SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTION OF OTOLOGY.

SPECIAL SUMMER MEETING, 27TH AND 28TH JUNE 1930, HELD IN THE AURAL DEPARTMENT OF THE NOTTINGHAM GENERAL HOSPITAL.

President—W. M. MOLLISON, M.Ch.

The Swim-bladder and Weberian Ossicles and their Relation to Hearing in Fishes—H. MUIR EVANS, M.D.—This paper is published in the *Journal of Laryngology and Otology*, Vol. xlv., p. 772, November 1930.

DISCUSSION.

Mr LOWNDES YATES said that in a paper in *Science Progress*, published in 1900, Dr Albert Gray had dealt with another aspect of this subject, namely, the development of the perilymphatic sacs in carps and herrings, and had shown the extreme complexity of these sacs as they made junction with the air vesicles of the fish. Dr Gray had pointed out that many of the further steps in man were represented in fishes.

Mr ALEXANDER TWEEDIE said he would be glad if the lecturer could say something about innervation in connection with the swim-bladder and its relation to the 8th nerve. A Russian investigator had been making some experiments on the subject,* which consisted in centrifugalisation and consequent destruction of the otolithic apparatus, but with the semicircular canals and muscular control of the fins left intact. Thereafter the fish were subjected to a pressure of five or six atmospheres, whilst other normal fish were placed in the same vessel as a control. The air pressure was then suddenly reduced, with the result that the normal fish at once regained their power of rising while those which were centrifugalised remained inert.

Dr MUIR EVANS (in reply) said he did not know the details of the innervation. At present he was working through a series of brain sections to study the comparative anatomy of the acoustico-lateral area in several members of the Cyprinidæ.

Repair in the Middle Ear—A. LOWNDES YATES, M.D.—This paper is published in the *Journal of Laryngology and Otology*, Vol. xlv., p. 785, November 1930.

DISCUSSION.

Mr ALEXANDER TWEEDIE said he did not know whether the model referred to was intended to show the part which was played by the

* "Bericht über die neueren russischen Arbeiten über Physiologie und Klinik des inneren Ohres," by S. Kompanejetz, *Otolaryngologia Slavica*, i., fasc. 2, 215.

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tympanic membrane in the function of hearing. He (the speaker) suggested that in the investigation should be included an experiment which would differentiate between the tympanic membrane factor in the transmission of sound, if any, and the value of the integrity of the two windows. He, and others also, had seen cases in which the tympanic membrane was lost and yet the hearing was almost as good as normal.

Mr WATKYN-THOMAS said that, in connection with Mr Lowndes Yates's views, it was interesting to recall that the late Mr Arthur Cheatle had pointed out how rarely cerumen was ever seen in the ears of patients suffering from clinical otosclerosis.

In the treatment of Eustachian catarrh he (the speaker) had practised aspiration, as advised by Mr Lowndes Yates, instead of inflation during the last six months and was satisfied with the results.

He had recently had a case which demonstrated beautifully the "out-placed" position of the ossicles. A hospital patient with chronic discharge from the ear had a degree of deafness which appeared to be excessive for the amount of tympanic destruction. A conservative operation was performed. The changes in the antrum were slight, but when the attic was opened it was found that the bands were so much swollen that the malleus and incus were forced apart.

Mr L. GRAHAM BROWN said that Mr Lowndes Yates, in dealing with the physiology of hearing, had stated that the tympanic membrane and auditory ossicles played a great part in the transmission of vibrations to the internal ear, and on that theory had spoken of the mechanism of these ossicles; how the tympanic membrane might be in a state of repose or a state of listening, which depended on the distance between the cog-like processes of the malleus and the incus. Nothing, however, had been said by Mr Lowndes Yates about the movements of the inner part of the ossicular chain, namely, the incus and stapes and the attachment of the stapes to the oval window. He (the speaker) thought that there would obviously be a different prognosis when disease affected only the tympanum proper and the tympanic portion of the ossicular chain from that when the neighbourhood of the windows was involved, since in the latter case there must be inflammatory conditions affecting that portion of the chain. Therefore he surmised there would be a means of distinguishing between the inflammatory condition for which the prognosis could not be anything but very poor—probably hopeless—and that in which otosclerosis could well be included and that type which affected only the malleolar portion of the ossicular chain and which would be more amenable to treatment.

With regard to the question of hearing, otologists were becoming more and more firmly convinced of the truth of the theory that vibrations were not conducted through the ossicular chain, but—and this was quite a different matter—that centripetal sound impulses were conveyed by means of this chain. In other words, centripetal impulses hit on the round window and, by their action on the endolymph, affected the hair-like processes in the cochlear canal.

Mr W. STEWART said that text-books emphasised the fact that in chronic catarrh of the middle ear the membrane was indrawn, but he

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(the speaker) found that it was blown out in 50 per cent. of cases. From what Mr Lowndes Yates had said, he gathered that there were two classes of case: one in which the drum was indrawn, the other in which it was blown out.

Mr LOWNDES YATES (in reply) said that he did not suggest that inflation of the Eustachian tube ever produced acute otitis media, but he did think that an exacerbation of the chronic otitis media from which the patient suffered could be caused thereby. An immediate good result was obtained by inflation, but the infective material was in many cases forced from the Eustachian tube into the middle ear, causing a low-grade inflammation. The reason why acute otitis media was not produced appeared to be because the ear was already protected against the micro-organisms of the Eustachian tube by the chronic state of inflammation of its mucous membrane.

In reply to Mr Tweedie, he thought the tympanic membrane did not possess any function of analysis—he regarded it purely as a structure which assisted in differential listening; it was the tympanic membrane which allowed the listener to pick out a particular voice in a conversation in which a number of people were participating. Also there was some evidence that the mechanism of the middle ear enabled the internal ear to be rested from noises or sounds it did not wish to hear.

Mr Watkyn-Thomas had recently shown him a case which was a very good example of the out-placed position of the tympanic membrane. He (the speaker) thought that otologists universally recognised the in-placed position of the tympanic membrane as a cause of deafness and believed that this resulted from obstruction of the Eustachian tube. The experimental evidence brought forward seemed to point to the fact that an equally definite type of deafness could be produced when the membrane was out-placed, as a result of being held in that position for long periods by mucus lying stagnant in the middle ear.

In answer to Mr Graham Brown, he had not dealt with the position of the incus and stapes because it had been necessary to limit the scope of the report. He thought, however, that there was no doubt that the incus and the stapes were returned into their normal position, after hearing, by the tension imparted to the round window by the inward movement of these bones acting through the fluid perilymph. After this inward movement these ossicles were returned outwards by a process of recoil and, therefore, at a speed which was dictated, not by the speed of movement of the malleus when it recorded sound, but by the tension of the membrane of the round window. He had investigated some cases in which the region of the round window was filled with granulations and had found that they showed a type of deafness peculiar to that condition.

In reply to Mr Stewart, he quite agreed that from the point of view of the position of the tympanic membrane, cases of deafness fell into two groups, but he thought that in chronic deafness the out-placed membrane was considerably less common than the in-drawn membrane.

Demonstration of Sound Records—A. LOWNDES YATES, M.D. —The records consist of sound strips similar to those employed in making talking pictures. They are of value for study partly because

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they are records of the movement of the diaphragm of the microphone into which the word is spoken and partly because there is no doubt that they are actually representations of these movements, for when passed through a talking picture apparatus the word is reproduced from the loud speaker.

On study of these records it is seen that with certain exceptions they record only the vowels, for the consonants are found to be merely methods of starting, stopping or modifying vowel sounds. Exceptions to this rule are the letters S, X and H, which are actually modifications of a vowel so high in pitch that it is composed of a hissing sound.

The interest to otologists appears to lie in the consideration that the normal tympanic membrane conducting apparatus and the fluids of the labyrinth have to make movements similar to those which are recorded. It is also clear from study of the records that if these portions of the hearing mechanism are diseased, certain syllables will be heard less well than others, and those syllables which are known to be lost most early in certain forms of deafness are seen to be the least defined upon the sound strip. It is not possible, however, from study of a sound strip to state which words will or will not be heard by a person who has a certain alteration in his ear. The auditory intelligence of patients differs vastly and a high degree of auditory intelligence will compensate for minor degrees of deafness, whereas a person of low auditory intelligence will be rendered deaf by a relatively slight alteration of his hearing mechanism. The deafness of the latter will be a diminution of the power of appreciation rather than a lessening of the power of hearing simple sounds such as those emanated by tuning-forks or formed in music.

(The films were provided by the kindness of Mr F. P. Culbert of the R.C.A. Photophone Company.)

Affections of Hearing and Adenoids: The Fight against Adenoidism in Italy.

Professor GUIDO GUIDA.

The great importance of adenoids in children as an ætiological factor in the origin of different diseases (catarrhal or purulent) of the ears, even up to complete deafness, has been for a long time known to the medical profession. Such knowledge should surely put us on our guard when we are confronted by a case of adenoids in which the patient begins to complain of diminished hearing.

Given the relation between adenoids and diseases of the ear, the first problem in Italy has been that of testing the frequency with which

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this phenomenon occurs. In fact statistical data have been obtained in almost all the provinces. De Cigna has found affections of the ear in 40 per cent. of cases of adenoids; Leidi in 25 per cent.; Arslan in 59 per cent.; Lazzi in 50 per cent.; I myself, in the region of Tuscany, in 42 per cent. (in 15 per cent. purulent otitis and in 27 per cent. decrease of hearing); Mancioli, in Rome, in 18 per cent. My opinion, therefore, is that cases of adenoids may be divided into those in which there are also auricular lesions at the present time, those in which they have previously existed, and those in which they may still appear.

Considering the high percentage of auricular complications in patients suffering from adenoids, and the important influence of these conditions upon the physical and the mental development of the affected children, the Italian Government has been trying to find a remedy. In their struggle against the social plague of adenoidism, and also with a prophylactic aim, the Italian Government has issued instructions to provincial authorities to organise special institutions for the treatment of adenoidism ("Instituti contro l'adenoidismo"), which are to work in co-operation with already existing hospitals and clinics and in which children suffering from adenoids will be examined and treated by operation by specialists.

These specialists, after making a thorough examination of the children at schools, send cases of adenoids and deafness or impaired hearing to the institute, where they are operated on and treated with inhalations of calcium and iodine for several days. Each child is provided with a card, on which his name is inscribed, together with the authorisation of the parents for the treatment and, later, the clinical notes of the case.

Children in the schools should be carefully examined, not only by the school medical officer but also by specialists, as to the condition of the ears and nasopharynx. It is surely not advisable to neglect these otopathic children when an amendment of their hearing faculties would render them capable of becoming useful and intelligent members of society, and therefore Italy, under its present Government, has faced a vital question by forming a powerful central organisation, working in co-operation with similar organisations all over the country, towards solving the biological and ethical problems of childhood and thus ameliorating the physical condition of the race and raising it to higher moral levels.

Mr SYDNEY SCOTT said he must congratulate the Italian Government on insisting that the operations in the clinics should be performed only by competent specialists.

Mr H. BELL TAWSE said that a committee, of which he was a member, had been appointed by the Board of Education six years before "to inquire

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into the incidence of—and physical and environmental conditions associated with—enlarged tonsils and adenoids, and into the methods and results of treatment." An interim report had been published in 1929.

The investigations were carried out in children of school age, many of whom had already passed the usual age of onset. It was therefore decided to proceed with a further investigation in younger children, utilising the infant Welfare Centres for that purpose.

During the last eighteen months he had been trying the effect, on children who were about to undergo operation for tonsils and adenoids, of preliminary administration of sodium bicarbonate until the urine was alkaline, as suggested by Mr Lowndes Yates.

He was satisfied that since the adoption of this plan there had been much less post-operative hæmorrhage from enucleation by the guillotine method. He had not been able to convince himself that the immediate loss of blood had been reduced.

There was no age limit. The operation should be carried out—irrespective of age—if the child showed symptoms detrimental to health and hearing.

Mr L. GRAHAM BROWN said that he had been impressed with the fact that more and more children were coming up for operations at a younger age. A few years before the late War the children coming for these operations were from 14 to 16 years old, though there were younger children too, but nowadays one had them coming as early as 3, 4 and 5 years of age. He operated in this way on about forty in a week, and the majority were from 3 to 8 years old. This showed that the authorities who dealt with these matters were alive to the association of adenoids with deafness, and the result of greater care in this matter was an all-round improvement, not only in the general health of the children, but in hearing capacity. Therefore he considered it of great importance nationally, as well as to the individual, that obstructive adenoids and adenoids producing symptoms of deafness should be recognised and operated upon early. It had been said that adenoids should not be operated upon at an earlier age than 3 years, but he did not subscribe to that opinion: he thought they should be removed as soon as indications pointed to the need. In other words, if hearing was defective, whatever the age of the child, adenoids, if present, should be removed.

Another point which had occurred to him was that since laryngologists saw a fair number of children returning for the adenoid operation, the question might be raised why these children should be sent to clinics for repeated adenoid operations. He thought it was because a considerable number of these children were again recommended to the clinic on account of nasal catarrh, and therefore medical officers, possibly inexperienced, concluded without proper investigation that adenoids were again present. In such cases, after the first removal of tonsils and adenoids, the child should be put into the hands of a competent ear, nose and throat surgeon, who could diagnose the condition correctly and so save the child from an unnecessary further operation. Frequently in such cases no adenoids were to be found, but there was a purely intranasal condition, possibly maxillary suppuration.

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Mr HAMBLEN THOMAS said he had examined a considerable number of infants. The Board of Education desired to have infants examined at the earliest possible age, and were trying to ascertain the cause of adenoids. The children should be examined over a period of five years. At first a fair number attended for examination, but towards the end of the five years' period the number dwindled to one or two, so that there was a real difficulty in arriving at a percentage.

So far he (the speaker) had been unable to point to any particular cause of the adenoids in these children, though the dietetic factor was an important one: in breast-feeding the mothers might not be receiving the right sort of diet, and they might not be in a fit state of health. If possible, children should be examined before they arrived at school age. In the usual way they began to attend school at the age of 5 years, and then they came under regular medical examination, but often by that time the damage was done. In many cases the child had not any medical attention before going to school.

Mr LOWNDES YATES said that the development of the nasal sinuses after birth was a subject of great importance in the question of the formation of adenoids. Just before the age of 5 years the permanent teeth passed into their adult position; the antrum enlarged, the ethmoids began to increase, and shortly afterwards they pushed the middle turbinate into the nasal airway. Until then, if a child inhaled a white powder it would pass through the nose into the nasopharynx, because the nasal mechanism for the removal of dust and bacteria hardly existed before this age. He (the speaker) thought that adenoids were the infantile mechanism for the removal of dust from the inspired air, and that to take them away too early in cases in which there were no respiratory or aural symptoms and no enlarged glands in the neck was to deprive the child unnecessarily of this method of protection of the lungs against inhaled infection. After 5 years of age the adult mechanism for the removal of dust and organisms began to function, and it became, during the ensuing years of childhood, more functionally complete, until at length it replaced the infantile mechanism.

He had investigated cases in which the child was subjected to a highly infective environment, as when the mother had a high degree of pyorrhœa or ozæna. In such a case adenoids were formed very early, and as they became large they had to be removed during the early stages of infancy if the mother's infective condition was not cleared up. If the infective condition of the mother was cured, the child's adenoids generally diminished in size. The results of the investigation seemed to point to the conclusion that the excess of lymphoid tissue in these children was the result of sepsis, and that it was the septic material floating about in the air, coupled with food deficiencies and other factors, which caused enlarged tonsils and adenoids.

Mr THACKER NEVILLE asked what instruments Professor Guida used for removing adenoids in Italy. He (the speaker) thought the Laforce guillotine, or adenotome, was best for removing adenoids from behind the openings of the Eustachian tubes and for preventing subsequent tags. The instrument had blades of three sizes, and so could fit the smallest nasopharynx.

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In this country there was a system for examining children who had septic tonsils and adenoids, and in the industrial towns these were removed by specialists. The counties of England were spending a good deal of money on this work; but there was as yet no means of examining the hearing of children in the mass. Was there a system in Italy, as in America, for simultaneously examining the hearing of large numbers of school children with an audiometer?

Mr HUGH E. JONES said that, in his opinion, a great number of very young children sent by the school authorities for operation did not require one. That was probably because they had not been examined by experts, or even by doctors, but by a schoolmistress or an assistant master. When the child came to hospital the surgeon looked down the mouth in a casual way, and thinking that the child had not been sent without good reason, operated. Examinations in schools should be carried out by competent persons.

A further point he would like to make was that children under school age were operated upon with too large an instrument. He had had a much smaller guillotine made for these cases. Frequently he found that children had sustained a slight tearing at the junction of the pillars. A smaller instrument would deal with even large tonsils.

Certainly adenoids should be dealt with early, but those in children under 2 years of age could not be operated upon with advantage unless they showed obvious interference with breathing.

Mr T. B. LAYTON said it was necessary to go still further back and agree on what was meant by "adenoids," as it seemed clear that Mr Graham Brown and Mr Hamblen Thomas had a different idea on the matter from that of Mr Lowndes Yates. The two former speakers seemed to look upon adenoids as a pathological condition which should be removed early in life, whereas Mr Lowndes Yates looked upon them as a physiological structure which, in early life, ought, as far as possible, to be conserved. He (Mr Layton) was on the side of Mr Yates. As to the age at which adenoids should be removed, he found himself making it later and later. He did not think Mr Graham Brown should really be proud of operating upon children at the age of 3 years; it must only be very occasionally that operation was needed at that age.

Again, it was necessary to decide whether there were such things as "septic adenoids." To him (the speaker) the term was meaningless; adenoids indicated simply a hypertrophy of a normal structure—it became pathological only when they were sufficiently large to obstruct either the posterior nares or the Eustachian tube, or both. He therefore found himself practising two separate operations on adenoids, according as to whether the indication was nasal or aural. If it was aural, he removed the lymphoid tissue round the Eustachian tube, particularly from Rosenmüller's fossa. He left the lymphoid tissue in the mid-line. In young children one could not get rid entirely of the lymphoid tissue in the nasopharynx; nature needed it there. If the lymphoid tissue in the mid-line were taken away, it hypertrophied all the more laterally round the Eustachian tube, often making the child, from the aural point of view, worse than he was before, and thereafter it was difficult to do anything for him.

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Lymphoid tissue was present to a greater extent in children who were constantly combating a larger number of micro-organisms than they should normally encounter; consequently a child living under bad hygienic conditions needed all its lymphoid tissue, and therefore, in the case of children living in overcrowded slums, the operation should not be performed. In every case he inquired of the parents what the home accommodation was, and if he found that there was overcrowding he refrained from operating. Of course these children needed treatment, and this must include, if possible, better living conditions.

Mr HAMBLEN THOMAS said he did not mean that children under the age of 5 years should have adenoids removed as a general rule; he meant that they should not be allowed to continue with large adenoids in their post-nasal space, causing deafness for two or three years, and then not come under adequate inspection and treatment until they arrived at school age. If children required treatment, this should not be postponed until school age. Adenoids were found in the children of the highest in the land, therefore the question was not altogether a matter of surroundings.

Mr HAROLD KISCH said that Mr Lowndes Yates had presented his point very ably, but he (the speaker) did not think that infection was altogether the cause of adenoids and enlarged tonsils. In India he had been in contact with a European colony who were living 5000 feet above sea level, and the children there had had an adequate supply of good milk and food and were well looked after, yet all had very large tonsils and masses of adenoids; he had operated upon the whole colony. There seemed no reason for the condition unless it were the altitude.

With regard to septic adenoids: on two occasions he had removed a pad of adenoids, inside which there was an abscess, therefore he was sure that there was such a condition as a septic adenoid. He had seen many cases in which pus had oozed out of adenoid tissue. A considerable number of cases of enlarged glands in the neck were due to septic adenoids, and not necessarily to septic tonsils at all. In many cases he had seen glandular masses disappear after septic adenoids were removed, the tonsils not having been touched. He thought that septic adenoids caused enlarged glands in the neck.

After children had undergone operations on account of defects in hearing, they should be kept under observation; as a rule, no more trouble was taken in regard to treating the hearing. He had had numbers of cases of children whom he had treated for years by inflation, thus getting their hearing back to normal. One child, aged 4, had been brought to the hospital as a deaf-mute. She had adenoids and enlarged tonsils, which were removed, and he (Mr Kisch) trained her to allow him to do Eustachian inflation. She was brought up regularly for five years for treatment by inflation, and she now had perfect hearing. A fortnight ago her mother had brought her to him to show how well she had progressed.

He had discarded the Laforce guillotine twenty years ago; he considered that Sir St Clair Thomson's curette, used as a cutting instrument, was better. In nearly all the cases of hæmorrhage after adenoid operations, a Laforce instrument had been used.

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Mr C. A. S. RIDOUT, referring to sinus infection after recurrent adenoids, said that in many cases this was nothing but nasal sepsis, and that was a reason why these operations should be performed by competent laryngologists, as many cases of maxillary sinusitis were missed by the ordinary practitioner when operating on adenoids. The child, not receiving benefit, was sent for another operation, which, perhaps, was carried out with equal vigour to that employed before. Possibly even a third operation was performed, and then it transpired that the trouble was due to sinus infection.

He thought that many cases of adenoids were being operated upon too early; if one waited, one found that the adenoids disappeared in the course of a few years as the sinuses developed.

Mr BROUGHTON BARNES thought people should not be given the impression that many laryngologists were meeting these cases for the first time when they were on the operating table. If children were operated upon unnecessarily that was the fault of the operator.

Mr Layton said he was leaving cases later and later before he operated, and that he now did not operate if the patients were in bad environment. Doubtless Mr Layton dogmatised in that way in order to make his hearers listen. If there was a mucopurulent discharge from the ears, and at the same time a mass of adenoids, whatever the age of the patient, he (the speaker) did not believe that Mr Layton would leave the adenoids untouched.

Mr WATKYN-THOMAS said that in a number of cases of so-called "recurrent adenoids" one could see a felted mass of sodden mucosa extending right across the nasopharynx from one anterior pillar to the other; such a condition was frequently associated with nasal sepsis.

He did not believe that it was justifiable to leave adenoids in the presence of a chronic suppurating ear.

He had seen a true abscess cavity in an adenoid pad, and had often expressed pus from a pad.

Professor GUIDO GUIDA (in reply) said that it was the custom in Italy to test the children's hearing power before performing the operation, and sometimes before the operation the children were sent to have inhalation of calcium or iodine; for the latter a special iodine-containing water from Salsomaggiore was used. Many school children were seated in a room into which steam was introduced from a boiling kettle containing this substance, and they remained for some time inhaling the vapour. The hearing of the children was tested individually, not *en masse*.

They were not usually operated upon in Italy before 3 years of age.

He (the speaker) used the ordinary curette, as did his colleagues.

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