upon as a cause. Where, as is often the case, the order of events cannot be told, the marked increase of suffering at the menstrual epoch will be significant. In such cases the obvious course to pursue is to eliminate the local pathological conditions as far as possible.

On the other hand, where the symptoms which might suggest pelvic lesions are distinctly secondary in their appearance, are not markedly aggravated at the time of menstruation, and are not progressively more severe as time goes on, their causal dependence upon the general nervous state may be taken for granted. With this statement of the case, however, the question is not always settled. In many cases where there can be no reasonable doubt that the primary factor is the general nervous system, which has either caused disturbances of the pelvic organs or brought into activity local troubles which were latent and causing no symptoms before, the pelvic trouble becomes a secondary cause of such importance that no permanent improvement can be looked for until this is relieved. The nervous system is not able to throw off the incubus of the additional local disorder, and it is a weight which must be removed before lasting cure can be effected. A stormy menstrual period may undo all the good effect of three weeks' steady gain under appropriate general treatment, and the wise practitioner will first devote his energies to removing all such obstacles and smoothing the road to recovery.

I have rather elaborately detailed this class of cases, because they seem to me to illustrate well the character of the highest type of work which the specialist is called upon to do, and to emphasize the kind of training which is necessary to success.

At the beginning of my paper I suggested that it was appropriate that in the year 1901 what I had to say should be prophetic in character. I find, however, as I read over what I have written, that there is very little of prophecy in it in the restricted sense of the word, which is perhaps wise. He is a bold man who would attempt to foretell in any more than the most general way what the future holds for us. I find that I have rather tried to analyze certain tendencies of medical practice, to point out their advantages and their dangers, and to suggest in what ways the advantages may be secured and added to and the dangers avoided.

And yet in a certain sense that is prophecy; for do we not know that we must advance, and that progress must be along certain inevitable lines, and that if we resist the temptations to worship strange gods, if we keep clearly in our minds certain high ideals and consecrate our energies to their attainment, the results can be foretold? We cannot know all the steps which will mark that advance, nor the pitfalls which will hamper our progress, nor the bypaths into which we may be tempted to stray; but the results are certain. These results, which will come as surely as day follows night, are increase in knowledge in all

branches of our noble profession, greater opportunities for rendering unselfish service to suffering humanity, and cordial coöperation with each other in the great work which is our heritage.

Original Articles.

THE AFTER-TREATMENT OF OPERATION ON THE NASAL ACCESSORY SINUSES.

BY WALTER A. WELLS, M.D., WASHINGTON, D. C.

THE after-treatment of any operation, unfortunately for the patient, never possesses for the surgeon and his assistants that degree of attraction which attaches to the operation itself, or even to the preoperative stage of the case. With the operation professional interest ascends to a climax, from which the descent is all too sudden, and the interest, thereafter, may be said to be in inverse ratio to the length of time the patient persists in remaining uncured. Nevertheless, the reflective surgeon knows that much depends upon the manner in which the after-treatment is carried out, and if he be careful and conscientious as well as intelligent, and have the welfare of his patient at heart, he will personally supervise every detail of the after-treatment of his case.

An operation is generally judged from the circumstances only which are present during its execution, and is considered successful merely with regard to the finding of suppuration or other suspected diseased focus, or, perhaps, according to the skill with which the incision, the flaps or the sutures are made, and the other manipulation procedures are carried out. Many an operation, therefore, which is to the surgeon and the spectators brilliant, is for the patient an ignominious failure. To no class of cases do these remarks more aptly apply than those of operation upon the various accessory sinuses of the nose. There are cases which will get well promptly, no doubt; but, as every specialist knows, there are others which drag on, not for months only, but for years, to the great chagrin of the physician and discomfort to the patient.

Killian,¹ who succeeded in curing 22 of 36 cases of antrum empyema (61%), found that the average length of time required to bring about a cure was 82.6 days; 5 cases, however, required more than 2 months, of which 2 were nearly 4 months, and 1 was under treatment over 2 years. In 5 other cases no recovery, but only an improvement, could be obtained, while in 9 others the antrum disease remained unchanged. Some of these cases had been under treatment many months, and 1 for more than 4 years.

The cause or causes of the delayed healing,—or as it may be, even of its ultimate failure,—if not owing either to some inherent, diathetic state of the patient's constitution, or to local causes, must be attributed to the insufficiency of the treatment. The latter may be either of the operation itself, or it may be of the treatment subsequent. It is

¹ Munch. Med. Woch., 1892, xxxix, 51, 70, 88.

superfluous to insist here upon the necessity of thoroughness in surgical procedure, the curetting of necrosed bone, the removal of all granulations or polyps, if they exist, and the eradication of all pathological conditions, which if left would maintain a suppurative process.

The conformation of these cavities, and the position and size of the surgical opening, are such as to make it improbable, if not impossible, that every vestige of disease has been removed. At any rate, we should proceed in the after-treatment of these cases not with a perfect satisfaction of having done all that needed to be done at the time of the operation, but with a mind open to conviction upon the observation of signs pointing to disease still present.

There are two general methods of local treatment which have been recommended for the nasal accessory suppurations; namely, the dry and the wet methods. The former was used and strongly recommended, especially for antrum empyema, by Hartman of Berlin.

His assistant, Friedlander, reported a number of cases treated by the dry method, and T. Melville Hardie and a few others have advocated its use in this country. Iodoform, boric acid and iodol are the favorite powders for insufflation by the partisans of this method.

Those who use the dry treatment in sinus suppurations have generally objected to irrigations, on the ground that they were insufficient, that they sometimes left in the cavity shreds of pus, and that in cases of abnormal septa, or where the opening was not at the lowest point of the sinus, some of the fluid would remain within the cavity and work harm. If there be objections to irrigation, they are not such, it seems to me, as are overcome by resorting to the use of powders instead of fluid. The former are far less capable than the latter of penetrating to all the recesses of the sinus, and I do not see that the long continence of a fluid is any more to be feared than in the case of a powder, especially of iodoform, known to have under such circumstances toxic effects. Irrigation must be made effective by its thorough and industrious employment, and by having the patient, if need be, assume positions which will favor the outflow of the fluid which has been injected. It is certainly apparent that the nasal sinuses do not offer such favorable fields for the dry method of treatment as do other more accessible cavities of the body; as, for example, the middle ear. Here we have better control of the part; we can first thoroughly cleanse the cavity of all pus and detritus before applying the powder, and afterwards we can remove the latter, to prevent an over-accumulation and caking, as otherwise might occur.

As to the selection of an agent for irrigation, I think this is of no small consequence. Boric acid, bichloride, formaline and nitrate of silver are those most in vogue. Hajek uses boric-acid solutions, alternating with the occasional application of a 5 to 10% solution of silver nitrate in cases which prove particularly obstinate.

For the past twelve months I have made habitual use of protargol solutions in sinus suppurations, and have seen from its use better results than from any other agent. My attention was called to its applicability to these cases by an article by Alexander of Berlin² on the use of protargol in rhinolaryngological practice. The class of cases in which he got the best results were those of antrum empyema. In 11 of the 16 cases in which he used protargol (5% aqueous solution preceded by sterile water) he obtained very successful results. Shortly after reading this article I had a patient come under my treatment who had bilateral frontal empyema. The patient was a woman, with history of nasal suppuration of six months' duration. As she was averse to any radical procedure, I undertook treatment by irrigating through the natural opening. I thought it a good opportunity to compare the effects of protargol with other irrigating fluids. Accordingly, I selected one side upon which to use exclusively a solution of protargol varying from 2 to occasionally 10%, while I used simultaneously upon the other boric acid, alternating occasionally with peroxide of hydrogen solution. The patient was treated every day for two weeks, then every other day. In six weeks the side upon which the protargol was used ceased to suppurate, while on the other side some pus could be always brought away with the irrigation. A month later the condition was the same, and having felt that sufficient time had been allowed to compare the relative worth of the different agents, I began to employ protargol on the still suppurating sinus, with the result of bringing about a lasting cure in fifteen days — using the solution daily.

The two following cases of antrum empyema will illustrate my principles of treatment subsequent to operation:

CASE I. Male, age forty-six, railroad conductor, had suffered from "catarrh on one side of the head" for about two years, the trouble begun seemingly in an attack of the grippe. He was compelled to use a half dozen handkerchiefs daily, and often brought away large clumps of yellowish secretion. In the morning on arising the trouble was always much aggravated. He sometimes suffered from neuralgic headaches. His head was nearly always stopped up, and he was subject to frequent attacks of coryza. Upon rhinoscopic examination I found the right nasal fossa normal, with the exception of some slight hypertrophy, while the left side was almost completely filled with polyps, springing apparently from the middle meatus. Pus was also visible, but its source could not be made out. In two or three sittings the polyps, six in all, were thoroughly removed, under cocaine, by the use of the cold snare. I then proceeded to discover which sinuses were interested in the suppuration. Illumination gave a positive result in that no reflex was produced on the left side corresponding to the situation of the antrum. With this encouragement I proceeded to make puncture through the

² Arch. f. Laryngol. u. Rhinol, Berlin, 1899, ix, 113-125.

inferior meatus, which resulted in bringing away a mass of exceedingly foul-smelling pus. In this case the first molar was missing. By means of a drill a large opening was made, the cavity thoroughly irrigated with boric-acid solution and packed with iodoform gauze. The latter was left *in situ* thirty-six hours. After its removal I inserted a small rubber drainage tube, and ordered the patient to irrigate every morning with sterile water. In the afternoons I used sometimes a 2% and sometimes a 5% solution of protargol. Every third day I applied a cotton swab saturated with a 20% solution in glycerine and water, which I rubbed thoroughly into all parts of the cavity. The secretion was really insignificant after the first week of treatment, and was altogether missing after the second. I, nevertheless, persisted in the treatment for three weeks longer, keeping the wound open for the purpose.

CASE II. Mrs. K., age thirty-five, first consulted me in July, 1900, in regard to some very annoying symptoms referable to her nose and throat. For some time past especially she had removed from the postnasal space every morning, on arising, large clumps of mucus, mixed with blood. She was accustomed also to frequently discharge bloody mucus anteriorly from the nose. Her nose was generally so obstructed as to prevent free nasal respiration; at nighttime she was afflicted with more or less oppressive breathing of an asthmatic character; she suffered often from pavor nocturnus, had severe frontal headaches, and was altogether greatly depressed mentally and physically by her suffering. In appearance she was anemic and somewhat poorly nourished, and made the impression of one who had neurasthenia. She had had measles, but very few other illnesses, either during her childhood or later life. She was the mother of three children, all of whom were generally healthy. There was no evidence of any serious systemic predisposition.

On rhinoscopic examination I found that, except for some narrowing on account of deviation of the septum to that side, the right nasal fossa was normal. On the left side, however, I saw occupying the space just above the inferior turbinate, and almost completely obstructing the nose, a large, rounded, rather smooth tumor, which pressed against the septum. On the use of an alkaline solution and of application of cocaine, a rather large, hardened crust of brownish yellow color was found to be occupying the surface of this tumor, which was directed towards the lateral wall. Upon its removal there escaped a few drops of creamy pus, mixed with blood. The sound showed the tumor to be somewhat resistant, as though having a bony wall. Although in some doubt as to whether we had here to do with only a simple bulbous middle turbinate, or one distended with mucus (hydrocele) or pus, or whether it might possibly be an enlarged ethmoidal bulla, I was sure that it was in some part responsible for the symptoms, on account of its size and pressure against the septum. I removed it then with cold wire, the tumor crushing as though it were

an eggshell. There escaped some, though not a large quantity, of lumpy, purulent matter and blood clots. I packed with iodoform gauze, and three days later, when the conditions were more favorable for examination, it was clear that we had to do with a suppuration in a bulbous-formed middle turbinate. The symptoms, especially the headache and the condition of the mind, were greatly relieved by this operation. The patient was seen daily for a while, and then every other day, the after-treatment consisting in cleaning with an alkaline douche, sometimes by syringing with boric-acid solution and the insufflation of aristol. Although the large crusts were not now so conspicuous, there still could always be seen a small amount of fresh pus to the outer side of the stump of the middle turbinate, having its source apparently about the junction of the middle turbinate and the bulla. Some days the patient would complain that the headache was present again with much of its former severity, and on examining the nose the explanation might be found in the existence of an obstructing plug at the location of the hiatus, for which I believe that the powder insufflated was in a large part responsible. On its removal immediate relief was generally experienced.

As, however, the suppuration in a measure continued, in spite of careful antiseptic treatment of the nose, it was evident that other cells of the ethmoid must be the seat of a suppurative inflammation. With a curette, therefore, an opening was made just outside of the middle turbinate into the middle ethmoidal cells, which were converted into one cavity, and considerable pus made its exit. The interior of the cells seemed to contain more or less granulation excrescences, which were destroyed as thoroughly as possible. The local treatment was carried on as before, with a more cautious use of the powder. In December, six months after the first and four months after the second operation, although on account of the relief of all subjective symptoms the patient regarded herself as cured, nevertheless, a few drops of pus could nearly always be discovered in the middle meatus.

As illumination was positive so far as the antrum was concerned, it seemed unnecessary to make an exploratory incision into the cavity. The frontal sinus could be easily sounded, and by means of canula irrigated. It was thus positively demonstrated that it was not the source of the pus. The pus must be, then, only from the ethmoid. Why did it not cease? The surgical measures had been unusually thorough, so far as opening of the cells was concerned, and there was no reason to suspect any specific tubercular or other cause on the part of the patient. I decided upon a change in the local treatment. The following plan was adopted: The nasal fossa was first cleansed as thoroughly as possible with an alkaline solution. This was followed with a solution of sterile water, which was applied by means of a fountain syringe with a slender nozzle attachment, which could be introduced well up into the wound cavity, accomplishing a very thorough irri-

gation of the cells. After this irrigation, a 40% glycerol-aqueous solution of protargol was applied on fine cotton swabs, which were carried into the depths of the cavity and rubbed with some force in every direction. Generally it was followed with a moderate amount of hemorrhage, accompanied, it could be seen, with small shreds, evidently of granulation.

From the time that this method of treatment was instituted, the secretion of pus noticeably diminished. It was persisted in for a month, the protargol application, sometimes of 20%, sometimes as high as 40%, being made about twice a week. Soon the suppuration had entirely ceased, and the nose, some two or three months after the treatment was discontinued, was found to be normal.

From the foregoing consideration, and our experience in general, we believe that the main points in the after-treatment of operation upon the nasal accessory sinuses may be stated as follows:

(1) Persistence of suppuration after operation is generally to be sought in one or several of the following causes: Syphilis or tuberculosis in the patient; incompleteness of the operation; presence of polyps or other obstructive condition in the nose; an empyema in a neighboring sinus; inadequacy of the local treatment.

(2) The after-treatment requires that not merely the antiseptic applications to the sinus, but that the patient's general state of health, must be investigated, and a careful supervision constantly maintained over the condition of the nasal fossa. The latter must be kept free of secretions, and polyps and other obstructing conditions removed whenever found.

(3) Empyema in a neighboring sinus, whose ostium is in close relation with the sinus operated on, will maintain the suppuration in the latter, unless cured. The frontal is frequently the cause of antrum disease, and the ethmoid the cause or the effect of disease of both the antrum and the frontal sinus.

(4) The cause for the continuance of the suppuration is attributable in many cases to the fact that all diseased tissue was not removed at the time of the operation. The irregularities and anomalies in the form of the sinus are often responsible for the failure to have reached every point where disease was located. In such cases curettage of the sinus must be repeated from time to time according to the indications.

(5) The institution of the proper local after-treatment is a matter of extreme importance. The so-called dry treatment is insufficient and unscientific, because it does not provide for the removal of the products of suppuration; only a mass of powder is superadded to a mass of decomposing debris, whereby an unabsorbable accumulation results, which may retard recovery and give rise to unpleasant symptoms.

(6) Frequent and thorough irrigations constitute the most rational method of treatment. Protargol in 2 to 5% solution has given the most

favorable results, especially when alternated with a thorough swabbing of all parts of the inner wall of the sinus with a 20 to 40% solution in water and glycerine.

(7) Immediately after operation the sinus should be packed with iodoform gauze, which remains in place from thirty-six to forty-eight hours. Subsequently the sinus is irrigated daily, and later on every other day. A thorough rubbing of the walls of the sinus is made with the solution mentioned every three, four or five days, according to individual requirements.

DIPHTHERIA AS A COMPLICATION OF MEASLES.

BY DAVID NEWTON BLAKELY, M.D., BOSTON,

AND

FRED GRANT BURROWS, M.D., SAN FRANCISCO,

Formerly Assistant Resident Physicians at the South Department of the Boston City Hospital.

Most of the recent textbooks of medicine in the discussion of acute infectious diseases mention diphtheria—especially diphtheria of the larynx—as one of the rarer complications of measles. During our stay at the South Department we had an opportunity of seeing and treating a considerable number of patients who had this complication, and we present here a clinical study of such cases as came under our observation.

No attempt has been made to determine the frequency with which this combination of diseases occurs, as the available statistics are too imperfect to warrant conclusions; but it is by no means uncommon.¹ We wish rather to emphasize the extreme danger to the patient of this unfortunate condition, especially if diphtheria begins early in the course of measles. Neither shall we discuss in detail the course or treatment or complications of diphtheria, for these show no essential difference, whether it occurs alone or in connection with measles.

We are indebted to Dr. McCollom both for constant instruction in the diagnosis and treatment of contagious diseases and for encouragement and assistance in the preparation of this paper.

During a period of two and one-half years, from Feb. 1, 1898, to July 31, 1900, there were treated at the South Department of the Boston City Hospital 157 patients who had measles and diphtheria. Of these, 54, or 34%, died. (The death-rate in our uncomplicated diphtheria patients for practically this same period, was less than 13%.) Of the whole number, 82, or 52%, had laryngeal diphtheria, and of these 36, or 44%, died. In the 82 laryngeal cases there were 47 intubations, with a death-rate of 55%; in the remaining 35 not intubed the death-rate was 29%.

¹ In the past few weeks, during the spring epidemic of measles, a large number of patients have been brought to the hospital ill with measles and diphtheria. Many of these have been in a moribund condition on arrival, and the death-rate among them has been extremely high. This condition prevails every year; and although these cases have not yet been tabulated, both the number of patients and the death-rate seem higher than in former years.