SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTION OF OTOLOGY.

December 2, 1927.

President—Dr J. S. FRASER, F.R.C.S.E.

Notes on Paracusis Willisii—SOMERVILLE HASTINGS, M.S., and GORDON R. SCARFF, F.R.C.S.E.—The Paper is published in the *Journal of Laryngology and Otology*, Vol. xliii., p. 261, April 1928.

DISCUSSION.

Dr S. A. TUCKER said the apparatus referred to by Mr Somerville Hastings was designed five years ago. The production of the apparatus had made great progress in the last two or three years; the work was being done on an intensive scale in America.

If the telephone was accepted as a means of conveying sound to the ear, then apparatus of this class would have to be used. At present the oscillating currents generating the sound on the telephone were so produced that their magnitude was the same for all frequencies. That quality was not possessed by this apparatus; by it sound vibrations of frequency, 512 and 1000 per second, could not be compared. But that did not affect this particular paper. The oscillating current producing the response was generated in the telephone, but the current was distorted by that instrument. The telephone lent itself very little to accurate mathematical treatment, and unless a good one, and the same one was used throughout, results could not be constant. However, for the period over which Mr Somerville Hastings had been working, it could be said that the telephones were giving the same signal under the same conditions.

If, in acoustic research, a standard source of sound was arrived at, the apparatus used by Mr Hastings could be compared with it, and the present qualitative values of the signals could be converted to quantitative ones. It was important to remember that he (the speaker) devised this apparatus, not for Mr Somerville Hastings, but for testing auditory acuity, and there the difficulties were even greater. It had to be ensured that the source of sound was not vitiated by reflections. If the sounds were transferred from the telephone to the loud speaker, and the patient placed successively in different parts of the room, different effects would be produced; if the patient moved his head, even slightly, when pure sounds were being used, the results would be vitiated. In his (the speaker's) laboratory a number of people being present during the production of pure sounds, the movement of one person—not the person being tested—had upset the whole wave system. This ruled out the loud speaker, and therefore the tuning-fork also. That was why the telephone was adopted. The disturbing sound produced by a tuning-fork, actuated by electro-magnetic means, was put into the telephone by induction. It was fairly well controlled and had a frequency of seventy-two double vibrations per second.

https://doi.org/10.1017/S0022215100031789 Published online by Cambridge University Press

Mr G. J. JENKINS said that this research supported the clinical experience of otologists. He had found that some paracusis patients could hear not only better, but also better than the ordinary person in a noisy place. One was familiar with the patient who heard in railway carriages conversations not meant for him to hear.

Sir JAMES DUNDAS-GRANT said many had doubted whether genuine paracusis existed. Mr Hastings had now apparently proved, however, that it did, but it was rare. He (the speaker) was sometimes sceptical about it. A patient had come to him with her mother for a consultation, and he had used the mother's voice in testing the daughter's hearing, the two standing back to back. He had placed a noise machine on the patient's head, but she heard no better. He then placed the machine *on the mother's head*, and at once the patient heard better! He thought the necessary conditions for paracusis were that the lower range of hearing should be considerably raised, *i.e.*, there must be deafness to a large range of low tones. In some cases, as the patient improved, and heard low tones better, paracusis disappeared. A patient having paracusis had said that she heard her dog's footsteps better in the midst of a noise than in quiet, and there was no question that this case was one of genuine paracusis.

The test tone in Mr Hastings' experiments was 760 vibrations a second, and he (the speaker) suggested the use of gramophone speech, which would not raise its voice in the midst of a noise. Advantage should be taken of the facilities offered by the Ferens Institute.

Another method of test would be to vary the character of the disturbing noise. With the seventy-two vibration noise there was an intentional admixture of other sounds, but if higher primal tones were tried as the disturbing sound, and their effects compared with those of deep tones, it might add to the value of this investigation. A paracusic person of his acquaintance heard better in a noisy railway carrage, and heard better still when a vibrating machine was pressed against his spine.

Mr A. LOWNDES YATES said he had had a somewhat similar apparatus for generating sound waves in occasional use for the last five years. The loud speaker, although it had disadvantages, possessed some advantages over the telephone. The hearing was at maximum only when the malleus was touching the incus. There was evidence that if these were not in contact the sound heard was considerably diminished. If a telephone was used and pressed closely to the ear, it rarified the air in the external meatus. The greater movement of the malleus so produced, and the shorter time of contact of the malleus with the incus, made it necessary to employ a sound of greater intensity to produce paracusis than if the loud speaker was employed.

Dr ALBERT A. GRAY said it was along these lines that the proposed investigation of otosclerosis should be carried out. He felt that paracusis had a real existence; some had denied it, but it had now been proved. He asked whether Mr Hastings found that any of his patients had otosclerosis paradoxica, *i.e.*, cases in which occasionally it was not another noise which made them hear better, but other circumstances. Some time ago he (Dr Gray) had read before the Section a paper mentioning cases in which persons suddenly felt faint, and he knew

https://doi.org/10.1017/S0022215100031789 Published online by Cambridge University Press

of a woman who, during the last two or three months of her pregnancy, had heard better than at any normal time, though she had been expected to hear worse. Mr Mollison had recorded a similar case in which the same occurred. In each of these cases of otosclerosis paradoxica there was ordinary paracusis Willisii; he had not come across an exception to that combination.

He wished strongly to emphasise what Sir James Dundas-Grant said about the pitch of the disturbing sound. The speaker suspected that the pitch of that sound must be fairly low. He had never heard of high-pitched shrieking sounds causing improvement in the hearing; it was such sounds as boiler-making and the low hum of street traffic which did this. In a paper read on his behalf at the Edinburgh meeting of the British Medical Association, he had suggested a possible explanation of paracusis. It was, that there was probably present a degenerative change in the auditory nerve (as well as changes in the bone), and particularly in the medullary sheath, which enabled the nerve stimuli to pass from one nerve to another.

When the medullary sheath underwent degeneration the axis-cylinder was no longer insulated, and the stimuli might pass from one nerve fibre to another, and when they came to the synapses of the nerves, the resistance there was too great to be overcome by them. When, however, the disturbing noise was added, the synaptic opposition was overcome, and the noise was heard. If that idea were extended to the cochlea, it might furnish an explanation. The organ of Corti was probably much fatigued in the disturbed ear, whereas in the ear which was not undergoing the disturbing sound, fatigue was not present to anything like the same extent.

Mr SYDNEY SCOTT said he would like to hear more about the pitch of the disturbing sound. At the invitation of the Western Telegraph Company, he had tried, a few years ago, at their laboratories in London, to ascertain whether paracusis could be produced by disturbing sounds of very high pitch, but the high tones completely failed to do so in people who were known to have paracusis. A vocation might now be open at New Scotland Yard to deaf patients having paracusis.

Mr SOMERVILLE HASTINGS (in reply) said that all the cases which had shown paracusis, either absolute, relative, or crossed, had also shown a raising of the lower tone limit. In every case testing was done with tuning-forks, and none of them heard the lower tones. He agreed that testing should be done with disturbing noises of different pitches; but it must be remembered that this unloaded tuning-fork, though giving 72 double vibrations per second, was at the same time producing harmonics, and therefore higher actual notes.

Dr Gray's remarks had been particularly interesting, for he had suggested the only plausible explanation of crossed paracusis that he (the speaker) had heard. There was no history given in his cases of otosclerosis paradoxica. Some of the results were found to be extra-ordinarily constant, and some cases were examined seven or eight times, at varying intervals, and the results were the same. These were cases of what he designated as high auditory intelligence. The variations were usually found in people of lower mental capacity.

https://doi.org/10.1017/S0022215100031789 Published online by Cambridge University Press

He had not had experience of the loud speaker in this connection. The apparatus he and his colleague had used seemed of value in investigating paracusis.

Posterior (Mastoid) Drainage in Acute Suppuration of the Middle-Ear—DAN MCKENZIE, M.D.—The Paper is published in the *Journal of Laryngology and Otology*, Vol. xliii., p. 255, April 1928.

DISCUSSION.

Mr J. S. FRASER (President) said that this subject was not a new one; it had been discussed at the Nottingham meeting of the British Medical Association a year or two ago. It was a matter of acute discussion in Vienna. Professor Neumann advocated early operation, whereas Professor Alexander recommended late operation. Neumann pointed out that if one operated early there were few intracranial complications, *i.e.* if it was done before extradural abscess had had time to develop. His own choice leaned towards late operation; he found that cases which were operated upon early did not, on the whole, heal well, certainly not so quickly as did those which were dealt with at a later stage. Probably, in the former case, the patient's resisting powers had not been stimulated into activity to the same extent as in the later stages.

Mr SYDNEY SCOTT, in thanking Dr McKenzie for his paper, said he was sorry that he (Dr McKenzie) had said anything about using a stilette in the aditus. Indeed, he would have expected him to have warned operators not to pass a seeker or curette into the aditus, because of the danger of disturbing the suspensory ligament of the incus.

In exceptional cases one should be prepared to operate within thirty-six hours, but in the majority of cases he (the speaker) had not operated before the fifth day after the onset of otitis media.

Sir WILLIAM MILLIGAN said that this matter had been thrashed out and definite opinions had been expressed upon it before. Fifteen years ago Professor Young and himself had read a paper on the subject. They had shown, by the injection of indigo-coloured water through the catheter, that when a small perforation existed, and there was, therefore, inefficient drainage, there was infection of the antrum, but this did not occur when the perforation was a large one. They concluded that every case of acute suppurative middle-ear disease with inadequate tympanic drainage was infected within the first week. Fifteen years ago they laid it down as a clinical rule, which he had since adopted, that in the event of free suppuration, the condition of the patient not being satisfactory, it was right to operate early, for two reasons: (1) Because from experimental findings it was known that the antrum would be found infected; (2) because it had always been shown that there were better hearing results after early operation. If operation was not done at once there was something to be said for postponing it for five weeks or so, until definite localised pus was present, but he did not think hearing was so good afterwards in late operation cases. If in a case with a small perforation suppuration persisted for a week, an operation should be performed.

https://doi.org/10.1017/S0022215100031789 Published online by Cambridge University Press

Sir JAMES DUNDAS-GRANT said that Politzer had referred to a special class of case frequent in the influenza epidemic of the "eighties," in which he had found a "sequestrated" cavity in the mastoid. In many cases the disease quickly subsided when he opened such a cavity.

Politzer insisted that tenderness of the mastoid on pressure was normal in acute suppuration of the middle ear during the first week; that there might be congestion of the lining membrane without disease of bone calling for operation. The speaker leaned towards early operation; he had heard of, but had not seen, bad effects from early operation. He had, however, seen bad effects from postponing operation. In one case in which consent to operation was long withheld, the bone round the facial nerve was involved, causing temporary facial paralysis. If the incus was disturbed by the bent probe, it found its way back, for he had not seen any injurious result. He was surprised that Neumann insisted that an early operation should be radical, and did not think we need go so far. Drainage was the important matter.

Sir William Milligan referred to a small perforation, and the speaker thought the moral of that was, not necessarily to open the mastoid immediately, but to enlarge the perforation. [Sir WILLIAM MILLIGAN: The perforation is small at the time one sees it.]

After removing adenoids, he (Sir James) had seen a striking subsidence of acute inflammation in the middle ear; there was therefore no reason to postpone dealing with adenoids because of the presence of the acute disease, which, indeed, the adenoids might be keeping up. The removal of a large area of bone, causing subsequent sinking in, had occasionally led to a recrudescence; there having been a shut-off focus just behind the attachment of the sunken skin to the inner wall. He had opened up again, removed all overhanging bone, and cut away some of the skin, allowing of complete union again. When it hung fire he had syringed with a weak zinc solution through a Eustachian catheter if there were discharge from the neighbourhood of the tube. He agreed with Dr McKenzie as to the advisability of introducing a drainage tube and, except where that entered, stitching up the wound, and then shortening the tube daily. He regarded a nipple-shaped perforation as an indication for operation.

Mr G. J. JENKINS said he protested against a partial opening of air-cell systems. There might be infection of the unopened system of cells, though the cells might appear healthy, and then give further trouble; also if the cells were shut off by cicatricial tissue they might cause trouble afterwards. In two or three cases he had seen collections of cholesterin associated with vague pain in the mastoid. He asked whether any members had encountered serious results from early operation on the mastoid. In those cases in which there was definite evidence of mastoiditis there must have been sufficient resistance established to form an exudate.

Mr H. NORMAN BARNETT said the important cases were the border-line ones in which there were practically none of the symptoms usually associated with mastoiditis. Error might creep in here, and it was very important to impress this fact on the practitioner who saw cases in the first instance. There was a general impression that there must be pain accompanied by swelling and tenderness over the mastoid region, together

https://doi.org/10.1017/S0022215100031789 Published online by Cambridge University Press

with rise of temperature. Such symptoms were frequently absent. The trouble often was that a specialist did not see the cases sufficiently early. Three cases seen lately were of the border-line type in that there was no "book picture" of mastoiditis. In only one was there any redness or tenderness on deep pressure, together with rise of temperature. In the other two there were no symptoms at all, except free discharge from the ear, yet on opening the mastoid there was found to be very extensive disease, extending to and including the tip cell. Each of these cases was operated on well within the first week. Disaster would have been the consequence had they not been subjected to early operation. In one case the bone was acellular; in two, cellular.

With regard to the complete removal of all the cells, he agreed with Mr Jenkins. In one of the cases instanced above there were apparently sound cells between a diseased antrum and the affected tip cell, which, had they not been removed, would in all probability have been the source of future trouble. His own practice was always to wash out the middle ear with some bland solution such as normal saline. It was impressive to see the amount of offensive material which came away, and undoubtedly its removal very materially shortened convalescence. He had never operated on these cases early without finding disease of the mastoid.

DR MCKENZIE (in reply) said the general feeling appeared to be in favour of early operation; nevertheless it was a step which should be taken cautiously. It seemed *logically* correct, but would it prove to be correct in nature? It was important that records of cases should be kept, so that one could be guided by statistical results.

He did not think that passing a stilette into the aditus made any difference afterwards, and he was not aware of ever having displaced the incus. He asked whether it would sometimes be possible to clear the condition up without opening the tympanic membrane at all in cases in which perforation had not occurred? He had operated before perforation of the membrane, and drained posteriorly with good results. But in one case tinnitus had developed and the patient had become deaf. He thought the exudate in the middle ear had become organised, and that the scar tissue caused deafness. If in that case the tympanic cavity had been drained through an opening in the membrane, deafness probably would not have resulted. For that reason he always made an incision into the membrane when performing posterior drainage.

Acute Otitis Media with very Rapid Involvement of one Lateral and both Cavernous Sinuses—LESLIE POWELL, M.D. —A girl, aged 7, was admitted 30th September 1927. Tonsils and adenoids had been removed three weeks earlier; convalescence was normal.

27th September. — Discharge from right ear; glands of neck slightly enlarged. Sudden abdominal pain arose due to enlarged spleen. Temperature 102° F.; discharge from ear profuse; no tenderness, earache, or swelling.

On admission.—Temperature 105° F., pulse 140; profuse discharge from right ear; no other physical signs; deafness very marked.

https://doi.org/10.1017/S0022215100031789 Published online by Cambridge University Press

1st October.—Swelling of right upper eyelid occurred. This was incised but no pus found. Simple mastoidectomy; lateral sinus exposed but did not appear to be thrombosed. Some lymph present on surface of sinus.

2nd October.—Left upper eyelid became swollen. Temperature again rose to 105° F. Death supervened.

Post-mortem.—Pus in both cavernous sinuses and in lower part of lateral sinus. Glands of neck not enlarged. Films showed streptococcus.

Specimen and Microscopic Slide of Papilloma of External Auditory Meatus — E. WATSON-WILLIAMS, M.C., F.R.C.S.E.—Specimen removed at operation because the pathologist thought the fragment first submitted was malignant. Patient was a male, aged 52; clinically the growth was a typical benign papilloma. It covered the whole anterior wall of the auditory meatus; a hyperostosis was present in the posterior meatal wall.

Specimen showing Bony Ankylosis of Malleus and Incus —E. WATSON-WILLIAMS, M.C., F.R.C.S.E.—Shown for comparison with similar specimen exhibited 8th November 1924 (*Journal of Laryngology and Otology*, Vol. xl., p. 125, 1925). Male, aged 35, had severe pain in ear and head; right ear "stone deaf" for years; free aural discharge; no vertigo. The ossicles were removed during a radical mastoid operation. There appears to be complete obliteration of the joint between them. The bones are intact, except that the tip of the processus gracilis is missing. Of especial interest are the osteophytic outgrowths on the long process of the incus. The fold of mucous membrane between the two bones is discernible. It is suggested that this condition is not of great rarity, although seldom reported.

PROCEEDINGS OF THE FORTY-NINTH ANNUAL CONGRESS OF THE AMERICAN LARYNGOLOGICAL ASSOCIATION.

May 23, 24, 25, 1927.

(*Abstracted from the Notes of Dr Charles J. Imperatori.*)

Five Cases of Frontal Lobe Abscess secondary to Frontal Sinus Disease.—The cases were presented by Dr Imperatori, and the following points were analysed. All the patients were under 28 years of age, two of them being young girls of 14 and 15 years respectively; the remaining three were aged 21, 25, and 27. In each instance the disease involved the frontal and ethmoidal air cells, and manifested itself externally by the presence of œdema of the eyelids, chemosis, or even by an abscess of the orbit.

https://doi.org/10.1017/S0022215100031789 Published online by Cambridge University Press