frontal sinus, post-influenzal, in July, 1904. Reopening of sinus; recovery; cure.

CASE IV.—Male, aged 18. Duration of disease two to three years. Right and left frontal and right and left maxillary antra involved. Operation, August, 1896. Median incision; alveolar drainage of antra. Cure.

CASE V.—Female, aged 18. Duration six months; uncomplicated case. Median incision; intranasal drainage; rapid recovery. Cure.

CASE VI.—Female, aged 26. Left frontal and ethmoidal sinus involved; duration of disease two years. Operation, March, 1897. Supraorbital incisions; nasal drainage; abscess in left frontal lobe; extensive basal meningitis. Death.

CASE VII.—Male, aged 19. Duration of disease six years; right and left frontal and right and left ethmoidal sinuses involved. Operation, April, 1897. Median incision; two further operations performed; considerable deformity, but ultimate cure.

CASE VIII.—Male, aged 38. Duration of disease six months; uncomplicated case of right frontal-sinus suppuration. Operation, April, 1897. Median incision; occasional discharge, probably from ethmoidal labyrinth.

CASE IX.—Female, aged 28. Duration of disease twelve years. Right frontal empyema; left maxillary antrum; supraorbital incision; Caldwell-Spicer operation upon maxillary antrum; right frontal sinus reopened and drained both externally and internally. Ultimate cure.

CASE X.—Male, aged 53. Duration of disease three years. Left frontal sinus and left maxillary antrum involved. Operation, July, 1897. Supraorbital incision; alveolar drainage of antrum. Cure.

CASE XI.—Male, aged 22. Duration of disease two and a half years. Right and left frontal sinuses and left maxillary antrum involved. Operation, October, 1897. Supraorbital incisions; Kuhn's operation upon frontal sinuses; Caldwell-Spicer's operation upon maxillary antrum. Patient developed pulmonary phthisis; went to South Africa. Result unknown.

CASE XII.—Male, aged 24. Duration of disease one year. Right and left frontal and ethmoidal sinuses and right maxillary antrum involved. Operation, January, 1898. Median incision; intranasal drainage. Cure.

CASE XIII.—Female, aged 27. Duration of disease seven years. Right and left frontal, maxillary, and ethmoidal sinuses involved. Operation, September, 1898. Very unsatisfactory case. Partial cure.

CASE XIV.—Female, aged 21. Duration of disease 2 years. Left frontal and ethmoidal sinuses involved. Operation, December, 1898. Supraorbital incision; sinus kept packed. Cure.

CASE XV.—Female, aged 37. Duration of disease a few years. Left frontal and maxillary sinuses involved. Operation, November, 1898. Supraorbital incision; Caldwell-Spicer-Luc operation upon antrum. Cure.

CASE XVI.—Male, aged 16. Duration of disease doubtful. Right and left frontal and ethmoidal sinuses involved. Operation, February, 1899. Median incision; drainage with tubes in nose; daily irrigation. Cure.

CASE XVII.—Male, aged 18. Duration of disease, two years. Right and left frontal and ethmoidal sinuses involved. Operation, March, 1899. Left sinuses dry; from right sinuses still slight discharge. Cure upon one side.

CASE XVIII.—Male, aged 54. Duration of disease two years. Right frontal, ethmoidal, and maxillary sinuses involved. Operation, October, 1899. Supraorbital incision; alveolar drainage of antrum; intercurrent attack of erysipelas. Cure.

CASE XIX.—Male, aged 47. Duration of disease a few years. Right and left frontal and right and left maxillary antra involved. Operation, October, 1899. Unsatisfactory case; still discharges; result doubtful.

CASE XX.—Male, aged 45. Duration of disease a few years. Right and left frontal, ethmoidal, and maxillary antra involved. Operation, October, 1899. Kuhn's operation upon frontal sinuses; Caldwell-Spicer's operation upon maxillary antra; patient still under treatment; still frequent headache.

CASE XXI.—Male, aged 21. Duration of disease five years. Right and left frontal and ethmoidal sinuses; left sphenoidal and left maxillary sinus involved. Operation, November, 1899. Kuhn's operation; Caldwell-Spicer's operation upon antrum. Unsatisfactory case; when last seen, still slight discharge.

CASE XXII.—Male, aged 40. Duration of disease a few years. Right and left frontal and maxillary sinuses involved. Operation, February, 1900. Three separate operations performed; relief to all head symptoms; general health unsatisfactory; slight discharge persists.

CASE XXIII.—Male, aged 25. Duration of disease thirteen months. Right frontal and maxillary sinuses involved. Operation, May, 1900, supraorbital incisions; alveolar drainage. Cure.

CASE XXIV.—Female, aged 25. Duration of disease doubtful. Left frontal sinus affected. Operation, October, 1900. Supraorbital incision, nasal drainage, daily irrigation, rapid progress. Cure.

CASE XXV.—Male, aged 36. Duration of disease six months. Left frontal sinus affected. Operation, April, 1901. Supraorbital incision. Rapid cure.

CASE XXVI.—Female, aged 12. Duration of disease uncertain. Left frontal and ethmoidal sinuses involved. Supraorbital incision, drainage with nasal tubes. Cure.

CASE XXVII.—Male, aged 40. Duration of disease uncertain. Right frontal sinus involved. Uncomplicated case. Operation during acute stage. Rapid cure.

CASE XXVIII.—Female, aged 32. Duration of disease one year. Right frontal and maxillary sinuses involved. Operation, October, 1901. Frontal sinus packed; packing gradually removed. Maxillary antrum infected, but apparently not diseased. Cure.

CASE XXIX.—Male, aged 30. Duration of disease four years; right and left frontal and ethmoidal sinuses involved. Killian's operation; cure.

CASE XXX.—Female, aged 35. Duration of disease doubtful; right and left frontal sinuses and right and left maxillary antra involved; discharging fistula in middle line of forehead. Very extensive operation; insertion of gold plate under skin of forehead; comparatively slight deformity. Cure.

CASE XXXI.—Female, aged 21. Duration of disease eight months. Right and left maxillary antra and left frontal sinus involved. Operation, July, 1902. Rapid cure.

CASE XXXII.—Male, aged 35. Duration of disease unknown; left frontal sinus affected. Operation, October, 1902. Killian's operation; considerable deformity. Cure.

CASE XXXIII.—Female, aged 26. Duration of disease three years; left frontal and maxillary sinuses affected; supraorbital incision; alveolar drainage; abscess in left frontal lobe; extensive basal meningitis. Death.

CASE XXXIV.—Male, aged 22. Duration of disease six months; left frontal sinus affected. Operation, November, 1902. Supraorbital incision, nasal drainage. Cure.

CASE XXXV.—Male, aged 25. Duration of disease doubtful; left frontal sinus and maxillary antrum affected. Operation, March, 1903. Kuhn's operation upon frontal sinus; alveolar drainage, followed by Caldwell-Spicer-Luc operation upon antrum. Cure.

CASE XXXVI.—Female, aged 29. Duration of disease doubtful; right and left frontal and ethmoidal sinuses involved. Operation, November, 1903. Kuhn's operation. Cure.

CASE XXXVII.—Female, aged 34. Duration of disease doubtful; uncomplicated left frontal sinusitis. Operation, June, 1904. Supraorbital incision. Nasal drainage. Cure.

CASE XXXVIII.—Male, aged 27. Duration of disease fourteen months; left frontal sinus and left ethmoidal labyrinth affected. Operation, August, 1904. Kuhn's operation, rapid recovery. Cure.

CASE XXXIX.—Male, aged 46. Duration of disease seven years. Right frontal sinus and right ethmoidal cells affected. Operation, August, 1904. Killian's operation, slight deformity. Cure.

CASE XL.—Female, aged 20. Duration of disease 2 years; left frontal sinus, ethmoidal labyrinth, and maxillary antrum affected; Killian's operation (October, 1904) upon frontal sinus. Excellent progress up to date.

THE CAUSES, SYMPTOMS, AND COMPLICATIONS OF THE DISEASES OF THE NASAL ACCESSORY SINUSES

IN THEIR RELATION TO GENERAL DISEASES, OPHTHALMOLOGY,
AND NEUROLOGY.

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It is for the purpose of this paper unnecessary to go into the interesting but intricate chapter of the anatomy of the "adnasal" cavities (I have coined the word "adnasal" in place of "nasal accessory," and hope the expression may recommend itself). It will suffice to mention that the frontal, the ethmoid, the sphenoid, and the maxillary sinuses have this in common, that they are irregular, bony cavities, some of them subdivided by bony lamina, standing in connexion one with another or with the nasal cavity by narrow openings. The adnasal cavities are lined by mucous membrane, continuous with the mucous membrane of the nose, and a diseased condition of an adnasal cavity may therefore have originated in the cavity itself or in an adjoining cavity, or in the nose, and may affect the bone, the periosteum, or the mucous membrane.

CAUSES.

Whilst syphilis is a frequent cause of disease of the adnasal cavities, tuberculosis is rare. The most frequent are inflammatory affections, due to infectious organisms. Principal among these are acute coryza and influenza; in both the infection is carried into the adnasal cavities directly from the mucous membrane of the nose. Lindenthal¹ and others have shown the presence of the influenza bacillus in the pus of adnasal cavities after influenza. Next to influenza in frequency, acute croupous pneumonia causes adnasal disease (E. Fraenkel²), a fact which is, I believe, not generally known, and ought to be borne in mind. As the pneumococcus is found in the healthy nose, and has been found in healthy adnasal cavities, it seems that by some cause or another it may suddenly become active and virulent. Of other infectious diseases, scarlatina, measles, diphtheria, erysipelas, small-pox, and cerebro-spinal meningitis may be followed or accompanied by adnasal disease. In regard to epidemic cerebro-spinal meningitis, Weichselbaum³ has found the

meningococcus in the adnasal cavities of every case he examined, and he considers it probable that the infection takes its primary root in the nose and adnasal cavities, and spreads thence to the cerebral cavity.

When erysipelas and adnasal inflammation are seen together it is of course difficult to say which of the two has been primary; chronic inflammatory adnasal disease is often accompanied by intermittent attacks of facial erysipelas.

Micro-organisms.

Fraenkel and others have demonstrated the presence of true diphtherial membranes in the adnasal cavities after diphtheria, and, besides the influenza bacillus, the diplococcus pneumoniae, the meningococcus intercellularis, the staphylococcus pyogenes aureus, streptococcus pyogenes, and also the gonococcus and bacterium coli have been found in the pus of adnasal cavities.

Other Causes.

The adnasal cavities may also become invaded by tumours, or inflammation in them may be caused by traumata. A frequent cause of infection of the antrum is, as is well known, dental caries.

Whilst it is certain that rhinologists frequently find that one or another of the before-mentioned infectious diseases formed the onset of adnasal disease, statistics as to the frequency by which the infectious diseases are followed or accompanied by adnasal disease are still wanting.

SYMPTOMS.

General.

The symptoms which accompany disease of the adnasal cavities are frequently of a general character; their true origin is often masked, and they may be, and are not rarely, mistaken for symptoms of some other affection.

A frequent, but not by any means a constant, symptom of adnasal disease is headache. The form of headache is in no way characterized; it may be general or circumscribed, constant or intermittent. Hajek⁴ describes as almost characteristic for the intermittent headache of adnasal disease that it is apt to follow even after a moderate indulgence in alcohol or tobacco, or after mental work or excitement. Though the form of headache accompanying adnasal disease is by no means characterized, the following forms are most frequently found:

1. *Neuralgic Headaches.*—Most frequently infraorbital or supradental, and then usually of a most violent character, in acute inflammation of the antrum; supraorbital in inflammation of the frontal cavity. These neuralgias may be persistent or intermittent. They usually exacerbate when the free discharge from the affected nasal cavity is temporarily stopped, but they may also be intermittent, when accompanying chronic closed empyemata. According to Hajek, these neuralgic attacks almost always take place in the morning hours, rarely in the afternoon, never at night. The pains are apt to radiate along the several branches of the fifth, and as they are relieved by phenacetin or antipyrin, the disease is frequently mistaken for simple neuralgia. Hajek says that he has not been able to find a single case of this form of neuralgia following influenza which has not been due to adnasal disease. True attacks of "tic douloureux" have as yet not been found due to adnasal disease.

2. *Diffuse Headache.*—This is usually of a dull character, felt in the frontal, parietal, or occipital region, or deeply in the head. A localization of the cavity affected from the region in which the pain is felt is impossible. It cannot be too distinctly understood that extensive adnasal disease may exist and headache never be felt, or that the headache may be frontal in disease of the antrum, or occipital in disease of the frontal cavity, etc. All one can say is that the affections of the frontal and sphenoid cavities are more frequently accompanied by headache, those of the antrum and ethmoid cavity not rarely unaccompanied by headaches.

On the whole, frontal headaches are more frequently felt with adnasal disease, whether affecting the frontal, the ethmoid or the supramaxillary cavity; whilst disease of the sphenoid cavity is more frequently accompanied with pain felt in the occipital region or at the vertex.

3. *Hemicranic headache* is but rarely found with adnasal disease, though Grünwald⁵ mentions four cases of typical migrain due to adnasal disease.

Fever.

Another frequent symptom of adnasal disease is an irregular

temperature, this being due to absorption or retention of pus. The temperature curve may be of a pyaemic or hectic character, and, if the latter, may be grossly misleading until a rhinological examination is made. A case of this sort came lately under my observation.

CASE I.—The patient, a lady aged 40, had, six weeks before I saw her, an attack of influenza of moderate severity, from which she had never quite recovered; her temperature, occasionally normal in the morning, was mostly raised with evening exacerbations to 101° or 102°, 102.8° being the highest record. She had suffered from almost persistent but not very severe diffuse headache, thought to be due to the temperature, though, on inquiry, she stated that it was worse in the morning. She had lost all appetite for food and had therefore become very emaciated; she had occasional night-sweats. Nothing abnormal could be found on repeated careful physical examination, excepting slightly harsh breath sounds over the right apex, and, though she had no cough, it was thought she suffered from incipient phthisis. On hearing that the patient also suffered from a purulent catarrh from one side of the nose, alternating with periods of obstruction of the same nostril, I was led to make a rhinoscopic examination. This showed that there was an empyema of one frontal sinus. I removed the anterior part of the middle turbinated body, which was greatly enlarged, and some hypertrophied mucous membrane, and thus afforded a freer drainage to the affected sinus, with the result that the patient almost immediately lost the headache and fever, and is now convalescent.

Neurasthenic Symptoms and Pulse.

Not at all rare are symptoms of cerebral congestion, mental excitability with flushing of face and quick pulse, or, on the other hand, symptoms of depression, lassitude, inability to work, the mental state bordering on melancholia, with slow and irregular pulse, or other so-called neurasthenic symptoms, which are really due to pyaemic absorption from infected adnasal cavities, the symptoms disappearing when the *fons et origo mali* is treated. Hajek mentions several such cases.

CASE II.—Only a few weeks ago I saw a lady, sent to me by Dr. Edwards of Chorlton, suffering from chronic empyema of the antrum. She complained of occasional flushes to the head, lasting half an hour and longer, together with palpitation, the pulse often going to 120 in the minute. All these symptoms were relieved by according a free exit to the accumulated pus and washing out the cavity.

Asthma.

A few cases have been observed in which pulmonary asthma seemed to be due to adnasal disease, but whether this was due to the adnasal disease or the accompanying hypertrophy of the mucous membrane of the turbinates must remain in question. When Hack⁶ several years ago first drew attention to the reflex symptoms in the form of asthma, etc., due to intranasal disease, the frequency of these reflex coincidences was no doubt over-estimated, but now it seems almost as if the pendulum had swung too far to the other side, and there can be no doubt that if any nasal or adnasal disease is present in a case of asthma it ought to be treated, with the possibility of relieving the asthma at the same time.

Gastric Symptoms.

Patients with adnasal disease and abundant purulent secretion, which is often of more or less fetid character, are frequently complaining about a disagreeable taste in the mouth and early morning vomiting; they may lose their appetite and the symptoms may simulate a gastric disorder. This is especially the case when the ethmoid or sphenoid cavities are affected and the secretion is apt to run into the naso-pharynx.

IMPORTANCE OF RHINOSCOPIC EXAMINATION.

Seeing the variability of the symptoms which appear in connexion with adnasal diseases, and considering the circumstance that a diseased condition of the adnasal cavities may exist without any apparent symptom pointing to the nose, it is clear that the diagnosis may go considerably astray until a rhinological examination is made; it would be specially erroneous to wait for any swelling of the integuments or an external tumour, as these occur only rarely. A discharge from one nostril, with intermittent periods of obstruction of the same nostril, is a symptom directly pointing to adnasal disease.

The diagnosis can only be established by a thorough rhinoscopic examination, including anterior and posterior rhinoscopy, and, if necessary, the use of the probe, aspiratory trocar, transillumination, Roentgen-ray examination, etc.

EYE COMPLICATIONS.

The adnasal cavities are separated from the orbits by bony walls which, in many cases are very thin; these walls, in

addition to their normal openings for the passage of nerves and blood vessels, occasionally show congenital defects, a matter to which Onodi⁷ has lately given special attention. These defects occur more frequently on the orbital plate of the frontal bone, at the lamina papyracea and lamina cribrosa of the ethmoid, and at the upper and lateral angles of the sphenoid cavity. Abundant anastomoses exist between the vessels and nerves of the orbits and its contents and the nasal accessory cavities. These simple anatomical facts explain how a diseased condition of the adnasal cavities may spread to the orbits and its contents, first, "ex continuo," and, secondly, by "infective embolism." Whilst Kuhnt⁸ first drew attention to the subject, Ziem⁹ went so far as to declare that 30 per cent. of all eye cases were due to primary nasal disease; the writings of Hajek, and especially of Eversbusch,¹⁰ have brought considerable light on this subject.

The eye symptoms most frequently connected with adnasal diseases are:

1. Obstruction of the lachrymal duct, with epiphora.
2. Conjunctivitis.
3. Oedema or an inflammatory swelling of the eyelids.

In disease of the antrum and ethmoid cavity it is usually the lower eyelid, in disease of the frontal sinus the upper eyelid, which becomes swollen—sometimes accompanied with swelling of the adjoining integument. The oedema is usually slight, and may appear and disappear. Often the oedema is present in the morning and disappears during the day; it is also apt to be brought on by bending forward.

Inflammatory disease of the frontal sinus only rarely produces a large external intumescence. A case of this sort is reported by the Duke Charles Theodore of Bavaria. The frontal sinus had gradually bulged outwards into the orbits, so that it was taken for an exostosis, only at the operation it was shown to be a frontal empyema. In the so-called "mucocele" of the frontal sinus such bulgings towards the orbita, causing displacement of the bulb, have more frequently been observed.

Perforations of Orbital Wall.

Empyemata of the frontal and ethmoid sinus occasionally perforate towards the orbits; such perforations may take place slowly or acutely. In frontal-sinus disease it is usually the inner and upper angle of the orbits which is first affected, pressing the eyeball outwards and downwards, whilst in ethmoid disease the inner and lower angle is the place affected, and the eye is pressed upward and outwards. Whilst the slow perforative process is going on, the eyelid swells, sometimes to a considerable degree, and there is chemosis of the conjunctiva; the swelling may then again disappear, but a tender spot with more or less infiltration remains in the orbital wall; this may show raised edges, due to periostitis, and finally a circumscribed or general orbital abscess may form; the former, if due to frontal sinusitis, tends to perforate at the middle of the upper eyelid; if due to ethmoiditis, at the lower and inner angle of the orbits. Acute perforation usually leads to general orbital abscess, and, unless speedily opened, to destruction of the eye; it is accompanied by considerable rise of temperature, rigors, severe pain, and serious general symptoms. The diagnosis is frequently only established when the probe, introduced into the opened abscess, penetrates into the affected adnasal cavity, or when the fluid used for rinsing out the abscess flows off through the nostril, or when on sneezing or blowing the nose air escapes through the opening of the abscess. In the latter way, also, considerable emphysema of the eyelids, etc., may form.

Optic Neuritis, etc.

The close proximity of the sphenoid cavity and of the posterior cells of the ethmoid (Onodi) to the optic nerve explains the nature of the eye symptoms connected with the affections of these cavities, namely, sudden loss of vision of one eye through compression of the optic nerve in the foramen opticum or by perineuritis, or exophthalmos through serous or purulent infiltration of the retrobulbar tissues.

Intermittent Exophthalmos.

There are two distinctive symptoms frequently combined with the exophthalmos caused by adnasal diseases, namely: (1) The exophthalmos is, at first at least, not permanent, but comes and goes. This is due to the periodical exacerbations which chronic adnasal empyemata frequently show, these again depending largely upon the freedom of the discharge or its obstruction. (2) The exophthalmos is usually com-

bined with more or less paralysis of the muscles of the eyeball through their inflammatory infiltration.

Papillitis.

The threatened affection of the optic nerve will be shown by hyperaemia or engorgement of the papilla, as observed by Kuhnt. The same author has also recorded three cases of thrombosis of the vena centralis retinae due to adnasal disease.

Other Eye Complications.

It is difficult to elucidate how far a complication of adnasal disease with iritis, choroiditis, and cyclitis, may be causal or simply accidental; enough that in some cases the eye trouble only improved when the adnasal disease was successfully treated.

Interesting is the observation of Eversbusch, who has several times seen a swelling of the middle turbinate body precede so called sympathetic inflammation of the other eye, so that in cases where there is any ground for fear he always and regularly examines the nose and advises enucleation of the affected eye as soon as nasal symptoms arise.

CEREBRAL COMPLICATIONS.

Whilst headache, neuralgic and other nervous symptoms are frequent concomitants of adnasal disease, more serious cerebral complications—as meningitis, cerebral abscess, and sinus thrombosis—are happily of comparatively rare occurrence. Nevertheless, Dreyfuss¹¹ was able to collect in 1896 the *post-mortem* histories of about 50 cases, and I have been able to find the records of 26 additional cases. But, if we consider, as Hajek says, that an accurate dissection of the nose and adnasal cavities is only exceptionally made, and that conspicuous macroscopic alterations which draw the attention of the pathologist to these organs may be absent, we must come to the conclusion that the sparing record of these complications is at least partly due to deficient examination.

In most of the recorded cases a perforation had taken place. This is either due to an inflammatory process or to syphilis, rarely to tuberculosis. In other cases the bone was found macroscopically intact, whilst the dura mater over it was inflamed and microscopic changes were present in the bone; occasionally no alterations could be detected in the bone, and the cerebral complications were due to infective thrombosis.

Empyema of the maxillary cavity seems the least to endanger cerebral complications. Dreyfuss records 5 such cases—1 of sinus-thrombosis, 4 of abscess in the frontal lobe. Cases in which an acute inflammation of the antrum was caused by an infection from a carious tooth (with or without extraction) with consecutive purulent thrombophlebitis and meningitis have long been known to the surgeon, and numbers of such cases are recorded.

Empyema of the frontal sinus is more frequently followed by cerebral complications. The mode of infection is usually perforation of the posterior frontal wall with consecutive abscess in the frontal lobe. The symptoms are in most cases of an insidious onset, as an abscess in the frontal lobe may be present without causing any distinct symptoms; even when these arise, they are usually of a more general nature, as rise in temperature, general *malaise*, etc., to which only later severe headache, vomiting, somnolence, and convulsions become added. When the left frontal lobe is affected mental changes arise, whilst they remain absent in right frontal abscess (Phelps); when the posterior frontal convolutions become involved, brachial and facial monoplegia, or, if on the left side, aphasia may be present.

The cases of cerebral complications, observed after ethmoid disease, were all of an extremely acute course. The infection usually takes place through the lamina cribrosa with consecutive frontal abscess or general meningitis.

In empyema of the sphenoid cavity the cerebral complications arose in most cases without perforation of the bony wall, a transmigration of the infective material having taken place through the diploë of the bone after a preceding periostitis. The intracranial affection often announces itself by sudden amaurosis through implication of the optic nerve, with consecutive meningitis, intradural abscess, or thrombosis of the sinus cavernosus.

CASE III.—In 1899 a girl, aged 18, presented herself at the Manchester Hospital for Consumption and Diseases of the Throat. She had suffered for some time from severe headache and a disagreeable discharge from the back of her throat. On rhinoscopic examination I found both nares filled with adherent crusts and pus in the nasopharynx. As the girl

had come at a late hour and on a busy day, and the symptoms presented no signs of urgency, I deferred further nasal examination and simply ordered a nasal douche. Two days later I was summoned to a coroner's inquest to explain what operation I had performed without permission of the parents, etc. Happily this had only consisted in the introduction of a nasal speculum and the rhinoscopic mirror—not even a probe had been used. It appeared that the patient, on her return from the hospital, had complained of increased headache, had in the course of the day become unconscious, and had died during the following night after several convulsive attacks. At the post-mortem examination a basal purulent meningitis was found and a perforation, probably of a syphilitic nature, in the sphenoid bone near the sella turcica.

Meningitis Affected by Eye Symptoms.

In many cases the meningitis or other cerebral symptoms arose consecutively to an orbital abscess or to one or another of the various eye complications before mentioned. Thus in one case blindness of both eyes developed eight days before the fatal meningitis (Duplay), in another strabismus was observed three weeks before basal meningitis (Grünwald), in another ptosis, dilated pupil, paralysis of eye muscles two weeks before basal meningitis (Demarquay), disease of visual power and ptosis before intradural abscess (Russell), blindness and exophthalmos of both eyes before basal meningitis (Raymond), etc.

Several cases of fatal meningitis have been observed after operation on the adnasal cavities, we will take it not because they were operated on, but on account of the operation being performed too late.

LITERATURE.

¹ Lindenthal, O., *Wien. klin. Woch.*, 1897, No. 15. ² Fraenkel, E., *Virchow's Archiv*, 1896, vol. xliii. ³ Weichselbaum, *Fortschritte d. Med.*, 1887. ⁴ Hajek, M., *Patholog. u. Therap. d. Nebenhöhlen d. Nase*, II, Aufl., Wien, 1903. ⁵ Grünwald, *Lehre von d. Nasenerkrankungen*, München, 1893. ⁶ Hack, *Ueb. Operative Behandlung*, Wiesbaden, 1884. ⁷ Onodi, A., *Arch. f. Laryngol.*, vol. xi, vol. xv, and *BRITISH MEDICAL JOURNAL*, November, 1904. ⁸ Kuhn, *Erkrankungen d. Stirnhöhlen*, 1895. ⁹ Ziem, *Monats. f. Ohrenheilk.*, 1893, etc. ¹⁰ Eversbusch, O., *Graefe-Memisch. Handb. d. Ges. Augenheilk.*, 61 and 62, Lieferg., 1903. ¹¹ Dreyfuss, *Krankh. d. Gehirns in Folge von Nasenerkrankungen*, Jena, 1896.

DISEASES OF THE NOSE IN THEIR RELATIONSHIP TO PATHOLOGICAL CONDITIONS OF OTHER ORGANS.

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NASAL obstruction is very common in the north of England, it is frequently overlooked, and its results on the development of children are most disastrous and far-reaching. The chief cause of nasal obstruction in infants is catarrh of the nasal mucous membrane. We know that the lower turbinated bones are (relatively) larger than in adults, and that the posterior and anterior ends of the mucous membrane of these bones are thickened. A slight catarrh of the mucous membrane will thus readily give rise to nasal obstruction. Infants are particularly liable to rhinitis; there is the possibility of infection during birth; they often lie in wet napkins, they are frequently nearly suffocated by flannel bandages, eiderdowns, etc., they crawl about on the cold and draughty floor or the dirty and dusty carpet. In elder children post-nasal growths are the commonest cause of nasal obstruction.

The results of nasal obstruction can be divided into two classes:

1. The effect on the general health and development of the child.

2. The effect on the neighbouring parts and organs.

The most disastrous result is the consequent arrested development of the lungs and chest. The upper part of the chest is generally fairly broad, but the lower part is narrow and contracted. If the child is rickety the deformity is, of course, more marked, but there can be very evident deformity without rickets. The children keep the mouth open, which gives them a stupid expression. They are languid and restless, irritable, sleep heavily, and often wake during the night and scream. They do not get on well at school, and they take a dislike to outdoor sports and exercise. Their speech is frequently much affected, and they have a tendency to stammer and stutter.

A very important question has recently been discussed, as to whether children with nasal obstruction are more liable to infection (local and general) than children who can breathe through the nose. We know, thanks to the excellent work of StClair Thomson and others, that no micro-organisms are found on the posterior parts of the healthy mucous membrane,

and that the air passing into the naso-pharynx through the normal nares is practically free from germs. These stick to the moist mucous membrane, and are destroyed there. In cases of nasal obstruction the mucous membrane and the tonsils become diseased, and the micro-organisms entering through the mouth settle on these affected parts, grow there very rapidly, and give rise to general and local infection—tubercle bacilli, diphtheria bacilli, germs of scarlet fever, measles, whooping-cough, etc.

In infants nasal obstruction is especially deleterious. Infants involuntarily breathe through the nose, and have frequently great difficulty in learning to breathe through the mouth. If you watch an infant asleep you will see that the tongue is pressed tightly against the hard palate, and that the breathing is entirely nasal. When there is nasal obstruction the infant does not readily adapt itself to mouth breathing; it sleeps restlessly, and is constantly waking and screaming. There is also increased difficulty in suckling. The child cannot suckle long together—it has to stop every few seconds to open the mouth and get breath. The result is imperfect oxidation of the blood, and impaired nutrition.

Nasal obstruction also affects the neighbouring organs and parts to a considerable extent. The mouth is generally open, and thus the muscles of the face and jaws become extended and relaxed. The gums are dry and inflamed, which often causes malformation and disease of the teeth. The hard palate is high and very arched. The upper front teeth become displaced. The nasal septum is bent. The mucous membrane of the nares is swollen, and often shows polypoid degeneration.

REFLEX SYMPTOMS.

We have all of us heard a great deal too much and are utterly sick of the so-called "nasal reflexes." At one time every disease or pain of the human body was proved, by nasal specialists, to be of nasal origin. Personally I do not believe that a small innocent spur of the nasal septum does give rise to hundreds of ailments. Numerous and varied reflex symptoms are, however, very frequently due to disease or irritation of the mucous membrane of the nares, and can be cured by local treatment of the same, and by that only. Many cases of asthma, hay fever, vasomotor rhinitis, spasm of the glottis, catarrh of the trachea, of the bronchi, irregular heart, cardialgia, conjunctivitis, asthenopia, contraction of the field of vision, neuralgia, megrim, epilepsy, vertigo, enuresis, hysteria, dysmenorrhoea, etc., are often of nasal origin, though of course not always.

Many cases of asthma are of nasal origin. In every case of asthma the nares should be most carefully examined, and any obstruction, polypus, etc., removed, and any diseased mucous membrane treated with the galvano-cautery. And yet I am constantly seeing cases of asthma which have been under treatment for years, and in which the nose has never been examined. Many of these I have relieved by treating the nares, but only after irreparable damage has been done to the patient's health and lungs.

In every case of hay fever the nares should also be examined and, if necessary, treated. Although cases of genuine hay fever are not very common in this country, a similar disease—so-called pseudo-hay fever—is very common. This is due to a condition of hypertrophy of the mucous membrane of the nares or to nasal polypi. Any change of temperature, dust, bad smell, can bring on symptoms similar to those of hay fever: sneezing, watery discharge, nasal obstruction, with severe headache, epiphora, etc. These cases can all be cured by the application of the galvano-cautery to the diseased mucous membrane or the use of the snare.

I do not for one moment wish to affirm that all cases of asthma and hay fever are due to nasal disease or nasal polypi; but many certainly are. If the nares are not normal they should always be treated. Even if this does not cure the asthma it must have a beneficial effect on the patient's general health and development. Francis has recently published a pamphlet on some 400 cases of asthma. He claims to have cured or relieved the majority of these by applying the galvano-cautery to the mucous membrane of the septum. Fleiss, of Berlin, recently wrote a paper on the connexion between the nose and the genital organs, which has raised a great deal of discussion. He examined and experimented on the nares of numerous women during the period of menstruation, and found that if you apply cocaine to the anterior part of the lower turbinate, or to the tubercle of the septum, you relieve the pain. If you destroy the mucous membrane over these areas, menstruation is permanently less painful. These