SOCIETIES' PROCEEDINGS

AUSTRIAN OTOLOGICAL SOCIETY

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By A. R. TWEEDIE

CASES

Acute Otitis Media with complete facial paralysis and extreme œdema of the postero-superior meatal wall. Spontaneous healing.—A. MARKUSSHON.

A woman, aged 56, had a severe attack of influenza on *December 18th,* 1930, associated with pain in the right ear six days later and a temperature of 38° C. The following day spontaneous perforation of the membrane occurred (with relief of pain), and six days later she developed complete facial paralysis, and was sent to the Hospital.

Examination—Right Ear.—Extreme œdema of the meatal walls preventing any view of the membrane. Slight purulent secretion. The tragus and ante-tragus were not involved. There was no post-aural tenderness.

Hearing—Right.—Conversation at 0·75 metres. Whisper a.c. Response to tuning fork tests, typical for middle-ear lesion. Left—normal.

Wassermann reaction, ocular and other examinations, negative. Operation was advised but declined, in spite of which the meatal œdema had so far subsided in two weeks' time that an injected but intact tympanic membrane could be seen, whilst the paralysis of the upper branch of the facial nerve had recovered, and hearing was improved to a conversation range of 5 metres; and, as one week later the membrane was no longer injected and all details were visible, the patient was discharged one month after admission, with almost complete recovery of all the branches of the 7th nerve.

Bilateral Deafness and loss of vestibular activity following injury.—E. RUTTIN.

A woman, aged 20, sustained a severe blow on her head by the fall of a mass of iron weighing 5 kg. on *July 27th,* 1932, owing to which she was unconscious for some five hours; no bleeding from the ears had occurred. On regaining consciousness she

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found she was deaf in both ears and had severe giddiness. The deafness improved slowly in the left ear in about a week, and at the end of three weeks only a slight disability remained, but complete deafness in the right ear had persisted. The giddiness slowly disappeared in some five weeks' time. Vomiting was present only the first day after the accident. Tinnitus on both sides persisted for some two weeks on the left side but was still present on the right.

She was first seen by the Exhibitor on *October 13th*, when both tympanic membranes were normal in appearance. There was no spontaneous nystagmus, but by-pointing with the right arm outwards and with the left arm inwards was present. The right ear was unresponsive to speech or tuning forks. The left ear had only a slight depreciation of hearing range and a slight reduction of bone conduction. Weber to the left.

On rotation, no response whatever could be obtained on either side in any position of the head, either as regards nystagmus, dizziness, by-pointing or head reaction, nor could any reaction be obtained by the caloric or galvanic test on either side.

Wassermann reaction, negative. X-ray examination, negative. Oculist's and Neurologist's report could suggest only some transitory lesion at the base of the brain.

The Exhibitor had considered that the lesion must have been due to some peripheral bleeding or fracture which, however, was not demonstrable by the X-ray examination.

On the question being raised as to what method of X-ray examination had been adopted, and as to whether it had been repeated since (as it was well known that fractures of the temporal bone which were not apparent at the first examination might, on repeated examinations, become obvious) Ruttin replied that the X-ray examination had been made in accordance with both Schüller's, Meyer's and Stenver's methods and that he well recognised the importance of repeating X-ray examination in such cases.

Chronic Suppurative Otitis Media with purulent Labyrinthitis, Meningitis, Saccus Empyema. Labyrinth Operation and Recovery.—E. SCHLANDER.

A man, aged 30, was admitted to Hospital on *July 29th*, 1932, with a history of recurrent attacks of otitis media on the left side, since childhood. Six days previously he had suddenly collapsed whilst at work, since when he had had severe sub-occipital headache and occasional vomiting.

Examination.—Temperature 39·5. Pulse 84. Patient was hardly able to stand and was rigid. The pupils reacted normally. There was coarse rotatory nystagmus to both sides, accompanied by transient loss of consciousness with frothing at the mouth.

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The eyeballs were tender on pressure. There was slight tenderness also over the cervical vertebrae. Neck stiffness. Kernig positive right, negative left. No Babinski reflex.

Ears.—Right—Chronic adhesive processes.

Left—No post-aural signs or symptoms. Meatus occupied with sanious fœtid pus. Granulations on the upper wall of the meatus made a view of the fundus impossible.

Hearing.—Right—Voice at 1·5 metres. Whisper at 0·5 metres.

Left—Complete deafness.

No fistula symptom. Coarse spontaneous nystagmus. By-pointing with both hands to the left.

C.S.F.—Turbid, pus. Marked polynuclear leucocytosis. Ocular fundi normal.

Operation.—The mastoid was small and sclerotic. Fistula in the posterior meatal wall leading to the antrum, which was much enlarged and occupied by a fœtid cholesteatoma. A large portion of the dura over the middle ear was already exposed and covered with granulations. The facial nerve also lay free in the middle ear, embedded in granulations.

The labyrinth was opened according to Neumann's method and was found to be filled with black necrotic material.

A meningitis operation according to the method of Neumann was performed. The dura of the middle cranial fossa was packed off, and Trautmann's triangle was exposed, when free pus appeared beneath the labyrinth. On further investigation of this area the saccus was exposed; it was the size of a cherry stone and was filled with pus. As its medial wall seemed to be involved also, the cerebellum was explored but no pus was found.

At the termination of the operation, Cylotropin 5 c.cm. was given, and this dose was repeated three times during the next week by intra-lumbar injections following lumbar puncture. The character of the cerebro-spinal fluid gradually improved in condition, with decrease of its cellular content. After four days' cultivation of the specimen taken the day after the operation, no growth was demonstrable. The patient's temperature gradually subsided and his general condition improved so that he was able to be discharged for further out-patient observation on *September 7th.*

Acute Lesion of the Cochlear Nerve following Lumbar Puncture.—H. FREY.

A woman, aged 42, was treated by diathermy, baths, etc., in *September*, 1932, in the Medical Department of the Hospital for chronic lumbago. The Wassermann reaction was negative and examination revealed no other trouble. In the course of general examination, however, lumbar puncture was carried out and about

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5 c.cm. of fluid were removed. Examination of the fluid showed a perfectly normal content and the Wassermann reaction was also negative.

Shortly after lumbar puncture the lumbar pains disappeared suddenly, but discomfort in the legs and feet continued whilst, at the same time, the patient complained of severe headache and thumping noises and deafness in the left ear, for which she was referred to the Exhibitor on *September 14th*, 1932.

Examination.—Tympanic membranes normal in appearance on both sides, with a perfectly normal functional condition on the right ; but, on the left side there was a marked depreciation of both air and bone conduction. Weber referred to the good ear. Rinne positive. Upper tone limit not particularly affected. Whisper at 3 metres. Normal vestibular condition and reaction.

Two days later the hearing in the left ear began to improve and the disturbance and the noises to lessen, and by *October 25th* Weber was not lateralised ; air and bone conduction had returned to normal, and the whisper range was over 7 metres.

The causative relation of lumbar puncture to this effect on the cochlear nerve was discussed and reference made to various other symptoms which had been observed following such procedure. The Exhibitor submitted in conclusion, that such an isolated effect on the cochlear nerve must occur very seldom and was not easy to explain.

Compression Nystagmus in a Case of Labyrinthotomy.
—G. BONDY.

A man, aged 30, was admitted to Hospital on *August 7th*, 1931, with the history that from the age of 10, following scarlet fever, there had been occasional otorrhœa on the left side, and that for the last two weeks he had noticed giddiness while he was washing or drying the ear. Further, the day before, the giddiness had become so continuous and so severe that he was not able to stand.

Examination.—Right ear—Membrane intact but indrawn.

Left ear—Moderate offensive otorrhœa.

On irrigation cholesteatomatous material was removed and a large defect of the outer attic wall was found.

Hearing.—Left—Nil. Spontaneous nystagmus towards the sound side. Headache, vomiting, giddiness. By-pointing towards the left. Slight fistula symptom. Caloric response. Left—Nil.

On rotation ten times to the right, no effect ; ten times to the left, nystagmus lasting 15 seconds. Kernig and Babinski, negative. Ocular fundi, normal. Internal examination, normal.

August 11th, 1931.—In the morning, subjectively improved. Fistula symptom not evident.

3 *p.m.*—Severe headache and rigor. Temperature 39·9.

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6 *p.m.*—Lumbar puncture—fluid under great pressure. 1,600 cells to the c.cm. After the puncture, Cheyne-Stokes breathing; drowsy.

7 *p.m.*—Radical operation—Antrum large and filled with cholesteatoma. Fistula of the horizontal canal filled with granulations which reached to the oval window. Neumann's labyrinth operation, during which about 1 cm. of the facial nerve was exposed. Exposure of the dura of both cranial fossae.

August 12th, 1931.—Temperature 36·8. Facial paralysis. No meningitic symptoms except slight headache. Intra-venous injections of Solganol and Osmon.

October 3rd, 1931.—Uneventful recovery. Patient discharged from Hospital but with the post-aural wound still open.

April 6th, 1932.—Post-aural wound closed by plastic operation.

June 28th, 1932. Further convalescence having been uneventful, the patient came complaining that the previous afternoon he had had slight pain in the ear, and that he had wakened in the night and found pus in the ear and on the pillow, but the pain had ceased. He also reported that for the last ten days, on washing and drying the ear, he had experienced slight giddiness. *On examination* the wound cavity was found to be discharging again from a point at which some sequestra had separated during his original convalescence. Pressure over the site of the removed promontory caused a backward movement of the head towards the sound side and three or four nystagmic movements towards the operated side; air compression induced nystagmus to the operated side.

These symptoms persisted unchanged until *October 20th*, when once more the wound cavity was dry and covered with a thin scar. Further examination then revealed spontaneous nystagmus to the right (sound side) and nystagmus either by direct pressure on the inner wall, or by air compression. Totally deaf in the left ear and unresponsive to the caloric test or to the galvanic test with 20 ma. Rotation in either direction, however, induced a nystagmus lasting 10 seconds.

Bondy drew attention to the fact that this case corresponded exactly with that of another he had shown in 1915, and that this agreement was important since, in both cases, the symptoms were associated with a suppurating cholesteatoma, circumscribed labyrinthitis and fistula; and in both a nystagmus was elicited by pressure on a suppurating area, posterior to the facial nerve. A simple explanation of this pressure nystagmus was not possible. It was only certain that it could not occur by influence of the endolymph, since it was impossible to assume a functional condition of the semi-circular canal.

At the present time, in spite of the complete lack of response of the left labyrinth to both caloric and galvanic stimuli, the

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result on rotation, owing to compensation, was a nystagmus in both directions lasting 10 seconds. It was this failure of response to the galvanic test that seemed to him of great importance. Formerly he would have regarded this as being due possibly to some error in the method of application, but in this case he had filled the wound cavity with wet wool so as to ensure that the current should be conducted to the inner wall of the operation cavity, and had applied the cathode thus directly into the ear, whilst the anode was held in the right hand. On raising the current to a strength of 20 ma. he had been unable to induce either nystagmus, dizziness, or any reaction movement, either by a constant flow of the current, or by opening or closing the circuit.

Ruttin, in commentary, pointed out that after the labyrinth operation, three possibilities remain :—

1. The labyrinth and nerve can be completely destroyed.
2. Some nerve elements may still be present in the labyrinth.
3. The labyrinth may be completely destroyed, but the stump of the nerve may still contain functioning fibres.

In the first place no reaction would be obtained ; but in the second and third, some remaining reaction might be possible. Such reaction, however, must be differentiated from the fistula symptom.

The stimuli which affect a sense organ are either " adequate " or " inadequate ".

According to the law of Müller, there is a specific sensation for every stimulus, but the " adequate " and " inadequate " stimuli are, as is known, not equal in their effect. The " adequate " stimulus causes sensations which are projected outwardly, whilst the " inadequate " stimulus causes subjective sensations ; that is to say, for the eyes, light is an " adequate " stimulus, but one can, by mechanical means such as pressure, by chemical irritation, or by galvanic application, cause sensations of light which are subjective, and all these stimuli are " inadequate " stimuli.

Sound is the " adequate " stimulus for the cochlear nerve. Mechanical stimuli such as pressure on the nerve stump, chemicals such as quinine or salicylic acid, or the galvanic current are " inadequate " stimuli, and cause only subjective sensations of hearing.

If we regard the vestibular apparatus as a sense organ, then its specific sensation is that of rotation and, just as the visible expression of light sensations in the eye is represented by the pupil reflex, so in the vestibular apparatus we have the appearance of nystagmus. The " adequate " stimulus for the vestibular nerve is the movement of the endolymph, whether this is caused by rotation, caloric effect, or mechanical action involved in the fistula test. " Inadequate " stimuli are pressure on the nerve without moving

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the endolymph ; e.g. chemical substances which induce giddiness, and galvanism.

Now the " adequate " stimulus can act only on the end organ ; e.g. light, only by means of the retina and not by means of the nerve stump ; sound, only by means of the cochlea, and not by means of the cochlear nerve stump, and so on ; and the movement of the endolymph only *viâ* the end-organs of the vestibular apparatus. If the vestibular apparatus is destroyed, it cannot be affected by any " adequate " stimulus and therefore there will be no fistula symptom, but this does not mean that the vestibular nerve does not respond to mechanical, chemical or galvanic stimuli. For the " inadequate " stimuli can affect the nerve even when the end apparatus is absent.

It seemed to him that when the labyrinth is destroyed, it is replaced with fibrous tissue in which there are still some nerve elements, as indeed can be seen by histological examination after the labyrinth operation, and it is these nervous elements which still react to pressure and cause nystagmus.

That, however, was the effect of an " inadequate " stimulus and not a stimulus conducted by means of the endolymph, thus no fistula symptom occurred in a physiological sense.

In his opinion, the phenomenon in this case was really due to such pressure in the proximity of a nerve stump containing some surviving fibres.

He would like to say a few words on the question of " compensation ".

He had described compensation as a condition that occurred after the destruction of one labyrinth, and which was expressed by the equal response of the nystagmus lasting about 10 seconds, with rotation in either direction. He had himself suggested that after destruction of one labyrinth, the effect of the endolymph movement in the remaining labyrinth—either to or from the ampulla, became equal, but this equalisation of action he really thought must take place in the central nuclei. The fact, however, that this compensation after the labyrinth operation did not become evident sometimes until some years later, and that this delay appeared almost always in those cases in which a slow total destruction had occurred, had led him to consider that the compensation was delayed by some remnant of nerve element in the labyrinth, probably because these nerve elements still constituted some path of conduction to the nuclei, and probably because such compensation could occur only when one nucleus no longer received any impulse.

He regarded the explanation of the phenomenon in Bondy's case as being due to the effect of mechanical transmission of pressure, *viâ* the tissue filling the labyrinth cavity, to the nerve stump.

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Eisinger asked how Ruttin would then explain the failure of any galvanic reaction, to which Ruttin answered that, with such a mass of fibrous tissue, a galvanic reaction could scarcely occur.

Bondy, in reply, pointed out that he had not shown the case as representing a fistula symptom, but a symptom due to pressure; and he did not think that failure to obtain galvanic reaction was due to the presence of dense fibrous tissue, since inspection of the operation showed that its walls were covered by a thin scar in immediate contact with the bone.

Cerebellar Abscess. Operation.—F. FREMEL.

A man, aged 38, who had suffered with a right otorrhœa associated with cholesteatoma since childhood, was admitted to Hospital on *October 7th*, 1932.

Examination.—Meatus narrowed. Otorrhœa. Deafness, but response to the caloric and rotation tests, typical fistula symptom present. Ocular fundi normal.

X-ray Examination.—Bone sclerotic, antrum scarcely visible, tegmen and bony sinus wall not apparently altered in condition. Sinus in normal position.

Cerebro-spinal Fluid.—Sterile. Headaches.

October 14th, 1932.—Operation. Cholesteatoma removed, dura of the middle cranial fossa exposed. Horizontal canal found to be invaded by granulations, which extended towards the oval window and the frontal semi-circular canal.

After the operation the headaches ceased, the patient felt extremely well, and the temperature was normal.

October 19th, 1932.—Facial paralysis. No response to the labyrinth tests. No fistula symptom. Cerebro-spinal fluid contained 8,000 cells to the c.cm., the majority of which were polymorphonuclears. Vomiting, but apart from this there were no meningeal symptoms.

Labyrinth operation.—On exposure, the semi-circular canal showed a black content. Granulations extended between the horizontal canal and the oval window, where the nerve appeared to be definitely diseased. Neumann's operation completed.

The day following the operation, the neurologist gave the following report: "Neck stiffness but without pain either on pressure or movement. Abdominal reflexes easily elicited. The right patellar reflex weak. Otherwise neurological examination, negative."

Pulse 100. Temperature 38·8. No headache, no psychical symptoms. No nystagmus.

During the next seven days the patient's general condition was good and the facial paralysis was definitely improving.

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October 22nd, 1932.—That is seven days after the labyrinth operation—severe nystagmus was suddenly noticed, but without any subjective discomfort to the patient. In character it was coarse, of the second grade, purely horizontal and directed to the diseased side but, on the eyes being directed to the left, that is the healthy side, a rotatory nystagmus occurred with, however, no feeling of giddiness and no by-pointing. Ocular fundi normal.

There was no doubt that this nystagmus was central in origin and that it originated from some lesion in the posterior cranial fossa. The nystagmus lasted six full days without any other symptoms, but on the seventh day the patient complained of slight headache. He was drowsy with a good appetite. On the eighth day adiodochokinesis occurred in the right extremity, and thus a clinical picture of cerebellar abscess was completed.

October 29th, 1932.—*Operation.*—The dura of both cranial fossae, on being detached, disclosed a large sequestrum, representing the upper portion of the petrous bone. Exploration of the posterior fossa revealed pus under pressure. The needle that was used for this purpose was left in position to act as a drain, but was replaced twenty-four hours later by a filiform drainage tube.

At the present time, the patient still had headache, was very sleepy, and the severe nystagmus was unaltered.

The Exhibitor drew attention to the fact that the only initial symptom of the cerebellar lesion was the "central" nystagmus, whilst the development of the other symptoms were not apparent till more than a week later.

Diplococcus lanceolatus, obtained as a pure culture from a case of "Secretory Middle-Ear Catarrh".—L. FORSCHNER.

A man, aged 30, applied for treatment in March, stating that for the last three days his hearing had been impaired on the right side. Examination revealed the picture of a so-called "secretorial catarrh" and the level of the obvious fluid content was easily to be seen through the membrane. The fluid was aspirated and the pathological report stated that it contained a pure culture of *Diplococcus lanceolatus*—an organism which is certainly rarely associated with this condition. The trouble subsided uneventfully in a few days and in one week the patient's hearing was normal.

Enteric Fever. Exacerbation of a Chronic Otitis Media with Fistula Symptom suggesting an Endocranial Complication. Radical Operation. Pulmonary Embolism. Death.—K. EISINGER.

A specimen was shown of a woman, aged 40, who was admitted to Hospital on *September 22nd*, 1932, with the history that she had suffered from a continuous otorrhœa in the right side since she was

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ten years old; and that, for the last five or six years, pressure in the neighbourhood of the meatus had induced giddiness, which latterly had become more severe. Sub-occipital headache had also existed for many years. Latterly the otorrhœa had become more profuse, associated with a rise of temperature to 38·6. No vomiting.

Examination on admission.—General condition robust. Temperature 38. Pupils normal. Slight pharyngitis.

Ears.—Right.—Otorrhœa, with polypus occupying the meatus. No post-aural signs. Absolute deafness both with the conversation tube and tuning forks. Fistula symptom easily elicited.

Left.—Normal in condition and function.

Cerebro-spinal Fluid.—Clear. Raised pressure, sterile. Four lymphocytes to the c.cm. Blood culture sterile.

September 23rd, 1932.—Operation.

Bone completely sclerosed, antrum small. Polypus and carious head of malleus all removed. Attic occupied by granulations. No fistula seen, but granulations extended from the ampullary end of the semi-circular canal to the oval window. Sinus and dura exposed and found to be normal in appearance.

Convalescence was anxious and various examinations failed to suggest a causative lesion for the continued raised temperature, coated tongue and general lack of recovery, except that on *September 29th*, blood from the lateral sinus (which otherwise appeared healthy) revealed the presence of culturable streptococci and staphylococci.

However on *October 4th*, further blood examination indicated Typhoid and Para-Typhoid B.

October 22nd, 1932.—Sudden death. *Post mortem* examination.—Pulmonary embolism.

Complete Obliteration of the Sinus above and below, with normal intermediate portion.—E. RUTTIN.

A child, aged 5 years, was admitted to Hospital on *September 10th*, 1932.

Otorrhœa unaccompanied by pain had first commenced in the previous August, but four days previously pain commenced and a post-aural swelling had developed the day before. *On examination*, a profuse pulsating otorrhœa was present with œdema of the postero-superior meatal wall, and a large fluctuating swelling behind the ear. Temperature 38·5. Marked apathy. No spontaneous nystagmus. No fistula symptom.

Cerebro-spinal Fluid.—Clear and sterile. Functional tests not applicable.

Operation was undertaken forthwith, when a large mastoid abscess and cholesteatoma was evacuated. No ossicles were

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visible; the sinus lay partially exposed and, as its condition did not appear healthy, it was further laid bare from above to below the bend. The wall of the middle fossa was also removed, but the underlying dura did not appear to be affected. The middle portion of the sinus was now punctured and blood aspirated, bleeding occurring at the puncture point, but further punctures of the upper limits of the previously exposed sinus did not reveal any fluid content.

The sinus was therefore slit up when, although its wall was found to be extremely thickened, the lumen was still present, with a smooth shining lining for about 1 cm. in its middle portion, whilst above and below this point the sinus was completely obliterated.

Under the circumstances, the jugular vein was not tied.

After an uninterrupted normal convalescence, the retro-auricular wound was healed on *October 28th*.

Streptococcal Mastoiditis with a peculiar course. —E. RUTTIN.

A girl, aged 19, was admitted to the Hospital on *September 19th*, 1932, with the history that, following an attack of influenza in *February*, she suffered with toothache on the left side, radiating to the left ear with general headache and a sanious otorrhœa on the left side.

The doctor in attendance diagnosed a furuncle and treated her accordingly, but the pain and otorrhœa continued, accompanied by tinnitus.

When first seen by the Exhibitor on admission, a localised area could be seen in the posterior superior meatal wall, which at first suggested a furuncle. Whilst, however, after two weeks' observation (although the tympanic membrane was normal, except for a slight infiltration, and the hearing was unaffected) a continuous purulent exudate was to be seen in this situation, an X-ray picture was taken, which showed a large cavity in the mastoid process, which suggested the presence of a cholesteatoma.

September 27th, 1932.—Operation.

Cortex thick, but a large cavity the size of a cherry was found, with a thin yellow, non-fœtid, purulent content, and the antrum was filled with granulations.

Convalescence uneventful. The culture of the pus showed streptococci. The case would appear therefore to be an infection of primary cholesteatoma with a fistula through the posterior meatal wall. The character of the otitis, however, did not correspond with an ordinary streptococcal infection, but rather to a condition caused by the *Streptococcus mucosus*.

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ROYAL SOCIETY OF MEDICINE—SECTION OF LARYNGOLOGY

March 3rd, 1933

President—MUSGRAVE WOODMAN, M.S.

Discussion on Acute and Chronic Inflammatory Disorders of the Ethmoidal and Sphenoidal Sinuses

The opening paper read by MM. FERNAND LEMAITRE and ANDRÉ AUBIN is published in this issue of the *Journal of Laryngology and Otology*, Vol. XLVIII, No. 9, pp. 585-94.

DISCUSSION.

A. LOWNDES YATES : The sinuses with which I propose to deal are the posterior ethmoidal and sphenoidal sinuses. There is considerable difference of opinion as to the pathological features of the discharge which justify the use of the term sinusitis. Some rhinologists include under this heading cases in which there is frank pus, others include those cases in which the sinus is filled with sterile mucus, and others, those cases in which there is no increase of secretion, but in which micro-organisms can be cultured from the scanty contents of the sinus. Rhinologists are tending to take a wider view of inflammatory conditions in the nasal sinuses.

In anterior sinusitis we can gain information from the condition of the mucous membrane in the region of the ostium of the sinus, and we have the aid of transillumination. In addition, radiography gives results which are more certain in anterior than in posterior sinusitis. The type of inflammation met with in the posterior sinuses differs little from that which affects the sinuses of the anterior group, but the diagnosis of the states of inflammation of these sinuses is more difficult because the mucous membrane on to which their contents are discharged is hidden from view and we rely on symptoms and on posterior rhinoscopy for diagnosis.

In any state of inflammation of a sinus, whether of the anterior or the posterior group, the final diagnosis must be made by the removal and examination of the contents of the sinus. In the posterior group of sinuses the results of inflammation may be far more serious than in the anterior group, for the following reasons :—

(1) The anatomical relations of the sinuses ; the carotid artery, the optic nerve and the Gasserian ganglion may come into close relationship with the outer wall of one of the posterior sinuses.

(2) Chronicity of the inflammation is liable to be established by reason of the lack of symptoms in cases of open sinusitis, and because the ostia of the sinuses discharge their contents on to an area of the mucous membrane which is neither in the inspiratory nor expiratory airway, and hence the sinus is not cleansed by sneezing.

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(3) The peculiarities of the lymphatic drainage of the mucous membrane on to which the sinuses discharge their contents are of importance. They drain by two routes, one of which follows the ordinary path pursued by the lymphatics from the remainder of the nose to the cervical glands; the other being more important, in that the lymphatic drainage is, in part, accomplished along the lymphatic sheaths of the olfactory nerves by which infected products may pass to the meninges.

The complications met with as a result of the inflammation of these sinuses are due to the spread of inflammation (*a*) to the optic nerve, producing optic neuritis, (*b*) by the internal carotid artery—spread by this route is stated to be associated with insanity (Pickworth),—and (*c*) by the fifth nerve, which Barnes suggests as a possible route in encephalitis lethargica.

As in inflammatory states which affect the other sinuses, there is, in some uncommon but important cases, a liability to spread of inflammation with complications as a result of treatment. This spread of inflammation seems to be found in those conditions in which the inflammation is maintained by the characteristics of micro-organisms rather than by the obstruction of the ostium of the sinus.

It is well recognised that there are many forms of inflammation of these sinuses in which treatment on accepted lines gives good results. There are a few forms of inflammation in which the accepted lines of treatment fail. The discovery of lysozyme by Fleming opened new avenues of investigation of this matter, and I have examined the discharge from a number of cases of sinusitis by the following simple technique :—

I place a drop of the discharge beneath a cover slip upon the warm stage of a microscope. Lymphocytes are generally seen and often some bacteria. After a certain lapse of time in one variety of discharge, the lymphocytes break down, the micro-organisms disappear, and a transparent fluid devoid of microscopical characteristics remains. In other cases polymorphonuclear cells are present and the solution of the micro-organisms is effected with increased rapidity.

In another type of discharge the lymphocytes break down, but the micro-organisms remain and in certain cases, if inspected the following day, the mucus is seen to contain a greater number of micro-organisms than when first examined. It is clear that the mucus is acting as a culture medium for the micro-organisms which are multiplying in it. Cases which show the first type of discharge, the type which has a high lysozymic factor by which the micro-organisms are destroyed, prove to be cases in which the inflammation is maintained by the obstruction in the ostium of the sinus. Cases in which the lysozymic factor is low and in which the micro-organisms

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are either not dissolved or multiply within the mucus prove to be cases of open sinusitis in which the inflammation is maintained by the character of the micro-organisms.

The micro-organisms may be staphylococci, streptococci, Pfeiffer's bacilli or pneumococci, but the type of micro-organism is not of primary importance. The determining factor in the maintenance of inflammation is that the micro-organism has acquired the power of multiplying in the mucus.

The rough measurement of the lysozymic factor therefore gives us a method which may assist materially in determining which form of treatment will suit the case and in which cases operation is likely to be followed by complications. I found that if the lysozymic factor was high, simple methods of drainage gave the best results. Drainage alone is necessary to effect a cure, and drainage is best accomplished in acute cases either by nature or by shrinkage of the mucous membrane with cocaine. Watery douches diminish the lysozymic power of the mucus and in the laboratory it can be demonstrated that dilution of a bactericidal mucus converts it into an efficient culture medium. For this reason watery solutions must not be used for douching or for intra-sinus lavage in acute rhinitis. Operation also lowers the lysozymic power and it is probably for this reason that the results of operation in acute states of inflammation are extremely bad.

When the lysozymic factor is low and micro-organisms multiply in the mucus, watery douches can be used, for there is no efficient lysozyme that will suffer from dilution. I can refer only briefly to the good results which follow diminution of the surface tension with sodium oleate or bile salts, especially when the douching fluid is caused to enter the sinuses by a modification of the displacement method of Proetz.

The treatment of closed sinusitis is to effect drainage either by causing opening of the ostium by palliative measures or by surgical drainage of a sinus. The treatment of open sinusitis is by palliative measures only, for drainage is already present and the inflammation is maintained by the ability of the micro-organisms to live in the mucus. It is therefore necessary that we should have more knowledge of the inflammatory state which we propose to relieve by treatment and it is probable that pathological investigations of the lysozyme can give us help in settling the form of treatment which will suit the case.

The estimation of the lysozyme seems to be of particular value in cases of posterior sinusitis, for in posterior sinusitis we cannot see the mucous membrane round the ostium and diagnosis is difficult.

HERBERT TILLEY : I will confine my remarks to chronic inflammation of the sphenoidal sinus. I am in entire agreement with Professor Lemaitre that chronic inflammation of this air-cell and

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of the posterior cells of the ethmoidal capsule is much more common than was formerly believed.

In so far as the sphenoidal sinus is concerned, there are at least three reasons why such a condition is frequently overlooked: (1) The relative inaccessibility of this air-cell when compared with that of the more anteriorly situated sinuses. Difficulties will be increased by high septal deviations. (2) The frequent co-existence of some pathological condition of the ethmoid capsule which alone might suffice to account for the symptoms. (3) Perhaps more important than either of these is the fact that in the frequent mild cases of chronic sphenoidal sinus inflammation, the subjective symptoms and objective manifestations are often far removed from the lesion which is causing them.

Anterior rhinoscopy may reveal no obvious nasal lesion, but frequently the lateral wall of the pharynx will be seen to be covered by a peculiarly adhesive, greyish-brown and dry secretion of mucus. Beneath this the lateral pharyngeal band is often swollen and hyperæmic.

Not seldom the laryngoscope will reveal that similar conditions are present in the larynx, and particularly in the inter-arytenoid region, which may be swollen and covered with sticky mucus.

In such cases the nasal endoscope enables the surgeon to obtain a clear view of the posterior choanae, and to detect the situation of pathological secretions, particularly those which appear to issue from the superior and middle meatus. If a purulent discharge be seen in those regions, it may be possible, with a long-bladed speculum, to press the middle turbinal outwards and see a pulsating drop of pus in the ostium of the sphenoidal sinus, and then to pass through it a suction cannula for the removal of pathological secretions from the air-cell.

One of the most characteristic signs of chronic suppurative inflammation of the posterior nasal sinuses is a purulent discharge with œdema of the mucous membrane of the olfactory sulcus.

If anterior and posterior rhinoscopy or nasal endoscopy fail to establish the diagnosis of chronic sphenoidal sinus inflammation, radiography, or the displacement method of Proetz may provide valuable information.

In obstructive conditions, more typical symptoms will be present, such as occipital, vertical or supra-orbital headache, and sometimes a distressing pain referred to the mastoid region.

The underlying principle of treatment is to provide for free, spontaneous and permanent drainage of the sinus, and this can be secured only by removal of its entire anterior wall.

From the operative point of view it may be well to add two warnings: (1) Never curette away the granulations within the sinus: if they are very prominent it is better to wipe them out

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with dry gauze pellets; the smaller ones will disappear if free drainage has been provided. It will be safer to leave the outer wall entirely alone. (2) If too radical a removal of the lower part of the anterior wall be made, the spheno-palatine artery may be wounded.

For a few days after removal of the anterior wall of the sinus, the opening appears to be blocked by an œdematous swelling resembling a polypus. This should not be interfered with because it invariably subsides.

P. WATSON-WILLIAMS: *Retrobulbar neuritis.*—This affection intimately concerns general medicine as well as our own domain, and interests me especially since it was the diagnostic problem which retrobulbar neuritis so often presents that originally suggested the method I have termed " suction-exploration " of the sinuses.

Retrobulbar neuritis occurs in affections in which rhinology plays no part, and when other differentiating signs are absent the diagnosis is obscured. Disseminated sclerosis is an outstanding example in point, for in this disease quite frequently one of the earliest, or indeed the only, symptom present is acute bulbar neuritis, indistinguishable from that due to sinusitis. However, the acute optic neuritis of disseminated sclerosis usually clears up in a few weeks, the disease itself is very slowly progressive and, so far, treatment is of no avail.

Retrobulbar neuritis is, however, quite another matter when it is due to infective sphenoidal sinusitis, not only as a menace to sight but also on account of grave risks from widespread blood-borne infection. In these circumstances it is wrong to watch and wait, for the importance of early diagnosis of sphenoidal sinus infection is enforced by the good results from its disinfection and drainage.

Towards the close of the last century frequent cures of canalicular optic neuritis following operation on the sphenoid and ethmoid cells were being reported, some of them cases in which no nasal discharge could be found. How to avoid needless operations when such cases were referred by ophthalmic and other colleagues—and, be it noted, without any such assistance as may nowadays be obtained from radiology—was really a problem. In my difficulty I bethought myself of the bacteriological examination of specimens aspirated from the sphenoidal sinuses so as to identify the pathogenic organisms, if present, and furthermore obtain irrefutable proofs of inflammatory reaction in the presence of polymorphonuclears and phagocytosis of the organisms and, thus having excluded possible error from accidental contamination, to differentiate the really infected sinus cases from the non-infective cases appertaining to neurology.

Since that time observations, conspicuously the researches of E. D. D. Davis, have proved the sinuses to be sterile in disseminated sclerosis, but on the other hand others, including myself, have

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recorded plentiful examples of retrobulbar neuritis due to sphenoidal sinusitis, which rapidly yielded to disinfection and drainage, the results being demonstrated and measured by the ophthalmic surgeon.

With the recent improvements in radiological technique and the help afforded by endo-rhinoscopy as well as by suction-exploration, there is little excuse for allowing cases of retrobulbar neuritis to drift with no effort to reach a correct differential diagnosis of its cause, and so distinguish those patients for whom the rhinologist can do so much good from those for whom the physician can do so little.

T. H. WHITTINGTON: One of the charms of ophthalmology is that it frequently leads to interesting " team work ", and this is so in the study of retrobulbar neuritis. Foster Moore, in the second edition of his *Medical Ophthalmology*, states that he has not seen a case in which he was fully satisfied that the condition was due to para-nasal sinusitis. Adie would have us believe that the great majority of cases seen by ophthalmologists are due to disseminated sclerosis. You, as rhinologists, have operated on cases in which you feel that sight was restored by your skilful treatment. Personally I have no doubt you are right. On the other hand, I do not remember a case of retrobulbar neuritis being referred by the rhinologist, but I not infrequently refer them to you.

The optic nerve is not homologous with the other cranial nerves. The first two neurones in the course of the visual impulse are situated in the retina, which is itself an outgrowth of the brain, and the fibres of the optic nerve are therefore an association tract, and may be considered an outlying part of the brain. These fibres, like those of the central nervous system, have no sheath of Schwann, are supported by neuroglia, closely surrounded by the pia arachnoid, and bathed in cerebro-spinal fluid, and the whole is surrounded by a tough dural sheath, from which, as in the spinal cord, connections cross the subdural space. As regards the sinuses, it is not in the cases with obvious purulent infection that the optic nerve is affected. It is in the chronic cases in which the infection passes through the bone, often of paper-like thinness. Plastic inflammation occurs between the dura and the pia arachnoid, as it may occur in disease of the spine, and by the combined effect of local pressure and local toxins, function is diminished. It is when the highly susceptible papillo-macular bundle (here in the centre of the nerve) is affected that the rapid loss of vision is noted by the patient.

What are the signs that would lead me, as an ophthalmologist, to suspect some such process, and therefore urge my rhinologist colleague to operate when he perhaps reports a " normal nose ". An analysis of the visual fields is the important thing. In the usual case of retrobulbar neuritis characterised by sudden unilateral loss

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of vision, with absence of—or scarcely any—signs at the optic disc, central scotoma, marked paracentral colour scotoma, and the peripheral field not affected—nine times out of ten we should be right in supposing it would recover spontaneously. But if there is a marked contraction of the peripheral field, signs of peripheral nerve bundle defects, and especially if these connect up with the central scotoma, then I visualise how these are being caused by a process outside the nerve and ask the rhinologist to go ahead. It is taken for granted that the fields of both eyes are examined and all other general examinations made.

T. C. GRAVES : Nasal sinus disease, and particularly sphenoidal disease, may cause, in addition to irritation of the peripheral sensory nerves and end-organs, cerebral and endocrine dysfunction, and thus produce varying degrees of disturbance of the intellectual life, the basal feeling tone and the primitive instinctive mechanisms—especially that of self-preservation—causing the subject to descend to lower levels of mental as well as physical efficiency.

These conclusions have followed an investigation into sinusitis in cases of mental disorder in the Birmingham Mental Hospitals during the last seven years, an investigation inspired by the counsel and carried out with the assistance of Mr. Musgrave Woodman and his colleagues.

The observations thus made were published in the *Journal of Mental Science*, 1932, lxxviii., 459.

The sequence of symptom-groups involving the nervous system, as an untreated sinusitis progresses, may be, if the patient survives, sensory, motor, metabolic, instinctive, feeling-tone, conative and intellectual disturbances, the last including disorders of attention, memory, judgment, perception and cognition. In the more advanced acute stages of the illness associated sensory disturbances caused by sinus disease, are perceived as hallucinations ; thus tinnitus aurium becomes imaginary " voices " whilst the delusions expressed in the acute and chronic stages are determined by the endogenous disturbances of feeling-tone and instinct.

A total of 1,225 cases, 601 male and 624 female have now been investigated by the Watson-Williams technique of suction exploration. Generally more than one sinus is involved in these psychotic cases. Out of a total of 1,001 cases in which positive clinical evidence was present the number of sinuses involved in individual cases was :—

One sinus in 277 cases, i.e. 28 per cent ; two sinuses in 288 ; three in 151 ; four in 148 ; five in 64 ; six in 73.

The incidence of involvement of the sphenoidal sinus is about half that of the antra. Antra alone or with others in 785 cases—397 males and 388 females. Ethmoids alone or with others in

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493 cases—247 males and 246 females. Sphenoids alone or with others in 352 cases—178 males and 174 females.

Whilst mental symptoms are not pathognomonic of disease of any one sinus, they seem to be much more pronounced in cases of disease of the sphenoidal sinus.

In some cases treatment of the disease may be followed by rapid diminution—having regard to the duration of the disease—and permanent disappearance of mental as well as allied symptoms; in other cases relapses are liable to occur. These relapses of psychotic symptoms are, however, the result of reactivation of the disease process of its extension to another sinus such as the sphenoid, and compare with the recurrence of headache in cases without psychotic symptoms.

In a case, notes of which are given below, the final inclusion of the sphenoidal sinus in the sinusitis seems to have been responsible for the appearance of a particularly severe psychosis. This case also illustrates the appearance and amelioration of psychotic symptoms in relation to the colder and warmer months of the year respectively, and their disappearance following drainage of the diseased sinuses.

A chocolate grinder, aged 46, of good stock, was admitted to the mental hospital, *January 24th*, 1929 (first certification). Severe influenza early in 1927 had been followed by an extremely depressed state, from which he had recovered by the following August. Early in 1928 a cold had been followed by another period of depression, and even by the next August he had not recovered as substantially as in the preceding year. With the return of the cooler months he again became depressed and, in spite of rest, and of hospital and convalescent home treatment, psychotic symptoms of depression, fear, and confusion continued with increasing severity until, and after, his admission to the mental hospital. His weight, which had fallen from an average of 13 st. to 8 st. 10 lb., fell further to 8 st. 5 lb.

On *February 25th*, 1929, suction-exploration of the sinuses revealed bilateral antral and right sphenoidal disease. The three sinuses were drained intranasally and the diseased tonsils were removed. Gradually, during the ensuing warmer months—especially after a course of non-specific protein therapy—the patient improved physically and mentally and was discharged on *October 10th*, 1929, from the mental hospital. He returned to work with the same firm, with whom he is still working. He has now passed through four winters without relapse and has regained his normal weight.

F. A. PICKWORTH (Birmingham) said that several years ago, as assistant to the late Sir Frederick Mott, he had begun the study of the pituitary gland in cases of mental disorder. Almost by accident it was noted that the adjacent sphenoidal sinus often contained pus. Since then as Director of the Joint Board of Research for Mental

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Disease, and with the encouragement and assistance of Dr. Graves, he had made the study of the sphenoidal sinus one of the chief lines of research of the Joint Board.

He showed a coloured sketch of a chronic infection of the sphenoidal sinus which contained yellow pus. Near by were to be seen the pituitary, the carotid arteries, and a portion of the Gasserian ganglion. It illustrated the anatomical possibility of chronic extension of the sepsis into (1) the most important endocrine gland of the whole body; (2) the blood supply of the brain; (3) the intracranial nerve structures.

Sluder (1910) had shown that cocaine, applied to the wall of the sphenoidal sinus, anæsthetised the central root of the fifth nerve, and it was therefore reasonable to infer that soluble bacterial products contained in the septic sinus shown would diffuse into the same structures in a manner similar to cocaine. Such absorption would account for the finding in mental hospital patients of (1) endocrine disturbances, by the action of toxins upon the pituitary gland; (2) nerve pareses and reflex phenomena, by the action of toxins on the nerve trunks; (3) histologically demonstrable vascular changes in small vessels of the brain, by the action of the toxin on the adjacent carotid arteries.

Not only toxins, but organisms themselves occasionally reached intracranial tissues from an infected sinus. Acute extensions often being fatal, such invasion by organisms was self-evident, but he thought that less severe, recoverable extensions were by no means uncommon. He had many times found organisms in the pituitary capsule, and in one case these were definitely associated with large masses of colloid, in which were embedded myriads of diplococci within the gland. A picture showed a large mass of colloid which separated the anterior and posterior lobes of the pituitary. This anatomical division of the gland constituents was found in several instances, but its significance was as yet doubtful; however, a correlation might be made with the clinical condition of Simmond's disease, in which severe wasting occurred.

Another specimen showed, in serial sections, the extension of diplococci into the sheath of the optic nerve.

Extensions of sepsis into the cancellous portions of the sphenoid were quite common; they were very tardy of resolution; the sinus membrane might be the first to resolve, so that streptococci were demonstrable in the bone when the sinus membrane seemed normal. As with other bone affections, these might remain latent for long periods, and were rarely associated with pus; tissue reaction seemed to be of the nature of a degenerative atrophy of the surrounding vessels, etc.

A specimen illustrated hyperplastic sphenoiditis associated with a perivasculitis of the carotid arteries of both sides. As all the

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toxic material which was absorbed into the artery was passed to brain tissue, where it was fixed by the lipoids, the correlation of the pathology with the clinical condition of violent homicidal mania associated with Huntington's chorea presented no difficulty.

A specimen was shown of a sphenoidal sinus containing pus. The carotid arteries were actually visible through the posterior wall of the sinus, and showed atheroma and irregularities of calibre. Even supposing that an unrecognised cause of general arteriosclerosis co-existed, there could hardly be any doubt that the sinus condition contributed to the pathological changes in the cerebral arteries.

T. B. LAYTON said that chronic sphenoidal sinus suppuration must be very rare; he had never yet absolutely assured himself that he had seen such a case.

That brought one to a consideration of the criteria on which the diagnosis was made. There was, on one hand, the diagnosis according to P. Watson-Williams and, on the other hand, the diagnosis according to Hajek. According to the latter, it was necessary to remove the posterior end of the middle turbinal bone, and then, a fortnight later, to examine the nose and to deal with the pus in the superior meatus, in the same critical way as one dealt with pus in the middle meatus when diagnosing an anterior sinusitis and to see whether it returned after it had been wiped away. If it did, one suspected that it came either from the sphenoidal sinus or the posterior ethmoidal sinus and then, by putting a little plug into the opening of the sphenoidal sinus and leaving it there from twelve to twenty-four hours, one made the diagnosis on what was then found. The question as to whether chronic suppuration of the sphenoidal sinus was common or was extraordinarily rare depended upon which of the diagnostic methods which he had mentioned one was prepared to rely on. He was not prepared to trust the Watson-Williams method of diagnosis by itself. It might be of value for leading one down to those cases which should be critically examined by Hajek's method, but the Watson-Williams method should not be used alone to diagnose suppuration of the sphenoidal sinus, and any work based upon that diagnosis could not be accepted. The report of the Board of Control stated that everyone doing this work must indicate in his report the exact technique upon which he had based his diagnosis, and unless in his (the speaker's) remaining years of practice he had reason to change his views, he would look with extreme scepticism upon work which had not been based upon the more careful and accurate diagnosis laid down by Hajek, or some process closely resembling it.

W. S. THACKER NEVILLE said that several years ago Proetz, of America, said that one could suck air out of a sinus and replace

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the air with drugs. Le Mée had introduced this method into France, and showed many cases in Paris. If it was true that one could suck air out of a sinus and put drugs in, it was better to do this than to give a spray of ephedrine. Every nasal patient who came to his (the speaker's) out-patient department was submitted to this method of investigation, no matter what was the matter with him. He cocainised the nose slightly, and told the patient to lie on a couch with the head back and the chin in line with the external auditory meatus; he then put in equal parts of lipiodol and olive oil, shut the opposite nostril, and asked the patient to say "K"; he used 10 lb. negative pressure. Then, by making the patient assume various postures, he induced lipiodol to enter the sphenoidal, maxillary and ethmoidal sinuses. He had never got it into the frontal sinus except in one case, on which he had already operated. The method was useless for diagnosing the thickness of the lining membrane of the sinuses, as the sinuses could not be filled by this method. As drugs could be made to stay in for four or five days, it was a good plan to fill the sinus periodically with ephedrine sulphate (8 c.cm. of a 0·5 per cent solution in saline) or with liquid paraffin. Lipiodol was used merely for investigation, and was useless for treatment. A pressure of not more than 1 lb. should be used at first in an acute case. An increase up to 10 lb. was quite bearable as the patient's condition improved.

J. A. GIBB said that he agreed with Mr. Layton. He had performed more than 2,000 operations on the nasal sinuses, but only six on the sphenoid, and in not more than twelve cases had he found disease in the sphenoid. He had operated in nine cases of retrobulbar neuritis, all cures. He had shown one at this meeting here to-day which had the classical features of retrobulbar neuritis. The vision was $\frac{6}{60}$ in the right eye, $\frac{6}{36}$ in the left, and in both eyes there was a complete scotoma for colours. Pus was exuding from both sphenoids; they were both opened, but with no result. There was pus in both maxillary antra; both were opened with no result. The patient was sent to a convalescent home for a time, and returned with the vision worse. After allowing the patient to rest, he opened both anterior ethmoids, with the result that there was a rapid recovery of vision.

E. D. D. DAVIS said he still maintained that in retrobulbar neuritis arising from nasal disease there were changes in the optic disc, and that it was an optic neuritis rather than loss of sight without physical signs. In such cases the disease in the sphenoid or posterior ethmoidal cells was obvious to the rhinologist. Œdema and pus could be seen in the sphenoidal region, and these sinuses would then be explored and drained. He did not consider that, in cases in which there were no physical signs and the skiagrams and aspiration were negative, retrobulbar neuritis was caused by

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nasal disease. Even then, if the neuritis progressed, the posterior nasal sinuses could be explored.

Œdema of the eyelids and of the orbit, diagnosed as orbital cellulitis, was sometimes treated by extensive incisions along the supra-orbital and infra-orbital margins, which led to permanent œdema of the lower eyelid and disfigurement. The majority of the cases of orbital cellulitis were due to nasal suppuration, and the nose should be attacked first and, at a later stage or if necessary at the same sitting, a limited incision could be made at the inner canthus of the eye, particularly if there was displacement of the eyeball.

W. STIRK ADAMS said the only facts which would convince Mr. Layton were those of morbid anatomy. If Mr. Layton would carry out serial *post mortem* examinations in hospital, opening every sphenoid whenever the head was being investigated, he would find more cases of sphenoidal sinus suppuration than he had been diagnosing. He (the speaker) had used the Watson-Williams technique, which had been taught to him by the President, and he had seen no reason for mistrusting it. Suppuration was not, however, the only evidence obtainable of inflammation ; there occurred a thickening of the lining membrane, which had not so far been mentioned ; that thickening, if present, could easily be felt by means of a trocar placed in the sphenoid.

BEDFORD RUSSELL said that at St. Bartholomew's Hospital extensive use had been made of the Proetz displacement method, from the diagnostic point of view, by the introduction of lipiodol. It was remarkably easy to discover a thickened lining membrane, and to find whether lipiodol was retained for longer than the seventy-two hours which Proetz had laid down as approximately the normal time. The method had also been used in the hospital for the treatment of headaches apparently due to sphenoidal or posterior ethmoidal disease. In some cases headaches had been cured easily by three instillations of ephedrine and saline.

CASES

Sphenoidal Sinusitis.—MUSGRAVE WOODMAN (President).

J.S., 39, male, was admitted with a diagnosis of a probable intracranial neoplasm.

He complained of headaches, which had been increasing in intensity for four years, causing some vomiting, affection of speech, and increased prominence of the eyes.

On examination.—A bad deviation of the septum to the right side was found, making a view of the posterior sinuses impossible on that side. A skiagram showed dullness of the right antrum and sphenoid.

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The septum was straightened and was found to have entirely prevented drainage on the right side. The right sphenoid was drained.

The symptoms definitely diminished after a few days. A fortnight ago the patient reported that he was perfectly well, free from pain, and back at work.

Sphenoidal and Ethmoidal Sinusitis with Hemianopia. —MUSGRAVE WOODMAN.

H.W., female, aged 56, came to hospital complaining of severe pain round each eye, frontal headaches and defective vision.

On examination.—A bilateral papillœdema was found most marked on the left side. This disappeared but a bi-nasal defect of the visual field remained. There was some post-nasal infection, the left antrum was dull on transillumination and a skiagram showed some haziness of the left posterior ethmoidal region.

On examination of the sinuses by suction puncture the wash-out from the left sphenoid was found to be hæmorrhagic. Cultures were made from the contents of the different sinuses, and *Staphylococcus aureus* grew on those from the left ethmoid and sphenoid. The pain diminished afterwards and there was some improvement in vision.

A fortnight later the left sphenoid was again washed out and a radical operation was performed.

The pain entirely disappeared after this and when the patient was seen a week ago the visual fields were almost normal.

Polypoid Ethmoiditis associated with Ipsiloteral and Progressive Loss of Vision.—F. J. CLEMINSON.

Female, aged 56. In *November*, 1923, this patient consulted Sir Arnold Lawson on account of failing vision in the right eye, with signs of retrobulbar neuritis. There was a long history of "nasal catarrh", for which she was referred to the Exhibitor. The right side of the nose contained a mass of polypi bathed in pus and arising from the ethmoid.

At operation the ethmoid was exenterated and the orbital plate, like most of the remainder of the bone, was found to be carious, and a small area of orbital fat was exposed. An orbital abscess developed and was opened by Sir Arnold Lawson six days later. Three weeks afterwards the patient was discharged healed. The vision had recovered its normal acuity in *January*, 1924, and there has been no recurrence of the polypi. During the last year she has had what she described as occasional slight "giddiness".

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Abstracts

Right Sphenoidal Sinusitis.—A. LOWNDES YATES.

Female, aged 38. Pain over right frontal and right occipital and mastoid region, six years ago. Pain ceased for two years after submucous resection of the septum and then recurred and was treated by repeated applications of cocaine. Injection of the sphenopalatine ganglion was refused by the patient. When first seen one year ago, 1 c.cm. of pus was washed out from the sphenoidal sinus and this was followed by relief of symptoms for one year. Three months ago the pain returned and was treated three weeks ago by displacement with relief of symptoms. All instrumental measures in the nose have caused reaction and the lysozyme factor in the discharge is low, the micro-organisms multiplying in the fluid. Operation has for this reason been deferred.

ABSTRACTS

EAR

Changes in the Auditory Apparatus in a Case of Bilateral Acoustic Tumour. DR. T. GERMAN (Recklinghausen). (*Monatsschrift für Ohrenheilkunde*, May, 1932.)

The frequency of the development of tumours in connection with the auditory nerves in contra-distinction to the other cranial nerves, and the bilateral situation in this disease, is of course well recognised. The author states that the cause of this predilection lies in the fact that in the neighbourhood of the cranial opening which transmits the nerves, embryonic fibrous tissue occurs between the nerve fibres, and especially, also, in the vestibular nerve at the point at which it divides into the superior and inferior branches.

The main reason for the publication of this case was the fact that although some thirty similar cases have already been published, according to the author, the number of those which had been subjected to histological investigation was extremely small.

Two components enter into the formation of these tumours: (1) Fibrous tissue, as is found elsewhere, and (2) a tissue which is a structure identical with the supporting tissue of the peripheral nerves.

The case on which the article is based, was that of a girl, aged 17, who first came under observation on December 19th, 1929. As the result of diseases during childhood, she was under-developed and so weak that she had to leave her school. Latterly, she had rapidly lost weight. She complained of evening headaches, with frequent vomiting after eating, dizziness and shivering whilst,

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