I believe that many obscure headaches have their origia in some one or more of the accessory cavities of the nose, and that relief can only be obtained by intelligent examination and treatment of the same. The above case is presented as an illustration of a headache which could not possibly have been cured without an operation.

PERSONAL EXPERIENCES WITH EMPYEMATA OF THE FRONTAL SINUS.¹

By GEORGE L. RICHARDS, M.D.,

OTOLOGIST AND LARYNGOLOGIST OF FALL RIVER UNION HOSPITAL, FALL RIVER, MASS.

At the present moment the therapy of frontal sinus affections is one of the much discussed and still unsettled problems in rhinology. During the last ten years various methods have been proposed, enthusiastically commended, and then allowed to drop more or less into disuse. These have varied from the simplest to the extremest methods of operation within the nasal canal, and from simple opening and prompt closure externally to the present much-advocated, very radical procedure of Professor Killian. As a contribution to the general subject the writer begs leave to offer for the consideration of this Association his own personal experiences in empyemata of the frontal sinus, together with some deductions from these experiences, and some observations as to what he regards as the probable future trend of operative procedure in this locality.

While the number of cases presented is not large, and while it is unsafe to reason too much from too limited experience, it is hoped that the deductions may have some value. The cases are reported somewhat in detail, the exact operative procedure being described rather than named after anybody in particular.

In his address at Atlantic City before the American Medical Association, 1904, Professor Logan Turner stated that what was really needed at the present time was an accurate report of the chronicity of the cases, the number of cases affected, the surgical method employed in operating, the treatment of the wound, and the results obtained as regards cure, relapse, the amount of disfigurement produced, and the fatal issue. As a contribution to such a qualified investigation I offer the present cases.

At the outset a certain amount of differentiation of cases must be made. I discard entirely that large group of acute inflammations of the frontal sinus which occur perhaps more and more often as accompaniments or sequelæ of grip, which may or may not be

¹ Presented as candidate's thesis, American Laryngological Association, Atlantic City meeting, 1905.

accompanied with purulent exudate, and which recover promptly under simple nasal treatment, sometimes with, sometimes without, removal of the anterior end of the middle turbinate.

The chronic cases of empyemata may also be divided into two classes: first, those in which the reasonable persistence of intranasal therapeutic measures has brought about success; and, second, those which, after the persistence for a reasonable time of such intranasal therapeutic measures as we have at our command, are still uncured or not sufficiently improved, and in which an external operation seems imperatively demanded.

Of the first group of cases the following four are examples:

CASE I. *Chronic inflammation of the left frontal sinus.*—Retired sea captain, aged seventy years. This case was referred to me on account of a great deal of mucopurulent discharge of long standing from the left nostril in a man of far from robust health and subject to attacks of heart difficulty.

There were numerous polypi in the left nostril, which were removed, leaving behind a steady discharge of foul pus in the middle meatus, with bare bone in the region of the frontal sinus outlet. Exploratory incision was made into the antrum, but there was no pus. I was able to pass a cannula directly into the frontal sinus after cutting away some diseased tissue in the region of the outlet with the Grünwald cutting forceps. The middle turbinate as a whole was not removed. The quantity of pus diminished, the odor gradually grew less, and the patient's general condition better. The sinus was syringed out every other day with 1:8000 corrosive sublimate. On one occasion this syringing made him dizzy, requiring an hypodermic of strychnine and morphine before he was able to go home.

The discharge steadily diminished, and on April 1, 1902, he having come under observation on November 26, 1901, there was absolutely no pus discharge and he felt perfectly well. He was seen occasionally from this time until December 10, 1903, and at no time was there any sign of discharge from the nose or any trouble in the sinus.

This case shows what can be done under apparently difficult conditions even with a foul purulent discharge. I was not allowed from start to finish to do anything but the mildest kind of operations such as could be done with a snare or a few strokes of a cutting forceps, yet, to all intents and purposes, this patient was as perfectly cured by treatment within the nose as he would have been by any external operation. Three years have now elapsed without any return of the trouble. I have recently seen him and he remains in good health. There has been no nasal discharge since the cessation of treatment.

CASE II. *Subacute inflammation of the right frontal sinus.*—Mrs. W. H., aged twenty-six years. First seen January 28, 1903. Had

history of pain in the head following grip three months ago, with a discharge from the right nostril for five weeks. Complained of pain in the right side of the head and soreness above the inner angle of the eye. Pain was very much worse when leaning over and of a throbbing character. There was pus in the right nostril. The middle turbinate was crowded against the septum and against the hulla so that the space for drainage was very poor. Could not probe the sinus. Provisional diagnosis of subacute empyema of the right frontal sinus.

The next day removed anterior portion of the right middle turbinate in order to get better drainage. The pain over the right eye soon diminished, and in a few days she was quite comfortable. The pus discharge continued, gradually diminishing. I was able to carry the cannula up into the sinus and syringe it out, but only with the greatest difficulty.

Two months later there was still discharge from the nose in spite of daily treatment. It was difficult to wash out the sinus very successfully, and I thought the only cure would be by means of an external operation, which I advised but which was refused. A few days after this I removed the rest of the middle turbinate and was able to get farther up toward the opening to the frontal sinus, but its washing out was only fairly successful, owing to a very narrow passage.

As, however, the patient refused any external operation and the discharge slightly lessened, and as the infundibular opening was gradually enlarged so that various solutions could be carried up into the sinus, the idea of an external operation was given up, and on May 19th there was apparently a cure of the sinus condition and the case was dismissed. Six months later there was no apparent difference on transillumination between the two sinuses, and no sign of trouble in the nose. At the present time, a year and a half later, there has been no further trouble. Her husband, however, reported to me that following an acute cold this winter there was a little sinus pain, which soon disappeared.

In this particular instance, although there has been an apparent cure by intranasal methods, I think it would have been better surgery to have opened externally, as I think there is a likelihood of a return of the trouble after an attack of grip or any acute infective disorder.

CASE III. *Chronic inflammation of the right frontal sinus, with acute exacerbation.*—Dr. E. E. R., aged forty-five years. Has a history of several times in the past having what was called severe neuralgic pains of the right side of the head, right eye, and region of the right sinus. At one time gave up his work for nearly an entire year, not having any relief at all until after three or four months in the summer in the dry air of the highlands of New Hampshire, after which he was free from this pain for several years. While travelling in a

sleeping car recently, March 12, 1904, was taken with severe pain in the region of the right frontal sinus. Had no relief from treatment. Had to give up his work, that of an active physician.

Examination of the nose showed the right middle turbinate engorged, so much so that adrenalin did not blanch it. No pus was visible. The right middle turbinate was at once removed, giving some relief to the severe pain. Could enter the sinus with a probe. The pain greatly diminished until, four days after seeing him, was able to wash out the right frontal sinus through a cannula, removing a considerable quantity of mucopus, with immediate relief of all the symptoms. Washing was continued, and at the end of a week he was well and has continued so to the present time.

This was one of those cases of severe involvement of the frontal sinus in which, if the removal of the middle turbinate can be promptly done, the sinus drained, and relief of the engorgement brought about, a cure will be effected without further operative procedure.

CASE IV. *Subacute inflammation of right frontal sinus.*—A. S., aged forty-four years, designer, came on April 12, 1904, complaining of great pain over the right eye, which he thought was due to trouble with his glasses. The oculist reported that they were all right. All nasal structures on that side congested. Treatment, nasal irrigation.

April 14th. Pain has been almost continuous. Unable to sleep. I at once removed the middle turbinate on the right side. After the operation was able to pass a curved cannula directly into the right frontal sinus, washing out some thick purulent debris.

15th. In spite of the pain which followed the operation and the necessity of wearing a cotton tampon, has had a better night than for weeks. Washed out the frontal again. April 16th, washed out the frontal sinus. No further pain over the eye.

19th. Tried to go to his work, but gave it up and went to bed. Some reaction evidently following the operation. Washed out the sinus, but no pus. From this time on the nasal discharge entirely ceased. He had an attack of acute rheumatism, for which he went into the hospital, but there was no pain in the region of the frontal sinus, and when seen the last time, on May 12th, there was no discharge and he was perfectly well.

This was a case of subacute inflammation of the frontal sinus with an acute exacerbation in which the prompt establishment of free drainage cured the case. It is also one of those cases which, improperly diagnosed, tends to go on to a chronic condition with constant pus discharge.

The following group of cases belongs to Class II.—viz., those which remain uncured or insufficiently improved after faithful use of intranasal measures, or in which, for urgent or other reasons, intranasal measures are manifestly not indicated,

CASE V.—Mrs. G., aged thirty-five years, seen October 17, 1899, on account of severe headaches. Examination showed pus in each nostril with polypi. The polypi were removed and then each middle turbinate.

December 15, 1899, the right frontal was opened externally at the inner angle of the eye underneath the supraorbital ridge. There was fluid pus but no granulations. The opening was extended down into the nose; the external wound was treated as an open wound for two weeks and then allowed to close, at which time the probe passed easily into the nose from the right sinus. There was improvement of the pain but the pus discharge continued, and later complaint was made of pain over the left sinus. This was then opened in the same manner and the right one reopened. The two did not communicate. The opening into each nose was made larger with good-sized curettes; iodoform gauze wicks passed through, followed in a few days by good-sized rubber drainage tubes passed clear into the nose and retained for four weeks. The wound was then allowed to close externally. The patient's general condition was much improved, although some pus discharge continued, varying more or less in amount.

A few months later the sinuses were again operated on and larger drainage tubes kept in for several weeks. There was improvement as before, but the pain returned again some months later and the discharge, which had never stopped, became worse, so another operation was done July 27, 1900. This time the incisions were made above the supraorbital ridge. It was found that the right sinus, except at its most dependent portion, was completely closed with osseous growth as the result of the former operation, but there was pus in the left sinus.

For something over a year the condition was not very troublesome, but November 8, 1901, on account of throbbing pain and some pus discharge, the sinuses were each opened at the most dependent portion of the inner angle of each eye; found nearly closed with bone, the trouble being mostly at this time in the cells in the dependent portion of the sinus. All of the ethmoidal cells which could be reached were curetted and destroyed. The rubber tubes were inserted and retained five days, followed by silver tubes worn for three weeks. She was seen occasionally for some months, then I observed that there was an empyema of the left antrum. This was due to infection, as on previous occasions both antra had been found free from pus.

On July 23, 1902, a radical operation for the empyema of the antrum was performed through the canine fossa, followed by rapid healing; the antrum at the time of the operation containing considerable granular debris. After this was done she was not seen for a year, during which time she became pregnant and had a normal labor. At this time nothing special was found

in the nose, although she still claimed to have more or less pus discharge.

On July 12, 1904, she was examined. There was a little mucopus in the nose, but she was practically well and in good health, all the pain having disappeared.

On April 11, 1905, re-examined; both frontal sinuses apparently obliterated. There was a little dried scabbing in the floor of the nose, due apparently to atrophic conditions. Probe detected bare bone in the right sphenoid; left sphenoid could not find the opening. The patient's general condition good. This case is a cure so far as the empyemata of the frontal sinuses are concerned. It is doubtful whether all of the ethmoidal cells are in a healthy condition.

Criticism. This was a case of extensive ethmoiditis with involvement of each sinus, and later infection of the left antrum from the sinus. My early operations were without doubt incomplete. Not having been followed by complete obliteration of the sinuses, there was continual reinfection until, as a result of the many operations, a final cure was effected. The early operations were too timid and the openings into the nose were not large enough nor the infected ethmoidal cells thoroughly destroyed. The sinuses were not extensive in area, and had complete obliteration, by packing, been attempted, a cure would no doubt have been effected much earlier.

CASE VI.—Mr. F. W. N., aged thirty-two years, milkman, resident of Martha's Vineyard. Seen in November and December, 1898, for polypi and pus discharge lasting a long time. The polypi were removed with so much improvement that he did not present himself again for a year, at which time the pus was still present and the polypi had recurred.

The middle turbinate was removed, and under ether January 12, 1900, I made an opening into the right frontal sinus at the inner angle of the eye, making an incision in the ridge from the supraorbital foramen to the nasal process of the superior maxilla. The opening into the sinus was made at about the mediate point of this incision, around the inner angle of the eye. The sinus was filled with free-bleeding granulation tissue, all of which was curetted out, and the opening enlarged so as to get free drainage into the nose. A wick of iodoform gauze was carried down into the nose, followed with rubber drainage tubes, and at the end of two weeks, the sinus being apparently in good condition, the external opening was allowed to close, and the patient returned home.

He was seen once or twice afterward and then not again for something over a year, when he reported that there was some pus in the right antrum, easily blown out when the right cheek was uppermost. He was not seen again for a year when, January 7, 1902, he reported that there was some discharge from the nose in winter. Examination showed no pus presenting at the frontonasal

canal, but a little bare bone could be felt with the probe, and there was no doubt but that the sinus was not perfectly healed.

April 10, 1905. This patient has just been re-examined. There is no sign whatever of pus in the nose, and he states that there has been no discharge from the frontal sinus so far as he knows for five years. Two or three times in the winter he has had a little sense of pain in the right maxillary sinus, followed by a discharge of mucus and mucopus, quickly stopping. This would apparently be due to a mild attack of inflammation of the maxillary sinus to which reference has already been made as having occurred in the past. Transillumination of both frontals was done, the right frontal showing almost entire obliteration, the left frontal extending high up on to the forehead, with two or three septa plainly visible. Transillumination of the two antra showed each one perfectly free, so that at the present time a perfect cure of all the accessory sinus trouble has apparently occurred.

Criticism. This was another one of the cases in which, viewed in the light of later events, I think that complete obliteration of the sinus should have been attempted at the original operation, and that presumptively the small amount of pus remaining, with the possibility of colds and inflammatory action in the nose, very likely infected the maxillary sinus. As, however, the patient was dependent upon his daily labor for existence, and as he lived where he was practically inaccessible, it seemed as though the less radical operation would probably answer, and this has in fact occurred, as with the lapse of time a perfect cure has resulted.

CASE VII.—L. J., student, first seen April 5, 1899, when sixteen years of age. Brought on account of fear that he had tuberculosis. Had had a cough for ten years. One sister had died of tuberculosis and he had spent the previous two years in Colorado and New Mexico. Was unable to find any tubercle bacilli in the lungs, but micrococcus tetragenus aureus and streptococci were abundant. Under treatment the chest conditions improved. During this time he had an acute otitis media in both ears, relieved by incision. Was under my care at intervals for a year, during which time I removed a few polypi from the right nostril, and a year later, June 27, 1900, recorded that the nose was running a good deal. There was some discharge apparently from the left frontal sinus. Transillumination did not show any very well-defined shadow. He was relieved by washing out the nose with hot Seiler's solution, which treatment he continued on his own account. About this time he entered Brown University, completing his course there in about three years.

From June 27, 1900, to May 29, 1903, I have no record in regard to him, though I saw him occasionally. The lung conditions had very much improved. At this time he came complaining of discharge from the nose, which he said had continued more or less for

several years. Examination showed pus in the nostril, and exploratory puncture demonstrated it in each maxillary antrum. These were washed out at intervals and numerous polypi removed. The right middle turbinate was also removed. Diagnosis of empyema of frontal as well as maxillary sinuses, and operation advised.

On June 17, 1903, he was operated on in the hospital, the left sinus, the left antrum, the right sinus, and the right antrum all opened. Pus and diseased mucous membrane and polypoid degenerative material was found in each cavity, the antra being practically filled. The frontal sinuses were opened at the inner angle of the eye, underneath the supraorbital ridge, the greater part of the front wall of each being cut away, while the frontonasal canals were each enlarged sufficiently to take a large drainage tube, and the adjacent ethmoid cells curetted. The entire mucous membrane of each sinus was curetted out. The sinuses did not communicate and were of ordinary size both as regards extension upward and outward. A large drainage tube was carried down into the nose from each sinus. Each maxillary antrum was opened through the canine fossa; all the diseased mucous membrane curetted away, and a large counter opening made underneath the floor of the nose. All the cavities were packed with gauze.

The after-treatment was uneventful so far as the maxillary sinuses were concerned. The gauze was kept in fifteen days and then not replaced. A gutta-percha obturator was kept in each antral opening for about two weeks afterward. Then they were allowed to close. There has been no further trouble from them. The opening underneath the inferior turbinate has continued to the present time.

The frontal sinuses at this time were granulating in a healthy way and were being allowed to close in, gauze dressings being retained, the tubes having been removed about ten days after the operation. The gauze put in was saturated with balsam of Peru. At this time I was taken ill with typhoid fever and did not see the case again for nearly three months, during which time he was under the care of a colleague, who allowed the openings to close up. When I saw the patient they had broken out again at the surface, and the right one, he said, had never entirely healed. Both were curetted. The left one had a very little superficial pus. The right one showed some soft bone under the supraorbital ridge and some thick pus with some polypoid tissue at the nasal outlet. Gauze drains were replaced.

October 24th, three weeks after, both sides were closed; the right nostril was discharging a little pus, the left none. November 18th, a month later, there was a little accumulation of pus from the right sinus. December 24th, the left middle turbinal, which had not been previously removed, was taken out and a polypus from the region of the right frontonasal canal.

February 2, 1904, the right sinus broke out again with slight pus discharge, but the probe followed only a narrow track. Did not find much of a cavity. Opening into the nose still patulous. Cured.

May 9, 1904, reported that he had some mucus discharge from the nose, but did not find any source from which it came. May 28th found several small polypi in the right infundibulum and just a suggestion of pus. Cured a little. Some anterior ethmoidal cells not wholly cured.

July 15, 1904, pocketing of pus had again occurred on the right side. On opening was able to pass a probe through a small opening down into the nose. The left sinus remained completely closed. Remnants of the right sinus were very small. Cured thoroughly. Washed down into the nose with pyoktanin solution, and allowed to close again in the hope that complete obliteration would this time take place.

At present, September, 1905, the sinuses are apparently well, but there is occasionally a slight mucoid discharge from the ethmoid region, for which I have recently removed several of the anterior ethmoid cells, and regard him as practically well. No appreciable scar remains as the result of the operative measures.

Criticism. As the sinuses in this case did not extend upward or outward beyond the ordinary average limits, and as the external wound could have been kept open sufficiently long for the obliteration method, I think this case would have done better if, at the time of the original operation, the opening down into the nose had been made larger, the anterior ethmoidal cells cured more vigorously, the bone opening continued lower down, cutting away a portion of the nasal process of the superior maxillary, and then the external wound maintained by gauze packing until complete obliteration had taken place. This was in my mind to do, but unfortunately my own illness prevented, nor had I at that time become so thoroughly convinced as at present of the absolute necessity of obliterating the sinus in order to prevent a recurrence. Nevertheless I believe that a cure has finally occurred.

CASE VIII.—G. F., aged twenty-six years. First seen June 21, 1899, having developed a frontal sinus trouble as the result of trauma, he having been injured in a railroad accident. The exact nature of the trouble was not discovered for some time, the case having first been reported to me as a case of atrophic rhinitis with a foul discharge. Was treated by the usual washing methods for a while, with opening through the canine fossa made with motor drill. The pus continuing in spite of pretty free drainage from the antrum, the question of frontal sinus trouble came up. He was seen by Dr. Leland, who thought the frontal sinus involved and advised an operation on the sinus. He was complaining a good deal of headache, which seemed to be due to the frontal sinus trouble.

On June 19, 1900, the right frontal sinus was opened at the inner angle of the eye. Pus was present but not in large amount. There was no odor and very little granulation tissue. Sinus area extended up about one-half inch and outward one and one-half to one and three-quarters inches from this point. The opening down into the nose was enlarged and a large-sized piece of gauze wicking put in. The right maxillary antrum was then freely opened through the canine fossa above the place previously opened and filled with gauze. The frontal sinus opening was packed with gauze two or three weeks, the gauze being followed by a small gold tube, which was worn for two or three months. Its removal was followed by complete closing of the frontal sinus opening, the sinus being completely obliterated.

This was in July, 1900, and there has never been any reopening of the frontal sinus, nearly five years having now elapsed. There has been occasionally a little bit of mucopus in the antrum, and he has insisted all these years on maintaining a small opening from the mouth into the antrum, which he washes out once or twice a week. I have not been able for some three years to demonstrate any pus in the antrum, but he feels better if he can wash out the antrum occasionally, and now and then imagines that he has a little pus. Practically, however, the case has remained perfectly well for the last four years, and the frontal sinus has never broken out.

In this instance, with a comparatively small sinus and rapid formation of granulation tissue after the operation the gold tube seems to have worked as well in maintaining the opening and to have been rather more comfortable to wear than the gauze. One reason for the good result may have been due to the fact that infection was secondary to antrum trouble and there was not extensive involvement of neighboring ethmoidal cells.

At the present time there is no appreciable scar, close search being required to determine the site of the operation.

CASE IX.—O. M., aged seventeen years, spinner. First seen February 11, 1902, at which time she complained of a nasal discharge and pain in the region of the right frontal sinus. Gave a history of the discharge from the right side of the nose for one year with pain in the right side over the right eye. Examination showed pus in the right nostril, coming from high up in the nose. Probe detected bare bone in the infundibular region. Transillumination was negative. Probable diagnosis of empyema of the frontal sinus made.

February 15th removed the entire middle turbinate on the right side. Diagnosis then positive. Could pass the cannula into the sinus and syringe out the pus.

On March 5th was operated on at hospital for empyema. Incision made beneath the supraorbital ridge at the inner angle of the eye. Periosteum laid bare. Bone darker than normal; thin over the

sinus wall; opened; pus and granulations; no odor. Enlarged the opening; removed the granulations. Enlarged the opening into the nose so that a fair-sized rubber drainage tube was easily passed into the nose. There were no symptoms pointing to antral trouble, so the antrum was not opened. There was no connection between the two sinuses. The area of the frontal sinus was not excessive, not going very high above or outwardly.

Treatment in the hospital uneventful. Occasional slight temperature rise for a few days. Dressing changed on the third day for the first time. New tube put in on the seventh day. Left the hospital on the twelfth day, at which time the drainage tube was still in and the pus discharge very slight. The tube was removed a few days later, followed by gauze in the external opening. Pus discharge almost stopped, but not entirely. From this time until May 3d the nose and the external wound were washed out every other day, the external wound being practically closed in.

As there was still some pus from the nose, I punctured the right antrum and found pus, and on May 7th, two months after the first operation, again put her in the hospital and did a radical antrum operation. There was some pus but not much degeneration of the mucous membrane. A large opening was made into the canine fossa with a counteropening underneath the anterior end of the inferior turbinate. This was packed with gauze. The frontal sinus was again curetted. At the external wound there was no pus, but there was more or less rather poor granulation tissue. The opening was packed with gauze. Slight rise of temperature after the operation, but hospital record practically negative.

On May 15th the communication between the sinus and the nose had closed. There was some pus discharge from the frontal sinus wound around the gauze, but it was granulating and filling in. May 20th there was no pus in the nose from the frontal sinus. On May 24th the frontal sinus wound was still discharging a little pus. She was given chloroform in the office, and some low form of granulation tissue recuretted, and instead of the gauze I put in a curved silver tube, carrying it down into the nose preparatory to letting the cavity close.

The antrum wound had had the gauze dressing continued and had done perfectly well. From May 27th to June 5th there was no apparent pus from either cavity, and the case, being apparently cured, was discharged.

On August 28th, three months later, she returned with the opening in the frontal sinus broken out, small accumulation of pus causing some oedema in this region. Under chloroform skin incision was made, the opening down into the nose found with the probe, and the cavity packed with gauze. The dressings were then done every other day, and on September 9th there was apparently complete healing, and the case was again dismissed.

Two months later she was again seen. There had been no trouble. Not seen again until ten months later, June 2, 1903, when she returned with a small area of pus presenting from the right sinus. Chloroform was given and the pus evacuated. It seemed to be in the surface only. The sinus was apparently obliterated and the probe did not go any distance. A gauze drain was put in, and on June 9th there was apparently complete healing. Case has been well ever since and there is no deformity.

Criticism. In this case the antrum was probably infected from the frontal sinus, and the diagnosis of the antrum trouble should have been made coincidentally with the diagnosis of the trouble with the frontal, and both operations should have been done the first time providing there had been pus in the antrum.

With reference to the treatment of the frontal, in which there was a recurrence of trouble in the granulating area on three different times, this should have been treated by the method of absolute obliteration with gauze drainage from the start, and the opening into the nose should have been made sufficiently large so there would be no likelihood of that closing during the period of granulating above. So far as can be seen, a perfect cure resulted with complete obliteration of the sinus, but the time required seems to me to have been longer than it should have been.

CASE X.—Mrs. E. S., aged forty-six years. Came on account of catarrh on April 10, 1903. Examination of the nose showed numerous small polypi around the anterior end of each middle turbinate. These were removed, and on April 15th the right inferior turbinate was removed. She suffered greatly from inability to sleep. April 25th several polypi had come down from the ethmoid region where the turbinate was snared off.

May 15th some pus from the frontal sinus. Washed out without difficulty. Probable diagnosis of old empyema of frontal. The sinus was washed out for a number of days and the infundibular region curetted of polypoid tissue. The pus lessened in amount but continued. The antrum was opened exploratorily but no pus found.

On June 17th the right sphenoid sinus was opened and cleaned out with a curette. The walls were rough, but no apparent pus. On June 24th the right frontal sinus was opened under ether. It was small in area with soft anterior walls, filled with pulpy mucous membrane, which was removed entire, the opening into the nose enlarged, large drainage tube inserted, and the sinus cavity packed with gauze.

The after history is uneventful with the exception that on July 7th, two weeks after the operation, she complained of seeing double. The affected eye could be rotated in every direction, and I was not conscious at the time of operation of injuring the pulley of the superior oblique. The double vision gradually lessened, and on

November 28th had entirely disappeared and she was perfectly well. This case has been recently seen and there has been no recurrence. The opposite side, which had shown some polypi, has ceased to trouble her, and there is no pus discharge or any trouble whatever.

Criticism. In this case the anterior bony wall of the antrum was so soft as to break away easily under the use of a curette, hence extraordinary care should have been taken when in the region of the pulley of the superior oblique. This is the only case of double vision which I have seen following frontal sinus trouble.

CASE XI.—W. G., aged twenty-nine years. First seen March 22, 1903, on account of pus in the right nose and right ear. Said to have followed an attack of grip. There was an otitis media purulenta with perforation.

The right nostril was filled with polypi and there was a constant pus discharge. Exploratory puncture into the antrum showed the presence of pus, and the case was treated by washing methods. The polypi were removed, after which it was possible to probe the frontal sinus and wash out through a cannula. The frontal sinus was irrigated daily with a great deal of care, and this method of treatment carried on an entire month without much if any improvement, except temporarily. Radical operation was then advised.

The right frontal sinus was opened underneath the supraorbital ridge on the right side. Pus immediately welled out in considerable quantity. The opening was enlarged. The sinus itself was very large, extending clear over to the left side as far as directly above the supraorbital foramen on the left side, and quite a distance up on the forehead. I thought at first there was a communication between the right and left sinuses, and was on the point of opening the left sinus but did not do so. Cleaned out considerable polypoid tissue in addition to the pus. Opening into the nose enlarged and drainage tube inserted.

A radical operation was then done on the antrum. It was found partly filled with large polypoid masses, some of them of considerable size. The usual counteropening was then made into the nose. He was kept in the hospital two or three weeks. Had more or less pain and swelling of the eye.

At this time I was away for three weeks, when he was under the care of another physician. Both cavities had been washed out daily. This was on May 16th. Examination showed the antrum apparently nearly healed. The frontal sinus had a silver tube in it. Opening down into the nose still present and of fair size. Examination showed a very large sinus going away over the left side.

Decided to open the left sinus for fear that the two sinuses communicated, and if this were not done some pus pocket might be left which would cause trouble in the final healing. On May 17th the left sinus was opened under ether. Could not find any communi-

cation whatever with the right one. This sinus was very small and quite limited in extent, communicating freely with the left nostril. The mucous membrane was pulpy, detached at one place, and on pulling came away entire. Made a good-sized opening into the nose. This sinus promptly healed by the obliteration method, and has caused no trouble since. The other sinus continued to discharge a little. The patient, however, went back to work. Felt perfectly well. Gold tube was kept at the external angle of the wound, and he was seen by me once or twice a week.

October 24th, had been at work through the summer, but reported at this time on account of some pain in the left eye. The opening between the two divisions of the sinus had closed, and pus had accumulated in the left side. This portion of the sinus was curetted as thoroughly as possible under ether, and gauze drain put in.

For the next two or three months there was slight discharge. Various things were used for syringing and the discharge became small in amount. Still there was always a little. During the following spring solutions of pyoktanin and boric acid were used to wash out the cavity, and under this the discharge became almost nothing. The opening into the nose continued, and on January 30th, at the meeting of the Eastern Section of the American Laryngological, Rhinological, and Otological Society, he was seen in consultation with Dr. C. G. Coakley, who thought that permanent cure would not be reached until every particle of mucous membrane was removed, which could be done best, in his opinion, by taking off the entire front plate of the sinus. It might be attained by opening up through the already obliterated left sinus. As, however, the patient was in good condition, able to labor, but unable to afford the time to give up work, it seemed to me doubtful if any further operation was then advisable.

From this time for the following four or five months the discharge was almost nil. Four, five, or six days would elapse without any, and then there would be a little at the angle of the eye. Examination with the probe on June 15th showed the sinus to be apparently closed on the left side, but there was still some hare bone to be filled in the region of the supraorbital foramen on the right, and the probe passed readily down into the nose. Curetted toward the outer portion of the cavity to the right and a drop or two of pus came out. Removed a couple of polypi from the nose. At this time I used the pyoktanin in powder form, blowing it into the cavity.

From July, 1904, to December, 1904, he was seen by me only three times. On December 14th he reported there had been no pus discharge for an entire week. The probe did not hit any hare bone. There was almost no trouble in the nose. Up to the present time an occasional polypus had formed at the nasal outlet of the frontal sinus opening.

There has been no discharge of any account since December. Recent examination (September, 1905) shows small external opening into right sinus, which is to be closed by suture. The portion of the sinus leading to the left side obliterated, or else, which is more probable, division wall grown up so there is no communication. Right sinus much smaller. Opening into the nose easily found with a probe. No discharge of any amount and no polypi.

Criticism. This is one of the cases where, in the light of subsequent history, either an entire resection of the front wall of the sinus ought to have been done at the time of the first operation, or else at the time the second operation of the left frontal sinus was done, this should have been opened clear up so as to throw the cavity of the right and left into one, thereby giving better access to the cavity of the left sinus. The entire treatment consisted of drainage only, and as I was unable to remove the entire mucous membrane at any one operation, the case can hardly be called an absolute cure, even though for the last year or year and a half there are practically no symptoms. Should he have an acute infection or an attack of grip or something of that sort, I think this sinus is liable to be reinfected, and although I have an apparent cure, I can hardly report this case as an absolute cure. At the same time the patient, who was very much run down physically when first seen, is strong and well and hearty, and has had no pain or discomfort from the sinus for more than a year.

CASE XII.—Dr. C. First seen January 27, 1904, with a history of illness for several weeks and a left-side nasal discharge, for which his physician wished me consulted. Examination showed creamy pus, coming apparently from the left frontal sinus, perhaps from the antrum as well. Transillumination showed extreme darkness as compared with the opposite side. There was some darkening over the left antrum. Exploratory puncture, however, showed the antrum to be clear. Nose was washed out for several days, giving some relief, and February 8th he had an acute otitis media, for which the drum was incised and gauze drainage used. There was some mastoid tenderness, but recovery from the ear trouble occurred without real trouble with the mastoid.

The sinus was washed out with pyoktania solution for one or two weeks. Soon after this pus appeared to come from the right frontal sinus as well as the left. Both middle turbinates were then removed. The discharge from the sinuses diminished but did not disappear.

April 15, 1904, decided to do a radical operation. Opened the left frontal sinus by curved incision between the root of the nose and the inner line of the eyebrow. There was no fluid pus but a pulpy condition of the entire mucous membrane. Sinus in area about the average, not running up on the forehead to any great distance, though farther on the right side than the left. The entire mucous membrane was pulpy, thickened, and everywhere diseased. Re-

moved it entire with thorough curetting. Underneath the membrane the bone seemed hard and sound. Just above the root of the nose was a small opening about 3 mm. in diameter communicating with the opposite sinus, and through which it is probable that the left sinus infected the right, although there seemed to be no direct communication between the two membranes. After thorough curetting of the interior, the probe was passed down into the nose and this opening enlarged to carry good-sized rubber drainage tube. It was fastened above and below and the cavity packed with gauze.

The right sinus was then opened in the same way, the front wall, however, was very much thinner on this side, and the periosteotome easily penetrated the sinus when engaged in stripping the periosteum. On incision through the mucous membrane of the sinus, fluid pus was found to fill the sinus. This sinus extended quite a way over the eye and also above much farther than on the left side. The entire mucous membrane was curetted out and removed, and the opening down into the nose enlarged as before and drainage tube inserted. The bony opening between the two sides was then enlarged and gauze placed between. Each cavity filled with small strips of iodoform gauze.

The after-history of this case is uneventful. It was kept packed with iodoform gauze, soaked at intervals in balsam of Peru, and changed every day or every other day, and on August 12, 1904, the case was dismissed, complete healing having taken place. The point which filled up last, and which was in the end the most annoying, was the small bony septum between the two sides, to which the granulations did not seem to attach very well, probably because of its insufficient blood supply, and I regretted that I had not enlarged the opening between the two sinuses more. This is the only criticism I have to offer on this case. Healing up to the present time has been complete, and the patient, who had suffered from various vague head symptoms for many years, is better than he ever remembers himself to have been before.

CASE XIII.—M. B., aged twenty years. First seen with nasal symptoms on March 2, 1900, at which time some pus presented from underneath the left middle turbinate and two small polypi were removed from this space. Probe was carried up into the frontal sinus. Transillumination showed opaque left antral region as against lightness on the opposite side. Pus was very apparent in the middle meatus. Diagnosis made of pus in the antrum, perhaps in the frontal.

March 7th was operated on under ether, a radical antrum operation being done. The antrum contained pus and soft, pulpy mucous membrane. This was entirely removed and the usual counteropening made into the floor of the nose. Frontal sinus not opened. The healing of the antrum was uneventful, but after this occurred

there was some pus still apparent in the nose, which did not disappear after syringing, and on April 23, 1900, the frontal sinus was opened underneath the supraorbital ridge at the inner angle of the eye. The bone was very thick. Pus abundant and very foul. Rubber drainage tube carried down into the nose and maintained for some time.

On May 14th the cavity had been allowed to close, trusting to nasal drainage. On June 8, 1900, there was a drop or two of pus exuding through the wound, so that a small curette was put in. Cavity curetted and packed with gauze. Healing of the external wound promptly took place, and I did not see him for some time, but on August 7, 1900, he complained of pain. Could not find any sign of pus in the external wound or nose. Seven days later, however, there was some sign of pus externally. This was curetted. Gold tube placed in for drainage and the probe carried down into the nose, readily finding the remnant of the opening made for the tube. Tube was maintained as long as possible, but the latter part of August the opening had closed, and September 19th, the case showing a tendency to continually reopen, he was again etherized. The frontal sinus recuretted thoroughly. Some soft bone found. The opening into the nose reopened and enlarged and the whole packed with gauze. By October 25th the opening had nearly closed, gauze having been kept in continuously, and the opening was allowed to heal up.

On November 8, 1900, the wound broke out again. There was a small amount of pus present. The whole area of softened bone again curetted. Small piece of gauze inserted. November 17th and 22d drop or two of pus found in each instance, and the latter time was able to carry the probe clear down into the nose. Syringed some peroxide through. The opening again allowed to close.

December 3d pus again found in considerable amount in the upper portion of the frontal sinus. Curetted again. Piece of gauze put in. December 10, 1900, under cocaine, curetted the upper portion of the frontal sinus over against the dividing line from its fellow of the opposite side. Put in gauze drain again. Washed out every day for the next month. December 29th no pus found in the sinus. January 15, 1901, a drop or two of pus showed in the angle of the wound. Frontal was again opened with the knife. On February 11, 1901, there was apparently complete cure.

For the next three years there was no sign of pus or trouble or anything of the kind. The young man went to the College of Physicians and Surgeons, New York, to study medicine, where early in April, 1904, having had no trouble whatever for three years, he was taken with an attack of grip while on ambulance service; had pain and signs of pressure over the right eye in the region of the scar of the former operation. He was put in St. Luke's Hospital, New York. Incision made. Some pus found. This incision was

allowed to close, then reopened, and fistulous opening had been maintained for three weeks at the time I saw him.

This was on May 20, 1904, at which time examination showed a fistulous tract, very narrow at the soft parts but leading into a wider, but not very large, cavity in the bone, apparently not communicating with the nose, of limited area, and very painful to the touch. Managed to curette a little. Enlarged the opening sufficiently to get a tube $2\frac{1}{2}$ mm. into the opening. Curetting of this area was very painful. It was evident that no healing was going to take place from the bottom until the external wound was enlarged and the drainage improved.

He was put into the hospital and again given ether. Reopened along the incision of the New York operation. Dissected up the periosteum. Found the surface bone soft, the sinus obliterated on the periphery over toward the eye, but at the centre soft and containing punky, purulent material. No fluid pus. Cut away the bone almost the entire length of the sinus outwardly as far as over the supraorbital foramen, but not injuring it. Just about the centre of the forehead found one cell containing a little pus. At first I thought this cell led into the right sinus, but it only led to the median partition, which was a little to the right of the exact centre. Then dissected downward, opening one large cell leading to the nose, which contained more or less soft material. Almost the entire front wall of the sinus was taken off, leaving a little bit overhanging so as to retain the ridge. A large opening was made down into the nose and all ethmoidal cells destroyed, and a large size gauze wick was put in. Apparently sound bone left everywhere. Compared with the preceding operation of three or four years ago the sinus was smaller, showing a portion of it to have filled in with solid bone. The centre had evidently remained open and had been reinfected through a small tract, probably from the nose, which opening had not been obliterated.

The after-history of the case is uneventful. There was some pain and photophobia, but no iritis. Cavity was kept firmly packed with iodoform and balsam of Peru gauze, the external opening being maintained until absolute obliteration took place, which, so far as is known, is the case. On September 10, 1904, there was apparently complete healing. There was no discharge from the nose. The sinus was completely closed in. Twelve months have since elapsed without any further trouble. As in all of the other operations there was repeated breaking out of pus from the external wound, and as there has been none this time since discharged, I feel that the case has been completely healed.

Criticism. This case illustrates very well the necessity of complete obliteration of the sinus, as there had been on previous occasions two apparently complete cures after the two former operations, and after the last no recurrence for three years. As,

however, the centre of the sinus had not been entirely obliterated and there was still some communication with the nose, there was a chance for reinfection, which took place. The mistake which I made in the earlier instances was in allowing the external wound to close, so much so as to be unable to work through it satisfactorily without being satisfied that every bit of the centre was filled with firm bone before so doing.

CASE XIV.—Mrs. B. Patient seen by Dr. S. on January 13, 1905, complaining of pain in the region of the right eye and right frontal. Next day right eye bulged very much forward. Next day bulging still the same. Pain rather diminished. Considerable pus discharge. Seen by Dr. J., an oculist, who thought the condition was probably frontal. Seen by me on January 16th. Examined carefully in bed. Slight frontal sinus tenderness; no pus in the nose; right eye protruding very markedly. Deemed it advisable to open the right sinus as an exploratory measure.

Admitted to the hospital. Temperature normal; pulse 68. Opened sinus in the internal angle under the ridge. On opening found some grumous-looking pus, not especially great in quantity, which welled forward but was apparently not under much pressure. Entire sinus did not extend very much upward, but a probe easily went down in the region of the orbit and behind it. Enlarged the bone incision with cutting forceps so as to take away a portion of the nasal process of the superior maxillary. Made large opening into the nose, which opening was apparently closed, as a probe would not go through it at first. Extended bone incision upward, and removed major portion of the anterior sinus wall, curetted out the entire mucous membrane, which was degenerated. Found that there was a good-sized opening into the opposite sinus at about the root of the nose. Opened the left sinus in a similar manner, making incision through the opening downward about as far and upward toward the notch of the supraorbital nerve, but not as far as this. Good-sized opening made into the nose, large enough to admit very large curettes. Scooped out all the degenerate mucous membrane. Packed both sinuses with gauze.

January 19th. Dressing not done for three days. Temperature has been normal. Practically no pain. On removing the dressings no sign of pus. Eye has gone backward to its natural position to quite a degree. Is not yet quite normal.

22d. Changed the dressings. Not much attempt at healing as yet.

27th. Some pus discharge on the dressings, which have a little odor at the end of two days. Right eye has resumed nearly its natural position. The only swelling seems to lie in the partition between the two sinuses curetted. There is free drainage into the nose. Patient has normal temperature; is feeling well.

28th. Is beginning to form granulations on the floor of the sinus all around. Sinuses do not extend upward a great distance. Cut

away small amount of bone with the Kerrison forceps. Patient's general condition all right.

March 31st. Considerable degree of filling in has occurred. Sinauses now very much smaller. Do not extend outwardly more than half an inch from the external opening. Right one extends upward a short distance. Left one practically filled except for the centre. Eye apparently normal.

June 24th. Left sinus entirely filled, right one open about the size of a large pea, still communicates with the nose. Now filling rapidly. Patient has been at work for several weeks. Scar on the left side inconsiderable.

July 15th. Complete healing; only slight scar.

While the treatment in this case lasted a considerable length of time, from the middle of January until the last of June, which length of time might be considered as a fair criticism of the method, it must be remembered on the other hand that each sinus was of large extent and that complete obliteration has been obtained without scarring to any extent.

The case which follows was of peculiar interest to me because it is the only one I have ever seen in which the empyema of the frontal sinus produced an external fistula. It also shows that a considerable degree of relief and comfort and, from the patient's standpoint, almost a cure can be brought about by merely improving the drainage.

CASE XV.—W. F. T., aged sixty years. Came November 26, 1904, on account of a sore in the external nose about midway between the bridge and the angle of the eye on the right side, which was discharging pus. This had lasted for several months. He had been treated by two ophthalmologists for abscess of the tear duct. Examination with the probe showed this space to have no relation whatever to the tear duct but to lead upward into the frontal sinus and downward into the nose. Was able to syringe directly from without into each cavity. Examination of the nose showed the whole condition to have been due to a polyp or hullous-like formation of the anterior end of the right middle turbinate, obstructing the natural outlet from the sinus. The sinus was washed out several times through a cannula. The anterior end of the right middle turbinate was then removed, and as the symptoms were disappearing he did not wish any radical operation done.

December 3d. Rewashing of the sinus brought away dark mucus, but the fluid pus seemed to have disappeared for the time being, and the external wound had healed, although the probe easily traversed the region around the sines. There was more or less bare bone around the opening from the external nose. Radical operation was urged but he did not feel as though he could afford to lie up for permanent operation.

January 31, 1905. The external wound seems to have permanently healed. The discharge now comes entirely down through the nose and he is having no conscious trouble with it. The case is by no means cured, but as it is not troubling him any he declines to have anything more done.

Careful examination of the case showed that he had presumptively had a chronic sinus trouble for a good many years, the pus discharge being denominated as merely catarrh, and up to the point where the internal drainage was interfered with and the pus broke through externally, he was not conscious of much if any trouble. This case illustrates the fact that many persons will stand a pus discharge from some one of the accessory sinuses without being conscious of very much trouble for many years, and only seek relief when some concurrent inflammatory condition blocks the outlet and causes absorption of the pus. In this instance the patient thinks that my operation of the removal of the middle turbinate has cured him, whereas, as a matter of fact, I have only made the drainage from the cavity better.

Of the cases cited those operated upon, namely, Cases V. to XIV., inclusive, briefly analyzed show the following results: In 7 the sinus was opened at the inner angle of the eye, nasal drainage established, with subsequent closure of the external wound after a varying period, the so-called Ogston-Lue method or some modification of it. Of these 2 showed a cure without recurrence, 4 had one or more recurrences with final cure, 1 certainly by obliteration, the others probably; 1 is still under treatment but is practically cured, but has had more or less recurrence. Three cases were treated by the method of obliteration, and of these there have been no recurrences. The cases which showed recurrence were all of them accompanied by more or less ethmoidal suppuration or occurred in connection with maxillary antrum suppuration. In the paper by Logan Turner already referred to he states that in 62 per cent. of 172 cases, histories of which were examined by him, the ethmoidal cells were implicated, and that in 55 cases operated upon by the Ogston-Lue method there were 33 cures and 22 failures, showing probably that the successful cases were those in which there was little or no involvement of the ethmoidal cells, while the cured cases were those of pure frontal sinus trouble without ethmoidal involvement.

My own statistics are of course too few of themselves to generalize from. In the main, however, it would seem to me that the cases in which the simple opening and drainage of the sinus have been immediately successful were those in which the ethmoids were involved either but little or not at all. The cosmetic results have been good in all the cases, even those where there were several recurrences.

CONCLUSIONS. What then shall be our attitude with reference to the treatment of chronic frontal sinus suppuration? What operation would seem to offer the best chance for the patient? Certain things must enter into the consideration of each individual case, such as the length of time the suppuration has lasted, the degree of discomfort, the probable danger to life, and the age, sex, and social condition of the patient. The intranasal method of treatment should certainly be tried if it offers any chance of a permanent cure or of sufficient degree of relief to satisfy the needs of the patient. If persisted in for a reasonable length of time without result the question of external operation should be considered.

Of the external operations, viewed in the light of the past and present experiences of the majority of rhinologists, what is the one to be chosen? In simple suppuration, not long continued, I agree with the conclusion of Luc as referred to by Logan Turner, that in cases where the dimensions of the sinus are limited and the frontonasal canal is roomy and the ethmoidal labyrinth free from suppuration, and where the inflammation has not lasted any considerable length of time, the simple operation of opening and draining the sinus, with closure of the external wound, will effect a satisfactory cure. In all other cases, especially those associated with ethmoidal trouble, accompanied by the formation of polypi and the probable implication of the sphenoidal or maxillary sinuses or both, it seems to me, in the light of my own and the experience of others, that some form of the obliteration method is the operation to be chosen. Whether it shall be that which I have myself performed, namely, the taking away of a sufficient portion of the anterior wall of the sinus below the supraorbital ridge to gain access to the sinus, and so much of the floor of the nose and the nasal process of the superior maxilla as may seem necessary, followed by a prolonged packing, a method which, while reasonably certain to effect a cure, necessitates a disagreeable and long-continued amount of after-treatment if the sinus be at all large, especially long and disagreeable if both sinuses are affected, or the method of obliteration described and followed by Dr. Coakley, namely, the taking away of the anterior wall of the sinus above the supraorbital ridge with immediate obliteration and closure of the frontonasal duct, partial suture of the skin opening, with packing of the cavity until obliteration takes place, this being materially aided by the partial sinking in of the soft parts, or the more radical and much discussed operation of Killian, must be determined by the individual case, the social status of the patient, and the individual skill and proclivities of the operator. The decision in many cases can hardly be made prior to the time the patient is on the table and the sinus opened, as, although transillumination gives us considerable information in many cases, it frequently does not absolutely show the extent of the sinus, hence the operator should

be sufficiently conversant with all the methods of treatment so that he may at the time of the operation be prepared to do that one which, in the light of his knowledge, then and there offers the best results for his patient. The question of the cosmetic result must be carefully considered, as cosmetic results which would be considered good in Germany would not be so considered here.

The published statistics of Killian's operation seem to show it to be satisfactory in its results, at the same time not all of the cases showed immediate cure, and in some of them there was more or less pus discharge for a considerable length of time thereafter. Killian's operation is also not wholly devoid of danger, as Freudenthal has recorded cases where he found the dura instead of the sinus in opening up above the bridge after the method of Killian. This of course could be obviated by invariably opening against the inner angle of the eye, where, if any sinus is present at all, it will be found. Of the cases reported as cures I think some of them may justly be doubted whether they are cures or not, as so long as the discharge from the nose has not entirely stopped the case can hardly be considered as an absolute cure, even though the patient feels no discomfort. This may be illustrated in the last case reported by myself where the patient regards himself as cured, although that is far from being the case. Better drainage does not necessarily mean a cure, although it means relief.

Another operation has recently been brought to my attention by Lothrop. This is a modification of the Ogston-Luc operation, which seems to have all the advantages of the latter without the danger of recurrence of symptoms of obstruction. At the same time it possesses the advantages of the Killian, but is not followed by the deformity which this operation produces. A short incision is made under the inner end of the eyebrow so as to approach the orbital floor of the frontal sinus. The sinus is opened by this route and the whole of the nasal floor of the frontal sinus is removed chiefly by means of curettes, thereby taking away all the ethmoid cells situated in the vicinity of the ostium frontale, limited externally by the inner wall of the orbital fossa and internally by the inner wall of the lateral mass of the ethmoid, a part of which is removed. This opening embraces, therefore, as great a space as the anatomy of the parts will allow. The anterior wall of the sinus remains intact. Lothrop states that none of these operations have been followed by obstruction and that drainage is free.

It is also fair in considering any report of cases to assume that in many patients it may be impossible to get a perfect cure, as the anatomical conditions and pathological changes militate against this and do not allow the operator with safety to his patient to remove a sufficient amount of tissue. I think the operator should feel fairly well satisfied with his results when he has got his patient free from recurrence, free from annoying nasal dis-

charge, free from pain, even though there may still continue to be a moderate amount of ethmoidal mucopus which, in the majority of instances, will not be noticed by the patient as anything more than ordinary nasal discharge.

The whole subject of nasal suppuration demands more consideration from the general practitioner than it has yet had, and in view of the fact that nearly every winter epidemics of grip bring about attacks of acute sinusitis, many of which can be prevented from becoming chronic under proper methods of treatment, it becomes the duty of members of societies such as this, by their written and spoken word, to educate the average practitioner into the need of proper nasal treatment for these conditions in order that they may be recognized early and cases of acute sinus inflammation prevented from becoming chronic.

THE LARYNX IN TYPHOID FEVER.¹

BY CHEVALIER JACKSON, M.D.,

OF PITTSBURG, PA.

THE vital importance of this subject is better stated by and comes with better grace from a practitioner of internal medicine. Dr. John W. Boyce wrote to the writer as follows:

"The question of great interest is whether it is possible for these affections to cause a fatal termination without such symptoms as shall plainly indicate the nature of the occurrence.

"Theoretically, it seems impossible that a man should choke to death without the conspicuous symptoms of asphyxia, particularly cyanosis; but observation has convinced me that it is only too true; that these cases may sink away as peacefully as a baby goes to sleep, and that one may not in the least suspect what is happening. I am convinced that in times past such has been the case, where I attributed the death to collapse. In the first case of this nature that I ever recognized (though it is scarcely possible it was the first case I ever saw) a fairly acute resident physician had seen the patient, and had no idea that his dyspnoea was in any way an important matter. The case was taken to the operating room for tracheotomy as a precautionary measure, not with the idea that the operation was needed but for fear it might come to be during the night in the absence of a physician. While we were making leisurely preparations for a systematic operation I accidentally noticed that the patient had stopped breathing. Fortunately the surgeon was

¹ Read at the meeting of the American Laryngological, Rhinological, and Otological Society, Boston, June, 1908.