

in an infant of 4 months is my excuse for presenting such an incomplete case.

History.—On Jan. 24th, 1922, a young mother brought her first baby to see me on account of a severe attack of infantile eczema which had shown no improvement under various lines of treatment. The baby was 4 months old, and had been suffering from an eczematous eruption from the age of 7 weeks; apart from the rash he was a healthy-looking infant, well nourished, and not at all fractious. The eczema chiefly affected the scalp, face, and flexor surfaces of limbs, with a few scattered nummular lesions on the buttocks, the eruption being moist and crusted but not pustular. Birth had occurred at full term and was normal; the baby was suckled for a week, after which Allenburys No. 1 food was employed for two months, followed by modified cow's milk, the reason for the discontinuance of the breast feeding being the too common one of "all the milk leaving the breasts." The mother gave the following account of her baby's previous history: When three weeks old circumcision was performed, and five hours after the operation smart bleeding took place and the doctor in attendance found it necessary to suture the prepuce (I could not ascertain whether this had been done previously), after which healing occurred naturally, though the baby seemed "out of sorts" for several days; it was noticed that its hands and feet were always blue, but did not feel cold to the touch. At seven weeks eczema appeared on the cheeks and very quickly spread to the scalp and limbs.

Examination.—I examined the child on the afternoon of Jan. 24th and beyond the eczema could detect nothing unusual; the motions appeared normal, and the frequency of micturition was that of a healthy baby; there was no pyrexia, while the gums and buccal mucous membranes showed no sign of any infection. Apart from the skin eruption the child appeared remarkably well.

Admission to Hospital.—The baby was taken into hospital and put to bed about 5 P.M., receiving his first feed at 6 P.M. (modified cow's milk taken well with no regurgitation), after which he went to sleep, waking at 2 A.M. He was again fed, and went to sleep immediately, waking once more at 6 A.M., when he was given a third feed. Again he went to sleep, and at 8 A.M., when the day-nurse went to dress the eczema, she found the child sleeping and decided to leave him for half an hour, intending to carry out the dressing later; but on returning at 8.30 A.M. she was astonished to find the baby quite dead. He had made no cry, and had not even turned over; there was no cyanosis or frothing at the mouth, nothing to suggest a cause of death, and when informed I was at a loss to account for it.

Autopsy.—I notified the coroner, and was present at the autopsy carried out on the following day, when it was found that all the organs were healthy with the exception of the lungs and the heart. On opening the thorax it was clear that there was no gross or widespread disease, both lungs being of the beautiful pink colour seen only in infants and quite free from any adhesions or the presence of lymph, but on the surfaces of both lungs were several bluish marks about the size of a mustard seed which on closer examination proved to be minute subpleural hæmorrhages. There was no excess of fluid in the pleural cavity or in the pericardial sac when the latter was opened. The heart appeared normal in size and colour, but on section it was observed that the tricuspid valve was somewhat less smooth than normal, and perhaps a little pinker than might have been expected, though the right auricle and pulmonary artery appeared perfectly healthy. The mitral valve, however, was found to be gravely involved, the free edges and auricular surfaces of the flaps being extensively covered with a beautiful growth of soft vegetations, not large, and quite recent, being shiny and pink in colour and extremely friable. The heart of a baby four months old is so small that it was difficult to make any detailed dissection, but so far as could be ascertained at the time the openings of the coronary arteries were patent and there were no congenital defects of any kind present. The cause of death having been ascertained with sufficient accuracy for the coroner's court, it was decided to leave the further investigation of the heart to the pathological department of the University, but by a regrettable misunderstanding the mortuary attendant failed to preserve this extremely beautiful pathological specimen.

Remarks.

Though the discovery of this unexpected and surprising lesion determined the terminology of the death certificate, the essential cause of death was obscure. There had been no clinical signs of any pulmonary or cerebral disturbance, nor were there present any pathological features, such as pulmonary infarcts or thrombosis of cerebral blood-vessels to account for such a sudden death. The most likely explanation perhaps is the onset of ventricular fibrillation conse-

quent on the presence of an embolus in a coronary artery sufficiently small to have passed beyond the openings, so that no sign of its presence was ascertainable from the naked-eye appearances of these arterial channels. Acute endocarditis in infancy is of extreme rarity, apart from foetal endocarditis, and I think this case was one of acquired disease for the following reasons. First, a careful history of the mother's previous health and pregnancy failed to elicit any suggestion of rheumatism or any other illness conceivably transmitted through the placental blood; syphilis was excluded in both parents, and so far as could be discovered no ante-natal circumstances seemed possible as ætiological factors. Secondly, as occurs in acquired disease, the left side of the heart was much more seriously involved than the right, whereas in endocarditis of foetal origin the right side is usually more diseased. Thirdly, there were no congenital defects in the heart, a factor of some importance, as foetal endocarditis is much more likely if such defects are present.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

SECTION OF OTOTOLOGY.

A MEETING of this section of the Royal Society of Medicine was held on May 19th, Dr. LOGAN TURNER, the President, being in the chair.

The Resonating System in the Cochlea.

Mr. GEORGE WILKINSON read a paper on the part played by the cochlea in the perception and analysis of sound, demonstrating his views by the epidiascope and by means of an apparatus constructed on the basis of the human cochlea. Helmholtz had declared that the only mechanical means by which sound could be analysed into its component vibrations was by a series of resonators, and that still held good. Every alternative theory was based on the possibility of a central analysis of the sounds received—i.e., by the brain. A notable step in advance was Dr. Albert Gray's observation that the spiral ligament increased in bulk from the base to the apex of the cochlea, denoting that it acted as the organ of tension. This increased bulk was a definite factor whose significance had hitherto been too lightly regarded. Mr. Wilkinson contended that the basilar fibres were loaded by a mass of cochlear fluid, which moved as they moved. The displaced fluid would travel along the scala until the membrane closing the round window was bulged to a corresponding extent; and a similar quantity of fluid would be displaced in the opposite direction in the scala vestibuli. The result would be the same whether the movement originated from an impulse applied to the stapes, or from vibratory movements of the sector itself. The mass of fluid moved was invariable for each sector, did not depend on the amplitude of the movement, and could be defined as that of a double column of fluid, the base of which was equal in area to the surface of the sector, and the length to the sum of the distances of the sector from the round and oval windows. The mass of the sector itself was inconsiderable in comparison with that of the fluid constituting the load. The formula for vibrating strings was:—

$$n = \frac{1}{2} l \sqrt{\frac{t}{m}}. \text{ This became } n = \frac{1}{2} l \sqrt{\frac{t}{ab}}$$

when applied to the transverse sectors of the basilar membrane, d being the sum of the distances of the sector from the round and oval windows, and b the width of the sector. The helicotræma was the essential part of the analysing membrane, and the conception of the mechanism now advanced allowed for a capacity of 10 octaves.

The model demonstrated by Mr. Wilkinson was a brass box in two chambers, representing the scala vestibuli with the ductus cochlearis, and the scala tympani. A window, closed by a rubber membrane, opened into each, and to one of the membranes was attached a small wooden plunger, the stapes. The chambers were divided by the analogue of a basilar membrane, formed of strands of fine brass wire stretched transversely and plastered over. The tension on the threads was regulated by suspending from them a graduated series of weights, and the whole was filled with water. It was set in action by tuning-forks applied to the stapes. The compass of the strings was four octaves. A fine powder enabled the vibrations of the particular segment to be clearly seen.

Dr. ALBERT GRAY said that this piece of work was the most important contribution to their specialty that had been made for many years. He briefly sketched the steps which had been made in the knowledge on the subject, and said Mr. Wilkinson's was the first demonstration of the membrane vibrating in sympathy with harmonic vibrations. This third factor, the mass, was very important. When he (the speaker) wrote on the subject in 1900, the "telephone" theory held the field—i.e., that the nerve impulses were analysed in the brain; but opinion had now reverted to that of sympathetic resonance as the method of analysis. Some assumed the existence of pressure patterns in the basilar membrane, but no one had shown how they could be produced except by sympathetic resonance. He would be surprised if sounds could be shown to be analysed in any other way than by sympathetic resonance in the cochlea.

Sir JAMES DUNDAS-GRANT said that this demonstration was skilful and scientific. It now seemed quite clear that sounds were analysed in the cochlea, but they had to be compounded in the brain to enable us to appreciate the combined sensation.

Mr. WILKINSON, in the course of his reply, said he believed the analysis of sound was, in its ultimate stage, a measurement of very short intervals of time, a function which, in its essence, was mechanical. The inertia of the fluids would destroy anything like the pressure patterns which had been referred to. He disagreed with the view expressed as to brain analysis.

Exhibition of Cases and Specimens.

Sir JAMES DUNDAS-GRANT communicated some results of vestibular tests in a fatal case of cerebello-pontine tumour. He said the patient from whom the specimen exhibited was removed showed a very fine nystagmus to the right, and a very coarse nystagmus to the left. The caloric test, with cold air, in the right horizontal canal gave nystagmus after 30 seconds, but the right vertical one gave no nystagmus after 90 seconds. The patient had evidence of optic neuritis and paralysis of the left sixth nerve. The skiagram exhibited showed enlargement of the internal auditory meatus.

Dr. J. S. COLLIER and Mr. LIONEL COLLEDGE showed a case of malignant disease of temporal bone, involving cranial nerves in a man, aged 40, who complained in February last of headache and pain in the frontal region and of right facial paralysis. He was deaf on the right side, and the deep part of the meatus was filled by a red mass. There was no optic neuritis or inequality of pupils. The mastoid when opened was found to be full of growth; the facial nerve was exposed in the aqueduct for about a quarter of an inch, and there was a fistula into the external semicircular canal. The canals were removed as they were full of growth. The ossicles were also surrounded with growth, but no pus was encountered. Further exploration showed growth extending between the inner and the outer tables of the skull in every direction, so the operation was abandoned. The relief from pain and headache only lasted three weeks; then a boss the size of half-a-crown appeared on the right frontal bone, and another

just above the right ear; and there was evidence of involvement of the right cranial nerves from the seventh to the twelfth.

Mr. COLLEDGE sent for examination a girl, aged 16, who a year ago was operated upon for mastoid disease and meningitis secondary to suppuration of the right labyrinth. The cochlea was found to be full of pus. On three occasions the *Staphylococcus aureus* was cultivated from the cerebro-spinal fluid. The facial nerve was not seen, but a complete facial palsy resulted. As there was no improvement in six months, and reaction of degeneration was present, the hypoglossal nerve was divided, and the central end anastomosed to the peripheral end of the facial. The peripheral end of the hypoglossal was anastomosed to a slip from the spinal accessory. Some wasting of the right half of the tongue followed, but this was very slight, and all symptoms had now disappeared, except dissociated voluntary control of that side of the face.—Dr. DAN MCKENZIE, commenting on the dissociated movement, said he did not think operation had ever yet succeeded in obtaining for the patient emotional movement of the face—i.e., that responding to direct volition. The most striking change seen after the anastomosing operation was in the better tonus of the face and the removal of the blank lack of expression. There was not yet good reason for expecting a much better result from doing this operation than if the patient had been left alone.

TUBERCULOSIS SOCIETY OF GREAT BRITAIN.

A MEETING of this Society was held at the Margaret-street Hospital for Consumption on May 22nd, Dr. DE CARL WOODCOCK, Vice-President, being in the chair. A discussion was opened by Dr. H. WILSON, tuberculosis officer for Southwark, on

Therapeutic Measures for the Relief of Pulmonary Tuberculosis,

especially in relation to dispensary treatment. Dr. Wilson considered that as tuberculosis officers had given more time to the subject and had a more accurate knowledge of the pathology and conditions of the disease than the general practitioner, they would in most cases be able to give greater relief. In his opinion, it was a gross error—and a very prevalent one—to give cough mixtures to tuberculosis cases. He believed them to be detrimental to the digestive system. He then described the methods by which he had obtained the best results. He had found picrate of ammonia to be the best general tonic; he emphasised the value of calcium salts in general treatment, and recommended bismuth in large doses for diarrhoea.

Dr. F. E. GUNTER exhibited a series of charts showing the results of tuberculin treatment in a number of cases. Theoretically, he said, tuberculin was the right remedy and recent practice was to push its administration, but much remained to be known as to the correct groups of cases to which it could be satisfactorily applied. One group in which it had proved valuable was the asthmatic.

The meeting was then opened for discussion and there was criticism of the action of the Ministry of Health in attempting to restrict tuberculosis officers to making diagnoses only, and to instructing the general practitioner how to conduct the treatment. The consensus of the meeting was that the position adopted by the Ministry was detrimental to the best interests of the public; for it was absurd to create specialists and then deny them the right to use their special knowledge.

Dr. Alexander Blackhall-Morison has been elected a corresponding member of the Medico-Chirurgical Society in Edinburgh.

Sir George Makins has been appointed a director of the Clerical, Medical, and General Life Assurance Society to fill the vacancy caused by the death of Sir Alfred Pearce Gould.