SOCIETIES' PROCEEDINGS

ROYAL SOCIETY OF MEDICINE—SECTION OF OTOLOGY.

March 7, 1930

President—W. M. MOLLISON, M.Ch.

Cysts of the Temporal Bone involving the Middle Ear and the Jugular Fossa.

G. J. JENKINS, F.R.C.S.

Three cases of new growth in the region of the jugular fossa, middle ear, and vertical portion of the seventh cranial nerve, have been under my observation in the last three years. The similarity of history, situation of disease, symptoms and clinical progress was striking, and indicated that the factors of incidence and progress must have been the same in all three.

In the early stage of the disease, when symptoms would be slight and progress slow, the diagnosis might easily be "unexplained deafness" or "facial paralysis." In the later stages, as in Case I. (Mrs C.), the diagnosis would be "gross malignant growth involving several cranial nerves, with a readily bleeding polypus in the ear."

In one of the three cases the diagnosis was cerebello-pontine angle tumour, and perhaps some of the failures to find an acoustic tumour may be due to such a mistake.

CASE I., Mrs C., aged 30.—Admitted to King's College Hospital, London, 22nd July 1926, suffering from severe pain of left side of head and profuse hæmorrhage from left ear. She was six months pregnant.

History.—After influenza in 1915 she had had severe vertigo (? direction of fall) lasting some weeks; she needed help when walking. No vomiting. Gradually recovered completely.

Early in 1916 had a severe blow on the head by a fall from a tramcar. Not unconscious, and walked away to do ordinary day's work. A few weeks after the injury twitching of the left side of the face began. In June 1916, was admitted to a hospital for nervous diseases. A few days ago the Registrar of this hospital kindly sent the following abstract of the notes made at that time: "Complete paralysis of left side of face and complete paralysis of left half of palate, and left sternomastoid muscle. Tongue protruded to left, and left somewhat wasted. Reflexes and gait normal. Cerebrospinal fluid normal. Complained of noises in left ear; left ear very deaf. Spontaneous nystagmus to the right; nil to the left."

Diagnosis at the hospital: "Tumour of left cerebello-pontine angle."

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On admission to King's College Hospital she was very ill from pain and loss of blood. The attacks of pain and bleeding had come on about four months previously but there had been no disturbance in the ear from the time she left the other hospital until recently—a period of nearly ten years. Large firm polypus blocked the deep meatus. No purulent discharge, or history of such discharge.

Weber to right. Rinné, positive on right; on left mastoid, sound referred to right ear.

Complete paralysis of seventh cranial nerve, left palate, left tongue, left larynx, left sternomastoid.

Caloric test, no reaction (on account of polypus). Wassermann reaction negative.

31*st July* 1926.—Operation: left external carotid artery tied. No note made about lateral sinus. What appeared to be a cyst extending to the region of the jugular bulb was opened. The dura mater of the posterior fossa was exposed.

A radical mastoid operation was carried out, and the polypoid mass in middle ear and meatus was removed.

Seven tubes of 8 mgm. radium were placed in the wound cavity. It was hoped that the operation would help the patient over the next three or four months. She had complete relief.

Readmitted 8th December 1927 for plastic operation and repair of ugly hole in mastoid.

Patient now shown, three and a half years after operation. The radical mastoid cavity is quite dry. The paralysis remains as at time of operation, but there has been no sign of recurrence, no pain and no bleeding.

CASE II., Mr B.—Abstract of notes, 10th January 1928: Paresis right side of face, five weeks. Deafness in right ear for three years, has gradually become worse. No pain or discharge. Tinnitus puffing in right ear; began one year ago. Not the slightest giddiness.

Accidents.—Has had three concussions, never causing bleeding from ear.

There was a conical red mass in the middle ear, arising from the floor in the posterior part of the cavity.

Weber to right. Bone conduction good in both ears. Rinné: Right, air and bone conduction almost equal at 90 d.v.; left, positive to all tones. Low-tone limit; Right, just hears low limit; left, hears limit well. High-tone limit (monochord): by air conduction, Right 20 cm., left 19 cm.; by bone conduction: Right 16 cm., left 16 cm. Conversational voice: Right 24 ft.+, left 24 ft.+. Whisper: Right 21 ft., left 24 ft.

No spontaneous nystagmus. Rombergism: Falls to right, with narrow base. Paresis, right side face (lower neuron). Puffing noise stopped by pressure on carotid.

CASE III., Mrs N.—*History*, 1908: Injury to right tibia, followed eighteen months later by blood tumour size of walnut. Removed by operation. 1920: Fell from horse and struck head against a tree. 1923: Severe labyrinthine disturbance with vertigo and vomiting.

4*th October* 1926: Deafness in left ear (this began twelve months after accident). Tinnitus: Buzzing. Vertigo (severe in 1923, lasting three

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months). Tympanic membrane normal. Weber to left. Bone conduction, diminished twenty seconds in right; fifteen in left. Rinné: Right, positive to all times; left, negative to 90 d.v. Low-tone limit: Right, good; left, raised to 50 d.v. High-tone limit (monochord) by air conduction: 17 cm. in both ears. Conversational voice: Right 24 ft., left 18 ft. Whisper: Right 24 ft., left 3 ft. Inflation: no improvement.

15*th May* 1927: Deafness much increased. Bruises easily. Paralysis of seventh cranial nerve. Began by spasmodic contractions 15th December 1926. Paralysis noticed on 3rd January 1927. Noted loss of taste. Left ear: Red convex mass in middle ear arising from floor and in posterior part of cavity. Weber to (?) right (bad witness for tuning-forks). Bone conduction diminished in both ears, about twenty seconds. Rinné: Right positive to all tones; left, negative to C3 (heard with noise apparatus to right). Low-tone limit: Right, good; left, raised to 90 d.v. High-tone limit (monochord) by air conduction: 16 cm. No spontaneous nystagmus. No Rombergism. No inco-ordination. Caloric tests: Cold in left; definite positive reaction; the lotion caused much pain in the ear. Palate: (?) good. Tongue; left side atrophy. Voice: Abductor paresis.

20*th September* 1927: Growth in middle ear much increased.

Skiagram, 21st September 1927 (Mr Graham Hodgson). Definite evidence of changes in bone in region of jugular foramen. The patient was distressed by pain and worried by the obvious progress of the disease in so short a time.

29*th November* 1927: Operation for removal of growth as far as possible, and for implantation of radium. The external carotid was ligatured. The lateral sinus was sought for, but seemed to have disappeared entirely. By keeping in touch with the dura mater of the posterior fossa, the cyst was reached fairly easily.

I have not described the operation in detail, as I think it might be very much improved. In attempting to remove the cyst an opening was made into the subarachnoid space. This caused a great deal of trouble. Cerebro-spinal fluid leaked out for six weeks afterwards. In the preliminary part of the operation I made a periosteum flap, which was very useful against the opening of the dura. The radium was put in at time of operation, and the wound packed with specially prepared iodoform gauze.

After receiving Dr Creed's report of the microscopic section, it was decided to apply the radium again.

The result was very slow, weak healing; intermittently, for about a year, small pieces of necrosed bone appeared.

The wound has now been soundly healed for some time. There is no evidence of recurrence of the disease two and a half years after operation.

We may note the points of obvious similarity in these three cases:—

Injury.—In all three there was a history of severe injury to the head. Neither Mrs C. nor Mrs N. had been unconscious, but Mr B. had been so on three occasions. There was no bleeding from the ears at the time of the accident in any case. Mrs C. had a severe attack of vertigo before the accident.

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Deafness.—The first symptom in all three was a middle-ear deafness and the next was tinnitus. These symptoms increased, and in the advanced stage certain cranial nerves became affected.

Seventh Cranial Nerve.—Spasmodic twitching of one side of the face was the first indication of affection of this nerve in the cases of Mrs C. and Mrs N. This was followed by complete lower neuron facial paralysis. In Mr B.'s case the paralysis was not complete when I examined him and he had not had a spasmodic stage.

Other Cranial Nerves.—The facial paralysis was followed, in the cases of Mrs N. and Mrs C., by paresis or paralysis of the palate, larynx, trapezius, etc., on the same side. Mrs C. shows the persistence of these effects, though the tongue has recovered to a great extent.

Tympanic Membrane: Middle Ear.—Mrs C. was seen at an earlier stage in 1916, at a hospital for nervous diseases. She complained of deafness and tinnitus in the left ear. The tympanic membrane was described as normal. Paralysis was found on the left side of the face, the left half of the palate, the left half of the larynx, left tongue, left sternomastoid, trapezius.

The deafness and tinnitus indicate that probably the middle ear was affected by the neoplasm, though no change in the tympanic membrane was noted. The later stage of the case was seen at King's College Hospital; then there was a polypus plugging the meatus, and it was the bleeding from this that first—in all those years—warned the patient of a change. Both Mrs C. and Mrs N. were examined in an early stage, and the appearances of the neoplasms in the middle ear were very similar and characteristic in the two cases. A small bright red conical mass appeared in the postero-inferior part of the middle ear as if pushing through the floor. In Mrs N. the tympanic membrane could be moved on this red mass by means of the Peters' speculum. Mrs N. did not reach the advanced stage attained by Mrs C., but showed in some degree the paresis described. After operation the tongue, palate and larynx improved.

Skiagram.—Another feature of great similarity was the X-ray picture in the two cases (those of Mrs N. and Mr B.) examined. Dr Graham Hodgson has demonstrated that in these two cases the neoplasm is in the same anatomical position. There are sufficient facts to allow us to deduce that in these cases the disease must have begun from the same point, extended in more or less the same direction, and affected the same structures.

The early appearance of the tumour in the postero-inferior part of the middle ear, with the affection of the seventh cranial nerve at about the same time, indicates the point of incidence very accurately, especially as we know that middle-ear deafness and tinnitus have

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appeared in all three cases, before the affection of this nerve. I venture to suggest that the probable point of incidence is in the outer wall of the jugular fossa, in close relation to the inner wall and floor of the middle ear, just in front of and internal to the seventh nerve.

The growth, in extending through the jugular fossa, would involve the other cranial nerves and obliterate the lateral sinus.

The cyst as found at operation in Mrs N.'s case, was in relation with a considerable area of dura mater above the region of the jugular foramen; the floor was on soft tissue; the roof was in relation to the under surface of the labyrinth and middle ear. It seemed to reach as far forward as the internal carotid artery and my impression was that it extended inwards, in contact with the dura mater, to about the internal auditory meatus. The seventh cranial nerve was in or just inside the outer wall of the cyst.

Pathology.—In both Mrs N.'s and Mrs C.'s cases there was found at operation a cyst containing a thick, dark, blood-fluid. The inner surface of the wall of the cyst (Mrs N.) was of a bright canary-yellow colour and had a granular surface. The wall was a definite structure and a great part of it was removed. Dr Creed, Director of the Pathological Department, King's College Hospital, reported as follows:—

"The piece of tissue is sarcomatous. The cells are spindle-shaped, and show considerable variation in size. The chromatin network of the nuclei is prominent, and several mitotic figures were seen. There is a fine fibrillary stroma separating the cells. The vessels are badly formed, and in many cases appear to be lined by tumour cells. There has been much extravasation of blood. In addition to the sarcomatous tissue, there are also present one or two fragments of stratified epithelium. The cellular character of the growth, the evidence of nuclear activity and the badly-formed vessels leave no doubt as to its sarcomatous nature, but the histological appearances do not suggest that it is a very rapidly growing tumour."

The history of severe injury to the head in all three cases suggests that the cyst was in some way due to injured blood-vessels and was innocent, but in the meantime I am inclined to regard the condition as of low malignancy until there is positive evidence that it is innocent.

Prognosis.—The neoplasm is very slow-growing; in Mrs N.'s case the advanced symptoms did not appear for six years and in Mrs C.'s case for ten years. The clinical progress of these cases suggests very strongly that these neoplasms will continue to grow and ultimately cause such damage as that found in these two cases, though it may take years to do so. In untreated cases we can imagine even more distressing symptoms than those recorded here. It might be contended on good basis that it would be better to avoid any active treatment of a disease which for many years may not do more than

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cause some deafness and paralysis to the seventh nerve. Again, it might be suggested that one should wait until the advanced stage before attempting to destroy the disease. Lastly, it might be thought best to adopt a method of treatment that seemed to offer some chance of delaying progress or even of destroying the disease whenever diagnosed. Having watched the clinical progress of these three cases and seen the distressing condition in the advanced stage, I am convinced that the disease should be attacked by operation and radiation as soon as the diagnosis has been made, especially if that diagnosis is clearly supported by X-ray examination. The mistakes made in the operations in the two cases quoted were due, perhaps, to attempting too much. The experience of the operations and the study of the anatomy of the region suggest that our object should be to expose all parts so as to allow the intimate and accurate application of radium, and not to endeavour to remove the whole growth.

The following is a rough plan of the operation which would seem to give the best approach and provide the effective protection afterwards: Make a skin-deep incision, $\frac{1}{4}$ in. behind the pinna following the curve of attachment of the pinna, and on reaching the point above the pinna extend upwards for about an inch. Another horizontal incision backwards from this point, about the level of the upper limit of attachment of the pinna, will be needed for a free exposure. Reflect the skin and cut a periosteal and muscle-flap with an antero-inferior base by an incision from a point just behind the mastoid process, extending upwards and backwards to about the occipital crest, from this an upward curved incision would be made forward to a point just above and in front of the pinna.

An extensive Schwartze operation would be performed, exposing the lateral sinus, the dura of the posterior fossa, external and internal to the lateral sinus. If not obliterated by disease, the lateral sinus should be blocked off.

In the two cases operated on, the seventh cranial nerve was regarded as destroyed, and therefore not to be considered in the operative procedure. In an early case an endeavour might be made to get between the nerve and the dura to the cyst, and thus perhaps save the nerve. It does not seem necessary to ligature the external carotid artery as was done in these cases.

The radium would be placed in position at the completion of this stage of the operation.

The flap must be carefully protected from the radiation whilst the radium is in position.

In the final plastic operation the upper part of the attachment of the base of flap would be cut through to allow the flap to reach the deep parts of the wound.

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The object of this paper was to draw attention to a syndrome common to three cases, and to suggest that it is probable there are other similar cases. As there is a history of severe injury of the head in all three, and as there are more fractures of the base of the skull in recent years, perhaps we may see cases with similar syndrome more frequently.

I have to thank Dr Creed for his valuable opinion on the microscopic section of the cyst wall, and Dr Graham Hodgson for his very helpful radiograms.

Mr ALEXANDER TWEEDIE said that Mr Jenkins had modified his title by drawing attention to the constant and important factor of trauma, whilst the cystic appearance certainly suggested some underlying vascular lesion. Could Mr Jenkins say whether there was a definite sarcomatous element in the cases in which he had operated?

Of the three cases described, he (Mr Tweedie) had had the privilege of seeing one in November 1926, some fifteen months before Mr Jenkins saw it. The patient had consulted him with regard to tinnitus in the right (affected) ear of about two months' duration. There was then no sign of facial paralysis. On this occasion the appearance of the membrane was similar to that described by Mr Jenkins, but as there was a chronic nasopharyngitis, palliative treatment was prescribed and further examination of hearing was postponed. However, for conversation, the patient's range for hearing on each side was at that time well up to the standard for his years.

He (Mr Tweedie) had not seen him again until after he had consulted Mr Jenkins, when he was able to complete the examination of the auditory and vestibular nerves, and was unable to detect any obvious abnormalities in either. At the same time he had noted that the injected area was mobile with the membrane on aspiration and could be displaced outwards after catheterisation. He had only seen the patient about five times since and could not at first detect any alteration except that the facial paralysis had become definitely established. During the last year, however, the hearing had gradually decreased, while more recently the lesion of the membrane had extended. It was important to note, with regard to the character of the lesion, that this patient, even during the present season, was hunting four days a week and tiring three or four horses each day.

These cases must be extremely rare; he (the speaker) had only seen one other. The patient was a heavily built elderly man, living a sedentary life, who consulted him on account of deafness of the old age type. However, he had noticed a similar triangular infiltration and injection of the membrane with its apex at the umbo and its base at the periphery. The patient, when questioned, did not admit any history of accident, but at a second visit, produced a broken bowler hat, which he said was the result of a severe fall on the back of his head on a slippery day. This fall had apparently caused a transient concussion. So far as he (Mr Tweedie) knew at present, there were no further developments in this case.

The first case Mr Jenkins had shown constituted a complete claim for the operation performed. The lesion, however, was apparently such a

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slowly progressive condition that he could not help feeling that the advisability of operation merited careful consideration.

Mr HAROLD KISCH said he was greatly interested in the syndrome which Mr Jenkins had described, because he (the speaker) had now under his care a case presenting a somewhat similar nerve involvement, though in this case the disease was tuberculosis of the petrous bone. The patient had come to hospital complaining of hoarseness, and the right vocal cord was found to be paralysed. Projecting from the right external meatus was a large polypus : there was no pus. The right trapezius was weak, but the patient said that the right side of the shoulder had always been so. The polypus was removed with difficulty, for microscopical examination. There was much bleeding, and the results of the examination were unsatisfactory. It was therefore decided, thinking the condition might be malignant, to explore the mastoid and middle ear. Both mastoid and antrum were normal, but when he (Mr Kisch) tried to expose the meatus and middle ear it was almost impossible to do so, owing to the mass of material present. He removed the bridge so as to get a better view, and the whole middle ear was seen to be filled, but the appearance did not suggest to him malignant disease. He removed some portions and closed the wound. Sections of the material showed definite giant-cell systems. Dr Graham Hodgson took skiagrams, without being told the clinical facts, and he reported that the appearance suggested an eighth-nerve tumour. While the patient was in hospital, definite weakness of the right side of the tongue had developed, with weakness of the right side of the palate. The patient had since returned to work, and had been instructed to lead an open-air life. There was still paralysis of the right vocal cord, tongue and palate, though the general health was very much better.

He considered that he was justified in regarding the condition as tuberculosis of the temporal bone, with pressure on the jugular and anterior condylar foramina.

Another case he remembered was one of a man who a few years ago had a tumour in the middle ear, on the other side of the membrane, and he thought it was malignant. Mr Wyatt Wyngrave described the portion removed as meso-endothelioma. It was before radium was obtainable at the hospital in any quantity, and the patient was set aside to await his turn for it. He did not turn up when sent for. Seven months afterwards he came with a note from the Middlesex Hospital, where the condition had been diagnosed as an acute mastoid. He had facial paralysis and a large swelling in the mastoid region. He had intracranial involvement and died shortly afterwards. That case showed that malignant disease of the temporal bone might take a different clinical course from that described by Mr Jenkins.

Mr W. A. MILL said that a case of Mr Layton's which he (the speaker) had seen several times, seemed to be similar to those described by Mr Jenkins. The patient was a man aged 32, who attended Guy's Hospital because of deafnesss and complete facial paralysis. That condition had been coming on for ten years, and had gradually become worse. When he had been in the army during the late war he could not close his eyes.

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There was middle-ear deafness on both sides. As a child he had had suppuration in both ears, and the tympanum showed scarring. He thought that this accounted for the deafness. None of the other nerves was affected. Dr C. P. Symonds suggested that there might be a growth at the base of the skull, but the skiagram showed nothing abnormal. The Wassermann reaction was negative. There was no history of any head injury. At the moment the case was being watched.

Dr DAN MCKENZIE said that from the aural—and perhaps also from the general—point of view, Mr Jenkins had made members acquainted with something new. Still, he (Dr McKenzie) wondered whether the novelty did not consist in it being approached from the ear standpoint, as in the sister Section a "Hughlings Jackson-McKenzie syndrome" was spoken of, connected with the jugular foramen, and he thought some malignant cases with that syndrome had been described. He did not think, however, that cases had been previously described in which the tumour was in the meatus or the middle ear.

Another point raised by Mr Jenkins' three cases was the occurrence of facial paralysis in connection with the development of growth; it gave one more point to clear up when meeting with a case of facial paralysis.

With regard to malignant disease of the ear generally, the method of treatment would vary according to the type and situation of the growth. In the "deep" cases, particularly when malignancy was of a mild degree, radium was obviously the remedy indicated. But when epithelioma occurred on such accessible areas as the pinna, removal by diathermy was indicated rather than radium. He had had one or two cases so treated and they had done well. If the disease implicated bone, as in the mastoid, he did not think diathermy was good; all the growth could not be removed by it, and it conferred no advantages over ordinary curetting. In such cases again, radium slowed the rate of growth, and gave much relief from pain.

Mr T. B. JOBSON asked whether there were any eye changes in Mr Jenkins' cases, and whether the paralysis was due to actual involvement of nerves, or to pressure on them.

Mr WATKYN-THOMAS said that evidence in favour of malignancy in the three cases described by Mr Jenkins was afforded by the differences in their course and in that of the serous cyst of the cerebello-pontine angle. In these serous cysts, which were definitely non-malignant, the signs were almost entirely intracranial. Many such serous cysts had been described and he did not think that in any of them had there been involvement of the 10th, 11th, or 12th nerves.

He had seen one case in which diathermy had been used for malignant disease of the middle ear. That was a case of Mr West's that he had seen early in 1915. He believed that the patient was still alive and without recurrence in 1922.

Mr JENKINS (in reply) said that there had been a severe injury of the head in all three cases. Dr Creed had described the tumour as a sarcoma. He advocated operation and radium treatment as soon as the diagnosis was made clear.

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Societies' Proceedings

Carcinoma of the Ear.

E. Broughton Barnes, F.R.C.S. Ed.

Although the title of this paper appears as "Carcinoma of the Ear," I do not intend to include epithelioma of the pinna. Though this seems to be much the commonest form of growth in the ear, it presents no special features and calls only for thorough removal.

I wish to deal with growths arising in the meatus, or deeper in the ear, and with their earliest signs and symptoms, and, particularly, to draw attention to one pitfall in the diagnosis of some of the cases.

My own experience of the condition is limited to three cases, and one of these I saw while I was house-surgeon to Mr Sydney Scott. I shall cite a few cases from the literature. They are few because (1) I have been under some disadvantage in the search; (2) the condition is rare; and (3) I needed a fairly full report of the history of the case: they are only selected cases in that I have omitted those in which it was not clear what the earliest symptoms were.

I have set out these cases in tabular form, showing a few outstanding resemblances. I shall also attempt to show that they fall into two groups.

The fact that they are not picked is important because of the nature of the growth, which in every case, except two, was reported as a squamous-celled epithelioma. The exceptions were reported as squamous adeno-carcinoma and rodent ulcer.

C. E. West used to call attention to this point and urge therefore that the growth began in the meatus or on the tympanic membrane, even in those cases reported as carcinoma of the mastoid. The ninth case may be regarded as supporting this contention. There was definite thickening of the roof of the meatus with some nodular granulations which appeared suspicious in view of the history. The section report was papilloma. Eleven months later the mastoid was full of growth, with an intact membrane and a meatus apparently normal so far as growth was concerned. Sir Charles Ballance's case supports this view to some extent as showing how readily the mastoid becomes involved. I would suggest, however, that the squamous-celled epithelioma may originate in the mastoid itself in cases with long-standing middle-ear suppuration, since we know that in such cases the epithelium of some part of the mastoid often becomes stratified. In the seven cases in which this point can be considered, five had had long-standing aural discharge.

With regard to early symptoms, in these ten cases four symptoms occurred especially frequently—pain, facial paralysis, granulations and a tendency to bleed.

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Surgeon.	Year reported.	Sex.	Age.	Otorrhœa: Years.	History: Months.	Growth.	Symptoms.	Notes.
1.—Guttmann .	1929	M.	59	Several	?	Squamous	Pain, Paralysis } onset together	...
2.—Burton .	1917	F.	43	5	6	Squamous	Pain, Paralysis, Granulations. } onset together. Free bleeding	...
3.—Milligan .	1911	M.	31	27	4	Squamous	Pain. Gray sloughy polyp. Middle-ear deafness	Paralysis soon after exploratory operation
4.—Milligan .	1911	F.	64	64	3	Squamous	Pain, vascular granulations, paralysis	...
5.—Parrish .	1924	F.	45	39	3	Squamous. Adenocarcinoma	Pain, bleeding, swelling of meatus	Paralysis after exploration. Diagnosed cellulitis of meatus
6.—Sydney Scott .	...	F.	...	Many	5	Squamous	Pain. Paralysis	Paralysis partial many weeks
7.—Guttmann .	1920	M.	60	5 years before for short period	6	Squamous	Discharge, dizziness, granulations. Facial paralysis. Sixth nerve paralysis	...
8.—Barnes .	1926	M.	43	...	...	Rodent ulcer. Recurrence	Pain. Meatal swelling, staphylococcal dermatitis. Later, growth in mastoid; pain, partial paralysis	Section from meatus reported as papilloma
9.—Barnes .	1927	F.	76	...	1½	Squamous	Pain, staphylococcal dermatitis	Meatus only
10.—Ballance .	1908	M.	...	...	...	Squamous	Irritation in meatus, pain, paralysis	Recurrence in mastoid 3 years after removal of part of pinna

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Pain is specially mentioned in nine cases; in every case it was noticeably severe. Facial paralysis occurred in seven of the ten before the patient was examined. In two it was especially stated that the onset of the paralysis coincided with the onset of pain. In two more cases facial paralysis occurred soon after an exploratory operation. There was facial paralysis during the course of the case in nine cases out of ten. In three of the cases in which paralysis was an early sign, it was only partial for many weeks.

Granulations in the meatus were observed in five cases; in three of these there was an unusual tendency to bleed. In one other case, number 6, in which there was meatal swelling, but in which granulations are not mentioned, there was also "excessive bleeding."

It seems probable that the larger number of cases do originate in the altered lining of the mastoid cavities after prolonged suppuration. In these there will be no symptoms at all that can properly be called "early." The most important symptoms that will first draw attention to the condition will be pain and facial paralysis. This paralysis may be incomplete for many weeks, but when these symptoms appear the mastoid is probably already full of growth. This is well illustrated by Sir Charles Ballance's case, which I have included for this reason—although it was one of recurrence in the mastoid after a growth on the pinna—and also by my own case, Case 8. In both these cases there was some irritation of the meatus, followed by pain and paralysis. In both the mastoid was explored immediately after the onset of pain, and found to be full of growth. The growth had completely filled the mastoid before giving rise to symptoms.

Pain and facial paralysis occurring in an ear which is the subject of a chronic otitis must, or at least always ought, I suppose, to lead to an immediate mastoid operation, so that even if the suspicion of malignant disease does not arise, it will be found, if present, by opening the mastoid, without any loss of time. I see no way in which the condition can be diagnosed earlier; the patient will not come to the surgeon, and epithelioma of this group becomes one more terror for the individual who neglects a chronic discharge from the ear.

In the other group—epithelioma arising in the meatus—the position is quite different. These patients have not had a chronic discharge, they have irritation and pain early, and see a surgeon early. I believe, on the strength of two cases, that the pain is due to infection of the growth and skin of the meatus.

In the first of these, the patient, a male aged 43, was shown to the Section by me in 1926. The history was rather unusual.* He had had what appeared to be a rodent ulcer in the centre of the forehead in 1922; this was removed surgically. In 1923 the left pre-

* *Proceedings*, 1926, xx., 621 (Section Otology, 27).

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auricular gland was enlarged. It was treated with radium applicators and disappeared. I saw him in November 1925. He then had a perichondritis of the pinna, thought to be due to radium, and a warty outgrowth in the roof of the meatus. He complained of irritation and pain; there was a discharge from the meatus which was staphylococcal. The warty outgrowth was removed for section and was reported as papilloma. The patient was instructed to report monthly, but the meatal infection cleared up as soon as the papillomatous outgrowth was removed, and he was lost sight of until eleven months later. He returned complaining of pain and partial facial paralysis. The mastoid was explored and found to be widely involved in growth. The section was reported as a rodent ulcer. On the advice of members of the Section, he was treated by X-rays and afterwards by radium. He is still alive but has had to have repeated treatments with radium. Had I diagnosed the condition correctly in November 1925, he would probably have been cured. The report on the section was unfortunate, but I probably took too small a piece.

In the second of these two cases the patient was a woman, aged 76. She gave a history of only six weeks. The first symptom was irritation of the meatus, followed three weeks later by pain, and discharge from the meatus. When I saw her she had already seen another aurist and had been treated for a fortnight for staphylococcal dermatitis. The meatus was almost completely blocked by swelling; the discharge gave a pure culture of *Staphylococcus aureus*. The other ear was perfectly healthy. I treated the condition vigorously for three weeks; it was very obstinate and I had to open several small meatal abscesses. At the end of this time there was still a great deal of swelling, but I could see the deeper part of the meatus and found on the posterior wall, close to the annulus, what appeared to be a nodule of granulations which bled easily and freely when touched. This I removed for section. It showed typical epithelioma. The meatal infection cleared up like magic when this nodule was removed and the patient was left with a wide meatus with a small ulcer in the position in which the nodule had been. I did not think that a frail woman aged 76 would stand any radical procedure and she completely refused to go to London for X-ray and radium treatment. She wore a radium needle in the meatus for ten days. The needle contained 1.3 milligrams of the radium element with a 0.5 millimetre platinum screen. It was further screened at first and maintained in position by wrapping it in sheet-lead to 0.5 mm. thickness, and the lead was rolled up into a fair-sized ball in such a way that the needle only just cleared the membrane: it was then enclosed in thin pure rubber. The reaction was very marked and first the rubber and then the lead had to be removed; even the needle alone caused such pressure that the patient

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was obliged to have morphia. The needle was in place for ten days, 315 mgm.-hrs. The ulcer rapidly disappeared. After two and a half years this patient is perfectly well, the meatus and membrane appear normal except for a small opaque area in the membrane posteriorly, and the hearing in that ear is at least as good as in the other.

I wish to emphasise strongly the importance, when dealing with meatal infection, of bearing in mind the possibility of growth. In a case of unilateral dermatitis which does not yield to the usual lines of treatment—especially if any tissue resembling granulations can be seen, or if there is unusually free bleeding—an attempt should be made to obtain tissue for section. The failure in my first case will emphasise the importance of taking as much as possible.

I believe that while the cases in which the growth originates within the mastoid will always be in an advanced stage when they are diagnosed, the cases in which it originates in the meatus can be diagnosed very early, provided that we remember the possibility of the condition occurring and are not misled by the accompanying dermatitis.

The growths in the meatus are sufficiently small for most of the tissue to be removed for section. In both my cases the meatal infection disappeared after this had been done, and with the infection, the pain, in the first case so completely that nearly eleven months elapsed before the patient returned. The irritation of which the patients first complained was probably due to the growth, but the pain was due to the severe staphylococcal infection.

Malignant Disease of the External Acoustic Meatus and Middle Ear.

J. S. Fraser, M.B., F.R.C.S.Ed.

Among 646 cases in which the external acoustic meatus was affected, seen in private practice from 1906 to 1929 inclusive, there were three cases of malignant disease of the external meatus, *i.e.* 0.464 per cent. From the statistical tables of the Department in the Royal Infirmary under the charge of Dr Logan Turner and myself, compiled by Dr David Maxwell, one finds that among 6605 cases in which there was an affection of the external ear and meatus, there were thirteen cases of malignant disease, *i.e.* 0.197 per cent. If we include two cases classified by Dr Maxwell as malignant disease of the middle ear, we get fifteen cases in 6605, *i.e.* 0.227 per cent.

Of eleven cases observed by myself during the last twelve years, eight were females. The youngest was aged 36 and the oldest 63.

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CASE I. A. C. Y., male, aged 45, first seen 9.11.18 complaining of shooting pain in the left ear, worse at night, of five months' duration. *Examination.*—The left meatus shows a horny projection on the anterior wall, at the junction of the cartilaginous and bony meatus. After the horny layer had been softened by bicarbonate of soda solution and removed, a small ulcer was exposed, about the size of a pin-head, with a dark red, granular base. External operation was advised but refused. The patient consulted a dermatologist who diagnosed rodent ulcer and advised scraping with a sharp spoon and the application of trichloracetic acid. Neumann's anæsthesia was employed. *Microscopical report* was "epithelioma" (November, 1918). 24.5.19. Small recurrence on floor of meatus; again patient only consented to a "scraping" operation (see *Journal of Laryngology and Otology*, 1921, xxxvi., p. 251). 25.7.19. Recurrence of growth; patient now consents to external operation.

28.7.19. General anæsthesia; incision behind left ear: bone removed with gouge from meatal wall; incision made in posterior wall of cartilaginous meatus at level of external opening and cartilaginous meatus separated above and below and also in front from the mandibular joint. The sleeve of tissue so formed was then removed (Fig. 2). The cavity was lined with a skin graft from the thigh and healed well. 14.11.19. Patient complains of pain in the left mandibular joint. *Examination* shows a polypoid growth on the anterior wall of the bony meatus. 24.11.19. *Operation* by a general surgeon; vertical incision in front of left ear, turning back below the auricle; parotid gland dissected forward. It was now found that the tumour tissue was invading the parotid and that the case was inoperable. After returning home the patient became a morpho-maniac. Later he had two attacks of erysipelas, spreading from the region of the left ear. Death occurred on 21.4.20.

CASE II. (reported, in abstract, in *Journal of Laryngology and Otology*, 1921, xxxvi., p. 251). Mrs A. C., aged 36, first seen 28.3.19. Patient gave a history of discharge from the right ear in childhood. Two months ago she complained of pain in and discharge from the right ear. On *examination* the right meatus contained a polypus apparently attached to the roof and posterior wall of the meatus. The polypus bled readily. There was tenderness at the tip of the mastoid. With the noise box in the left ear the patient was not quite deaf. Rotation tests normal.

3.4.19. Radical operation: the antrum contained only clear, brownish-black fluid; long process of incus absent. On cutting the Koerner flap marked ulceration of its medial end was noted. Granulations were also noted on the anterior wall of the meatus, in its deeper part. The affected portions were entirely excised, and further granulations, or tumour tissue, curetted from the tympanum and Eustachian orifice. The operation cavity was swabbed out with trichloracetic acid and packed with iodoform worsted. Pathological report: "Squamous epithelioma" (Fig. 3). 7.4.19. Patient has had more pain than usual after the radical operation. 23.4.19. Radium capsule, like a small date-stone (the only available form at this time) inserted into operation cavity; dosage not given. The capsule remained in position for six days. 26.8.19. Operation cavity looks satisfactory. 24.4.20. Cavity lined by epithelium. 24.2.30. Patient's doctor reports that Mrs Alice C. is alive and well. "The wound is perfect and the cavity is lined by quite smooth epithelium."

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CASE III (reported, in abstract, in *Journal of Laryngology and Otology*, 1925, xl., 600.) D. R., male, aged 55, first seen 4.6.24, with a history of shooting pain in right ear, worse at night, for two and a half years; no deafness. *Examination* showed a red, irregular swelling of the roof of the right external meatus; operation advised but refused 13.8.24. The pain and meatal swelling have increased; operation consented to. 18.8.24. Local anæsthesia; piece of tissue removed and reported as "Squamous-celled carcinoma of a slow-growing type" (Fig. 4). 23.8.24. Sleeve operation as in Case I. The disease had penetrated the cartilaginous meatus and the upper part of the drumhead was involved. Radical mastoid operation therefore performed and capsule of mandibular joint exposed; skin graft applied. 20.2.30. Patient reported by request. *Operation:* cavity dry; no sign of recurrence; hearing reduced to conversation voice at three feet.

CASE IV. C. C., male, aged 63, first seen 1.8.24, complaining of pain in, and discharge from, the left ear for several months; the pain radiates to the left side of the throat, and is worse when lying on the ear or clenching the teeth. *Examination.*—There is foul-smelling, grumous discharge in the left meatus; an irregular swelling is noted on the anterior wall and floor of the canal. *Pathologist's report:* "Epithelioma" (Fig. 5). 21.8.24. Sleeve operation; some bone was removed from the walls of the bony meatus but the drumhead was not touched; skin graft applied. 25.8.24. Mastoid wound was healed; temperature normal. 27.8.24. Patient dined well and read far into the night; his only complaint to the night nurse was of cramp in the left leg. The nurse, answering the patient's bell at 4 a.m., found him still propped up with pillows but pale and pulseless. *Post-mortem* examination showed heart dilated; the right ventricle contained slightly adherent clot which appeared to have formed before death. A portion of similar clot, about the size of a sparrow's egg, was lying free in the pulmonary artery; this had apparently been detached from the clot found in the right ventricle. The muscle of the heart was generally flabby. *Remarks.*—This is the only case of death from embolism of the pulmonary artery which has occurred in the writer's experience.

CASE V. (reported, in abstract, *Journal of Laryngology and Otology*, 1929, xliv., 764.) Mrs Annie W.; aged 49, first seen 27.1.25, complaining of bleeding from the right ear and pain, worst at night: foul-smelling discharge present. *Examination.*—The right external meatus contains pus and polypus: right ear not totally deaf. 29.1.25. Radical mastoid operation right ear: tympanum full of tumour tissue (*Pathologist's report:* "Squamous epithelioma"). 24.7.25. Right ear is not quite deaf but whole operation cavity is filled with a mass of malignant material. 28.7.25. Two capsules of radium inserted, each 10 mgm., and kept in position for five days. Patient's doctor reported that after operation the discharge from the ear never ceased and gradually the cervical glands became affected and the whole right side of the neck was filled with a mass of fungating, cancerous growth. She died in January 1927.

CASE VI. (reported, in abstract, *Journal of Laryngology and Otology*, 1926, xli., 677). Mrs Jean S., aged 48, first seen 30.4.26, gave a history of discharge from left ear since scarlet fever at age of four years: pain in left ear for five months—worst at night; headaches and giddiness for one

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month. *Examination.*—Foul pus in left meatus: concha excoriated: irregular granular swelling sagging down the superior meatal wall: mastoid tenderness present. Patient deaf with noise box in right ear. No spontaneous nystagmus. Rombergism or pointing error: no fistula symptom: cold caloric test negative. 2.5.26. *Radical mastoid operation:* fistula present over antrum with tumour tissue protruding: antrum, aditus and attic full of tumour: prominence of lateral canal eroded: facial nerve lying free in the tumour tissue: promontory and lower part of tympanic cavity almost normal: malleus and incus absent: dura of middle and posterior fossæ exposed by disease and covered by tumour tissue: practically no pus present in middle-ear spaces. It was obviously impossible to remove all disease. *Pathological report:* "Squamous epithelioma." 7.5.26. Three radium tubes (5 mgm. each) were inserted and kept in position for three days with gauze soaked in 30 per cent. glucose solution. 27.5.26. Second treatment as above. 28.8.26. Report received from patient's doctor that she died to-day. Soon after her return amnesia for nouns appeared: this increased rapidly to all vocables and for the last four to six weeks of her life she could hardly speak at all. There was a vague history of fits, but her doctor had not seen the patient during any of these. Probably the left temporal lobe was invaded by the tumour.

CASE VII. Mrs M. R., aged 60, first seen 2.9.29, complaining of discharge from both ears for many years. For six weeks there has been bleeding from, and pain in, the right ear, causing loss of sleep. *Examination.*—Right meatus is full of polypoid "granulations" which bleed easily: mastoid tenderness present. Left meatus also shows a polypus. No facial paralysis on either side. Patient is so deaf that hearing tests are not possible. She will not allow vestibular tests. 3.9.27. *Radical mastoid operation* (right ear): antrum, aditus and attic and tympanum full of tumour tissue: malleus and incus absent: the promontory appeared normal but the lateral canal was eroded. The bony wall of the facial nerve was absent above the oval window. (*Pathological report:* "Rapidly growing squamous epithelioma"). 4.9.29. Slight facial paralysis: operation cavity looks satisfactory. Left ear discharging very profusely. 14.9.29. *Radical mastoid operation* (left ear): no appearance of malignancy on this side. 19.9.29. Four radium needles, each 0.5 mgms., inserted into operation cavity on right side and retained for four days, *i.e.* 192 mgm.-hours. 14.10.29. Operation cavity on both sides satisfactory. 1.11.29. *In statu quo.*

CASE VIII. Mrs J. M., aged 57, first seen 4.12.29, complaining of pain in, and discharge from, the right ear for nine months.

Examination.—Bleeding polypus at the inner end of the right meatus. With the noise box in the left ear, the patient can hear fairly well: the vestibular apparatus is normal. 7.1.30. *Radical mastoid operation:* Mastoid antrum and cells, malleus and incus all normal. Meatal sleeve operation carried out: the bony floor of the tympanum and meatus were eroded by the tumour. *Pathological report:* "Widespread carcinomatous growth: the type on the whole is that of a squamous epithelioma, but in areas there are metaplastic changes from a columnar-celled type: the neoplasm is fairly rapidly growing." 14.1.30. On the advice of Dr

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Woodburn Morison, six radium needles (1 mgm. each) were inserted into the radical mastoid cavity and left in position for three days, *i.e.* 422 mgm.-hours. 28.1.30. Patient discharged: treatment is to be continued.

CASE IX. (See *Journal of Laryngology and Otology*, 1929, xliv., 7, p. 63).—Mrs A. H., aged 62, first seen 11.3.19, complaining of pain in the right ear of fourteen years' duration. The right external meatus was blocked by a neoplasm apparently growing from the posterior wall. 13.8.19. *Operation:* Free bleeding: the mastoid cells were healthy: whole of posterior wall of membranous and cartilaginous meatus removed, including the tumour: the drumhead appeared normal: cavity packed. *Pathological report:* "The tumour consists of a scanty matrix in which lie large masses of epithelial cells of glandular origin: in places there are signs of acinus formation: conclusion is that condition is one of malignant adenoma probably growing from sebaceous glands" (Fig. 6). 29.10.20. The swelling has recurred but there is no ulceration; the drumhead can be seen. 19.8.23. Patient still complaining of pain in right ear. 21.12.28. There is now a large tender swelling behind the right ear and another swelling in front of the auricle: rotation reactions normal. 8.1.29. General anæsthesia: four radium tubes (each of 5 mgm.) inserted—two behind the ear, one into the meatus, and one in front of the auricle—and retained in position for three days, *i.e.* 360 mgm.-hours. A piece of tumour removed at same time and reported on as "Basal-celled carcinoma of the rodent type: the tumour is of slight malignancy." 7.3.29. Condition fairly satisfactory. 17.1.30. Patient reports by request. There is an enlarged gland over the mastoid, at the lower end of the scar. The right external meatus is entirely occluded by growth, which bleeds readily: tenderness is present on pressure over the tragus. 29.1.30. Radium plaque (10 mgm.) applied over swelling behind right ear and left *in situ* for twenty-four hours. On the following day plaque removed and placed over the swelling in front of the auricle. The case is still under treatment eleven years after the original operation. 9.6.30. Patient slowly dying.

CASE X. Mrs L. I., aged 47, first seen 22.6.27, complaining of discharge from the left ear for many years, with occasional pain. Patient was recommended by Dr Walker of Ayr, who suspected malignant disease of the ear. *Examination* showed stenosis of the left meatus: on probing, profuse bleeding occurred: tenderness present over left mastoid but no facial paralysis. With the noise box in the right ear the patient was not deaf. The skin around the auricle was of almost cartilaginous hardness. 28.6.27. *Operation:* The skin over the mastoid was so brittle that it cracked when the flap was being dissected forward: the periosteum over the mastoid was also infiltrated by tumour tissue. The mastoid bone was softened: there was no pus in the cells or antrum: the dura of the middle fossa was involved by the disease but the malleus and incus were healthy. The cartilaginous and membranous meatus were excised and even then one had not reached healthy tissue. The infiltrated skin behind the ear was excised. The wound was lightly packed and left open. *Microscopic report:* "In parts the masses of neoplastic cells resemble a basal-celled carcinoma, while in other areas they are commencing to form acini and have the appearance of an adeno-carcinoma." 1.7.27. Patient has had consider-

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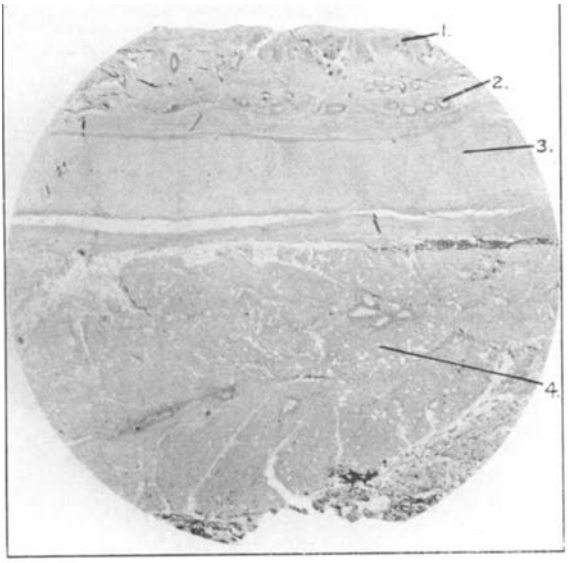


FIG. 1.—Transverse section through anterior wall of cartilaginous meatus. 1, Superficial epithelium. 2, Ceruminous glands. 3, Cartilage. 4, Parotid gland. × 11.

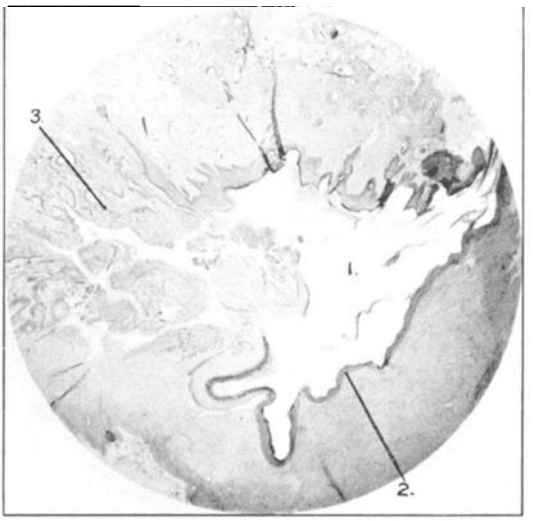


FIG. 2.—Case I. 1, Lumen of meatus. 2, Normal squamous epithelium lining meatus. 3, Epithelioma extending towards parotid gland and mandibular joint. × 9.

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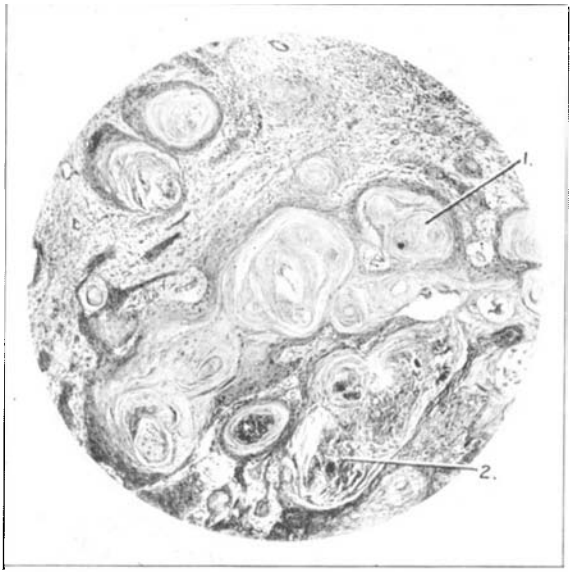


FIG. 3.—Case II. 1, Cell-nest. 2, Cell-nests showing phagocytosis by leucocytes. ×43.

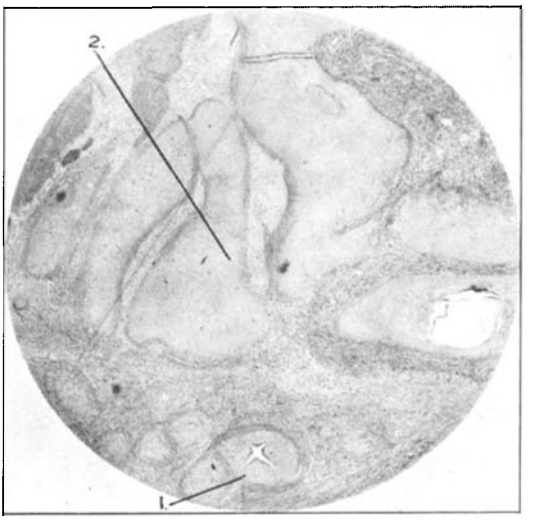


FIG. 4.—Case III. 1, Blood-vessel with thickened wall. 2, Invasion of connective tissue by epithelioma. ×28.

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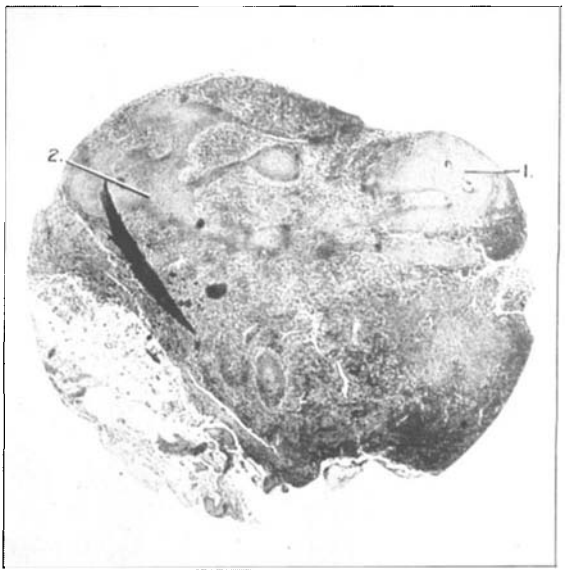


FIG. 5.—Case IV. 1, Superficial epithelium. 2, Malignant infiltration of subepithelial tissue. ×43.

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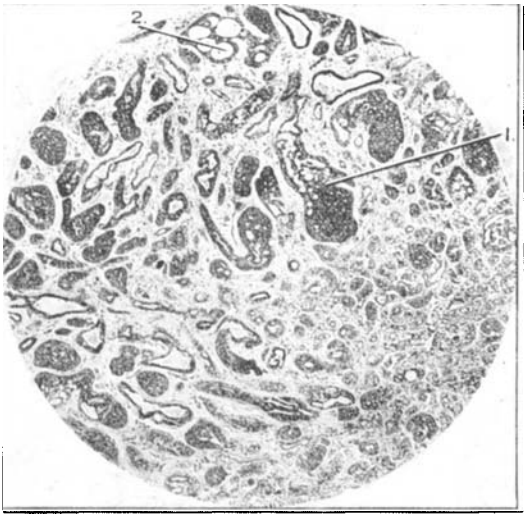


FIG. 6.—Case IX. Malignant adenoma. 1, Almost solid mass of malignant epithelium. 2, Acinus formation. ×43.

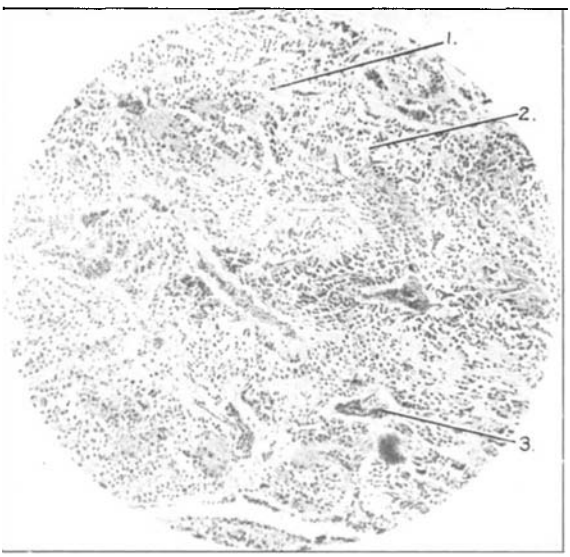


FIG. 7.—Case XI. Endothelioma growing from lymph spaces. 1, Delicate connective tissue stroma. 2, Space filled with small endothelial cells. 3, Dilated and congested blood-vessels in stroma. ×75.

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ably less pain since operation. 7.7.27. Radiologist advises treatment by deep X-ray therapy rather than by radium. The patient returned to the Radiological Department on numerous occasions during the remainder of the year 1927 and the early months of 1928. 22.3.28. Letter received from Dr Walker stating that the patient died a few days ago. She did not complain of pain or headache after the operation but became mentally affected. She appeared to know what she wanted to say but could not say it. A week before death she became unconscious. The pupil on the affected side was widely dilated. Probably the temporal lobe was invaded by the tumour.

CASE XI. (reported in *Journal of Laryngology and Otology*, 1912, xxvii., 200: also 1928, xliii., 752). Mrs L., aged 50, first seen 12.12.10, complaining of pain in the right ear, with deafness, tinnitus, giddiness and facial paralysis of four months' duration. *Examination*—Patient mentally depressed; complete right-sided facial paralysis; smooth, red polypus in meatus; slight mastoid tenderness. Functional tests: Schwabach lengthened; Rinné negative and low tones not heard (right ear); watch heard on right mastoid; raised voice heard at six inches. Slight spontaneous nystagmus to left; rotation tests showed some reduction of irritability of right vestibular apparatus. 26.12.10. *Radical operation:* mastoid cells and antrum normal; severe bleeding from facial spur; malleus and incus absent; lateral canal and promontory healthy; the polypus was apparently growing from the facial canal. *Pathological report:* "Sarcoma of endothelial type growing from lymph-spaces" (Fig. 7). 13.1.11. Profuse granulations in operation cavity, with blood-stained discharge; patient complains of pain and giddiness. 15.4.11. Pain and giddiness have disappeared; bleeding has ceased; facial paralysis *in statu quo*. 12.8.11. General health good; operation cavity has filled up, but is covered by smooth epithelium: occasional pain: with noise apparatus in sound ear, patient is quite deaf. The patient did not report again till 28.12.27, *i.e.* seventeen years later, when she returned complaining of bleeding from the right ear, pain and giddiness. There was now a hard mass on the right side, below the tip of the mastoid. There was also a swelling of the right tonsillar region and lateral wall of the pharynx. *Examination.*—Ptosis of the right eye; right pupil smaller than left (cervical sympathetic involved): optic discs normal: no paresis of ocular muscles; some loss of sensation on right side of face: complete right facial paralysis and loss of taste on right side of tongue; tongue protruded to right; paralysis of right side of palate and right vocal cord: right sterno-mastoid reduced to thin band and trapezius also wasted: no weakness, inco-ordination or abnormality of the reflexes in either the upper or lower limbs. 9.1.28. Patient developed a femoral hernia, and was admitted to a surgical ward; death after operation for hernia.

SUMMARY.

Squamous Epithelioma (Cases I. to VIII.).—In eight cases the pathologist's report was "squamous epithelioma." In three of these the disease was confined to the external meatus, when the patients

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were first seen, and in the earliest of these cases a horny growth was noted on the anterior wall, and after its removal, a small, dark-red granular ulcer was seen. In the other five cases it is probable that the tumour began in the deeper part of the meatus, though the middle ear was certainly involved (in three of these there was a history of chronic middle-ear suppuration). It is of course very difficult to determine in some cases whether the malignant disease began in the deeper part of the external acoustic meatus or in the tympanic cavity. These five patients did not present themselves till the meatus was occluded by dark-red, granular polypi, which bled easily. In two cases the periauricular glands were enlarged, and in one of these the facial nerve was already paralysed and the mastoid infiltrated.

Symptoms.—In all of these cases pain, worst at night, was the most marked symptom: in three it was mentioned that the pain shot over the face on the affected side, and that the patient could not lie on this side at night. Discharge was present in six cases. Only one patient complained of giddiness.

Treatment.—One patient would not at first consent to external operation but, on the advice of a dermatologist, allowed a "sharp spoon" operation through the meatus with the aid of local anæsthesia. Only later, when the disease recurred, would he submit to a retro-auricular incision with removal of a sleeve of tissue comprising the whole of the cartilaginous and membranous meatus. Unfortunately, the disease had by this time spread to the parotid gland, and the patient became a morpho-maniac before his death from erysipelas. In another case the "sleeve" mentioned above was removed, but the patient died a few days later from pulmonary embolism.

A third patient, in whose case the radical mastoid operation with skin graft was performed, is alive and well six years after operation. Another patient is alive and free from disease eleven years after operation. Two recent cases are still under treatment, while the remaining two patients have died after recurrence of the growth, one from cancerous toxæmia, and the other most probably from involvement of the temporal lobe due to cancerous invasion.

Malignant Sebaceous Adenoma (Cases IX. and X.).—There were two cases of this type, both in females over 46 years of age, complaining of pain and blood-stained discharge—in one case of fourteen years' duration. In both there was a neoplasm in the meatus and the radical mastoid operation was performed, with removal of the cartilaginous and membranous meatus. The pathologist reported "malignant adenoma growing from sebaceous glands." One patient is alive but, in spite of radium therapy, suffers from recurrence of the tumour eleven years after operation. In the other case, the skin over the mastoid, the mastoid bone, and the dura mater of the middle

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fossa were all involved at the time of operation and, in spite of deep X-ray therapy, the patient died from invasion of the temporal lobe by the tumour.

Endothelioma.—The remaining case (XI.) was one of endothelioma in a female, aged 50. Pain, tinnitus, giddiness and facial paralysis were all noted on admission. A polypus which bled easily was present. The radical mastoid operation was performed. Seventeen years later the patient was sent back by her doctor, and it was then found that the 5th, 7th, 8th, 9th, 10th, 11th and 12th nerves were all paralysed on the affected side. Death occurred after an operation for femoral hernia.

CONCLUSIONS.

The early diagnosis in cases of malignant disease of the external acoustic meatus is of the greatest importance. If the patients come early, when there is only a small ulcer in the external meatus, possibly covered by a horny layer, and if at this stage they are willing to submit to post-aural operation with excision of a "sleeve" of tissue containing the cartilaginous and membranous meatus, possibly also with removal of some bone from the meatal wall, the prognosis is good. Even if the tympanic cavity is involved, the chances of cure are at least fair if a radical mastoid operation is performed and radium treatment carried out. On the other hand, in cases in which the whole of the mastoid and even the skin covering the mastoid are involved, even the most extensive operation followed by radium treatment or deep X-ray therapy offers little or no hope of recovery.

[The writer begs to acknowledge a grant from the Carnegie Trust of Scotland to provide the illustrations for this paper.]

Malignant Disease of the Right External Auditory Meatus —HERBERT TILLEY, F.R.C.S.

Patient is an adult male. He complains of stabbing pain in the right ear and an occasional but slight discharge. Examination reveals a pale excavating ulcer on the deep antero-inferior wall of the right meatus. The granulations are hard and resisting when probed, but nevertheless bleed freely.

I only saw this patient for the first time last week at hospital and since then he has used peroxide and spirit drops. There is still some ulceration, and he complains of pain, especially when eating. Bare bone can be felt in the antero-inferior region of the meatus but there is no history of suppuration.

The PRESIDENT said he would have been sorry to diagnose growth in the meatus in this case. In one or two cases which he had seen there had been minute granulations in the deep meatus, which he feared would be malignant, but on removal they were found to be only inflammatory and disappeared under suitable treatment.

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Mr TILLEY (in reply) said he still felt that this lesion would turn out to be malignant, like some of the cases which Mr Broughton Barnes had described. He had only seen the patient once before, and did not know whether he had had dermatitis in the meatus in the past. There was no middle-ear suppuration at present. He had only seen such an excavated ulcer in cases which were malignant.

Microscopical Sections from a Case of Endothelioma arising in connection with a Nævoid Angioma—Sir JAMES DUNDAS-GRANT, K.B.E, F.R.C.S.

The patient, a man then aged 29, was shown to the Section in November 1924.* He was first seen in July 1924, on account of deafness in the right ear and attacks of giddiness from which he had suffered for over a year.

I found a smooth, red swelling, which was pulsating and resilient, and bleeding when manipulated. There was considerable lowering of the labyrinthine reactions on the right side and almost complete loss of hearing.

Microscopical examination of a portion was reported by Dr Carnegie Dickson to show endothelioma arising in connection with a nævoid angioma. With Mr Ormerod's assistance I removed it freely by the mastoid operation.

Two months later the patient felt well, but there was a small elastic swelling in the postero-inferior part of the tympanum; this was punctured with the galvano-cautery point and again with the zinc electrolytic needle.

On 11*th November* 1924, I removed a portion for microscopic examination, and there were found none of the alveolar masses of cells suggestive of endothelioma, but the nævoid vascular spaces were present, and at one extreme corner of the specimen there was a proliferation of the surface squamous epithelium suggestive of a low grade of malignant infiltration of the deeper tissues.

18*th November* 1924.—A tube of radon (17 millicuries with 0.3 mm. platinum filtration) was introduced into the growth and left for ten hours. Next day the growth was quite white, less resilient and less tender. Reaction showed itself by the formation of a thick, white pultaceous exudate adherent to the walls of the deepest part of the meatus. It consisted of necrotic and scab-like material without any sign of actively growing epithelial or other tumour cells.

In *May* 1925, the patient reported that he had had for the last two months no pain except a little smarting after introducing alcohol drops. Dr van Voorthuijsen had examined him, in Java, and had found no trace of the tumour.

* For full report of case to that date, see *Proceedings*, 1924, xviii. (Section Otology, 3).

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Microscopical Section from a Case of Epithelioma of the External Auditory Meatus—Sir JAMES DUNDAS-GRANT, K.B.E., F.R.C.S.

The patient was a middle-aged man, seen in 1899, who complained of pain in the ear. On inspection there appeared to be simply a swelling of the cutaneous lining. Subsequently a granulation developed. The probe revealed a remarkably extensive area of bare bone on the posterior wall of the meatus. I removed a portion of the sprouting tissue for microscopical examination, and it proved to be epitheliomatous, as seen in the section exhibited. Symptoms eventually developed which led a surgeon to explore for cerebral abscess. A frozen section made at the time of the operation, however, confirmed the diagnosis of "typical epithelioma."

In a case seen with the late Sir James Cantlie, I found the same "granulation" formation, also with an extensive area of bare bone. The granulation was found to consist of epitheliomatous tissue with the same sequence of events.

Malignant Disease of Right Ear—T. JEFFERSON FAULDER, F.R.C.S.

Mrs M. C., aged 46. History of ten years' discharge from right ear, becoming painful recently.

September 1929.—Ear contains much pus. Two sequestra removed. Furunculosis.

November 1929.—Radical mastoid operation. Bony meatal wall, bridge, and facial spur necrosed and deficient. Much granulation tissue in cavity and on sigmoid sinus. Microscopical report on tissue: Squamous carcinoma.

December 1929.—Wide excision of lower half of auricle and surrounding tissue.

February 1930.—Extensive local recurrence treated by diathermy and insertion of 52 mgm. radium for ninety-four hours (4888 mgm.-hours).

Carcinoma in External Acoustic Meatus: treated by Radium—GILBERT CHUBB, F.R.C.S., and F. C. ORMEROD, F.R.C.S.

Miss E. C., aged 51. Deafness and otorrhœa following measles in childhood. Severe earache (right) since July 1928. Noticed a growth in the right ear since July 1928.

Portion of growth removed in December 1928—squamous-celled carcinoma. Admitted to Westminster Hospital, 5th January 1929; pain getting more severe. A wart-like growth springing from antero-inferior part of meatal wall and practically filling meatus. No glands palpable in region of right ear.

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7th January 1929.—Five needles, each containing 1.3 mgm. radium, were inserted into the wall of the meatus on the superior, posterior and inferior aspects.

16th January 1929.—Radium removed. Total 1404 mgm.-hours. The growth and pain disappeared in about a month and there has been no recurrence.

Epithelioma in Left External Meatus: treated by Radium—GILBERT CHUBB, F.R.C.S., and F. C. ORMEROD, F.R.C.S.

Miss A. H., aged 42.

April 1926.—Sent from municipal hospital. *History:* Twelve months' foul discharge from left ear, bleeding for six months and sharp shooting pain at times. Meatus occluded by a reddish polypoid growth springing from antero-inferior portion of wall. Portion removed and reported as epithelioma.

17th May 1926.—Westminster Hospital. Growth removed together with anterior wall of meatus, tragus and portion of parotid. 15 mgm. of radium inserted and left in for three hours (dose 45 mgm.-hrs.). Dissection of glands of neck at same time.

During the third week marked signs of labyrinthine irritation occurred; giddiness, vomiting and nystagmus. The patient was drowsy, temperature rose to 101° F. and there was some papillœdema on the same side. A radical mastoid operation was performed with subsidence of all symptoms.

11th November 1926.—Patient was readmitted with a very extensive recurrence at the site of the original growth.

15.2 mgm. radium were inserted for seventy-one hours and the growth disappeared extremely rapidly (dose 1079.2 mgm.-hrs.).

Six months later the patient was apparently free from malignant disease in the ear, but she had marked cerebral symptoms; she was suffering from amnesia, was having fits, and was unable to speak properly. There was involvement of the temporal lobe by the malignant disease. Presumably the patient has died.

Secondary Carcinoma of the Middle Ear involving the Dura Mater—W. M. MOLLISON, M.Ch. (President).

This case was shown at a meeting of the Section in December, 1928. The growth in the ear was apparently secondary to carcinoma of the right breast which had been removed three years previously.

For the aural history, see *Proceedings*, 1929, xxii., 687 (Sect. Otol., 39, 40).

The patient had ninety minutes' radiation treatment (in three doses) in November 1928, and a further similar dosage in January 1929.

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30*th January* 1930.—The mastoid was healed and the pain in the ear had ceased.

The patient was distinctly dyspnœic and it was feared that there were secondary deposits in the chest. A skiagram showed thickening at the base of the right lung (? growth) and fluid.

February 1930.—Two radiations.

Healing—that is to say, disappearance—of secondary deposits must be very rare. I think the deep X-ray therapy takes the credit for the disappearance in this case so far as the ear is concerned.

A point of interest was the early appearance of facial paralysis (*Proceedings*, loc. cit.). This was also a striking symptom in a case of Mr Sydney Scott's which I saw.

Rodent Ulcer in the External Auditory Meatus.—W. M. MOLLISON, M.Ch. (President).

Mrs P., aged 67, was referred to me by Dr H. D. Apergis in June 1929. She complained of intermittent pain in the left ear, of perhaps a year's duration. In 1928 she consulted a doctor on account of a pricking in the ear, but he said that nothing but wax was present. The hearing was and is normal. On examination an area in the floor of the meatus was seen to be covered with a hard scale of "wax," which could not be removed without hurting the patient. Later, a diagnosis of rodent ulcer was made, as a distinct ulcer was apparent.

The patient was referred to the Radium Institute, where she was treated by Dr Gosse.

She was not seen again by me until January 1930, when it was found that the ulceration was nearly healed, only a very small crater being left, but on the anterior wall of the meatus was a crust such as is so often seen on rodent ulcers elsewhere; this crust could be removed but only with difficulty.

Dr Gosse gave another dose of radium and twelve days later the little crater had disappeared and the meatal wall was sound.

Dr Gosse said he could not remember having seen a previous case of rodent ulcer in the external auditory meatus.

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