. In young persons an effort should be made to restore the tone of the dilator ala muscles. Practice in stretching these will increase their activity. The lubrication of the interior of the nares with some unguent carried on the finger will stretch the parts and assist in the recovery of their normal tension. In other words, we should apply the principle of massage.

IV. FRACTURE AND DISLOCATIONS OF THE NASAL BONES.—Fractures of the nasal bones constitute about one per cent. of all fractures. They may be simple, compound, or comminuted. Both bones are generally involved. The injury may also affect the perpendicular plate of the ethmoid, but the vomer generally escapes. The fracture may also extend to the nasal processes of the superior maxilla; the cribriform plate of the ethmoid is, fortunately, rarely involved. It may also involve the zygomatic arch or extend to the frontal sinuses, thus possibly opening a portal for septic infection of the meninges. Occasionally the lachrymal bone is involved, with obstruction of the tear duct. Very often the nasal bones are not really fractured but simply separated from their attachment to the superior maxilla, or the bones may become separated from each other; this separation may allow the bones to remain in perfect apposition, or they may be depressed.

The causes of this class of injuries are blows and falls. It has been said that displacement in the infant may come from the pressure of burying the nose against the breast or in the pillow.

The exact lesion produced varies according to the direction of the trauma. If it is from below, the brunt of

impact falls upon the septum, while the nasal bones may escape. The triangular cartilage is detached from its bony surroundings, including the nasal spine of the superior maxilla. Here there is merely swelling of the septum, which may run on to abscess with not much external deformity. If the trauma is from the side, both bones may be dislocated laterally, while their internal borders remain in contact. If it is from in front, the nose is flattened, the inner borders of the bones are driven outward and tilted so as to form a sharp ridge on either side of the nose. Perhaps the most common form of injury is a transverse fracture about the middle of the bones, driving back the lower fragment or possibly both bones backward between the nasal processes of the superior maxilla, thus leaving a depression instead of the normal nasal convexity. Unless the upper half of the bone is distinctly driven in, the perpendicular plate of the ethmoid generally escapes.

The symptoms are epistaxis, deformity, and marked swelling. The latter may extend to the cheeks and eyelids. From the direct results of the trauma or from forcible blowing of the nose immediately after, there may be a subcutaneous emphysema with crackling on pressure. The latter condition on the forehead (when the nose has not been blown) is an evidence that the frontal bone has also been fractured. More or less ecchymosis quickly forms. The swelling may mask the exact nature of the injury. The nose may retain its normal shape or be but part of a diffused swelling. In the latter state, bony crepitus is elicited with difficulty; it may possibly be obtained in minor cases.

Diagnosis is made from the foregoing conditions and from careful digital examination. It is to be remembered that many of the so-called "broken noses" have never been actually fractured. Rhinoscopy should never be omitted. In doubtful cases the x-ray may accurately determine the relative positions of the various bony structures.

Treatment calls for the restoration of the bony parts to their normal contour and for the adoption of such means as will keep them in their proper positions. The actual relations must first be determined, and for this purpose a general anæsthetic (a little chloroform) is often necessary. The under surface of the nasal arch should be carefully probed for irregularities. In many cases the bony parts are easily replaced and only a cold compress is required. In more difficult cases an instrument, such as a metal catheter (female) or the closed blades of a dressing forceps should be introduced into the nares and the bones elevated to their proper level, while their position is regulated by the fingers on the outside. The object is to restore the nasal arch. If this can be done and the patient is a self-controlled person who will let his nose alone, the above measures are all that is required. Instruments should be covered with light rubber tubing. It is better, as a rule, to dispense with external splints and plugs in the nares. The emphysema requires no treatment. Epistaxis is treated in the usual manner. Firm union results in from two to three weeks.

If the bones should show a tendency to fall in again, they may be raised by the insertion, within the nose, of an india-rubber dilator, introduced empty and then filled with water, or a piece of rubber tubing may be used. Plugs and splints are generally useless because they rest on the floor of the nose, while the trouble is higher up, and thus is not reached by them. If the nasal bones show a tendency to separate, we may make a plaster splint by having the patient lie flat while several layers of a plaster bandage are moulded over the nose, the ends being carried out on to the cheeks. The ends carry tapes which fasten behind the head. Thus the apparatus is well worn at night. Another serviceable material is gutta-percha, which may be cut to the general shape of the part, covered with antiseptic gauze and then rendered malleable by insertion in hot water. It is then accurately fitted to the nose and secured by tapes. Block tin, thin copper, and aluminum may be used in the same way. These splints may be padded with cotton to exert

pressure in any direction required for maintaining the proper shape of the nose. Another device is the employment, within the nose, of the Bernays sponge material, cut to fit the nares. Various head-bands with forehead plates, to which nasal apparatus may be fastened, have been employed. In the worst cases it is justifiable, if marked deformity has resulted, to cut down on the fragments, replace them, and close the wound. The resulting scar will be trivial in comparison with the deformity unrelieved by operative intervention.

V. SADDLE NOSE.—This term is applied to that particular deformity in which the usual convexity of the nasal bones is replaced by a depression which is the more marked from the fact that the mechanical conditions causing it also tip the point of the nose upward. The deformity is generally the result of some ulcerative process, syphilis being responsible for the majority of cases. The nasal bones are supported in their anterior third by the quadrangular cartilage, and in their posterior two-thirds by the perpendicular plate of the ethmoid. Consequently the entire cartilage may disappear without any change in the external contour of the nose; but when the destructive process encroaches upon the ethmoid or subjacent vomer, the support of the arch begins to crumble and deformity results. The latter is still further aggravated when the destructive process invades the nasal processes of the superior maxilla.

Various operations have been devised for the relief of this condition. In minor conditions a support may be introduced through a subcutaneous incision. Marked deformities require external incision. With such operations the names of Israel and Koenig are intimately associated. A deep incision is made along the dorsum of the nose, and a flap from the forehead containing skin, periosteum, and a small fragment of bone is diverted to fill the sunken area, the flap being stitched to the lower portion of the nose. The denuded space on the forehead is then closed, while secondary operations are required to close the lateral gap.

Another type of operation is that of raising the depressed area and maintaining it in position by a bridge of some light metal, such as platinum or aluminum; celluloid has also been used for the same purpose. With such procedures the names of Lericq and Martin are associated. A very convenient form of bridge is that devised by F. E. Hopkins, in which the rounded convexity of the bridge is supported on each side by an arm which runs out on to the upper surface of the superior maxilla and is there secured. For the insertion of such apparatus it may be advisable first to perform Rouge's operation, consisting of incision through the gingivobuccal fold, dissection of the lip and face from the subjacent bone as far as the border of the nares, and the division of the septum, so as to allow the entire nose to be turned up over the face, thus more or less completely exposing the bony openings of the nasal passages. The great objection to all such apparatus is that we cannot foresee that it will be comfortably worn, and moreover there is always danger that the pressure of the bridge will lead to ulceration and destruction of tissue. In several instances the pain attending the wearing of the bridge and the threatened integrity of the tissue have compelled the removal of the support.

A very recent plan of treatment, and one that promises much, is that of paraffin injections under the skin so as to raise the latter to a normal position and thus restore the normal contour of the nose. It was devised by Gersuny, of Vienna, in 1900; and while it is still *sub judice*, sufficient time has elapsed in several instances to predicate its success and wide applicability. The skin is carefully disinfected and cocaineized with a four-per-cent. solution, which is also carried into the area to be occupied by the paraffin. The melting-point of the latter should be about 105° F. The ordinary white paraffin is too hard, while the soft variety, known as white vaseline, is too soft. A mixture of the two may be made of just the right melting-point. A syringe, made entirely of metal, is preferable, with a needle of moderate calibre.

The paraffin mixture is first sterilized and then drawn into the syringe, which is kept in sterilized hot water. When all is ready for the injection the syringe is allowed to cool until its contents issue, not as a liquid but as a coherent string. The needle should be inserted at a little distance from the depressed area, but carried beyond the point of greatest defect, and the material slowly expelled, the syringe being meanwhile slowly withdrawn. The paraffin remains plastic for about half a minute, during which time the nasal convexity thus produced can be properly moulded. A temporary lymphatic oedema may follow, but it has been found that the paraffin will retain its shape, and that it produces no deleterious consequences when once lodged under the skin. It gradually becomes encapsulated by connective tissue, a fact which is still further advantageous in helping to retain the new shape of the nose.

Objections have been made to the effect that this new mode of treatment may cause some danger of lung embolism; also that any rise of body temperature might cause a melting of the paraffin. On this account some have preferred a paraffin with a higher melting-point, say one of 110° F. As far as is known, no cases of embolism have resulted from supranasal injections.

VI. SYNECHIAE.—Adhesions may occur in any part of the nasal chambers, but the great majority of them are visible by anterior rhinoscopy. They assume various appearances and are of various shapes.

Causes.—In many of these cases the synechia are the result of some operation in the nose, especially the overzealous or careless use of the galvanocautery; less frequently, they follow the use of cutting instruments. Some cases are attributable to traumatism, such as a fall or a blow. Even when operative intervention has been fully justified and skilfully performed, neglect of after-treatment may lead to unfortunate results. Adhesions may also result from the use of chemical caustics, or of powerful hæmostatics, as the *Liquor ferri chloridi*. A few congenital cases are recorded. The condition also follows diphtheria, measles, scarlet fever, and occasionally acute and chronic rhinitis. Basing his statements upon autopsy records, Zuckerkandl found inflammatory cases far more common than traumatic, his figures being in the proportion of seventeen to three respectively; statistics based on clinical experience show traumatic cases to be more common. They are more apt to occur between the upper turbinates and the septum than between the latter and the inferior turbinate.

In all acquired cases the mode of production is essentially the same. Either from trauma or from some trophic disturbance leading to loss of tissue two opposing surfaces become bare, and later approaching each other become fused in the process of healing.

Symptoms.—Symptoms depend on the degree of nasal obstruction. Diagnosis is made by inspection, and the extent of the adhesion is determined by the probe.

Treatment.—This consists of the removal of tissue excess and the prevention of readhesion until both sides have healed. The question turns upon the proper method to be adopted in each individual case. In operating on either the septum or the turbinates the utmost care should be exercised not to wound the opposite surface; if inadvertently the least injury has been inflicted on the healthy tissue, some form of tampon should be worn for a few days. A pledget of oiled gauze or cotton, a thin plate of celluloid, or some form of tubular splint may be used. These should be removed daily, cleansed, and reinserted. So also in treating severe acute injuries of the septum or *ala nasi*, we should bear in mind the necessity of maintaining the patency of the nostrils during healing. In cases in which the adhesion is firm and hard, it may be cut through with the galvanocautery or scissors, and the cut edges kept apart as above indicated. In narrow nostrils it is extremely difficult to prevent readhesion. Watson has advised persistent friction with a cotton-wrapped probe, stating that he has often seen absorption of the adhesion follow this manoeuvre. Others have suggested the encircling of the adhesion with a loop.

EXPLANATION OF
PLATE XLV.

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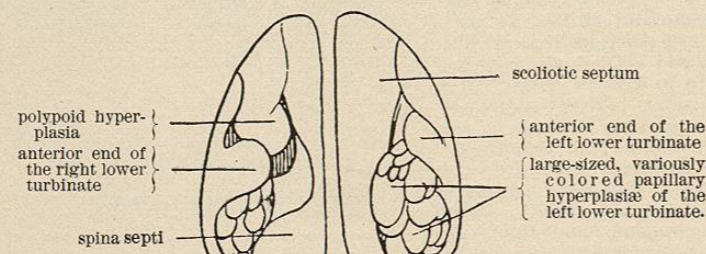
FIGS. 1, 2, and 3.—Papillary Growths Removed from the Nasal Mucous Membrane by Means of the Wire Snare Heated to a Red Heat. They represent simple hypertrophies of the mucous membrane.

FIG. 4.—Ulcer on the Left Side of the Septum Narium, the Nasal Mucous Membrane Everywhere Else Being Quite Healthy. Syphilis many years previously. Specific treatment was tried in vain. Healing finally took place under the combined use of a long series of cauterizations and a paste containing resorcin.

FIG. 5.—Smooth Hypertrophy of Both Lower Turbinates, in a Man Fifty-three Years of Age. The most marked pathological changes existed in the pharynx and larynx. The picture gives a faithful representation of a genuine connective-tissue hyperplasia. Neither pressure with a probe nor the application of cocaine caused the mucous membrane to yield to a noticeable degree. Both sides were about equally affected.

FIG. 6.—Polypoid Degeneration of the Middle Turbinates, in the Case of a Woman, Sixty-five Years of Age, who had Suffered for Some Time from Dacryocystoblenorrhœa. Smooth hypertrophies of the middle turbinates are often scarcely distinguishable from true polypoid growths. It is only after the mass has been extracted that one is able to establish the fact that it represents an altered state of the mucous membrane covering the concha. After the operation the latter will sometimes be found denuded of all covering throughout quite an extensive area. (Note the vascularization of the tumor.)

FIG. 7.—Papillary Hypertrophy of Both Lower Turbinates in a Woman Forty-two Years of Age. Excrescences of considerable size are visible in the picture. Those situated in front and above are very vascular and red, whereas those which lie farther back and below are quite pale. The right middle turbinate shows a condition of smooth hypertrophy.



Key to Fig. 7 of Plate XLIII.

FIGS. 8 and 10.—Epistaxis due to a Varicose Condition of the Blood-vessels of the Cartilaginous Septum. In both of these pictures the artist, in making the drawing of the right half of the nose, has turned the patient's head as far round toward the left as he could, in order to secure as broad a view of the septum as possible. In the case of the left half of the nose he has simply reversed the process.

FIG. 9.—Hypertrophy of the Lower Turbinates: of the Smooth Variety on the Right Side, of a Papillary Nature on the Left and at the Posterior End of the Turbinate.

FIG. 11.—Papillary Hypertrophy of the Posterior Ends of the Lower Turbinates, of such Dimensions, on the Right Side, as Entirely to Cover up the Mouth of the Eustachian Tube and Close the Posterior Entrance of the Right Narial Passage. On the left side the hypertrophy is less pronounced.

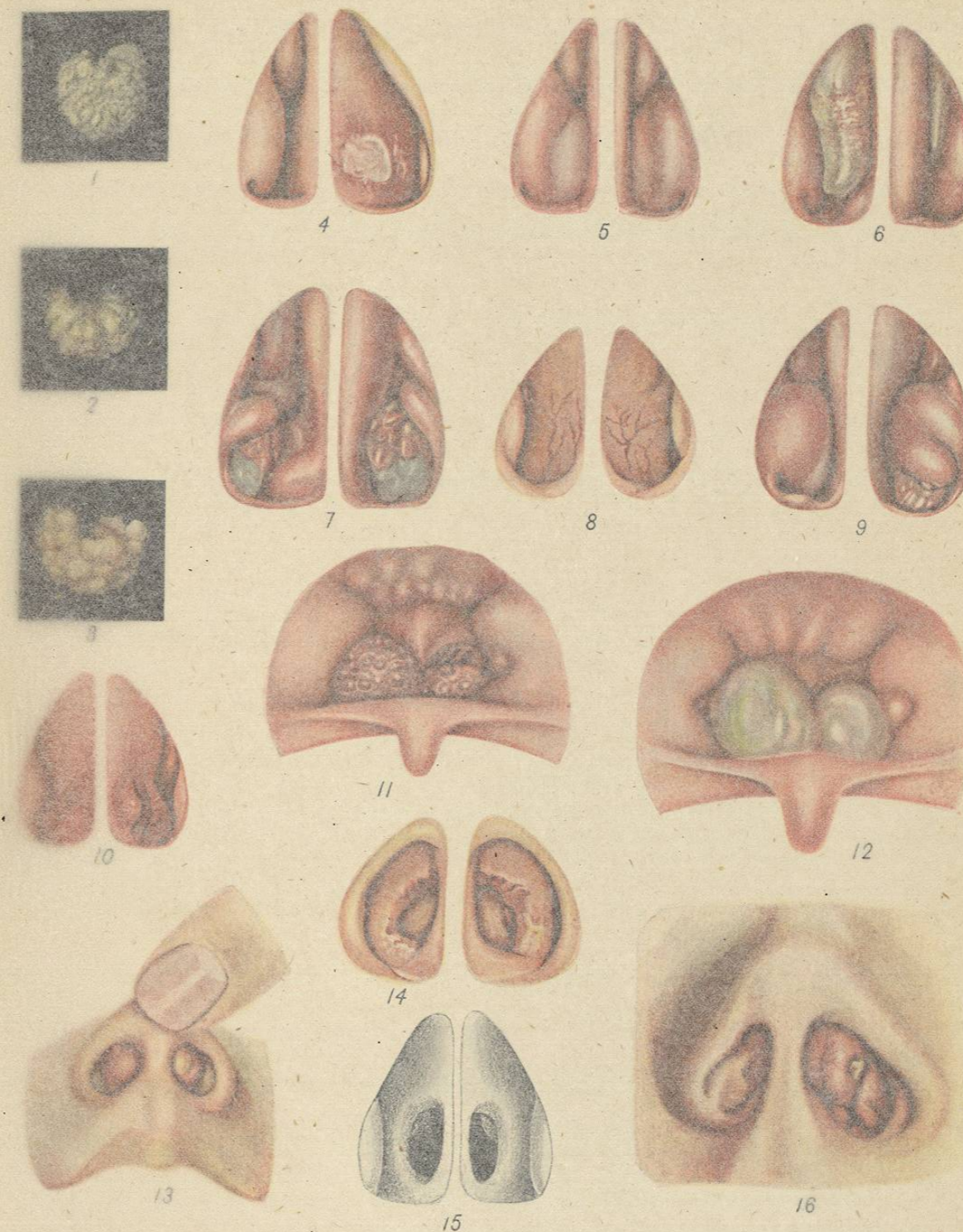
FIG. 12.—Polypoid Hypertrophy of the Posterior Ends of the Lower Turbinates. (Also remains of pharyngeal tonsil.) The patient was a young man, eighteen years of age. Although these polypoid masses are somewhat hummocked or knobbed, as they generally are, they should, in the present instance, still be classed as smooth hypertrophies.

FIG. 13.—Abscess of the Septum Narium, Probably of Traumatic Origin, in the Case of a Child Fifteen Months Old. On the left side there is a spot where softening has already taken place and where a spontaneous rupture is about to occur.

FIG. 14.—Perforation of the Septum Narium in the Cartilaginous Portion, Quite Far Forward. The margins of the opening still show irregularities of the surface and are eroded. The nasal mucous membrane as a whole is pale and atrophic. On looking through the opening, either from the right side or from the left, one can see the surface of the opposite turbinate as far back as to its posterior end. The patient was a woman thirty-four years of age, and the cause of the defect was probably lupus.

FIG. 15.—Another Instance of Perforation of the Septum Narium in a Patient who Manifested No Other Evidences of Disease. The etiology in this case is unknown.

FIG. 16.—Abscess of the Septum, with Protrusion of the Overlying Mucous Membrane only on the Left Side. (Perforation occurred spontaneously.) The anterior end of the left lower turbinate is in an inflamed and swollen condition.



PATHOLOGICAL CONDITIONS OF THE NASAL MUCOUS MEMBRANE
(From the "Atlas der Krankheiten der Nase," by Dr. P. H. Gerber.)