

present in the occipital, temporal or frontal lobes. Focal signs in abscess may come and go because of the varying size of the abscess and the disappearance, temporarily at least, of the surrounding softening. We may have large abscesses of the centrum semi-ovale without focal signs, for the pus at first separates the white fibers instead of destroying them, and if the gray matter is intact, a whole lobe, Bergman says the greater part of a hemisphere may be destroyed without the development of a focal sign. The closer, however, the abscess is to gray matter and the greater destruction of tissue the more focal signs are developed. As in brain tumor, we must distinguish between focal signs due to destruction and focal signs due to pressure from edematous infiltration. The latter may come and go; the former are permanent and localizing. As abscesses may be present in any part of the brain we may have any of the corresponding focal signs.

Traumatic abscesses of psycho-motor area are characterized by the rapidity with which monoplegia and hemiplegia follow the Jacksonian epilepsy, or if the abscess is deep-seated, the rapid, but not apoplectic development of a hemiplegia without hemianesthesia. The paralysis is rarely complete.

Abscesses of the frontal lobe, like tumors in this region, have no specially localizing signs; on left side when large we may have motor aphasia involvement of right facial, even of arm; the localizing can be done, however, by considering the causal factors.

The hearing center is of value only if opposite ear is involved externally and has not been the seat of previous inflammation. Hence, according to Barr, it is of no value in two-thirds of the cases because the purulent otitis is bilateral.

Sensory aphasia is present in abscess of the left temporo-sphenoidal lobe. It is very important to remember that in most cases the sensory aphasia is transitory and not permanent; this is due to the fact that the abscess is usually on the underside of the temporo-sphenoidal lobe, which lies above the roof of middle ear, and affects the speech center only by distal pressure. Even epidural abscesses can affect the speech center by pressure (second case).

Abscesses of the temporal lobe are differentiated with difficulty from tumors, because fever is so frequently absent. We must rely on the etiology. Bergman says that even with all our diagnostic aids we frequently make mistakes in temporal abscesses.

With the abscess in the lateral lobes we will usually miss marked cerebellar signs, unless the pressure of the abscess affects the vermiform lobe, when, as in MacEwen's case, we will have marked ataxia. Then the centers and branches of six of the basilar nerves may be affected, but not so often as in tumor. Vertigo may just as well be due to labyrinthine as to cerebellar trouble, and is therefore of little value. Vertigo, uncertain gait and retraction or stiffness of neck are fairly often associated in cerebellar abscess. We can see, therefore, that the diagnosis of cerebellar abscess has usually been made, after the mastoid had been opened. In 19 operated cases tabulated by Koch, 8 times the abscess was found by the finding of a sinus leading to the abscess during mastoid operations, 7 times by aspirating in all directions and finally finding the abscess in the cerebellum, and only 4 times was the diagnosis properly made before the operation by a consideration of signs and symptoms.

A chief factor of chronic latent abscesses is that they are subcortical, usually about one eighth to one-fourth of an inch beneath the surface. The discovery that the

cortex of the brain could be punctured and cut into with almost no danger, is very recent. In compound comminuted fractures Ashley Cooper would not even remove the spiculæ of bone which had been driven into the brain. Dupuytren was the first to cut into the brain and empty an abscess, but his patient died, and for many years no surgeon ventured to repeat the daring operation. As a result of aspiration on the one hand and of increased knowledge of the physiology of the cortex on the other, surgeons no longer hesitate to make incisions into and puncture even deep into the brain substance. This procedure, however, is not without some danger. I have seen one death result after aspiration as a result of an injury to a vein of the choroid plexus with hemorrhage into the lateral ventricle.

CONCLUSION.

In conclusion let me introduce Oppenheim's résumé of his diagnostic experience. He says that in the majority of cases of suspected abscess he could rule out abscess at once without any trouble. In 35 cases he had serious difficulties of diagnosis. In 14 of the 35 cases he made the diagnosis of abscess. The other 21 cases were either localized meningitis, cerebrospinal meningitis, encephalitis median otitis and brain concussion.

Of the 14 abscesses, four belong to the period antedating the days of brain operations. In five cases an operation was deemed inadvisable, either because the abscess could not be located or because of complications. In five cases an operation was performed, in two of these the abscess was not found, although present. In the three remaining cases the operation was successful, but only one case recovered, the other two dying of the complicating meningitis. This experience of Oppenheim is the experience of all neurologists and explains the difference of opinion between us and the surgeon. The surgeon sees only the sifted and positive cases and feels that the diagnosis is easy and the results good; the neurologist sees all the doubtful and fatal cases and is not quite so sanguine.

THE DISEASED MIDDLE TURBINATE.*

CHARLES H. BAKER, M.D.

BAY CITY, MICH.

The undue importance which has been given the lower turbinate bodies in the search for the etiology of nasal disorders has overshadowed all other parts of the nasal cavities and led to wrongfully crediting the lower turbinates with the more important instead of the less important rôle in the production of nasal disease. This was principally owing to their easy accessibility and also to the fact that in most nasal disorders these bodies were found swollen and occluding the respiratory passages whereby effect was mistaken for cause.

A moment's reflection will convince one that an acute coryza manifests itself in the region above the lower turbinate first, with a feeling of dryness and pressure followed later by obstruction to respiration due to swelling of the lower turbinate. Very often a patient presents himself with a beginning coryza in which the only perceptible change of the mucous surface is a dryness and redness of the upper nasal chambers with some swelling of the tissue over the middle turbinate and little obstruction to breathing; but a few hours later having the lower passages tightly plugged by swollen tissue.

* Read at the Fifty-third Annual Meeting of the American Medical Association, in the Section on Laryngology and Otology, and approved for publication by the Executive Committee: Drs. Emil Mayer, C. R. Holmes and G. H. Makuen.

The anatomic relations of the middle turbinates are of the highest importance and can not too often be reviewed. The middle, sometimes called the ethmoid turbinate, is the extension of the ethmoid bone into the nasal chambers. This fact must be borne in mind for its important bearing on the etiology of disease in the middle turbinate, for suppurations in the ethmoid cells are often accompanied by a like condition in the turbinate, and vice versa.

Between the body of the middle turbinate and the nasal side wall are the openings of the frontal sinus, maxillary sinus, ethmoid cells, and at its posterior end is the opening of the sphenoid antrum. In a state of health the turbinate acts as a barrier, protecting the outlets of these various cavities from external irritants, but when inflammation occurs the resultant swelling produces occlusion of the outlets and retention of the secretions. The retained discharges ferment and in their turn become irritants, whence the above condition tends to be self-perpetuated.

The shape of the middle turbinate within physiologic limits varies greatly, depending on the type of nasal chambers in which it is found. In the high-roofed narrow chamber it may be merely a thin lamellar plate suspended by its upper border from the inward leaning side wall, and may be easily bent from side to side by the exploring probe. In the wide roomy chambers of the Germanic races it may assume the typical shape described in the text-books, while it may possess almost any variation from these and still retain, physiologically, perfect shape. By this I mean that when, itself not involved in inflammation, it does not press on any of the sensitive areas in its neighborhood or block the openings of the accessory sinuses it may be considered physiologic, however bizarre its shape.

The most common type of the middle turbinate is the one with knobbed anterior, which quite effectually shuts off from view the space lying above and behind. The space between the turbinate and septum varies from 1.5 to 3 mm., and between the turbinate and side wall usually a little less.

The opinion seems gaining ground that the meatuses serve merely as gutters to drain off nasal secretions and when pus is found in them it is produced in one or more of the accessory sinuses or cells. If time proves this to be correct it will greatly simplify our etiology if it does not make treatment any easier.

For the location of the point of origin of nasal pus a certain line of procedure is important. Inspection both anterior and posterior should precede cleansing or blowing the nose and masses of pus will often be seen lying in the lower and middle meatuses which are continued upward to their point of origin, or at least far on the road. After the patient blows his nose inspection is to be made again.

By way of parenthesis let me say that one-half the patients, especially children, need instruction in the proper way to blow the nose, most of them holding both nostrils tightly closed until the air is under pressure, then allowing it to partly escape by both nostrils at once and suddenly checking it; a method eminently calculated to precipitate Eustachian and middle-ear catarrh. The proper method is this: One nostril should be closed by pressure on the ala and the whole explosive air current directed through the open side. When this is properly done the masses of fluid pus will be expelled from the lower passages and inspection will often show the pus drawn out into a rope with one end issuing from the infected sinus infallibly pointing out the way.

Next, a cocain solution is applied with a probe to the lower turbinate and the anterior part of the middle one, sufficiently strong to induce some shrinking of the tissue. This opens the way frequently to discovery of hidden polypi, spurs, etc., which are not seen on first inspection.

Next, with a very thin and flexible probe, the tip surrounded by a thin pledget of cotton tightly wound and dipped in cocain, the regions about the middle turbinate are carefully explored and an estimate of the amount of space between septum and turbinate body, and the latter and side wall is obtained, together with the discovery of small polypi, localized hypertrophies, abnormalities of form and size of the turbinate and possibly denuded areas of bone.

The limited time at my disposal will permit an examination of two conditions only which are the results of suppuration, the one external and the other internal to the turbinate body, both of which may lead to increase in its bulk.

The first of these is nasal polypus, and my first proposition is this: Nasal polypus is a sign of existent or past suppuration in either the ethmoid cells or one of the accessory sinuses. Nasal polypus arises most frequently from the middle turbinate, next from the edges of the hiatus semilunaris around the outlets of the frontal and maxillary sinuses and anterior ethmoid cells, lastly from the posterior ethmoid and sphenoid antrum outlets. They are usually accompanied by suppuration, and I believe they never occur without antecedent suppuration of the ethmoid or the sinuses.

Pus issuing from these and flowing over the mucous membrane, eroded as happens during an acute coryza, excites the formation of true granulation tissue just the same as forms in the suppurating ear or around a healing mastoid and aided by gravity and an over-abundant serous secretion they go on to become polypus. I am aware this is not a generally accepted theory, but it has the merit of newness and plausibility, and in view of the fact that about all authorities acknowledge that the cause of nasal polypus is obscure or "in accord with some unknown law" it is as worthy of acceptance as any.

By far the larger number of cases of nasal polypus, particularly if multiple, will be found accompanied by suppuration, sometimes unseen until the polyps are removed, when an enormous amount of pus may be found to issue from some adjacent sinus. The removal of polypus should be considered as preliminary to more extensive operations in most cases, and should be undertaken only with the cold snare and strong illumination so as to be able, so far as may be, to see every step of the operation. Blind fishing with polypus forceps is a relic from the days of the moxa and seton, and no man is warranted in being guilty of their use.

After removal under cocain and adrenalin of all the polyps in sight, within a day or two it is often possible to find more which have come down from the spaces above, where they had been retained by the pressure of the lower ones, so that several sittings may be necessary to secure those which can be reached without interference with the bone. There is no assurance that when this is done all have been secured, for I have repeatedly removed the middle turbinate body and found from one to a dozen good-sized polyps concealed either behind, above or within the bone. Because of this experience I now make it a rule to remove the middle turbinate, either in whole or in part, when there is active disease of the turbinate, the adjacent sinuses or cells or

when asthma is not relieved permanently or when the polyps reform after removal.

The tendency of polyps to grow again after removal is well recognized, but this is more common with the mucous than the fibrous and the multiple than the single. This is due, not to an inherent disease or degeneration in the mucous membrane so much as it is to irritation from pus flowing over it externally or to purulent inflammation of the underlying bone.

No treatment of the stump is likely to prevent recurrence and is often worse than useless, increasing rather than checking growth. Nothing but removal of the cause will succeed, and to do this the middle turbinate requires amputation. This bone is the site of fully one-half the polyps formed and I believe much more than half, so that its removal gets rid of the basis of the larger part. Then the turbinate is usually greatly increased in size in these cases, adding its own bulk to the causes of obstruction. After polypus has existed for some time, even if from disease of other parts, this bone is found diseased and the pneumatic cells filled with pus or containing polyps.

I would therefore advocate removal of the middle turbinate in all cases of recurrent polypus of the middle turbinal itself; in all cases of recurrent polypus of the hiatus semilunaris; in all cases when removal of polypus opens and reveals collections of pus issuing from the sinuses, and in cases when by pressure the enlarged turbinate causes reflex nervous ailments, such as muscular asthenopia, persistent headache, chorea or epilepsy and especially asthma.

Nasal suppurations, post-nasal dropping, asthma, headache, disposition to frequent coryzas with slight cause; in short, continual nasal irritability is liable to remain so long as a single polypus is left, and if such symptoms persist after the healing following total removal of all which can be discovered, I contend it is the duty of the rhinologist to remove the middle turbinate, or enough of it to uncover the hiatus semilunaris and render easily accessible all portions of the nasal chambers lying above and behind the turbinate. So generally have I found polypus in surprising amounts after such removal in case of multiple polypi that I would now be surprised if I did not find them.

CASE 1.—A case in point is that of a physician, for years an acute sufferer from asthma, who under several eminent rhinologists had run the gamut of fashionable treatment, from galvano-cautery, that converted the nasal chamber into a beautiful dry scar, to trephine, which left only a hypertrophied scar stump on the site of the opposite inferior turbinate. As interlude he had had frequent removals of mucous polypus from either chamber. The right middle turbinate was hypertrophied and pressed on the septum, but no polyps could be detected on either side. To stop pressure the bone was removed and four large polyps were found in the hiatus semilunaris and above the bone posteriorly three additional were found within a week. The result of removing the stump of lower turbinate and straightening a deformed septum on the same side and removal of the middle turbinate of the opposite, with its concealed polyps, was nearly total relief of an asthma which had lasted for years and broken down an otherwise vigorous constitution.

Removal of the turbinate for several different conditions has brought to my notice a considerable number of cases which I think account for the bullous enlargement of the middle turbinate, which is such a fruitful source of nasal disorder. Bullous enlargement has been variously attributed to a periostitis and to a hyperplasia of the bony elements, but these cases point to a very different cause.

CASE 2.—A hay-fever patient had in childhood suffered from eczema and asthma, probably from adenoids, which disappeared before puberty, but his hay fever developed at about 30 years of age. There was at that time no enlargement of the middle turbinate and no asthma, but about six years ago asthma complicated the attacks coincident with commencing enlargement of the turbinate. The asthmatic seizures grew heavier as the bone grew thicker, and lasted later into the winter, until they were likely to be precipitated by any overexertion or error of diet. By this time the bone was pressing continuously on the sensitive septum. To relieve the irritation of this pressure the turbinate was amputated in October last and was found becoming bullous; stiff, inspissated pus occupied the greater part of the cell in the anterior portion. None of the adjoining ethmoid cells or sinuses gave any evidence of disease and healing was very prompt. The patient gained weight and strength very rapidly and passed the last winter in better health than for years. There was very moderate post-nasal discharge with a burning, smarting feeling above the palate, particularly on



Fig. 1.—Specimens (actual size) illustrating cases 1, 2 and 4. No. 2 is the first case—dried specimen; No. 1, three fragments of specimen from Case 2, also dry; No. 3 is from Case 4, with its adhering polyps P and P', the latter being on the upper posterior surface entirely concealed until the bone had been extracted.

awakening, and disposition to rasp the throat and an obscure feeling of constant pressure in the bone below the inner angle of the eye, but nothing else to indicate the presence of the pus. There has been no asthma since the operation, but the next hay-fever season will tell whether it is curative for the asthma.

CASE 3.—Another case was also an asthmatic without any definite clinical history, either as to origin of the attacks or symptoms aside from frequent severe paroxysms. The removal was done for relief of the pressure on the septum, which was very severe. The bulla, which was very much larger and the walls thinner than in the last case, was found completely filled with cheesy pus. As before, there was no involvement of the adjacent sinuses or cells and the healing was uneventful. There has been no asthma since the operation except an attack brought on by pressure from dry secretions imperfectly removed by the patient.

CASE 4.—The last case to which I call your attention shows an extreme development of this condition. The patient was a German farmer, who developed a paralysis of the external rectus of the left eye, for which no cause could be discovered outside the nasal chambers. His previous health had been perfect, there had been no specific disease or any unusual exposure or hardship, no headache, impairment of vision or any discernible cause until inspection of the nasal cavity showed a very much enlarged middle turbinate pressing both on the septum and the side wall, and a large nasal polypus dependent from its anterior end. The polypus was first removed and then the turbinate body, which was filled with thick and cheesy pus. Behind the turbinate was a small polypus which was impossible to discover until the bone had first been removed. No suppuration could be discovered in the adjacent cells or sinuses.

At the time of removal the various specimens of these conditions presented no evidence of inflammation within the cell, the pus being stiff and cheesy, and when the cavity was emptied the lining membrane had the pearly glistening appearance of those in which no pus was found. I therefore contend that bullous hypertrophy, the so-called pneumatic distention, is the result of continued suppuration within the middle turbinate, doubtless from infection of one of the normal pneumatic cells, and that the growing accumulation of

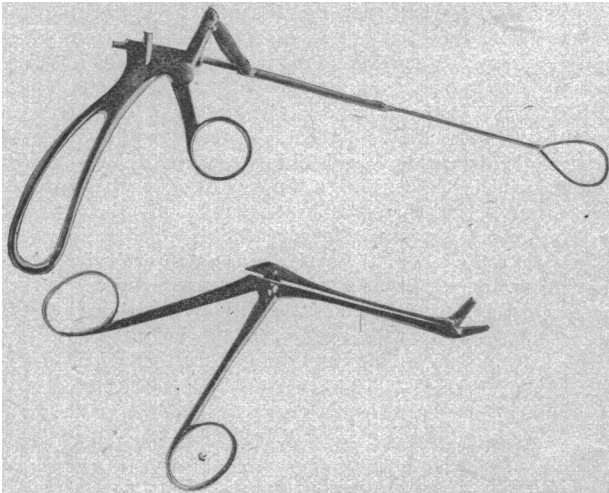


Fig. 2.—One-third actual size.

pus causes the obscure feeling of pressure of which patients with fairly open lower meatuses often complain.

Internal pressure fuses the existent pneumatic cells and gradually distends the bone, at the same time thinning the wall of the cell. The suppurative process in time dies out, the pus is absorbed and the cell is empty or it may contain one or more polypi which in no way differ in appearance or origin from the mucous polyp of the other parts of the nose.

In conclusion let me say, the removal of the middle turbinate is not always the easy operation it is when the bone is thin and dependent. Its base is often wide and the bone dense and a variety of instruments are required. Various modifications of Grünwald scissors and forceps and a good snare are necessary, and they must be mechanically correct or they will fail to work at a critical period.

I wish to call attention to a modified cutting forceps with angular blade which I have found useful, particularly in cleaning the ethmoid cells and edge of the hiatus semilunaris.

The snare, which is operated by a toggle joint, operates by pushing the canula over the loop instead of drawing the latter into the canula, which makes it easy to remove sessile growths and it is particularly suited

to remove posterior hypertrophies of the turbinals, which are usually so exasperatingly elusive. This snare will cut the turbinals very easily, and as it threads the loop like the Sajous snare it is very quickly made ready and very economically of wire.

I have been asked if the removal of the middle turbinate does not unduly expose the sinus openings to external irritants in the inspired air currents. It does not, and for the very good reason that the bulk of the air current does not pass into the upper chamber, as we have been taught.

All experimenters, so far as I have been able to learn, who sought to determine the direction taken by the inspired air in its passage through the nose, have blown the air through the nostril to the pharynx instead of drawing it through, as is the method of Nature. The result has been identical with the act of pushing a string through a hole, namely, to bend it in all sorts of directions instead of pulling it through, in which case it goes straight. The only correct way would be to attach a suction apparatus to the posterior naris and draw the air through, in which case the course would be in the line of least resistance, which would be by way of the lower meatus.

DISCUSSION.

DR. O. T. FREER, Chicago—Where the nasal fossa is of a high, narrow construction or is contracted by reason of a moderate septal deflection I have found that there is at times not sufficient room for the manipulations with scissors or cutting forceps necessary for the removal of the middle turbinated body, unless force be used in applying the instruments. In these cases I have successfully employed a heart-shaped spokeshave with the blade attached to the shank at an angle of 45 degrees. The blade is passed back into the nasopharynx and applied to fit over the posterior end of the middle turbinated body. Then, with a strong, steady pull forward, while the shank of the instrument is crowded upward and uplifts the cartilaginous external nose, the middle turbinal is cut away. Where possible it is well to sever the anterior attachment of the middle turbinal with scissors as a preliminary, as scissors can usually be applied here, even though there may be no room to use them further back. Lifting the external nose makes it possible to bring the spokeshave forward in nearly a horizontal line. The method seems crude, but really does with one clean cut what is accomplished by many with scissors, cutting forceps and snare. Where there is room for the latter instruments their accuracy of application makes them preferable.

I think that Dr. Baker has exaggerated the influence of intranasal suppuration in producing nasal mucous polypi. I think that we have all seen cases in which, before and after removal of polypi, there was no evidence of suppuration, and I think that in the majority of instances there is no purulent discharge visible in the nose. I can recall two cases of cyst of the anterior end of the middle turbinal, neither of which showed proof that there had even been any suppuration, and I think that simple cyst of the middle turbinal is rather more common than the suppurating cyst.

DR. EDWIN PYNCHON, Chicago—There is no doubt that nasal occlusion in child life is one of the most frequent causes of the coryzas and catarrhs we so often meet in years later. Suitable attacks on the hypertrophied middle turbinal will give drainage to the attic of the nose. The course of respiration has been proved to be normally through the upper part of the nose, hence, as soon as the upper part of the nose is stopped, the normal respiration is interfered with, so we get our catarrhal manifestations. As regards blowing the nose, I have been in the habit of instructing patients to stoop over the washstand and blow simultaneously through both nostrils, preliminary to the cleansing of one nostril after the other. The enlargement of the middle turbinal and the pressure resulting therefrom is a common cause of headache.

Asthma and hay fever are particularly aggravated by attic occlusion from middle turbinal enlargement. There is one point that I have been rather surprised not to find mentioned in the literature, and that is the invariable association of middle turbinal hypertrophy with atrophy of the inferior turbinal. I have found the best results in atrophic rhinitis to follow vigorous attacks on the middle turbinal so as to improve the ventilation and drainage of the attic of the nose. One very important thing in operating is not to substitute one evil for another, therefore we do not want to produce a synechia which will also cause occlusion. Consequently, a method of operation should be selected whereby the wound will be limited to the middle turbinal and whereby the mucous membrane of the septum will not be injured. The objection to the punching forceps, often used, is that the mucous membrane of the septum may be injured and a synechia follow. I have designed a trephine, whereby I can remove a piece from the anterior end of the middle turbinal both painlessly and bloodlessly. This trephine is different from the ordinary trephines and is very much longer. It is probably six inches long, including the hand-piece collar, and the projecting guard is perhaps an inch and a half long and projects about one-quarter of an inch beyond the trephine, being thin and flat, so it can always be passed between the middle turbinal and the septum, and thus serves as a protector of the mucous membrane of the septum. As the trephine enters, the guard projecting beyond its point acts not only as a guide but also as a guard, preventing the injury of any part that it is not desired to touch. By a slight up and down motion the core is detached and the trephine removed, leaving a hole in the turbinal into which one blade of a pair of shears may be introduced while the other blade is placed in the meatus beneath and an incision is then easily made with the shears. This leaves a loose piece, somewhat resembling a polypus that is horizontal instead of vertical, about which a cold snare is introduced, so the entire piece is removed. I will say I have found that there is more resilience in a certain kind of wire that is sold as the E guitar string wire. In regard to the snare, I have found the Bucklin snare to be the most satisfactory. It is a modification of the Wright snare. I have not seen the forceps mentioned by the essayist, but it has occurred to me if the blade that cuts upward was only a fenestrated blade, as in Dr. Myles' forceps, it would be more useful. I recently ordered such a pair from Europe, but when the order returned the forceps were not included. I have since learned that such forceps have been designed by Dr. Roe of Rochester, but I have not yet been able to secure a pair.

DR. G. V. WOOLEN, Indianapolis—I have noticed of late a very strong tendency to deal with the affections of the nose and head with a view to suppuration and empyema. One time we ran in the direction of microbes, and then we ran in the direction of suppuration. I have not heard anything about pressure irritation. I wonder if we have forgotten the classical paper by Dr. Lefferts, written in the eighties, in which he called attention to pressure irritation and defective drainage. When we take into consideration the nasal nerve coming down over the turbinates and septum, the form of the attic of the nose and the middle turbinal, the first thing, it seems to me, that we ought to think of is pressure irritation. Anybody who has had an attack of pain from a corn or bunion can appreciate it.

DR. KATE W. BALDWIN, Philadelphia—I have had one case of severe hemorrhage seven days after a turbinectomy. At the time of the operation a number of polypi were thoroughly removed, leaving the space free. There was almost no hemorrhage at the time of the operation and not until the seventh day, when it occurred after some vigorous exercise. It was as alarming a hemorrhage as I have seen in nose and throat work. There was so little bleeding at the time of the operation that I did not pack. At the time of the hemorrhage I was obliged to do so. A large polypus had come down, and I am not sure whether or not it was the release of it that caused the hemorrhage.

DR. EMIL MAYER—What was the age of the patient? Was there any constitutional condition, hemorrhagic diathesis, that

might account for it, or might there have been an arteriosclerosis?

DR. BALDWIN—The patient's condition was very poor, especially the mental condition. I think there were probably polypi in the sinuses, but I had no further opportunity to watch her. There was no hemorrhagic diathesis. The mental condition improved somewhat. The patient was 25 years of age.

DR. MAYER—The reason I asked the question was to determine if there was any arteriosclerosis, such as might be due to syphilis or something of that kind.

DR. ALLEN DEVILBISS, Toledo, Ohio—I wish to ask a question of Dr. Baker. I understood that he would hook his spokeshave over the growth and pass it through the mucous membrane and bone at one pull. Is that correct?

DR. BAKER—Yes, sir.

DR. DEVILBISS—I believe I have a good strong hand, but I can furnish some turbinates in which the Doctor would have to have a stronger arm than I have to do that. We could shave the soft tissues off in that manner, but it requires only a little resistance to stop a cutting edge against a hard surface. It is different if you can use a sliding motion, and it may be that the Doctor has some peculiar method of doing this.

DR. O. T. FREER, Chicago—I have resected both the inferior and middle turbinated bodies in this manner and have had no trouble in cutting through the bone in the cases that I have so far met. Ordinarily the turbinated bones are so frail and porous that they can be inflected with the finger and they offer thus but little resistance to the strong edge of the spokeshave. Where middle turbinectomy is done to give drainage of the upper nasal passages, the middle turbinated bone is often softened by rarifying osteitis, due to chronic suppurative inflammation. There is less trouble in cutting through the bone than in hooking the spokeshave over the posterior end of the turbinated body. This may be impossible of performance and the instrument may slip off, where tortuous nasal chambers displace it from the intended direction. I do not advocate the use of the spokeshave as an exclusive method for turbinectomy, but as a valuable resource where scissors, snare or cutting forceps can not be employed with satisfaction. In these cases it may do with one cut what otherwise could only be attained by tedious and painful manipulation.

DR. R. C. MYLES, New York City—I must confess it has been rather difficult for me to always tell definitely how far the middle turbinate is diseased. We have mechanical conditions that interfere with its functions and when those are relieved the middle turbinate recovers. That is chiefly true in cases of deflection of the septum. If the deflected septum is properly treated, the middle turbinate will return to its normal condition. Removal of the anterior half of the middle turbinal will relieve many cases of incipient empyema. Eight or ten years ago I described an instrument in the *Medical Record*, and from that time until now I have modified it, until I believe in all cases in which the septum is not deflected, and in many cases in which it is, it may be moved over sufficiently to introduce this instrument. Under cocaine and adrenalin the turbinal may be quickly and satisfactorily removed. I was forcibly struck by the elongation of the uvula in cases of quincy. It may become three or four times its normal length within a few days. This is because the quincy interferes with the venous return of blood. I have found that elongated palates, more or less chronic, may shorten up when the blood is allowed to return through the venous channels. I believe much is due to the stasis of blood circulation. We find it in arteriosclerosis, and in syphilis and in polypi. When the antrum of Highmore is opened and free ventilation is secured one will find that polypi and edema will frequently disappear, because the pressure has been removed and the irritating material drained off.

DR. P. J. GIBBONS, Syracuse, N. Y.—In the removal of the middle turbinate, I have often found we can make a mere perforation, if necessary, and it will make a cracking sound as if you punctured the shell of an egg, and then you can use the instruments more readily. I have seen the anterior portion of the middle turbinate so dense that the electric

drill, revolving 2,200 to even 3,200 revolutions per minute, would not touch it. I would like to speak of the total removal of the middle turbinated bone. You should not remove it entirely except when you can not possibly help it. The posterior part, if possible, should be retained. If the turbinate presses on the septum, crush it, if necessary, as you do in craniotomy for the removal of a child. An article by me appeared in the *New York Medical Journal* of July 9, 1892, on the treatment of nasal stenosis by means of a new intranasal tube. I called it a new intranasal tube because Hippocrates and later Galen used intranasal tubes. Dr. Baker called attention to asthma. In one part of my article I say: "In the tube we possess a valuable device, and with it, in conjunction with medicinal and operative treatment, we can cure diseases that we were unable to cure in the past. This is true, especially in asthma and hay fever, which, I believe, can positively be cured by one or more of the drugs which we now possess, or by operative interference, or by using the tube, or it may be necessary to resort to two or even the three measures combined to cure some of the cases we meet."

I think the opening of the anterior part, either with the drill and the removal of part of it afterward, or by some other method, is better than the total removal of the middle turbinate. If you ever want to make a new instrument for nose and throat work and want to know whether there is any like it made, it has been said that all you need to do is to write to Dr. John Roe, and you will probably find that he has made the same thing a number of years before.

DR. W. S. ANDERSON, Detroit—I want to make a plea not to destroy more than is absolutely necessary in the removal of the turbinals. Only in a very few instances is it necessary to remove more than the anterior portion. It is possible, in many cases, to make an incision with a small knife through the mucous membrane, push it up, remove the anterior portion of the turbinal, drop down the flap of mucous membrane over it, and thus save the mucous membrane. There is too much of a tendency to unnecessarily destroy tissue. By being careful one can often save the mucous membrane, which is so often destroyed. The results, after the saving of the mucous membrane, are more satisfactory and prompt and the irritable scars are largely avoided.

DR. J. A. STUCKY, Lexington—I wish to protest against the crushing process for the removal of the turbinal. I have frequently found an osteitis following the use of this method. I would like to refer to the use of Dr. Holmes' little scissors. With them you can cut off an enlargement with a single cut while you would be adjusting a snare, and in this way take off two turbinates while adjusting the wire around one.

DR. GEORGE L. RICHARDS, Fall River, Mass.—I think an examination of the skulls here will show the portion necessary to be removed is the anterior portion, and if you use the spokeshave that is practically all you can remove. That is the operation I almost invariably do, only I do not do it with the spokeshave, for the removal of the anterior third is usually all that is necessary. Beside, I think a part of the middle turbinated is important in olfaction.

DR. B. A. RANDALL, Philadelphia—The essential basis of much of this work depends on the question of how we breathe and what is the respiratory tract of the nose. It is remarkable that such a matter should still be a matter of dispute. The failure definitely and finally to answer this seems to depend largely on the work of such men as Harrison Allen, who made very few mistakes, but who, because of study of comparative anatomy and the anatomy of the lower animals, was led to believe that we have an olfactory tract above and a respiratory tract below. Dr. Baker seems to take the same view. If you will take a few grains of magnesium powder and dust it in the air before the patient with normal, tidal breathing, and then find any of it, as drawn in and deposited on the mucous surfaces, below the level of the middle turbinate you will very much surprise me. The lower nasal meatus is not the respiratory but the drainage channel. You can, in this manner, very easily convince yourself that the upper olfactory tract is the respiratory tract of the nose. It is a pity that the matter is not clear in the minds of every one.

Dr. Baker's admirable ecraseur observes the only proper indication in that the cannula moves forward over the snare. I mention this because others may have only the other kind of snare, such as the Jarvis, and will find that it will slip off if the loop is drawn. But it is perfectly feasible for us to push forward the cannula over the snare, when we use any of those snares, and avoid all slipping.

DR. C. R. HOLMES, Cincinnati—I have made a crude sketch here. Some of you have probably read my article on the removal of the turbinated bodies, particularly the inferior turbinated, and in that is pictured also the manner in which the scissors are introduced. And, by the way, I wish to state that they are usually not made correctly. Meyrowitz does make them right, but I have seen some not made correctly. If they are too long they will fracture. I have had Meyrowitz thicken the point a little and strengthen it so that they answer better. I have had occasion to see how a little lack of knowledge in the use of an instrument may cause the condemnation of the instrument. I let my first assistant remove a turbinate. He is an able man, who has been with me for three years. I noticed him having some difficulty, and finally he said: "Doctor, that is too hard; we can not cut it." I found he had taken the middle turbinate in the middle of its body. The object of the scissors is to get up near to the wall, and that is the reason they are made in this shape. A pair of scissors has been made by another gentleman, that work at right angles, but they do not seem to me so applicable. By taking hold of it with a pair of forceps, after using the scissors, or, if necessary, following the scissors with the snare, we can readily remove the turbinate. Many a man, however, does excellent work with a clumsy instrument, because he is familiar with it. I would say it is advisable to buy the smaller size of these scissors, because they usually are sufficient. Dr. Randall has called attention to the fact that the air does rise and go through the upper passages. The air passes along the upper passages of the nose, and if you have obstruction there you must remove it. At the time my paper was written I had made 1,500 turbinectomies, and I have made 2,000 since then, but they were not all middle turbinectomies by any means.

DR. EMIL MAYER—I would like Dr. Holmes to make it a little clearer that two instruments are used, a right and left, and that the instrument is suitable for the middle turbinated but not for the inferior turbinated.

DR. HOLMES—Yes, that is true. For the removal of the inferior turbinated I prefer an instrument made by Betz.

DR. G. HUDSON MAKUEN, Philadelphia—When you are standing, the air passes naturally upward, and it would have to go almost at a right angle to get through the inferior passage of the nose. I have accepted Dr. Reynolds' explanation without having tried the experiment, for it seems to me that is the natural course for the air to take.

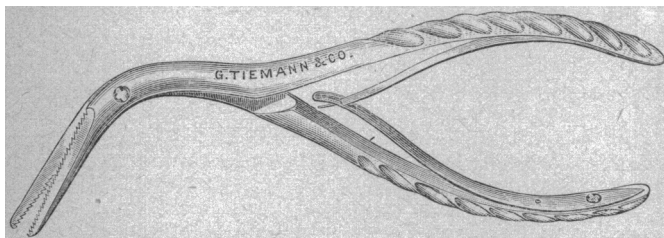
DR. HOLMES—Those who are interested in that subject will find that the experiment has been made. Cadavers were used and the inside of the nasal passages painted with iodine and powders of starch were used, with the cadavers in both the standing and sitting position.

DR. G. MCAULIFFE, New York City—The inspiratory currents experiment, etc., quoted by Dr. Randall were mentioned in a French magazine some 8 years ago. Since then I have been interested in studying the middle turbinate. It is surprising how often we will find collapsed inferior turbinates with troubled respiration due to the encroaching middle turbinate. We then find it is usually the turgescence of the mucous membrane which it is necessary to treat. By snipping off the mucous membrane of the anterior end of the middle turbinate, we can relieve the symptoms of impaired respiration. The statement of Dr. Randall that the powder is not found on the inferior turbinate will be explained by the fact that the air enters the nose in eddies. The eddies started up by the slow inspiration carry the powder to the roof. There is no doubt that some of the air passes across the surface of the inferior turbinate. The quick expiration goes more through the inferior meatus. All the treatments that have

done any good have been those in which the space of the middle meatus has been enlarged. By enlarging the space in the middle meatus we relieve the stagnation of secretion and the difficulty of inspiration that these patients complain of.

DR. J. C. BECK, Chicago—Two points I would like to make. In regard to the enlargement of the middle turbinate, nothing has been said about the effect of a large middle turbinate on the tear duct. After turbinectomy, you will find it stated that secondary hemorrhages, due to infection, may occur, where the proper cleansing of the nose is not attended to after operation. This is hemorrhage due to infection.

DR. IRA J. DUNN, Erie, Pa.—It seems to me appropriate to present these scissors, which I have found more satisfactory in nasal operating than any I have been able to find in the stock of the instrument makers. It was only after thorough search and failure to obtain scissors that would cut on the point strong enough to go through bone if necessary and still leave room for observation that these were devised. They only represent the best ideas of others. They are very strong, the blades are straight and compact, giving all possible room for observation. The hand is well out of the way of vision and situated so that, if necessary, a powerful grasp can be made. The edges are serrated, so that they do not slip back, but go cleanly through any tissue, cutting by one closure what is with difficulty accomplished by other scissors by a number of cuts. With more or less blood present, as is usual, several



cuts necessitate making a ragged and bruised surface. They enable one to cut off the posterior portion of a turbinated which otherwise usually has to be snared, because they do cut clear to the point. I hope they may be found useful by some of the members of the Section.

DR. CHARLES H. BAKER, Bay City, Mich.—I purposely omitted the method of removing the turbinal, because I described that at length in my paper, read last year, in which I credited Dr. Holmes' instruments. Dr. Holmes has said that the base is not always of a thin lamellar character, and sometimes the scissors may be used with difficulty. In those cases I have found the Gruenwald instruments and, particularly, the angular one which I have devised, very useful. I frequently find it advisable to remove the whole body of the turbinal. The polypi often occupy the posterior upper portion of the middle turbinal and you can not see them until you have removed the bone. That will explain the frequent failure to cure nasal polypi by persistent removal. I will acknowledge that I have sometimes secured the cure of polypi in this way. Failure is due to the polypi sometimes being out of sight, in the way I have described. Anatomically, the tear duct has no relation with the middle turbinate, since it opens behind the lower turbinate. As to synechia, they occur when you have not removed sufficient tissue or can not keep the patient under observation long enough to know that healing is complete before he passes out of your care. The trouble with the spokeshave is that you are trying to remove a curve by cutting on a straight line, and you often will not remove the entire body if you use the spokeshave.

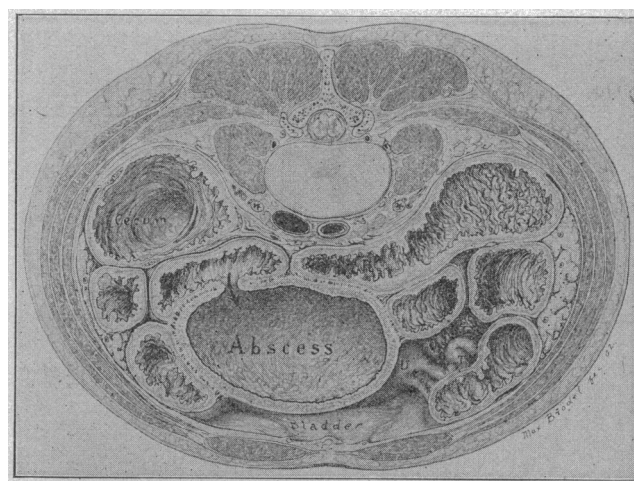
Age Limit Fixed by Dentists.—In the November *Digest* we stated that factory inspectors in Illinois were enlisting the aid of dentists to tell by the teeth the age of children who seemed too young to work in factories. There is now a bill before the Illinois legislature providing that no factory owner shall employ a child who can not produce a certificate from a dentist showing that he is over 16 years of age.—*Dental Digest*.

TYPHOID FEVER WITH PERFORATION OF THE BOWEL AND RECOVERY.

T. K. HOLMES, M.D.

CHATHAM, ONTARIO.

Miss S., aged 30, of good family and personal history, was attacked with typhoid fever Oct. 6, 1900, and the disease pursued a mild and favorable course until October 26, when she was seized with agonizing pain in the abdomen accompanied by severe shock. I saw her half an hour later and found her temperature 96, pulse 150, skin cold and wet and altogether presenting the symptoms of perforation. The nurse had given a hypodermic injection of morphin $\frac{1}{4}$ grain, and strychnin $\frac{1}{20}$ grain. Dr. J. H. Duncan saw the patient with me and we deemed it inexpedient to operate on account of her desperate condition. The strychnin and morphin were repeated at varying intervals to control the pain and sustain the heart, and normal salt solution was transfused beneath the skin every 12 hours, a quart being used each time. Tympanitis, which had been absent, soon became excessive, and vomiting was almost



Pelvic abscess due to perforation of a typhoid ulcer. A transverse section of the body just above the pelvic brim. Small portions of the bladder, uterus and of the left tube and ovary are seen, but the major portion of the pelvis is occupied by a large abscess. The intestinal loops are everywhere densely adherent to it and at the point indicated by the arrow is an opening between the loop of the small gut and the abscess. The omentum also was adherent to the surface of the abscess.

incessant for 24 hours. For ten days the patient was sustained entirely by rectal enemata. On the tenth day the bowels moved spontaneously, the bloating subsided and the stomach became tolerant of small quantities of peptonized milk.

Recovery after this occurred gradually, but when the bloating and tenderness had sufficiently subsided to permit examination a hard mass could be felt below and a little to the left of the navel, and could also be detected by pressing the finger through the vagina in the same locality. The mass was very hard and no fluctuation could be detected at any time. During the winter she gained slowly in strength, but her pulse never became normal and there was a slight rise of temperature toward evening.

In April, 1901, I consulted Dr. Cullen of Baltimore as to the propriety of operating on the patient, and asked him to perform the operation. This he did May 9, assisted by Dr. McKeough and myself. On vaginal examination a distinct mass could be felt occupying the pelvis, but not lying very low. On making an abdominal incision the intestinal loops were found adherent to the surface of this mass, which almost completely filled the pelvis. They were separated with considerable difficulty. In liberating one of these adhesions, evidently at the point of rupture, a perforation fully 2 cm. in diameter was found blending with the wall of the sac. This opening was closed with a continuous silk suture and reinforced by a second one. Further intestinal loops were freed, but it was impossible to remove the sac. The sac was punctured and about 700 c.c.