further allusion. On the other hand, there was no direct anastomosis between the branches of the vagus and the trigeminus.

Dr. WATSON-WILLIAMS drew attention to the advantage of the suction exploratory method that he had brought before the Section at the Annual Meeting at Birmingham. They had used the exploratory syringe at Bristol in many hundreds of cases with most satisfactory result and without, so far, any untoward symptoms. By means of this syringe and antral cannula one could get, so to speak, a deep-sea fishing of the antral contents, whereas, with a Lichtwitz puncture it was open to the objection that if the amount of muco-pus was small it was impossible to say whether it had come from the antrum or the frontal or fronto-ethmoidal cells.

ROYAL SOCIETY OF MEDICINE.—OTOLOGICAL SECTION.

April 17, 1914.

MR. RICHARD LAKE, *President, in the Chair.*

Temporo-sphenoidal Abscess.—H. L. Whale, F.R.C.S.—Female, aged eight. History: Three weeks left otorrhœa; two days drowsiness, for which she was brought to hospital. Vomited once, just before admission. Condition on admission: Affected side—meatus occupied by pus and a polypus. No mastoid signs. Marked ptosis. Slight dimness of edge of optic disc. Opposite side—paresis of orbicularis oris; marked dimming of edge of optic disc; both of these signs cleared up within a few days. Temperature 79° F., pulse 100; knee-jerks normal. Normal but sluggish caloric responses of labyrinths. Lumbar puncture: Fluid came out at first rapidly, but after a few seconds ceased entirely. It was neutral, non-reducing, and contained a few lymphocytes and no albumin. Operation: Radical mastoid. A little pus in antrum. Tegmen antri removed; dura bulged to the size of a cherry; no suggestion of pulsation. Dura incised; immediate pulsation and hernia. Temporo-sphenoidal lobe explored in all possible directions; no pus found. Temperature rose to 99° F.; child much better; urotropine given. Fourteenth day: Temperature rose, reaching 104° F. on seventeenth day, with no rigor or convulsion; no other signs or symptoms except repeated projectile vomiting. Lumbar puncture: fluid under pressure; considerable increase of lymphocytes and some polymorphonuclears; culture sterile. After puncture vomiting ceased; temperature became subnormal; drowsiness again steadily increased. Second operation, twenty-fourth day: About 2 dr. of offensive pus evacuated from temporo-sphenoidal lobe; diphtheroid organism, (?) Hoffmann's bacillus, in pure culture. Drainage by tracheotomy tube. Drowsiness passed into coma. Death on twenty-eighth day, after evacuating $\frac{1}{2}$ oz. of pus. Autopsy: A large gangrenous abscess occupied the whole length of under surface of temporo-sphenoidal lobe, measuring about $3\frac{1}{2}$ in. by $\frac{3}{4}$ in. by $\frac{3}{4}$ in.

Dr. DUNDAS GRANT said there were two interesting features about

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the case: the presence of ptosis, indicating pressure on the third nerve by the temporo-sphenoidal abscess, and the paresis of the orbicularis oris on the opposite side, showing that there had been an overflowing of the trouble into the cortical centre for the opposite side of the face. This would indicate that the abscess was extending in a forward direction, and under such circumstances exploration would be more likely to succeed if directed rather forwards than directly above the tegmen.

Mr. WHALE, in reply, said that with regard to the exploring forwards, he did explore at least an inch in every direction, which was a good deal in this locality in a child aged eight, and he feared that if he went still further forward there would be risk of damaging the superior petrosal sinus.

Nerve Deafness associated with Anæmia.—Dan McKenzie.—Female patient, aged forty-one; came to hospital a month ago complaining of deafness and tinnitus of three months' duration. The hearing tests showed slight nerve deafness. Vestibular reactions: Caloric—right ear, exaggerated responses; violent nystagmus in twenty seconds with extensive vertigo. Left ear, similar results. The patient's evident anæmia led to a blood examination, which resulted as follows: Red cells, 4,000,000; white cells, 3500. Differential count: Leucocytes, 60 per cent.; lymphocytes, 40 per cent.; oxyphiles, 2·5 per cent. Red cells: Poikilocytosis; no erythroblasts—*i. e.*, anæmia; leucopenia (Wyatt Wingrave). The urine showed a trace of sugar but no albumin. The patient shows the lemon tint characteristic of the severe anæmias, and her teeth are one and all carious and affected with severe pyorrhœa.

The PRESIDENT (Mr. Richard Lake) thought it would be of advantage to know whether the blood-pressure was observed, though knowledge was not yet very exact as to the meaning of alterations in the blood-pressure.

Dr. W. MILLIGAN thought it was difficult to diagnose nerve deafness as being due to anæmia, because the actual diagnostic points were few and far between.

Dr. A. A. GRAY asked whether the pyorrhœa might not be regarded as having a causative effect on the tinnitus and deafness. Apparently there was an association between anæmia and nerve deafness, as also between deafness and other forms of intoxication, including that from the teeth. It would be interesting to know whether the deafness improved with the anæmia.

Dr. DUNDAS GRANT asked whether the hearing was diminished for the highest-pitched tones, which was usual in cases of labyrinthine deafness in comparison with central deafness.

Dr. DAN MCKENZIE said, in reply, that he ought perhaps to apologise for bringing the case forward at such an early stage, as he had only seen the patient once so far. The hearing power for high-pitched tones was reduced; the optic discs were not examined, neither was the blood-pressure. Dr. Gray's suggestion as to the direct causative influence of the pyorrhœa was impossible of exclusion, but it was well known that the severer forms of pyorrhœa were frequently associated with profound anæmia, especially hæmolytic anæmia, a disease which had been specially investigated in connection with pyorrhœa.

Fracture of the Base of the Skull with an Unusual Appearance of the Drum observed some Months after the Injury.—E. D. Davis.

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—A man, aged thirty-nine, sustained fracture of the base of the skull (diagnosis definite) on November 28, 1913. On March 12 last he came complaining of deafness, and stated that his doctor could see a piece of bone lying on the drum. Two small pieces of bone were removed from the meatus, and, on examination with a lens, one piece appeared to be like the head of the malleus, and the other like the two crura of the stapes, but there was nothing to prove that the fragments were pieces of those two ossicles and not fragments of the tegmen tympani. Deafness occurred after the injury, and is of the middle-ear type—Weber +; no loss of bone-conduction. Politzer by catheter no improvement, no perforation sound. When last seen a piece of bone, like that of the handle of the malleus, projected from the upper part of the drum.

The PRESIDENT thought there was extreme redness of the fundus, so that one could not exactly define the various parts. In fractures of the base of the skull the malleus had been known to have been fractured.

Dr. W. MILLIGAN said it looked like a fracture of the malleus with some callus thrown out. He had seen one similar case of fracture of the malleus. A man was sitting under an apple tree, when he suddenly raised his head, and a twig of the tree went right down the external auditory meatus, without injuring the wall in its passage, and fractured the malleus. He saw the condition when the two segments were movable, and he also saw it later when there was a lump similar to that now seen in this case. These cases of fracture of the base of the skull were sometimes remarkable for the way in which the patients recovered. He had seen a patient who had had a very large rupture through the membrane, and a considerable quantity of brain-tissue had come through the external meatus; recovery was absolute and uninterrupted.

Mr. E. D. DAVIS replied that, so far as could be ascertained, the handle of the malleus lay in front of the spicule of bone. He agreed that now the ear was red, and it was difficult to differentiate the parts; a clearer view had been possible.

Tuberculosis of the Mastoid.—E. D. Davis.—In February, 1910, a boy, aged eleven months, came to hospital with a glandular abscess of the superficial parotid glands, and enlarged posterior auricular and upper deep cervical glands on the left side, left otorrhœa, and left facial paralysis. The parotid abscess was opened, curetted, and the posterior auricular and cervical glands were removed. June, 1910: A radical mastoid operation was performed, and more caseating cervical glands were removed. Finally, twelve months later, as the mastoid was still suppurating, the area was opened up and the large sequestrum shown was removed from behind the lateral sinus. The disease is now arrested and the result is shown.

Dr. JOBSON HORNE regarded the case as a typical one of primary tuberculosis of the ear. The case presented features very characteristic; in fact, in his experience, pathognomonic of the primary as distinct from the secondary form of the disease. In the first place, the age of the patient was eleven months. Primary tuberculosis of the ear, in his experience, was a disease of child-life. Secondly, the remarkable enlargement of the adjacent lymphatic glands. The enlarged glands at times completely overshadowed the disease that led to their enlargement, with the result that the glands were removed and the disease left. The *rôle* of the lymphatic glands he had described as that of potential lines of defence, and also as that of potential paths of general invasion. Thirdly, the large size of the sequestrum removed from the temporal bone in

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this case. As far back as 1903, in opening a discussion on this subject in the Otological Society of the United Kingdom, he had raised the question whether tuberculosis of the ear in child-life should be regarded strictly as a form of middle-ear disease, in precisely the same sense as other forms of suppurative otitis media, or whether it should not more properly be grouped under the tuberculous diseases of bone. All the clinical evidence—and more than a quarter of a century ago it was pointed out that facial paralysis in a child might be the first clue to tuberculous disease of the ear—supported the view that the disease had a deep-seated origin in the bone, and the extensive ravages found already to have been made by the disease when a case was first brought under observation confirmed that opinion.

Dr. Dundas Grant thought that the course of events dwelt on in this case was particularly characteristic of early life; it was in young children with tuberculosis of the mastoid that one saw the separation of comparatively large sequestra, and in operating it was advisable to keep that well in view, and concentrate upon the sequestrum rather than on the carrying out of any set radical operation on the mastoid. There were various possible causes for the facial paralysis in this case; it might have been in the depth of the petrous bone, or near the sterno-mastoid foramen, or possibly it was due to involvement of the nerve in the tubercular process in the parotid lymphatic glands.

Mr. Somerville Hastings asked whether the tuberculosis in this case was primary. Most of the cases of tuberculous mastoid that he had seen were secondary to adenoids. He would like to know if adenoids had been present in this case, and if they existed now.

Dr. W. Milligan asked whether this child was breast-fed, or whether it had been fed with a spoon, and, if so, whether any investigation had been made as to the source of the milk which was used. He agreed with Dr. Grant that in these tubercular children it was a mistake to do any set operation on the mastoid; all that was necessary was to remove the diseased bone, and follow up the various tracts of infection. He dissented from the view of Dr. Jobson Horne that the tuberculosis was primarily in the bone; he thought it was an infection of mucous membrane, and that the bone followed early. It was advisable, in connection with operations, to leave the glands for a time; they acted as a first line of defence, and hence served a useful purpose. Many of the glands were the result of septic infection. If any glands were found to be tuberculous they could be removed afterwards.

Mr. Whale said that in a case of tuberculosis of this region, which he had under care, he decided to do first the bony part of the operation and leave the glands till later. But before healing of the mastoid set in all the glands broke down, and the result was a very bad neck, causing him to regret that he had not dealt with the glands immediately on making the diagnosis, so that the wound might perhaps have closed by primary intention.

Mr. E. D. Davis replied that when the child appeared at the hospital there was a huge parotid abscess and a mass of caseating glands at the lobe of the ear. Operation was done the same morning, as the glands were suppurating. The child was then given tuberculin in small doses, but it did not seem to make much difference. Later the radical mastoid operation was done, and subsequently, at a second operation, a large sequestrum was found at the posterior part of the mastoid process and behind the lateral sinus. After the removal of the large sequestrum the child did well. The good result was largely due to the mother, who

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never missed bringing the child to hospital, and she bestowed great attention to the case. There were other children in the family, and she had fed them all at the breast until the tenth month of life. The child had adenoids. After it was clear that the mastoid operation was doing well, he removed a large adenoid growth and the tonsils. In the light of the subsequent history, it would have been better to have done the mastoid operation at first; but the child was obviously urgently ill with a large abscess.

Post-mortem Specimen of a Tuberculous Temporal Bone.[1]—**E. D. Davis.**—The patient had suffered for some years from pulmonary tuberculosis. During sanatorium treatment he developed mastoiditis and facial paralysis, following chronic otorrhœa. At the time of the radical mastoid operation he was suffering from advanced laryngeal and pulmonary tuberculosis. The mastoid process was extensively involved, and in removing the focus of disease a large area of the dura mater of the middle fossa was exposed. The post-aural wound healed by first intention, and the patient left the hospital after ten days with the symptoms relieved and health improved. When seen about six months before death, the mastoid cavity was satisfactory. The *post-mortem* showed extensive laryngeal, pulmonary, and intestinal tuberculosis. The middle fossa dura mater was thickened and the exposed area covered by tuberculous granulation tissue. The petrous bone below the dura and surrounding the opening made at the operation was necrosed. The brain was normal, and the meninges, apart from those in immediate relation to the area of operation, were unaffected.

Dr. Jobson Horne, upon the histological evidence, regarded the case as one of secondary tuberculosis of the ear. It formed an instructive contrast with the previous case of primary tuberculosis of the ear. It brought out the interesting fact that whereas in the primary form of the disease children not uncommonly died from a diffuse tuberculous meningitis—part of a general infection and not a direct extension of the disease—in the secondary form of the disease the meninges, apart from the direct local infection, escaped. In this case, although *post-mortem* there was found extensive laryngeal, pulmonary and intestinal tuberculosis, the brain was normal, and the meninges, excepting those in immediate relation to the area of operation, were not affected.

Ossiculectomy.—**E. D. Davis.**—Man, aged thirty-six, with chronic attic suppuration of the left ear, treated by intra-tympanic syringing, etc., with no improvement, required a submucous resection, and, with the same anæsthetic, ossiculectomy was performed. The patient has arrested pulmonary tuberculosis.

Dr. Dundas Grant said that in chronic attic suppuration, if it did not yield to syringing, as in this case, the question arose whether it should be treated by enlarging the attic opening and removing the outer wall of the attic; or whether it should be drained from below by removing the ossicles. In this decision the operator should be much influenced by the state of the tympanic membrane below and whether the ossicles were of any use for hearing purposes. In many instances of attic suppuration the hearing was very good. He asked as to the condition of the lower part of the membrane, and whether the ossicles appeared to be mobile.

[1] Journ. of Laryngol., Rhinol., and Otol., vol. xxviii, p. 540.

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On the other hand, he strongly advocated the removal of the ossicles when the membrane was destroyed to any great extent and hearing was much reduced, and when the ossicles were perhaps glued together and acting only as an obstruction to the escape of cholesteatomatous masses or other septic materials, which would wander into other channels if a free escape were not provided.

Dr. W. MILLIGAN thought ossiculectomy a disappointing operation. When disease was present in the attic it was invariably associated with disease in the antrum, and the proper course was to leave the lower part of the membrane and the ossicular chain alone to open into the antrum from the posterior wall. Then one obtained good results, because the suppuration was arrested and good hearing ensued.

Dr. FITZGERALD POWELL said the ear was still suppurating. The mastoid operation would have been more satisfactory, and the hearing would have been as good as now.

Dr. JOBSON HORNE, speaking quite generally, expressed himself as opposed to intra-tympanic tinkering. Caseous ossicles meant suppurative disease in the attic, if not also in the antrum and the mastoid, and that disease could not be cured by removing the ossicles. Sooner or later the case came to a mastoid operation, and he preferred to do it in the first instance.

Dr. A. A. GRAY said he agreed with Dr. Milligan and Dr. Horne in reference to ordinary cases, but what would make him hesitate about the radical mastoid operation in this particular case was that the patient had arrested tuberculosis. If the tuberculosis were to become again active, possibly Mr. Davis might have been blamed for causing the recrudescence.

Mr. E. D. DAVIS replied that he had watched the case for twelve months. The patient was at Mount Vernon Hospital, and had arrested pulmonary tuberculosis. He had a discharge from the ear, and a forward perforation of the attic, with granulation tissue. He also had nasal symptoms, and required submucous resection. The hearing was not good. It was then decided to do ossiculectomy at the same time. The ear was operated upon six weeks ago, and until ten days ago was dry. At the end of a week it seemed to be doing very well, but when he saw the man three days ago there was some discharge and œdema of the mucous membrane of the tympanum. He did not care to perform the radical mastoid operation on a man who had arrested pulmonary tuberculosis, and who had no signs or symptoms of mastoid disease.

Post-mortem Specimen of Malignant Disease of the Ear.—G. Stebbing and **G. J. Jenkins.**—The case described on February 20, as follows: Male, aged sixty-one. History: Patient first noticed swelling on right side of the neck, which appeared about two months ago, and about the same time, or soon afterwards, he noticed a change in the right side of the face. About a month ago the discharge and occasional bleeding from the right ear began. Some tinnitus since the onset, but deafness noticed only recently. Hoarseness two to three weeks. Dysphagia about ten days. Pain about two weeks. He had earache and discharge from the right ear when aged about twenty. No history of vertigo. Condition on examination: Patient has a swelling on the right side of the neck, involving the region of the lower part of the mastoid and extending downwards to the level of the thyroid cartilage, backwards to the posterior border of the sterno-mastoid muscle, and forwards to the angle of the jaw. Complete paralysis of the seventh

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cranial nerve; eleventh and twelfth cranial nerves also paralysed. Soft, readily bleeding polypus showing at the orifice of the right external auditory meatus. The patient died about the middle of March. The specimen includes the temporal bone, pinna, Eustachian tube, part of pharynx, tongue, larynx, œsophagus and enlarged glands, all in one piece. The growth involves the middle fossa of the skull. Suggestions are invited as to how to make the best use of such a specimen.

The PRESIDENT said he would be inclined to make a longitudinal section of it.

Dr. JOBSON HORNE considered that it would be as well for the present to mount the specimen as a whole by the formalin method and to defer the cutting of it until the special points to be investigated had been decided upon.

Dr. W. MILLIGAN said he would cut it obliquely from the meatus through the petrous bone to the apex; he would have the two sides so mounted that one could see the growth in the external ear, and the invasion of the middle ear and middle fossa.

Dr. A. A. GRAY said that before cutting sections he would decalcify, and then do the cutting with a very sharp, large microtome knife, making the serial sections $\frac{1}{4}$ in. thick, preserving them in formalin or glycerine, with a black background. However carefully done, sawing through distorted the parts to some degree, and the use of a sharp microtome knife would be better.

Mr. SOMERVILLE HASTINGS said he hoped that whatever Mr. Jenkins did he would show, later, microscopic sections of the growth. He would like to know from what part of the aural tract the growth was thought to have sprung originally.

Mr. JENKINS replied that he could make microscopical sections of the whole of that temporal bone, and the pinna, but if he did that, he would like to know whether there was any particular direction in which he should cut the sections. He did not know what was the nature of the new growth. The small size of the malignant polypus with very extensive involvement of deeper structure, including the middle fossa and glands of the neck, were very striking. These cases were often operated upon for enlarged glands rather than for malignant disease of the ear. This specimen pressed home the lesson that if there were glands which appeared to be malignant the ear should be carefully examined.

Hæmatoma Auris.—G. J. Jenkins.—This patient was exhibited at the meeting on January 16, and the members requested that she should be shown at a later date. The operation was done on December 20, the day following the injury.

The PRESIDENT said he thought it was tending towards a very excellent result. He suggested a course of X-ray applications to get rid of the hyperæmic condition remaining.

Dr. FITZGERALD POWELL asked what was the method of dealing with the hæmatoma.

Mr. JENKINS, in reply, said an incision was made in front of the helix, and a clot which was lying external to the cartilage turned out. This clot extended well into the meatus. He returned the flap into position, and tried to retain it there. It would be seen now, on careful examination, that there was a slight malposition of the perichondrium, but he thought the result justified the procedure. In some cases possibly the method would not answer so well.

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Demonstration of Microscopical Specimens.—G. J. Jenkins.—(*a*) *Otosclerosis: Serial Microscopic Sections of the Left Temporal Bone of a Female, aged fifty-nine, showing Ankylosis of the Stapes and other Changes in the region of the Foramen Ovale.*—The patient on the left side was able to hear only "loud shouting" in the ear; she could not distinguish any words. The specimen was removed about ten hours after death, and fixed in formalin in normal saline solution. The specimen was decalcified by the formalin and nitric acid method, described at a previous meeting, and embedded in celloidin. The sections were made transverse to the long axis of the petrous portion of the bone, and cut 12·5 μ in thickness. Every second section from the modiolus to the vertical part of the seventh nerve had been mounted. The sections were stained in a variety of ways —hæmatoxylin and orange G., Mallory and Van Giesen, iron hæmatoxylin. A series of sections were demonstrated under the microscope and by the epidiascope. An obvious feature in the series was the complete replacement of the stapes and surrounding bone by a new bone formation. The new bone representing the stapes was completely ankylosed or fused with the surrounding bone anteriorly, superiorly or posteriorly. There was an indication, at parts, of the original joint inferiorly. This new bone formation was very different from that found normally in these situations. It was cancellous in type, with large medullary spaces containing cells of a variety of forms. The most interesting feature of this part were the *large giant cells* in the mass representing the stapes. These giant cells contained five to twelve nuclei, had a protoplasm that stained strongly, and a well-defined outline. The nuclei were irregularly arranged usually, but in many cases they were peripheral. Mr. Jenkins had not seen giant cells of this type before in any condition, and had not heard of them being described in otosclerosis. Other features he thought worth noting were the diminution in size of the foramen ovale, the great thickness of the mass replacing the stapes, and the thickening of the margin of the foramen. He had not been able to detect any changes in the bone in any other part than in the immediate neighbourhood of the foramen ovale. The regions of the foramen rotundum and interossicular joints seemed normal.

(*b*) *Acute Mastoiditis, Septic Labyrinthitis and Facial Paralysis: Serial Microscopic Sections of the Mastoid, Labyrinth and Middle-ear Tract of the Temporal Bone of a Male, aged thirty-two.*—The patient was admitted into an institution seriously ill with phthisis, and also suffering from deafness and otorrhœa in the left ear. A complete clinical examination was impossible. About ten days before death he was said to have had more trouble in the ear, and developed facial paralysis on that side. The specimen was removed about fourteen hours after death, and fixed in formalin and normal saline solution. It was decalcified by the formalin and nitric acid method, and embedded in celloidin. The sections were cut 15 μ in thickness in the coronal plane. The sections through the mastoid and antrum showed pus in the antrum, with loss of lining membrane of the space. The mastoid was of the infantile (dense) type, and the fine medullary spaces infero-external to the antrum showed a marked leucocytosis. The leucocytosis extended into the canal of the seventh nerve as low as and into the canal for the chorda tympani nerve. Masses of leucocytes in the perilymphatic space of the external posterior and superior canals, and fibrinous deposits in the endo-lymphatic spaces of these canals. Sections farther forward showed total loss of the tympanic membrane, malleus, and incus. There were small sequestra in various parts, lying in pus. The tympanic wall of the

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Aqueductus Fallopii was sequestrated in many places, and the canal contained pus. In the region of the foramen ovale the bone exhibited all the appearance of otosclerosis, and a stream of pus could be detected between the stapes and margin of the foramen. The vestibule was filled with pus. The endo-lymphatic space contained a few leucocytes, and was filled with fibrinous material. There was a fistula of the promontory, and a pus stream could be seen between cochlea and the middle ear. The membrane of the foramen rotundum persisted only at the inner part, elsewhere it was destroyed, and the cochlea laid open into the middle ear.

Dr. A. A. Gray said that with regard to the presence of giant cells in otosclerosis, the giant cells were there in Dr. Jenkins's case, and the question was as to where they came from, and what their presence meant. Manasse said that the osteoclasts were not active in otosclerosis—*i.e.*, the old bone which had to be absorbed in order to make room for the new formation of bone was not absorbed by osteoclasts—and Manasse did not admit that they were absorbed by cells at all, but said the absorption was brought about by simple pressure. That seemed an extraordinary statement coming from such a careful histologist as Manasse. Bone could not be absorbed by pressure, one could not press the calcareous particles into a lymph space or blood-vessel. It could only be done by cell activity, by the cells taking up the material round about them. He thought the giant cells which Mr. Jenkins showed were the active agents in absorbing the bone. He believed them to be osteoclasts, but not following the usual distribution of osteoclasts in ordinary bone. As to where the osteoclasts originally came from, even in normal bone, he believed they came from the smaller blood-vessels, and that the giant cells in otosclerosis and normal osteoclasts were originally one and the same thing. With regard to the occurrence of suppuration in otosclerosis, Mr. Jenkins pointed out a portion of the posterior margin of the oral window, in which he said suppuration apparently occurred in a patient with otosclerosis. The more he (the speaker) had studied these cases the more he had concluded that suppuration in the ear might be a cause of otosclerosis, but that did not mean necessarily that nerve conditions were unassociated with it. He thought there must be some inherent tendency in these people, and, given that tendency, the same change might be produced as occurred in otosclerosis without suppuration. Even where the whole membrane was destroyed some patients became almost stone deaf, whereas others were only slightly affected.

Mr. Jenkins had not studied the point raised by Dr. Gray as to whether the suppuration was causative of the change in the foramen ovale, or whether it was an accidental association of otosclerosis with chronic suppuration. The latter was the view he leaned to. With regard to giant cell formation in otosclerosis, he did not think these giant cells were similar to any he had previously seen, but they appeared in these cases to be taking on the function of osteoblasts; they seemed to fit into the various rarefied spaces of bone.

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