

## Societies' Proceedings

sound in fifty-seven cases, but in all of these he came up against quite a firm obstruction.

Mr. Stirk Adams had asked about treatment. If immediate treatment was going to do any good it must be applied in a short time—he thought within two hours. Group Captain Dickson had allowed him to ask medical officers at his station to do this when the airmen came down, and at one or two stations there had been a lessening of the number of patients referred to hospital, and from one station no patients at all had been received for three or four weeks.

The CHAIRMAN expressed the thanks of both Sections to the five openers and the meeting concluded.

### ABSTRACTS

#### EAR

*Investigation of Professional Deafness in Shipyard and Machine Factory Labourers.* BØRGE LARSEN. (*Acta Otolaryngologica* 1939, Supplementum xxxvi.)

The author has investigated the hearing in a large number of employees in the shipbuilding yards at Odense near Copenhagen. They were employed in the boiler-making and riveting departments, and had in many cases been employed for thirty years.

In workers accustomed for many years to work in an extremely noisy environment it was found that the upper auditory limit was lowered to a point below the pitch considered normal for the particular age, according to Struycken. It was found that the lowering of the upper limit by air conduction was associated with a similar lowering by bone conduction. In these individuals there was very little raising of the lower tone limit. Out of 246 ears only twenty-two were raised, five to 20 cycles, fifteen to 24 cycles, and one to 36 cycles. Hearing by air conduction for a<sup>t</sup> (435 cycles) was normal in 137 ears, but of these hearing of a whisper was reduced to below one metre in twenty-eight ears. In sixty-one it was between one and eight metres and in forty-eight it was over eight metres. Where either air or bone conduction is reduced by 50 per cent. or more, hearing for whisper is reduced to one metre. On the other hand in seventy-nine cases where the hearing for whisper was reduced to less than one metre, the upper limit was not lowered below normal, and in a few cases was particularly high. In men of 51 years, after thirty-one years' work in the boiler shops, hearing for whisper was reduced in all cases to less than one metre, but in many the hearing for the spoken voice was well preserved.

Audiographic investigation of these cases showed that there was a sharp dip in the acuity of hearing beginning as a rule between

## Ear

3,000 and 4,000 cycles with its maximum depth at about  $c^5$  (4,096 cycles) and beginning to rise again at about 6,000 cycles until in many cases the normal level of hearing was reached at  $c^6$  (8,192 cycles). This sudden dip with subsequent resumption of normal level explains why there is the marked loss of appreciation for whisper, but with hearing for the spoken voice and the upper limit well preserved. This maintenance of the upper limits of hearing is more marked in younger men though not entirely restricted to them. In many of the older men the sudden dip occurred but there was no recovery at the level of  $c^6$  or at any point higher. In others there was the curve of a typical internal ear deafness, a steady trend downwards of the curve from about  $c^1$  (512) or  $c^2$  (1,024).

Buzzing in the ears was reported in 52 per cent. of cases but was severe only in 15 per cent. Paracusis and pain were complained of in one case each. Vertigo was reported in 5 per cent. of cases but no changes could be detected in the vestibular apparatus. On account of the deafness being in the upper registers it was often well established before the subject was aware of its existence. It was found that there were considerable variations in the amount of deafness. On Sundays and after periods of unemployment there was a distinct improvement in the hearing and the audiometric dip was less marked. On resumption of work, however, there was a rapid return to the previous level of deafness. The reduction for hearing of whisper did not alter much during these rest periods.

The pitch of whispering, where the reduction of hearing is greatest, is around  $c^5$ . The noise of riveting boilers lies between 1,200 and 2,000 cycles and is therefore about two octaves below the pitch at which the deafness is maximum. The noise of riveting reaches an intensity level of 120 phons.

It has been shown therefore that loud and prolonged noise at a different pitch causes deafness for sounds at the level of  $c^5$ , and it is presumed that there has occurred some damage to the cochlea at the corresponding level, that is at about eight or nine millimetres from the basal end of the cochlea. It appears that this is a particularly sensitive part of the acoustic organ and various peculiarities of this area have been described which may possibly explain its sensitiveness. The ossification of the labyrinth capsule begins at this point and the cochlear ramus of the auditory artery bifurcates opposite to it. There has also been described a constriction of the first whorl of the cochlea at this level.

It has also been suggested that this localized deafness may be explained by the fact that the lower pitched sounds reach the cochlea by the ossicles and oval window, but that the higher pitched sounds, round about  $c^5$  enter by the round window. At this point there is no protection to loud sounds, as is provided in the case of the oval window by the intratympanic muscles. The opening of

## Abstracts

the round window is in the neighbourhood of the level of the cochlear tube under discussion, and it may be that injury in this region is easily accounted for. The opportunity for post mortem examination of these cases does not very often present itself but the author records one case where there was a complete absence of hearing at the level of 4,096 cycles, and on histological examination of the cochlea there was found an area of total atrophy of the organ of Corti and the nerve fibres in the spiral lamina at a point some 9-10 millimetres from the basal end of the cochlear tube.

The highest notes, the hearing of which is often retained, are perceived in the basal turn proximal to this anatomically and physiologically peculiar point.

Similar dips in the acuity of hearing have been reported in patients suffering from various types of intoxication (tobacco, alcohol, quinine, cocaine, etc.), syphilis, head trauma and the hereditary disease—retinitis pigmentosa. It did not appear that suppuration of the middle ear confers any increased liability to deafness in those exposed to such prolonged and loud noises. Labourers with a marked familial tendency to deafness are, however, more easily affected by noise. Syphilis, which has been adequately treated does not cause an increased liability to deafness.

F. C. ORMEROD.

## MISCELLANEOUS

*Foreign Bodies in the Air Passages.* H. V. MORLOCK and B. G. EDELSTON. (*Lancet*, 1942, i, 138.)

The authors report four cases of interest. The first, a woman of 53, diagnosed as bronchiectasis with pulmonary fibrotic induration and atelectasis. Ten years previously she had inhaled a piece of bone, but every doctor who had seen her refused to entertain the statement. Bronchoscopy revealed its presence and it was removed after ten years. The second case was that of a boy of six in whom bronchoscopy revealed a split pea-nut in the trachea after six weeks of paroxysmal asphyxial attacks. A third case, a male child of two years, was six weeks in a Fever Hospital before a croupy cough and a collapsed right lung was found to be due to the almond of a sugar plum in the right bronchus. The fourth example was a man of 35 in whom bronchoscopy showed a mutton bone,  $1\frac{1}{2}$  by  $2\frac{3}{4}$  cm., lodged in the right bronchus. In this case the patient was relieved of his foreign body in about ten days. As the authors suggest in commenting on the first three cases, it is wise to pay attention to patients' statements in lung conditions.

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