SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTION OF OTOLOGY

President: T. A. CLARKE

May 4th, 1962

Discussion on stapes surgery

DR. SIMSON HALL thanked the President for the privilege of opening the discussion on this very interesting day. Dr. Hall took the opportunity of thanking Dr. Shea for his magnificent presentation and the wonderful film which he had shown. There were many points of the greatest interest which had been raised in Dr. Shea's paper. Dr. Hall wished to refer only to very few so that others might have the opportunity of speaking.

Dr. Shea's results showed a very high percentage of operations which were termed successful. Dr. Hall drew attention to the fact that the methods of assessment of successful operation required revision, for it seemed to him that the word success was used inaccurately. The first method of assessment of success was used inaccurately. The first method of assessment of success in the surgery of otosclerosis was a rise in the audiogram of more than 11 decibels, maintained for 2 years, then the "Social Adequacy Index" became the standard, now there was the "Air-bone Gap Closure". A great many people now however believe that discrimination scores are the measure of improvement. The usefulness of the first three methods is not primarily to estimate the success as far as the patient is concerned, but is of greatest use in estimating the value of one technique versus another technique, for comparing the success of one surgeon with that of another, or success in different periods of the same surgeons' work. From the patient's point of view they frequently mean very little. Dr. Hall pointed out that he had on many occasions, on both sides of the Atlantic, before success could be claimed, included in the assessment the patient's conviction that improvement has been effected. Provided we have accurate speech audimeters there is no doubt that the discrimination score gives a far better idea of what the patient has experienced than any of the other methods previously used.

Dr. Hall quoted the opinions of several leading experts showing that the discrimination score is now universally accepted as the correct method of assessment of improvement. Having said that, it seemed to Dr. Hall that confusion was even greater, because no-one, and again he quoted from several authors, was agreed as to what was the standard under which speech audiometry should be carried out. Some believed in carrying out speech audiometry in ordinary surroundings, others thought that sound treated rooms were essential. This seemed to offer a fruitful field for research in order to determine what

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was patent. A polyethylene drainage tube was pushed down the duct, and its end was retrieved through the nose and fixed to the external nares. The upper end of the tube was kept in the frontal sinus. The fistulous tract in the skin was excised and the wound was sutured in two layers. The patient was put on streptopenicillin injections for 10 days. The frontal sinus was lavaged daily through the polyethylene tube with penicillin solution, 10,000 units per c.c. On the fourth post-operative day the returning fluid was clear, and the drainage tube was removed. Sutures were removed on the seventh day. Skin union was was good and recovery was uneventful. The patient is now quite normal more than 8 months after the operation. There is a slight depression in the left frontal region, but the patient is not keen on getting it corrected (Fig. 3).

The foreign body removed was very hard and granular, with a dark brown coating of blood (Fig. 2). It measured about $2\frac{1}{2} \times 1\frac{1}{2}$ cm. It was sent for examination to the Pathology Department of the Topiwala National Medical College. Chemical analysis of the foreign body did not show the presence of any inorganic or organic constituents associated with rhinolithiasis. Part of the foreign body was hence sent to the Geology department of the St. Xavier's College, and the report of the geologist was as follows: The small bit of stone is the fragment of a local rock called "lateritized breccia" available in Bombay, Trombay and Salsette islands. This rock contains about 25 per cent. to 30 per cent. of iron together with fairly good amount of Al_2O_3 and SiO_2.

Summary

A case of foreign body, stone, in the frontal sinus is presented. The patient had a persistent fistula communicating with the frontal sinus. When the foreign body was removed, rapid healing followed.

Acknowledgements

Our thanks are due to Dr. K. N. Kamdar for the radiological studies, to Dr. D. S. Nadkarni for the chemical analysis, and to Dr. R. N. Sukheswala for the geological report. Our thanks are also due to Dr. S. R. Rege for his guidance in the preparation of this paper, and to Dr. and Mrs. A. S. Punde, Superintendent, Lokmanya Tilak Municipal General Hospital, Sion, Bombay, for permission to publish this case report.

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are the correct surroundings and conditions under which speech discrimination scores become valid as a measure of successful operation.

Dr. Hall has used speech audiometry for a great many cases a number of years ago, but had abandoned the method largely because he found that it was only essential for the estimation of suitability for operation in a very small number of borderline cases, and because he felt that standards of assessment were not sufficiently matured to make the test worth doing as routine.

Dr. Hall asked Dr. Shea if he considered that Rosen's original conception was completely superseded by his present methods.

He, himself, felt that there was still room for some of the minimal procedures, before going on to reconstruct the physiology of the middle ear in an artificial fashion. Examination of figures concerning cases done with adequate follow-up, seemed to him to show that in a small number of cases where the footplate involvment was minimal, successful mobilization through neck or lenticular process would give a very high percentage of lasting improvement. Dr. Hall felt that our ideas with regard to mobilization had been distorted by the amount of destructive surgery which had been carried out on the footplate in the name of mobilization. Dr. Hall realized that the number of cases suitable for this type of treatment was very small, but they were worth exploring before proceeding to destroy and then reconstruct the physiology of the middle ear. It seemed to him good surgery to accept a few failures for the sake of obtaining a normal ear, especially as in his experience the simple mobilization did not carry any increased risk in subsequent operations. At the other end of the scale, while realizing that some procedures such as that of Dr. Shea was undoubtedly now the procedure of choice for the treatment of otosclerosis, he asked if in Dr. Shea's opinion there was any room for the fenestration operation. Dr. Hall quoted briefly some figures from an article of Dr. Schuknecht's, where he analysed cases of severe sensorineural loss, occurring in a series of 750 operations. In that article Dr. Schuknecht showed that in slightly more than 50 per cent. of those cases showing severe sensorineural loss, extensive work had been done by drilling upon the footplate. Dr. Hall wished to know if, in Dr. Shea's opinion, where it was obvious that in order to obtain successful removal of the footplate of the stapes it would be necessary to drill extensively around the footplate, that the classical horizontal canal fenestration would not be the better operation, provided that the patient's audiogram permitted such an operation as a feasible procedure.

It was evident that the fenestration operation was the correct method of procedure in certain cases of malformation of the ear, and in the results of some cases of chronic middle-ear disease; it was therefore necessary to keep the fenestration operation in the equipment of the fully trained otologist. It seemed to him that it still had a place in the treatment of certain cases of otosclerosis.

Finally it appeared unwise to rely entirely upon one method of treatment for a condition which could vary widely in its extent and in its effects, but that experience should dictate the appropriate operation in each case.

Mr. J. D. K. Dawes (Newcastle-upon-Tyne): A bulging facial nerve, an overhanging facial canal, angular deviations of the lenticular process in the horizontal and verticle plane, and a narrow fossa ovalis all tend to prevent a

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normal polythene prosthesis fitting snugly to the lenticular process and at the same time dimpling a vein graft into the centre of the oval window. If the polythene strut should abut against bone the re-consituted ossicular chain fails to work efficiently. Apart from the use of modified struts these problems can usually be better solved by the use of a trimmed stapes (Portman (1959), Ruedi (1960), Beales (1962), or the use of malleable tantalum or stainless steel wire Schuknecht (1960), Kos (1961), House (1959)) for a stapes can always be returned to the site from which it came and a malleable wire adjusted to fit.

The extent of the otosclerotic focus determines whether or not a good natural strut consisting of a full length posterior crus of the stapes can be manufactured satisfactorily. When this is not possible as in Type IV and obliterative foci it is better to proceed directly to a Shea or Schuknecht operation. A personal series of 102 consecutive cases shows a high incidence of extensive foci for many of the cases were re-operations for previous failures or refixation. Using a combination of techniques, Shea (1958), Portmann (1959), Hough (1958) 100 patients heard immediately but after 6 weeks only 94 maintained their hearing gain.

A further case is beginning to deteriorate 1 year after a Portmann operation. No case of sensorineural loss has yet occurred. Of the failures, two resulted from inadequate surgery for the stapes was buried up to its neck in otosclerotic bone. The other failures were due to fibrosis in the oval window, the use of too short a strut and four from a post-operative necrosis of the lenticular or long process of the incus.

Finally, I would like to ask Dr. Shea two questions. Firstly, can one avoid lenticular process necrosis and what is the best method of dealing with a post-stapedectomy necrosis of the long or lenticular process of the incus. Secondly, is it worth while operating on those patients who have an air-bone gap but whose bone conduction is so poor that it can barely be recorded by an audiometer?

MR. WILLIAM MCKENZIE asked whether Dr. Shea had any comment to make on other techniques of stapes surgery and particularly on the method which Schuknecht adopted.

Dr. Shea's reply to this was that he had discussed his results with Dr. Schuknecht, and that Schuknecht had told him that he had records of 300 cases with no serious complication, in which the results were at least as good as those where Shea's method had been used.

MR. P. H. BEALES: I would like to refer to the incidence of post-operative otitis media after the Shea operation with the polythene strut, as infection after operation is a not uncommon complication.

The operation I perform for otosclerosis does not depend on the use of a foreign body in the tympanum and with this technique post-operative otitis media has not occurred. I believe that in the majority of cases some infection is conveyed to the middle ear during the operation as it is not possible to sterilize the external ear canal before operation. The normal protective mechanism of the body aided by antibiotics is adequate to deal with the bacteria introduced at operation but in a small percentage of cases with a polythene

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insert the foreign body interferes with this reaction and post-operative infection occurs. Only time will tell if this interpretation is correct as my series is as yet a small one.

June 29th, 1962

Discussion on Chronic Middle-Ear Infection

I. B. THORBURN said Mr. McGuckin does well to insist on fresh thinking about destructive ear disease, particularly when he states that keratosis is the basis of all this chronic ear pathology.

Though he regards me as an opponent of his ideas, actually I agree with his central thesis but disagree with many of his practical applications and conclusions. I accept the theory that the development of the condition which most of us still prefer to call cholesteatoma, is determined by invasion from without the tympanum. I do not share his consequent anxiety to discard the term chronic otitis media. Mr. McGuckin infers that it is incorrect to speak of chronic otitis media unless there has been an original acute-chronic sequence; careful clinical observation has convinced him that this is not true.

I thought it might be of interest to get a definition of chronic inflammation from Muir's Textbook of Pathology. This puts it very simply:

"It is important to distinguish two main types of chronic inflammation.

1. Chronic Inflammation which is a sequel to acute.

2. Chronic inflammation which is of slow progress throughout; i.e. it is chronic from the outset."

Muir further comments that the causes of such a primary chronic inflammatory process may be:

(*a*) Organismal, e.g. tubercle or syphilis;

(*b*) A poison in solution, e.g. toxins or chemical substances;

(*c*) Particulate or foreign body in character. Under this last heading in relation to the ear, we might include keratin and cholesterol crystals.

By the time most cases come to our clinics the disease has invaded the tympanomastoid cleft, usually with partial destruction of the tympanic ring, the ossicles or the drum and there is enclosure of cholesteatoma matrix containing keratin. Part of the tympanic cleft is involved by a *primary* chronic disease process so surely it is reasonably correct to refer to it as chronic otitis media.

I also agree that all suspect ears should have a careful microscopic examination. This may require an anæsthetic, but often this is not necessary. The objects of this examination are:

1. To carry out a thorough microscopic toilet or you may prefer to call it a suction clearance.

2. To assess the tympanic response to past or present disease.

3. To explain *how* the patient is hearing or *why* he is deaf.

4. To assess the nature and extent of the pathology and to decide the best management.

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May I focus your attention on *management*?

Microscopic examination with suction clearance offers a new field of interest and activity in Otology. I accept Mr. McGuckin's proposition that many cases with early keratotic pathology can be spotted and controlled before they progress to the deeper invasion of the tympano-mastoid cleft in the manner of a classical cholesteatoma. His maxim, "Once a keratosis always a keratosis", means that these ears remain at risk and will require microscopic observation with suction clearance at intervals for years. The snowball effect is evident at present only in Newcastle where any visitor to his department may think that suction clearance has replaced coal as the major industry of that great city.

I would now like to define and discuss three types of more familiar and possibly more advanced ear pathology.

Type A has useful hearing and active disease spreading beyond the tympanum.

Type B has significant conductive deafness and active disease of uncertain extent.

Type C has a damaged tympanum with no residual active disease; deafness is the presenting symptom.

In relation to Types A and B, Mr. McGuckin demonstrates considerable dexterity in dissecting out and removing disease through an ear speculum. It is my submission that anything he can do through an ear speculum most of us can do better and more safely by creating reasonable access through an endural incision. An essential first step is to uncover and remove disease from the mastoid and attic; this facilitates a careful microscopic dissection of the tympanum, so completing a modified radical mastoid operation. In Type A one expects to identify and conserve the tympanic mucous membrane where it has limited the spread of disease making hearing possible in the manner of a Wullstein Type 2, 3 or 4 physiology.

In Type B there is usually no tympanic membrane and no ossicles apart from the stapes. One may find a healthy Eustachian tube and some surviving healthy mucosa over the promontory and hypotympanum. If the hearing is important to the patient conditions are suitable for a Type 3 or 4 tympanoplasty. A reasonable alternative would be to leave the ear to heal and consider it later under Type C, the ear with marked conductive deafness and no residual active disease. This group (Type C) is really the end of destructive ear disease. Mr. McGuckin has little to offer on its management but he condemns tympanoplasty since this does not correct the underlying "keratosis".

The attitude of the individual otologist towards tympanoplasty will vary with his technical competence, possibly his enthusiasm and certainly with his experience and ability for self criticism. I agree in condemning tympanoplasty which relies upon the use of extra-meatal skin. I am prepared to look for and very carefully to preserve any attempt to provide a functioning substitute for a tympanic membrane. I am *not* prepared just to sit on the fence and hope that something will grow. The functional principles of tympanoplasty are still valid. We must however, employ techniques which provide secure and permanent repair of the new tympanic cavity.

In *February 1961*, at the Royal Society of Medicine I described the technique of Tympanomuscleplasty. I am grateful to our President, Mr. Clarke, for suggesting Tympanomyoplasty as a more appropriate title. Further experience

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has convinced me that extra meatal skin is unnecessary and undesirable. For the tympanic repair I now rely on temporal fascia combined with meatal skin. These are ideal materials for a limited myringoplasty operation. Also when one had a large tympanomastoid cavity, the use of temporal fascia and meatal skin for the tympanoplasty repair, combines conveniently with the obliteration by pedicled temporal muscle of an unwanted mastoid cavity. During the past 2½ years I have performed over 80 myoplasties or tympanoplasties. The large majority have healed quickly and there have been very few after-care problems.

Those of you who, like Mr. McGuckin, have become discouraged by the poor results of tympanoplasty, will probably condemn me as one obsessed by the lure of yet another technique. While I heartily commend Mr. McGuckin's intensive efforts to attain a better understanding of the pathogenesis and prophylaxis of destructive ear disease, I suggest that he himself has become obsessed by a technique which imposes too many restrictions to commend it as a satisfactory alternative to open conservative mastoid surgery, including tympanoplasty—or may I suggest tympanomyoplasty.

MR. R. THOMAS (Carlisle) said that Mr McGuckin (1961), had already convinced him that there is a common disease of the meatal epithelium which can cause loss of the underlying tissues and is a likely cause of loss of middle layer or perforation of the drum. Clearly squamous epithelium can grow round the edges of a perforation and so cause cholesteatoma. However, he could not accept Mr. McGuckin's ready dismissal of infective and mucosal factors in the etiology of chronic otitis.

For example Otitis Externa can cause gross subepithelial fibrosis at the meatal entrance. In the deep meatus, where the skin lies on the periosteum, there can be granulations and osteitis. There is, in the active stage, offensive pus and organisms can be grown. Surely it is reasonable at least to surmise that infection is playing a major part and that the products of infection pass through the skin and damage the underlying tissues.

It is generally accepted (Rothman, 1954) that skin (especially where there are no hairs) is almost impermeable except to two kinds of substance, lipid soluble and gases (sulphides in particular). It is also accepted that the process of keratinization depends to an extent on the re-arrangement of sulphur groups and the loss of water. Perhaps bacterial or fungal activity can inhibit keratinization by utilizing the sulphur groups and converting them into foul-smelling gases and other poisonous products, leaving a mass of wet epithelial debris which has not keratinized and is not keratin and cannot therefore be shed in the usual way. Would it be possible to analyse the chemical products of common aural bacteria and their effect on living tissues? Has there been any investigation of the protein constituents of the "sodden keratin" so often observed in these cases?

With regard to mucosal factors, he, Mr. Thomas, had some years ago become aware of the *secretory otitis—cholesteatoma sequence* and had seen many cases. A recent example is a child of 3: in one ear operation had disclosed cholesteatoma extending to the mastoid tip; on the other side the drum is indrawn and the middle ear contains mucopus. Unless the negative pressure is relieved and the fluid dispersed, this side too will develop cholesteatoma for reasons which can be explained by a series of diagrams.

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Fig. 1 shows the normal ear. The black is bone, the white air, the red squamous epithelium and the green mucosa. If, as in Fig. 2, the Eustachian tube fails to open often enough or, for some reason—infection for example—it becomes blocked by the products of cellular metabolism which are in excess or too viscid, there will be negative pressure. The result of the negative pressure will be an effusion of serum, mucus or sometimes blood into the middle-ear spaces. There can be too a submucous exudate in some of the mastoid cells with the formation of a granuloma containing cholesterol spaces and the crowding together of the mucosal cells giving the histological appearance of a multi-layered epithelium. This common condition generally resolves spontaneously or with minor measures; but, if it does not, the result can be disastrous to the hearing and may require urgent and complicated treatment which is not relevant to the present discussion. What is relevant is the intrusion of the hernial sack of Shrapnell's membrane or of another part of the drum weakened by previous disease. This sack cannot develop without negative pressure. Is it reasonable to aspirate the squamous products of this sack repeatedly unless the underlying cause is also dealt with?

One of the reasons the sack may become infected is that the sensation of fluid in the middle ear or the negative pressure may compel the patient to keep on poking the finger in the ear. When the sack becomes infected or if a bottleneck develops, it will expand in any direction as the products of desquamation collect, pushing before it a layer of mucosa. Such a case as is shown in Fig. 3, if not infected, might have no trouble for many years, especially if the squamous products were aspirated occasionally. However, since he cannot tell what is happening in the mastoid cells or what is the extent of the sack, he, Mr. Thomas would prefer to perform what he calls a modified radical mastoid so that the family doctor can have some idea what has been done. He would also in this case take care to preserve the membrane between the sack and the middle ear which has in this case returned to normal (as indicated in the drawing).

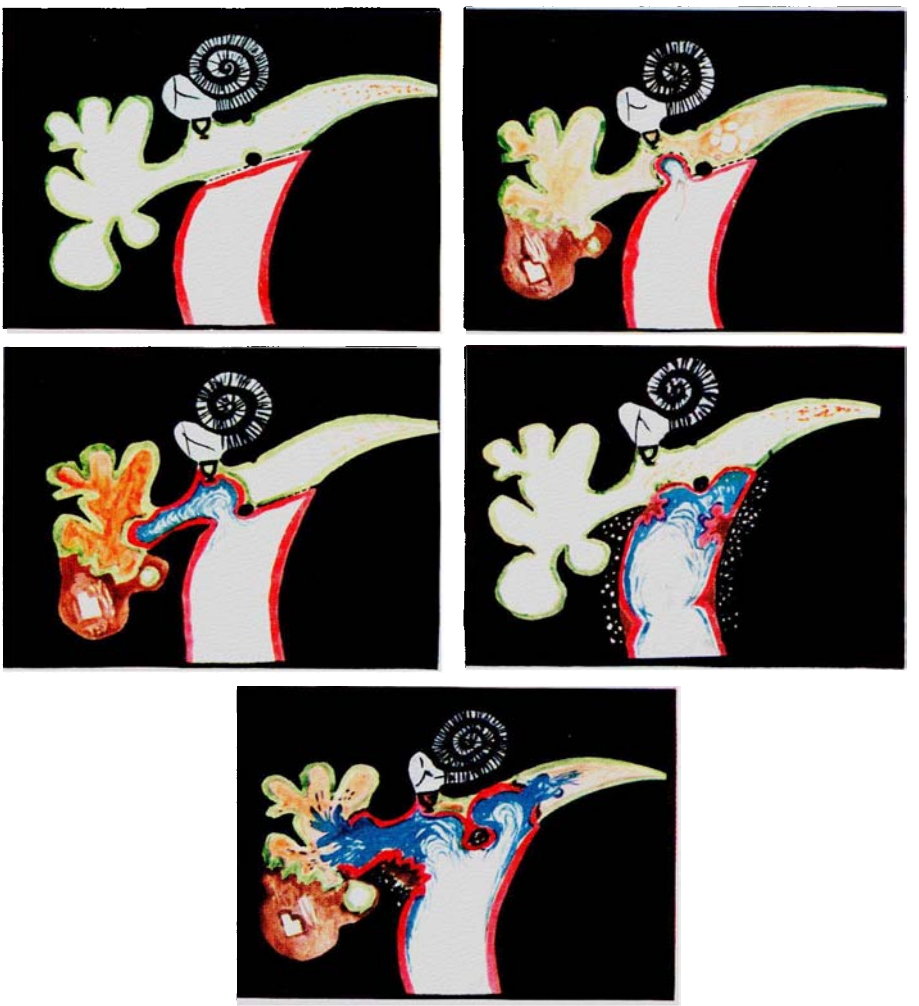
Fig. 4 illustrates a conception of the meatal disease which Mr. McGuckin has demonstrated. It shows the underlying osteitis of the bony meatus, which may lead to dilatation; also are shown granulations, intrinsic myringitis and loss of middle layer of the drum.

Fig. 5 is intended to show that all types of disease have combined to produce the well-known picture of advanced disease. There is cholesterol granuloma and thick mastoid mucosa; the cholesteatoma has burst into the mastoid cells; there is attic erosion and another sack has burst down towards the eustachian tube, whose obstruction was the original cause of the trouble.

Whatever may be the cause of the hypocellular mastoid, there can be little doubt that, in a case of unilateral disease, the hypocellular side is likely to be the diseased one. The well-pneumatized mastoid. a greater reservoir of air, is better able to resist episodes of negative pressure than the hypocellular.

Although he could not agree with Mr. McGuckin's assessment of chronic otitis, he regarded him as the most able and stimulating otologist of today and members of the section in search of ideas for further thought and research should follow Mr. McGuckin's example with out-patient clinical microscopic work and photography. For example we have seen the brilliant

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FIGS. 1, 2, 3, 4, 5.
See text.

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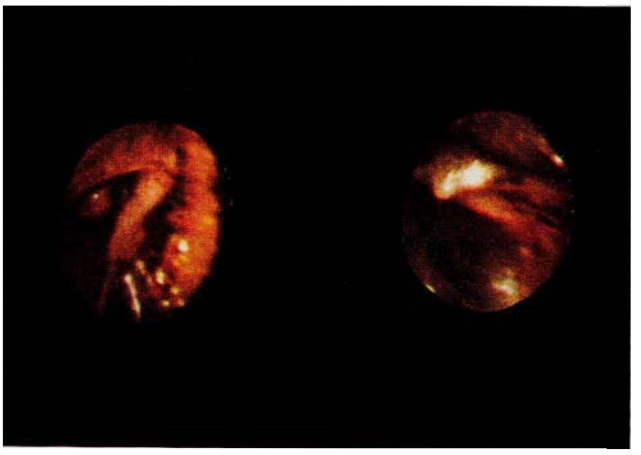


FIG. 6.

Right ear: Following removal of adenoids. Negative pressure relieved; the drum is thin and lax. *Left ear:* Same case. Negative pressure unrelieved. The drum is still stretched and retracted.



FIG. 7.

Right ear: Drum shows loss of middle layer both anteriorly and posteriorly. *Left ear:* There is active disease and perforation, which is partly obscured by "sodden keratin".

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series of photographs shown by him and by Mr. Thorburn. He, Mr. Thomas, had tried to take photographs without the use of the microscope with home-made apparatus which is easily portable and showed examples, Figs. 6 and 7.

Another suggestion is about words. Every few years some new terminology is advocated. The latest is "destructive ear disease". It must be very puzzling for those who are not members of the section and yet have to treat this common disease to realize what we mean. The term "chronic otitis" is all embracing, and, unlike the collection of diseases it represents, is easy for all to understand.

Postscript. Mr. Thomas wishes to say that he is, as always, very indebted to Mr. Tumarkin and especially so for the annotation (1962) which was published after the above short paper had been prepared.

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Aural Keratosis

R. E. Jowett (Sunderland): The doctrine preached by my colleague Frank McGuckin may well prove to be a turning point in our conception of the development of chronic middle-ear disease, just as the procedures which he and his associate Verhofen advocated have altered our ideas upon the treatment of Keratosis. I speak as one largely converted.

In the period *June, 1961*, to *June, 1962*, we have had 81 cases of these under active treatment. In addition 65 other cases have had aural debris removed by suction, with or without removal of granulation tissue at the same time. It is possible to regard these latter as cases of burnt-out canal keratosis but I am not yet prepared to admit this in all of them. Of the 81 cases of definite Keratosis mentioned, 31 are new ones first seen in the named period. In these, squames were present in the middle ear in 18 instances and it would appear that diagnosis is improving. The term "Obturans" is now avoided as it leads to confusion.

I consider the condition due to recurrent respiratory infection, with desquamation of the outer tympanic layer, with or without a serum leak. It is interesting to speculate upon the cause of the respiratory infection, or the tendency to it, and a possible relationship with allergic changes of non-atopic type as described by van Dishoek in Paris last year is of importance. In Birmingham a M.R.C. working party is at present investigating Hypogammaglobulinæmia and along with other cases a series showing the combined lesions of sinus infection, bronchiectasis and middle-ear disease is included (Squire, 1962). It would be of interest to know if any of these cases showed Keratosis. We have investigated a small number on these lines, with negative results taking a proportion of 200 mg. of gammaglobulin per 100 ml. as normal. An attempt to genotype these cases has so far proved unsuccessful.

As Dr. Holti has referred to a possible relationship with Vitamin A deficiency I would refer him to Hartman's work in this connection (Hartman, 1953).

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Adequate treatment is dependent upon the availability of suction and microscope. Meticulous removal of squames from the canal and middle ear is amply rewarding. Although time-consuming, on balance it is time better spent

TABLE

Aural Keratosis. June 1961-62. 13 males, 18 females. Total 31 cases.

	Associated Lesions		
	Under age 15 21 cases	Over age 15 10 cases	Total 31
Established Bronchiectasis ..	4	2	6
Antrum Suppuration	9	2	11
Nasal Polypi	2	3	5
Recurrent or Chronic Bronchitis ..			6
Invaded middle ear (Squames present)			18

than upon tympanoplastic procedures in this class of case, apart from the later humiliation of having to remove skin so painstakingly and mistakenly introduced.

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THE IRISH OTOLARYNGOLOGICAL SOCIETY

The Second Annual Meeting of the Society was held on *Saturday, November 18th, 1961*, at the Institute of Clinical Science, Belfast. The President, Mr. T. G. Wilson, was in the Chair.

Mr. Michael O'Brien read a paper on the "Surgery of Bilateral Midline Laryngeal Paralysis". Mr. H. W. H. Shepperd discussed "Vascular Phenomena in E.N.T.", and Mr. Ronal Harvey presented a paper entitled "Management of Partially Deaf Children in the Early School Age." These papers were discussed by the members of the Society.

In the clinical proceedings cases were shown by Mr. Kennedy Hunter, Mr. D. H. Craig, Mr. G. D. L. Smyth, Dr. Noreen Simpson, and Mr. R. S. McCrea, and of these the following gave rise to discussion:

Case IV. Carcinoma of the Vocal Cord treated by Radium Fenestration

Mr. Woods said that the Finzi Harmer operation was good in suitable cases because it gave a high percentage of 5-year cures, gave a better voice than did

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