March 3rd, 1934.—As the septic temperature still continued, the internal jugular vein was ligatured. *March 6th*, 1934.—Temperature falling, but general condition still very serious. Cerebrospinal fluid slightly turbid. Pandy and Nonne-Apelt positive. One hundred and thirty cells to the c.cm. *March 7th*, 1934.—Cerebrospinal fluid, pressure normal, clear. Sixty cells to the c.cm. Pandy positive. Staphylococcus aureus on culture. *March 9th*, 1934.—As the condition became even worse, the temporo-sphenoidal lobe was again explored, when some 35 c.cm. of pus were evacuated. The pus contained hæmolytic streptococci which were also culturable.

No improvement followed these efforts and the child died on *March 14th*, 1934. The *post mortem* examination confirmed the presence of a temporo-sphenoidal abscess combined with generalized meningitis.

AUSTRIAN OTOLOGICAL SOCIETY

Meeting May 28th, 1934

Abstract of Proceedings from the Monatsschrift für Ohrenheilkunde, September, 1934

By A. R. TWEEDIE

CASES

Acute Mastoiditis. Thrombus of Sinus and Bulb. Secondary Abscess under the base of the Skull. Lung Abscess, recovery.—ERNST URBANTSCHITSCH.

A woman of 33 had been deaf in the left ear since 1924, as the result of influenza associated with a left-sided purulent otitis media of two weeks' duration.

At the end of *January*, 1934, continuous headache commenced, followed by left earache on *February 13th* and otorrhœa seven days later and, after yet another week, rigors with temperature of 41·2. She was admitted to the hospital on *February 27th*.

Examination.—Ears: Right, nothing abnormal detected. Left, muco-purulent otorrhœa, large central defect of the membrane, the remainder of which was injected and infiltrated. Post-aural condition normal. Rinne: right, positive; left, negative. Weber not lateralized. Bone conduction normal. Whisper: right, 6 metres; left, complete deafness. Spontaneous nystagmus. No fistula symptom.

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Caloric reaction.—Left, normal, but response was followed by a suspicion of an occasional change of the spontaneous nystagmus directed towards the right side, and a later test produced no response. The test was followed by pallor, loss of consciousness, tonic-clonic twitchings of the right side of the body and trismus.

Oculist's Report.—"Myopia. No optic neuritis. Fields normal."

Neurologist's Report.—"Pupils equal and react promptly to light and accommodation. Transient nystagmus to the right. Facial R. > L. Abdominal reflex, R. < L. Patella and Achilles reflex, R. > L. No Babinski, no foot clonus."

Diagnosis.—Lesion in left motor area (? left temporal lobe).

Blood Examination.—Leucocytes 10,900. No cloudiness of either nuclei or plasma. Immature polymorphs 1 per cent. Polynuclear 89 per cent. Lymphocytes 6 per cent. Monocytes 4 per cent.

March 1st, 1934.—*Operation.*—Mastoid process represented by a large excavation occupied by purulent granulation. Dura, middle fossa, and sinus examined but appeared to be normal. Pus sterile on culture.

March 6th, 1934.—As the temperature remained pyæmic and there were occasional shiverings, although there was no definite rigor, the sinus and bulb were exposed, and, on being opened, were found to contain blood-stained pus. The outer wall of the vein was therefore removed freely in both directions, and the common facial vein and internal jugular were ligated; but no thrombus was found in the latter, which was normal in appearance. The lower end of the jugular vein was sewn into the skin wound. In the pus from the thrombus, gram-positive bacilli and *streptococcus pyogenes* were found.

Although the patient improved very considerably after this operation, her condition was not altogether satisfactory, and on *March 23rd*, as there was a definite bronchitis, an X-ray examination was undertaken, which showed two small abscesses in the left upper lobe.

March 24th, 1934.—A swelling appeared in the neck, obviously associated with infection from the bulb, since pressure over the swelling expelled pus from the exposed vein. An incision was therefore made behind the left mastoid process up to the base of the skull, and a large abscess was opened. After a further anxious convalescence and treatment by intravenous injections of Trypaflavin, autogenous vaccines, Elektrokollargol, Emiten, Neosalvarsan, and Calcium Sandoz, the patient was definitely recovering by *April 10th*, but was kept under further similar treatment on account of the pulmonary condition which, according to further X-ray examination, had healed completely and spontaneously by *May 8th*, and she was discharged from hospital four days later.

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Societies' Proceedings

Post-operative Otogenous Meningitis. Newman's Meningitis Operation. Injection of Artificial Cerebrospinal Fluid. Recovery.—L. VERMES.

A little girl of 6 was admitted to hospital on *September 28th*, 1933, with an acute otitis media on the right side, for which a paracentesis was at once performed. As, however, she at once developed scarlet fever and diphtheria, she was transferred to a children's hospital where further local treatment was carried out by the Exhibitor.

Recovery from the general infection and the condition of the right ear were perfectly satisfactory with the usual palliative measures, until *October 31st*, when the temperature rose to 39° C., and the mastoid process was tender.

Blood Examination.

(Abbreviation references:

I.M.	Immature polymorphs.
M.P.	Mature polymorphs.
E.O.	Eosinophils.
B.A.	Basophils.
M.O.	Monocytes.
M.Y.	Myelocytes.
L.Y.	Lymphocytes.
P.L.	Plasma cells.)

Leucocytes 12,000; I.M., 1%; M.P., 65%; E.O., 5%; B.A.—M.O., 9·5%; L.Y., 24%.

Pus from the right ear showed numerous leucocytes, and a few diplococci. No signs of meningeal irritation. Other general examination, nothing abnormal detected. Evening temperature, 39·3° C.

At 7 p.m. the same day a right antrotomy was performed. The mastoid process was found to be well developed with a thin cortex. It was otherwise pneumatic, but the walls of the cells were softened everywhere, especially towards the apex of the mastoid, whilst the cells themselves were filled with infiltrated mucous membrane, and here and there, as also the antrum, with mucopus. All cell groups were exenterated in the usual manner of operation, resulting in a small exposure of the sinus, which appeared to be thickened and was covered by a streaky deposit. The emmissary vein was also exposed during the course of the operation.

Although the general condition of the patient gave no cause for anxiety, the temperature continued to vary from 38·9° C. to 39·3° C. and a further blood examination on *November 8th* showed leucocytes 27,000; I.M., 1·2%; M.P., 71·7%; E.O., 12%; B.A., 6%; M.O., 5·7%; L.Y., 18·9%; P.L., 6%, and gross

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toxic granulation of leucocytes; on lumbar puncture the pressure was found to be raised and the content of the cerebrospinal fluid showed 700 cells to the c.cm. Pandy and Nonne strongly positive. Great excess of polynuclear leucocytes, but no bacteria on direct examination.

Since, in addition to these symptoms and signs, there was now also a considerable change in the general condition (frontal headache and general lassitude) further interference was considered necessary, and at 3.30 p.m. the same day, Neumann's meningitis operation was performed, when the dura of the middle cranial fossa was found to be overlaid with a slight thready deposit, but the lateral sinus was only covered with granulations in the area which had been exposed at the original operation. Further aspiration of the sinus revealed only blood. Further lumbar puncture after the operation showed a cloudy cerebrospinal fluid under raised pressure, and 6,800 polymorph cells to the c.cm.

The following day the general condition was fairly good, although there was still headache. Intravenous injection of Cylotropin, 5 c.cm. Repeated lumbar puncture showed cerebrospinal fluid under slight pressure with a content of 2,800 cells to the c.cm.

November 10th.—Blood Examination.—Leucocytes 18,900; I.M., ·5%; M.P., 70%; E.O.—B.A.—M.O., 11·5%. Temperature: morning, 37·7°; evening, 38·8°. Intrathecal injection of 30 c.cm. artificial cerebrospinal fluid. Intravenous injection of Cylotropin, 5 c.cm., which latter was repeated in the evening.

Blood Examination.—Leucocytes, 22,400; I.M., 1%; M.P., 73%; E.O., 5%; M.O., 4%; L.Y., 21·2%. (Only in one leucocyte was any tonic granulation visible.)

Lumbar puncture clear. Eight hundred and seventy-two cells to the c.cm. Repeated lumbar puncture in the evening showed 648 cells to the c.cm., after which 30 c.cm. Artificial cerebrospinal fluid was injected.

November 12th.—Ocular examination, nothing abnormal detected. Morning temperature, 39·2° C.; evening, 39·5° C. Blood taken for culture. X-ray examination indicated no signs of infection in the apex of the pyramid. Repeated lumbar puncture morning and evening, followed by injection of artificial cerebrospinal fluid, showed 1,500 cells to the c.cm. in which hæmolytic streptococci were culturable. (No culturable content of the cerebrospinal fluid, apparently, had been obtained previously.—A.R.T.)

November 13th.—Morning, temperature 38·3° C. General condition good. No neck stiffness. Cerebrospinal fluid, cloudy. Four hundred and forty-eight cells to the c.cm.

November 14th.—Temperature, 38·1° C. Cerebrospinal fluid, cloudy.

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Blood Examination.—Leucocytes 16,800; I.M., ·5%; M.P., 61%; E.O., 3%; B.A., ·5%; M.O., 8%; L.Y., 26·5%; M.Y., ·5%.

November 15th.—Temperature, 38·2° C. Cerebrospinal fluid, opalescent. Seven hundred cells to the c.cm. 25 c.cm. artificial cerebrospinal fluid injected.

November 16th.—Morning, temperature not above 38° C.; evening, 38·2° C. Cerebrospinal fluid, opalescent. Eight hundred cells to the c.cm. 30 c.cm. artificial cerebrospinal fluid injected. Patient ill-humoured.

Temperature and general condition then improved, and on *November 27th* the cerebrospinal fluid was clear, with scarcely any raised pressure and only 340 cells to the c.cm.

December 9th.—Discharged from hospital.

December 24th.—Wound completely healed. Tympanic membrane normal in appearance. Whisper range at 8 metres.

In a lengthy discussion which followed O. MAYER submitted that the case in question, as described, represented an instance of circumscribed otogenous meningitis with a very favourable prognosis owing to the fact that, not only were there no clinical symptoms of meningitis, but also that the first appearance of hyperæsthesia of the skin and tenderness in the occipital region did not appear until after the first lumbar puncture; that no streptococci were demonstrable in the cerebrospinal fluid, and that not until after several punctures could streptococci be cultured in this fluid.

Such cases, as was well known, did recover. He therefore considered that the treatment carried out could not be regarded as an instance of improvement in meningitis therapy. The term "Meningitis operation" should be avoided, since it gave the idea that a new method of operation had been discovered by which one could cure meningitis. The efficiency of a free exposure of the dura, as was carried out in this case, had been practised a long while over the whole world, and its efficiency was supported on recognized pathological grounds. Any operation for the control of meningitis must have for its object the treatment of the cause and its inflammatory extensions. He was unable to regard the meningitis operation in any way as a new procedure.

E. RUTTIN considered that this operative method was certainly an advance. Neumann had never said that he had performed this operation in cases of meningitis originating from the labyrinth or in sinus thrombosis, cases which obviously called for corresponding operations. Neumann had especially emphasized that he performed his meningitis operation only in cases of meningitis following acute otitis media. The operation was a far more extensive procedure than was formerly practised and consisted in free exposure of both the middle and posterior cranial fossae, and systematic removal of

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the angle of the pyramid and a portion of the posterior bony wall, so that finally the pyramid of the petrous bone alone remained, isolated, with the surrounding parts removed. The method was, in his opinion, advantageous, as they had reached almost 50 per cent. of cures. Hæmolytic streptococcal infection, moveover, was not always the most unfavourable infection, and he could show a similar case in which a pure culture of this infection was present in the cerebrospinal fluid which he had treated with Solganol. The case under consideration, he admitted, was certainly not one of the most severe. He would again urge that Neumann's operation must be regarded as an advance.

K. EISINGER submitted that the remarks by Mayer had already been answered by Ruttin, but as Professor Neumann himself was not present, he wished to point out that Neumann had expressly emphasized the point that he did not offer this method as a panacea for otogenous meningitis, and quoted from Neumann's own description of the procedure and its application.

H. BRUNNER and R. LEIDLER pointed out that cases of scarlet fever could at times show cerebral symptoms similar to those of otitic meningitis; and this remark led to further consideration of the differential diagnosis in such cases.

Acute Otitis Media. Serous Meningitis. Meningitis Operation. Repeated Lumbar Puncture followed by Injections of Artificial Cerebrospinal Fluid. Recovery. —K. EISINGER.

A man, aged 68, was admitted to hospital on *February 23rd*, 1934, with the following history. Previously perfectly healthy. Eight years ago, influenza. Pleurisy, Christmas, 1933. *January 26th*, 1934, complained of bilateral earache, tinnitus and severe headache. The temperature was not raised and there was no otorrhœa.

He was treated for the earache by a local doctor with " drops ". Five days later, as the condition did not improve, he applied for treatment at the Clinic on *February 8th*, when examination showed no indication for his admission and the X-ray report indicated: " Right mastoid pneumatic with moderate definition and irregular cellular structure. Antrum and other cells hazy. No evidence of bone infection. Left similar to right side except that antrum and cells were clear."

February 23rd.—Re-examination by X-rays showed that the contour of the cells was much less definite. Ocular and general examination, nothing abnormal detected. Nose: septum deviated to the right. Mouth and Pharynx: tongue coated, tonsils healthy. Post-nasal space and larynx, nothing abnormal detected. Ears: (R.) No external lesion but the meatus was filled with secretion.

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Tympanic membrane intact, injected and no details visible. (L.) Meatus normal. Tympanic membrane slightly hazy. Malleolar plexus slightly injected. Otherwise nothing abnormal detected. Hearing: (R.) C.V. at 30 cm.; whisper nil. (L.) C.V. at 1 metre; whisper at $\frac{1}{2}$ metre. Rinne (right) negative. B.C. increased. Lower tone limit much reduced. Upper tone limit reduced.

Some days later the patient had a sore throat with raised temperature, but the otorrhœa had ceased.

March 7th.—Further X-ray examination showed no alteration from that previously seen and the result of puncture of the middle ear afforded no assistance, but the patient had a recurrence of sore throat, headache and rise of temperature. As, however, he had been exposed to scarlet fever infection he was submitted to examination by the physician, who could give no definite decision on this point.

On lumbar puncture the cerebrospinal fluid was found to be clear with a content represented by two-thirds lymphocytes and one third polynuclears. Under these conditions and a now falling temperature, further treatment was decided upon.

March 15th.—Temperature, 38° C. Left-sided headache.

March 16th.—Temperature, 39·8° C. Headache more severe. *Neurological examination.*—Nothing abnormal detected. Lumbar puncture, 2,000 cells to the c.cm. about half of which were polynuclears.

Operation.—Cortex thin. Cells occupied with typical "mucosus" granulations, especially the post-meatal and supra-bulbar groups. The typical meningitis operation was performed. Puncture of the sinus revealed normal bleeding.

March 17th.—Temperature, 38·3° C. Slight headache. Lumbar puncture: 30 c.cm. of slightly cloudy fluid withdrawn and 25 c.cm. of artificial fluid injected. Intravenous injection of Cyclotropin. Cerebrospinal fluid content, 16,000 cells to the c.cm., mostly polynuclear.

March 19th.—Temperature, 39·4° C. General condition considerably improved. Wound normal. Puncture of the sinus showed normal content. Lumbar puncture 30 c.cm. slightly cloudy fluid withdrawn and a similar amount of artificial fluid injected. Cerebrospinal fluid, 2,300 cells to the c.cm., mostly polynuclears.

March 21st.—Temperature, 38·2° C. Otherwise condition unchanged. On account of hæmaturia, injections of Cyclotropin were discontinued. Lumbar puncture, 10 c.cm. withdrawn, but the fluid was so mixed with blood that a cell count was impossible. From this point onwards the patient's condition steadily improved and four weeks after the operation he was discharged from hospital, cured.

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Abstracts

The patient was shown as representing:

1. An instance of suspected scarlet fever, complicated by a " mucosus " infection.
2. The sudden onset of meningitis.
3. The great diagnostic value of lumbar puncture.
4. The good result obtained by the " meningitis operation ", and injection of artificial cerebrospinal fluid.
5. The advanced age of the patient.

ABSTRACTS

EAR

" An analysis of the effects of repeated bodily rotation, with especial reference to the possible impairment of static equilibrium." O. H. MOWRER. (*Annals of O.R.L.*, 1934, xliii., 367.)

It has long been established that repeated bodily rotation (e.g. as among whirling dancers) will produce immunity to visual vertigo. The mechanism of this immunity is, however, in dispute. Certain persons, the subjects of repeated rotation experiments, have complained of more or less permanent impairment of static equilibrium, and it has been argued that this probably indicates damage to the peripheral organ. The experiments recorded here have been undertaken to elucidate this point.

Pigeons were used exclusively and their equilibratory ability gauged by means of a freely rotating perch, the movements of which could be recorded. It was found that repeated rotation periods over two weeks did not in the least affect the balancing ability of the experimented birds as against controls or against their own records prior to rotation, indeed if anything they had improved. Thus, concludes the author, it is proved that the mechanism of immunity is not due to damage to the peripheral organ.

E. J. GILROY GLASS.

Significant Anatomical Features of the Auditory Mechanism with special reference to the Late Fœtus. DOROTHY WOLFF. (*Annals of O.R.L.*, 1933, xlii., 1136-70, and 1934, xliii., 193-247.)

Early epochal investigations of the anatomy of the ear are reviewed. A routine method for procuring and preparing microscopic sections of the petrous portion of the human temporal bone is given. Detailed gross and microscopic observations of the auditory mechanism of a six months' premature fœtus of the American negro are made. A wax-plate model of the labyrinth

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