The upper part of the cavity had exactly and minutely resembled that of a radical mastoid performed by experienced hands, showing Nature's approval of that proceeding. Findings similar to mine at this operation occur sometimes, but sufficiently rarely, I think, to be worth while reporting.

# SOCIETIES' PROCEEDINGS.

## PROCEEDINGS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

*Niagara Falls, Canada, June* 1, 2, 3, 1915.

(*Continued from p.* 489.)

**Observations Upon the Intra-nasal Exenteration of the Ethmoidal Labyrinth in Pansinuitis. — Harris P. Mosher.** — The speaker detailed the fundamental points in the anatomy of the ethmoidal labyrinth, describing the anterior cells, the naso-frontal duct, the unciform cell, the posterior ethmoidal cells, and the superior nasal spine.

After mentioning Hajek's and Ballenger's operation, he then described his own method, as follows: The anterior end of the middle turbinate is first removed. The initial plunge of the curette into the ethmoidal labyrinth is best made by disregarding the agger nasi cell if it is present and going higher on the superior overhang—that is, the extreme upper part of the middle turbinate and a little further backward. If the curette does not really break into the labyrinth, it should be carried a little higher and a little further back. Finding this point may bother the beginner. Once in the labyrinth the curette is turned and swept forward until it strikes the posterior surface of the ascending process of the superior maxilla. Then it is turned so that it faces posteriorly, and by backward and downward sweeps the unciform process, the ethmoidal bulla and its cells are opened. The cavity so made in the anterior part of the ethmoidal labyrinth is cleared of fragments by using a small round tonsil punch. The operator is now ready to probe for the naso-frontal duct and to enlarge it by sounds, rasps and burr.

In a great majority of instances the ascending process of the superior maxilla is a guide to the naso-frontal duct, so that a probe slipped upward along its posterior border finds the sinus. In the small percentage of cases where this fails the duct can be found by carrying the probe backward to the limit of the roof of the operated cavity and then bringing it forward with the point turned outward. Only as a last resort should the point be turned inward.

The second part of the operation: The head of the patient is held so that the cribriform plate is level, and it is kept so. The curette is now plunged through the attachment of the middle turbinate and carried backward to the outside of the middle and superior turbinates to the front wall of the sphenoidal sinus. This is firm and stops the instrument with a dull and sometimes with a sickening thud. The face of the

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curette is now turned downward and the bowl and shaft forced through the bottom of the ethmoidal labyrinth. This generally leaves the posterior half of the middle turbinate dislocated and hanging. The middle is removed by snare or conchotome.

The lower two-thirds of the inner wall have now been removed. The upper third of this wall is left as a prominent antero-posterior ridge, composed in front of the middle turbinate and behind of the superior turbinate. As much of the turbinate ridge as possible should be removed. The amount of the ridge left at the end of the operation determines the thoroughness of the exenteration. Whenever there is an appreciable ridge left there is a chance to remove the inner wall of one or more of the posterior cells. It is especially important to get this remaining portion of the inner wall of the labyrinth removed posteriorly, in order to do away with the inward bulging of the labyrinth which so obscures the nasal face of the front wall of the sphenoidal sinus. For this purpose the round tonsil punch is very convenient. The sinus is now evulsed or laid bare as needed. Finally, the inner surface of the os planum is curetted from behind forward. Packing over night is advisable.

The writer does not consider, that an ethmoidal case is ever free from the liability of a recurrence. While the writer has had no deaths, such have been recorded, and there is always danger in ethmoidal operating. The method of removal of the nasal spine appeals to the writer, provided the anterior ethmoidal cells are dealt with at the same time. In all chronic cases of antral disease the writer prefers opening the canine fossa to the intra-nasal route.

**The Frontal Sinus.—Opening it Through the Nose.—Otto T. Freer.**—The intra-nasal frontal sinus operation has been developed in the last ten years, and principally by E. F. Ingals, Max Halle, Segura, Vacher, H. P. Mosher, P. Watson Williams, and Herbert Tilley. Freer's article is based upon their work and original observations.

*Anatomy.*—The frontal sinus outlet or ostium is bounded in front by the crista nasalis interna, internally by the expanded portion of the anterior superior nasal spine of the frontal bone, externally by ethmoid cells lying between the ostium and the lacrymal bone, posteriorly by the anterior ethmoidal cells, which extend from the ostium posteriorly underneath the orbital process of the frontal bone and are completed and roofed by it. Removal of the ethmoidal cells thus forming the portion of the sinus floor behind and external to the ostium, gives a space for drainage greater than that created by cutting away the internal nasal crest forward with rasp or burr, while the opening is more likely to remain permanent. It may, however, be necessary to cut away both the cells and the crest to open the sinus sufficiently.

*The Operation.*—This usually begins with the severing of the anterior attachment of the middle turbinate or with resection of its anterior half, if necessary. In some cases a projecting middle turbinate may be left intact. If needed the uncinate process is next cut away with the Freer sharp septum elevators to expose the bulla ethmoidalis fully to view. With a ring curette, whose edge is directed forward and obliquely upward and inward against the bottom of the bulla, the bulla is entered and the curette is made to sweep away the anterior ethmoid cells from the bulla forward and upward to the ascending process of the superior maxillary bone, and, if possible, to the sinus floor, breaking through the latter and entering the sinus behind the crista

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nasalis interna. If the sinus floor prove too hard to give way to the curette, an especially devised probe curette is passed through the sinus ostium after the way through it has been found by an ordinary probe, and the probe curette is made to cut its way out of the sinus through the ethmoid cells under the orbital plate of the frontal bone, thus enlarging the ostium posteriorly, so that a larger curette of the same form may be passed up into the sinus to clear away all of the cell remnants under the orbital plate and in the pathway down into the nose from the sinus, this pathway lying between the lamina papyracea of the ethmoid bone and its turbinal wall. If necessary, the ostium is enlarged forward also with a straight burr driven by the dental engine. The preference is, however, given to posterior enlargement, because of the tendency to the post-operative formation of obstructing cicatrices in the region of the crista nasalis interna.

It is unsafe to curette inward in enlarging the frontal sinus ostium, as there is danger of entering the cranial cavity through the wall of the fossa olfactoria, especially if a torus olfactorius, as described by L. Onodi, exists.

In cases where the suppuration continues in marked degree after the intra-nasal operation, while the sinus remains open for intra-nasal drainage, the external operation must be resorted to. Where great swelling of the lid, exophthalmos or cerebral symptoms indicate the existence of caries of the sinus wall and progress of the disease beyond it in the form of sinuitis frontalis exulcerans (Killian), the intra-nasal operation should not be attempted.

**Chronic Pansinuitis Associated with Systemic Infection.—George E. Shambaugh.**—Both cases occurred in young women. One case was caused by a diseased tooth; the cause of the other case is not clear. In both, every accessory sinus on both sides was involved. Intra-nasal operations succeeded in curing the infection in all the sinuses except the frontal sinuses in one case, while in the other even the frontal sinuses are apparently healed. In one case an attack of acute articular rheumatism occurred, apparently from the focus in the sinuses. The opening of a large posterior ethmoid cell and the neighbouring sphenoid sinus was followed by a disappearance of the rheumatism. In the other case a severe chronic arthritis, involving every joint in the body, occurred as the result of a severe acute articular rheumatism which followed an acute exacerbation of the long-standing sinuitis. This case was subject to recurring attacks of acute exacerbations, associated with fever and increased pain in the joints, until by persistent efforts apparently the last focus of pus in the sinuses was drained. Since the sinuitis has been cured there has been an absence of acute exacerbations, but the inflammatory process in the joints is undergoing fibrous changes, resulting in increased rigidity of the joints.

Dr. Harmon Smith: I have here an instrument which bears on the treatment of the conditions under discussion. It works along the line of creating a vacuum, and while there is a vacuum, lactic acid bacilli are injected. The syringe is loaded with lactic acid bacilli in a solution of argyrol, enzymol, or any other preparation. By means of the syringe the solution is forced into the sinus. A bicycle pump may be employed to create the vacuum. The instrument can be used at home, and should be employed two or three times a day. Subacute and chronic cases have all improved under this method of treatment.

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Dr. THOMAS HUBBARD: Referring to Dr. Coffin's method, I have one criticism to offer concerning the actual amount of negative pressure used. The statement that he used so many pounds of negative pressure is absolutely incorrect, because the mucosa will stand not more than four or five pounds. This can be determined exactly if measured by a manometer. Three or four pounds is my experience. There is more or less hæmorrhage from five pounds of negative pressure.

HENRY L. SWAIN: The idea of Dr. Wilson's paper is in line with what I have always held. If the ciliated membrane of the cells can be preserved, better results will be obtained than would otherwise be possible. The less the traumatism the better. I had the pleasure of seeing two of the cases mentioned by Dr. Coffin, and the exhibition of the method on the patient. I learned a great deal from the demonstration. I saw him treat a man into whose nose I could easily see. The patient had lost his septum, and it was possible to see into the sphenoid sinus. Everything was very open and apparently clear. I could see no secretion at all, yet Dr. Coffin got out a tube half full of secretion. It was not only serous matter, but pus as well, and was coloured with iodine which had been introduced two or three days before. In the case of the woman there was some pus along the floor. This was all sucked out. At the present time the right side of the face transilluminates better than the left. The effect of the Bulgarian bacillus will be proved by time. The applicability of the apparatus has been demonstrated. I was called upon to treat a case of acute antrum disease in a man who had a round opening in his septum. By going in on the opposite side I could use small tubes or probes, and could flush out the antrum through the natural opening. I could look in through one nostril, put the tube in, and flush out perfectly well.

JOHN F. BARNHILL: Two years ago I saw Dr. Mosher's specimens and his method of operating at that time, and I have employed the method since, with very good results. The limitations can be well marked out, and that is what makes Dr. Mosher's method safer than some of the others. The Ballenger operation is dangerous unless the bone is soft. Where the bone has been softened by the polypoid masses, and where the cells are filled with polypi, the Ballenger method is excellent. Until the posterior retaining wall is reached the operator is within the field of safety. So, then, we are working within a bony capsule, the limitations of which, unless too diseased, will give the sensation of where we are working. In the absence of these limitations, the Ballenger knife is useful.

CHARLES W. RICHARDSON: In the Mosher operation I have met with one complication, which I am surprised that others have not met—the possibility of entering the antrum. There is danger unless one is very cautious in making the downward stroke.

E. FLETCHER INGALS: The Mosher operation for the ethmoid seems to me in every way desirable. However, it has not appealed to me to leave the middle turbinated body until the end, unless the posterior cells are also involved. I prefer to take off the anterior portion of the middle turbinate, as it gives a better view. In acute cases of frontal sinuitis the Mosher method is admirable for opening up the sinus. The intranasal method of opening the frontal sinus which I devised several years ago has answered my purpose better than any of the methods described, giving 90 per cent. better results in chronic suppurative frontal sinuitis. In acute cases I cannot get the probe in. The instrument which I use is 6 mm. in diameter. I have had four or five cases in which

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I could not pass it the whole distance. I would get in half way, and be unable to go farther; I would then pass in the burr. The probe prevents one from doing any harm. If it is merely the frontal sinus that is diseased, this method gives all the opening that is necessary. In 90 per cent. of the cases the patients get well just as rapidly as they would from any of the more severe operations. There is no use, as a rule, in making an opening of more than 2 mm. in diameter.

Lewis A. Coffin: I employ a method modified somewhat after that of Mosher. He goes in with a curette, I go in with a chisel. I know by a slight tap whether I am on solid ground. There is a big safety space of about half an inch. I make an up-and-down incision with the chisel, then bear upward toward the median line, and at that point introduce Luc's forceps. I take out all I can. Three bites and I am looking into the sphenoid. There is very little hæmorrhage; I have never had to pack a case. It may be necessary to clean up with angular forceps and curette, but to me this is the easiest way.

William E. Casselberry: In the earlier years I employed the Hajek method; of late I have adopted various methods. I have followed Mosher's plan, and I have used Coffin's method, except that in all these methods I first remove the anterior end of the middle turbinated body. That which is left of the turbinal is sufficient as a guide, without having the anterior end in the line of the light and shutting off the view. It has been stated by Watson Williams and others that the upper wall is so rich in lymphatics and blood-vessels that there is danger of the communication of sepsis to the brain. That statement has deterred me several times from making my operation as complete and thorough as I wanted to make it in order to enter the sphenoid. I have also found this turbinal plate very hard and difficult to get through. In certain instances I have felt it almost impossible to get down on a level with the sphenoid wall in order to do the classical Hajek operation and the Mosher operation. I have thus been obliged to leave quite a ridge projecting down.

Dr. Wilson, closing the discussion: We do not know much about the lymphatics of the upper part of the nose; most of our knowledge is theoretic. If we inject the subarachnoid space of the brain we can pass dye into the olfactory nerve. We know that the olfactory nerve is surrounded by lymphatics, but we do not know that by injuring the olfactory nerve we will communicate sepsis to the brain. Anatomists teach that it is dangerous to subject the olfactory nerves which come out from the cribiform plate to injury; further than that we do not know.

Dr. Coffin: Answering Dr. Hubbard's remarks about the amount of pressure; the gauge is graduated, but how I do not know.

Dr. Mosher: I am sorry to have added to the nomenclature, but the term "agger nasi" seems to me to be the better for the cell at the ensiform curve than "lacrymal" or "infundibular." The selection of a method of operating upon the ethmoidal labyrinth is a personal matter. The danger of working in the extreme upper and anterior part of the middle terminal has been mentioned by Watson Williams, and also by Freer. The higher one goes the greater the danger. Two patients died from meningitis, as I said in the paper. I do not see why the rasp is more dangerous than the burr. For the last year I have removed the anterior end of the middle turbinal, as a routine procedure. As to opening the antrum, as suggested by Dr. Richardson: The amount of

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overhang varies greatly. In extreme cases the overhang in front is great. In many cases of frontal sinuitis the antrum is already infected. One also runs the risk of infecting it by taking off the unciform process, as the inner wall of the antrum is opened as soon as this is removed.

Dr. Otto T. Freer: Quite a number of years ago Holbrook Curtis gave a description of an intra-nasal antrum operation in which he used trephine and burr. I modified this operation. In the course of ten years I have had unvarying success in opening with the trephine and burr. I have had complete recovery in some sixty cases of antral suppuration. Most of them got well as soon as there was an opening in the lower meatus. It is not always necessary to resect the anterior turbinated body. The trouble with the Ingals operation is that you get a beautiful opening at first, with a tendency to contraction. Whether I use the Ingals burr or another method, I think his tube may be a valuable aid in keeping an opening. Referring to Hajek's operation, it cannot be denied that he has done a large amount of work since 1905. He has enough cases now to speak authoritatively. He has another flap operation which should be studied. He objects to the rasp on account of the danger of breaking down everything and inducing meningitis. He works with a burr which I have used, and have found to be a safe instrument. Hajek is absolutely right in regard to his burr. The cutting forward is apt to be followed by contraction. I did not object to the term "agger nasi cell," but I did object to the term "uncinate cell."

George E. Shambaugh: The question raised by Dr. Casselberry with reference to the danger of setting up meningitis holds if the wrong method is followed in operating upon the ethmoid. Taking the whole mesial plate of the ethmoid, and pulling and tearing off pieces, will lead to extension which will eventuate in meningitis. That should be left alone, and work be confined to the labyrinth. The labyrinth itself has no communication with the intradural space. As to the use of the rasp: I do not push and pull down, but use it gently. Used properly, it is not a dangerous instrument. It is unfortunate when everybody tries to use different terms for the same anatomical structure. Most anatomical terms are fixed by the anatomical nomenclature. The term "infundibulum" is used incorrectly. "Infundibulum ethmoidale" is the term used by the Nomenclature Congress at Basle. Another term which we have been using wrongly throughout this discussion is the synonym for inflammation of the sinus—"sinuitis," which has been incorrectly called "sinusitis." We might as well get into the habit of using correct terms.

## THE AMERICAN LARYNGOLOGICAL, RHINOLOGICAL, AND OTOLOGICAL SOCIETY.

*Meeting at Chicago, June 15 and 16, 1915.*

**Technique of Suspension Laryngoscopy, with Lantern Slides and New Instruments.—Robert Clyde Lynch.**—Dr. Lynch presented his modification of the suspension apparatus of Killian, with the latest improvements which he has devised to overcome difficulties encountered with the older models. He described the technique as now employed by

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