quieters and is more readily controlled after three or four doses have been well retained. But the most dramatic change of all is the sudden ceasing of the coloured sputum. It is not uncommon to see a bright red sputum in the morning and to find white frothy expectoration in the evening of the same day.

Sometimes there is a little free haemorrhage for an hour or so just before this change takes place, and as this may alarm parents or attendants they should be warned that it may occur. An hour or two later the sputum may be milky white. The pulse, and respirations settle down according to the course of the temperature, which itself may rise a degree or so before the crisis or lysis sets in. Indications point to mixed infections being rather less responsive, though a sufficient number of bacteriological examinations have not been made to settle the point. Crisis is not infrequent, but descent is by lysis in most cases, taking on an average from two to three and a half days from the commencement of treatment.

A few practical points must be mentioned in connexion with this treatment, whether it is being used for pneumonia or other toxic complaints, which if not carefully attended to may tend against success. In the first place, it is always advisable that the medical attendant be present when the first injection is given, for many mistakes may be made and valuable time lost; besides which it is reassuring to the patient to know that the treatment is being conducted properly. Nurses have been found giving vaginal injections when rectal ones have been ordered; some are too hasty or clumsy in using the syringe, or funnel and tube, and may irritate the patient; whilst others are to be found who frankly express an opinion that they have "no faith in the blue injections," and the fluid is thrown away accordingly. A temperature chart will sometimes clearly disclose mismanagement of this kind, and suspicions raised thereby have been followed by confessions.

A word must be said also as to the awkward situations which naturally occur when a child, who was looking deadly ill with bronchopneumonia three or four days before, is seen half-sitting up reading a book or playing with his toys as unconcernedly as though he had just recovered from an ordinary cold; and when this is accompanied with a ravenous appetite doubting parents may think the diagnosis has been at fault. In some cases it may be better to have confirmation at the outset, in the interests of the child, for, as has been said already, too early cessation of treatment may allow of recurrence. It is disconcerting, too, to find an adult in his fourth or fifth day of the disease, and whose temperature was 103.3° a few hours previously, now with a falling temperature, calmly smiling, and wiping a little blood from his lips, hardly more inconvenienced than if he had been just relieved of a painful tooth under a local anaesthetic. But this tame and unexciting ending is not what the public imagines the crisis of pneumonia to be, and the diagnosis may again be called in question. So what are we to say? Difficult, no doubt; but cannot we reply with a little more faith than of yore, "Perhaps this manganese has raised the patient's power of resistance to pneumonia"? Nor need it prevent our hoping that some day we shall be able to state this as a proven fact.

As the introductory paper referred to above begins by stating that the idea of this treatment originated in the study of Colonel R. McCarrison's works, so this contribution may end by saying that the quelling of the dangers and horrors of pneumonia, with the reduction in its death rate that will follow, has come in the first place from his brilliant book *Studies in Deficiency Diseases*.

Reports from DR. GRACE and DR. PIRRIE.

This man, aged 71, was admitted to the Royal Infirmary, Chester, in a semi-conscious condition on the sixth day of the disease. He was a case one would have expected to lapse into coma. But on receiving two injections of the standard solution of potassium permanganate his temperature dropped by crisis to normal, and he regained consciousness. He died two days later from heart failure, with myocardial degeneration.

W. H. GRACE, M.R.C.P.

This lady, aged 60, was a semi-invalid, and had been suffering from pyelitis and cystitis for some time, which flared up during her attack of pneumonia. Rectal injections of potassium permanganate

were given every four hours in her case, beginning on the third day of the disease; twenty-four hours later the temperature came down by a quick lysis from 103° to subnormal, taking three days to do so. Concurrently her pulse improved, and the respiration rate never exceeded 26; it was usually 22 to 24. She died seven days later from exhaustion caused by the pyelitis and cystitis. I have never seen a true pneumonia with such a remarkable absence of distress and toxæmia.

I. M. PIRRIE, M.C., M.D.

MASTOIDITIS AND ITS COMPLICATIONS.

BY

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THIS paper is a review of over 800 cases of mastoiditis operated on in the Leeds General Infirmary during the past six and a half years. In almost every case the operation was performed for an urgent condition, such as acute mastoiditis, obvious cholesteatoma causing symptoms, or recurrent polypi with pain. On account of the difficulties of hospital accommodation, the simple mastoid operation for the cure of persistent otorrhoea of short standing or the radical operation for chronic otorrhoea has been rarely performed. In all but a few of the fatal cases a report of the necropsy has been available.

For purposes of discussion the cases have been classified as follows:

1. *Complicated Cases:* Mastoiditis with, in addition, brain abscess, sinus thrombosis, or meningitis.
2. *Uncomplicated Cases:*
 - (a) The simple acute or chronic case which runs a straightforward course.
 - (b) Cases with extradural abscess and no further lesion.
 - (c) Cases of tuberculous mastoiditis.

COMPLICATED CASES.

For practical purposes it can be said that one out of every four chronic, and one out of every nine acute, cases presents one of the above-mentioned complications for treatment. There is little difference in the mortality rate, that in the acute being slightly greater than in the chronic.

TABLE I.—Incidence of Complications in Mastoiditis.

	Cases.	Percentage of Complicated Cases.	Percentage of Total Cases.
Temporo-sphenoidal abscess ...	46	31.0	5.6
Cerebellar abscess ...	27	18.4	3.3
Meningitis, serous and purulent ...	21	14.3	2.5
Lateral sinus thrombosis ...	41	27.8	5.0
Occipital abscess ...	3	8.5	1.7
No autopsy available or negative ...	2		
Probable sinus thrombosis cases ...	7		
	147	100.0	18.1

Table I illustrates the relative frequency of each complication to mastoiditis as a whole. Fuller details of each complication are given later.

1. *The Meningeal Syndrome.*—Before considering the individual complications it is necessary to comment upon a common manifestation suggestive of infective meningitis, which is nevertheless not necessarily present. Head retraction, vomiting, high temperature with semi-coma and irritability, frequently mask the complicating lesions. Meningeal irritation is undoubtedly present, but whether the condition known as meningitis in the *post-mortem* room causes it is doubtful. After exploration, even where the cerebro-spinal fluid is milky, some of these cases will recover. Others will be found to have a brain abscess or sinus thrombosis, of which the symptoms were not apparent,

and the prognosis with suitable treatment of these lesions is favourable in a fair proportion of cases. In all such cases the risk of immediate and thorough exploration must be undertaken. In eleven of our cases operations were not undertaken on account of severe meningeal symptoms. Six of these cases were found to have brain abscesses. Purulent meningitis is a rare complication of otitis and mastoiditis in the absence of another lesion.

2. Brain Exploration.—In many cases, in the presence of meningeal symptoms and where brain abscess is suspected, one is strongly tempted to explore the brain, but refrains, because of the possible effects of trauma or of sepsis following such a procedure. In such cases an exploratory brain puncture may be the only chance of proving the presence of brain abscess, and it has been found that this operation can be undertaken with only slight risk.

Twenty-seven cases, all presenting meningeal symptoms or symptoms suggesting abscess, were explored with a negative result. Of these, 3 were found *post mortem* to have purulent meningitis; 12 an abscess, with or without other complications; and 3 had lateral sinus thrombosis. Eight recovered, these being probably cases of serous meningitis presenting the masking syndrome. In one the complication present was doubtful. No *post-mortem* examination was allowed. Of the eight cases which recovered, not one showed any effects attributable to brain exploration.

BRAIN ABSCESS.

A statistical record of the cases of brain abscess is given in Table II.

TABLE II.—Brain Abscesses.

	Total Cases.	Incidence in Mastoiditis.	Diagnosed.	Suspected.	Not Diagnosed.	Not Opened (Died).	Opened (Died).	Total Deaths.	Death Rate.	Opened (Lived).	Sinus Thrombosis Superadded.	Incidence of S.T. as a Complication.	Acute Mastoiditis.	Chronic.	No Operation.
Temporo-sphenoidal	46	5.6	32	7	7	14	15	29	63.0	17	7	15.2	6	37	3
Cerebellar	27	3.3	8	9	10	19	5	24	88.0	3	9	33.3	6	18	3
Total	73	9.0	40	16	17	33	20	53	72.6	20	16	22.0	12	55	6

Temporo-sphenoidal abscess occurs in about 6 per cent. of all cases of mastoiditis. In this series it has been six times more frequent in the chronic than in the acute cases. Cerebellar abscess, on the other hand, is about half as frequent as temporo-sphenoidal abscess, and occurs three times more frequently in chronic disease than in the acute variety.

Diagnosis.

The signs and symptoms in any given case vary enormously, and it is impossible to divide the course of the disease into stages, as has been frequently attempted. Intracranial abscess defies rule-of-thumb methods of diagnosis, and exploration is frequently justified by the presence of one sign or symptom alone. A few notes on the reliability of certain features of the symptomatology are, however, worthy of consideration.

General muscular wasting is a more prominent sign in cerebellar than in temporo-sphenoidal abscess. Cerebral hebetude and irritability are by no means common, but in some cases slow cerebration does occur. The majority of patients are quite rational, complaining only of weakness and loss of physical and mental energy. The semi-comatose condition occurring in the late stages is most frequently seen in association with meningeal signs. Headache of distracting severity is the commonest symptom. It is not necessarily localized, but is often frontal and bilateral. An extradural abscess or sinus thrombosis will cause headache of equal severity, but persistence of this symptom after treatment of such a lesion would justify an exploratory brain puncture. Vomiting is inconstant, is not often effortless, and sometimes occurs after meals, simulating a food vomit. The temperature chart is a most

unreliable guide. A subnormal temperature is rare, and even in the absence of other complications the majority of these cases have a normal temperature or an abnormal one of remittent, intermittent, or continuous type up to 103° F. Much more useful is the disproportion in the pulse temperature ratio, the pulse being frequently ten beats or more subnormal, taking a normal rise in pulse rate of ten beats for every degree rise of temperature as a standard. Optic neuritis is rare, though more frequent in cerebellar than in temporo-sphenoidal abscess.

Temporo-sphenoidal Abscess.—The diagnosis of this condition presents less difficulty than that of cerebellar abscess. In only seven out of forty-six cases was the condition definitely undiagnosed, although the signs referable to the nervous system are more indefinite than in cases of cerebellar abscess, and we explain the apparent discrepancy on the ground of the more frequent occurrence of meningeal and sinus thrombosis symptoms in the latter, which symptoms mask the less manifest brain condition. The presence of aphasia of the type in which there is inability to name objects or sounds, for which loss the patient compensates by description, is of great use in diagnosis of left-sided lesions. A fixed, dilated pupil on the side of the lesion is occasionally present early enough to be of assistance in diagnosis. Contralateral hemiparesis is rare, and interference with the motor tracts is not often seen.

Cerebellar Abscess.—Examination of the nervous system is of more value than in temporo-sphenoidal abscess. Optic neuritis is more likely to be present. Ophthalmoplegias have not been noted, except the phenomenon of skew deviation, which has only been found in association with semi-coma. Nystagmus is infrequent, but always to the side of the lesion. There is usually atonia with ataxia, and loss of the deep reflexes can be demonstrated. The past-pointing test and the sign known as dysidiadochokinesia have been useful. Marked deafness, which is sometimes found, is an important sign, indicating involvement of the opposite auditory tracts by pressure.

Treatment.

The mastoid operation is first performed, either simple or radical according to the indications present. The dura mater is then exposed in either the posterior or middle fossa. In doubtful cases the direction of spread of the bone disease is helpful as an indication which fossa to expose and explore. Frequently a localized pachymeningitis externa or fistula will indicate the spot for exploration. A large-bored Gauvain's needle or a thin-bladed scalpel can be used. In those cases where pus is not immediately evacuated the brain can be explored in several directions to a depth of one and a half inches, and some reliance may be placed on an odour clinging to the exploring instrument after withdrawal, if pus has not been immediately evacuated. Whether puncture is performed in front of or behind the lateral sinus in cerebellar abscesses depends upon the position of the sinus, but for drainage the posterior route is the more satisfactory. If successful the opening in the dura mater is enlarged to admit a rubber drainage tube one-third of an inch in external diameter with a moderate bore, with the end turned back like a flange to make it self-retaining, as advised by Dundas-Grant. Cerebellar abscess is difficult to drain, as the tube becomes blocked with diffuent brain matter and there is a liability to kinking of the rubber tube. A medium sized Parker's tracheotomy tube is appropriate by reason of its curve and length, and can be held in position by means of tapes. The posterior wound is closed as far as possible, or lightly packed with gauze. On account of the small opening in the dura mater and bone obtained by this method of access no trouble has been experienced in the way of hernia cerebri.

Speed in operating and a short period of anaesthesia are without doubt essential, but some care must be taken over the ear plastic in the radical cases to give good and easy access to the mastoid cavity for after-treatment. The subsequent dressing of the case when the patient is semi-conscious and refractory is by no means simple, and stricture of the canal must be especially avoided. The drainage

tube has been removed at varying periods after operation from forty-eight hours, and there is still some doubt as to the best time for removal, but until discharge has ceased it should not be removed, and it is better to wait until it is extruded. In one case the tube remained for six weeks without untoward result.

Prognosis.

The prognosis of brain abscess is very serious. In our cases the mortality rate for temporo-sphenoidal abscess is 63 per cent., compared with 80 per cent. in the series which was described by Hunter Tod. This figure renders an opinion as to the ultimate result impossible in any individual case, and the chance of recovery seems to be almost as good in the cases with meningeal symptoms as in those without.

In cerebellar abscesses the prognosis is even worse, and in our cases the mortality rate was 88 per cent. Hunter Tod gives a death rate of 90 per cent. This high death rate is explained by: (1) The difficulties of diagnosis (a) on account of the frequent concomitant symptoms of basal meningitis, masking those of the brain lesion, and (b) the frequent occurrence of sinus thrombosis as an added complication. (2) The difficulties in treatment. The cerebellar lesion is more difficult of access and drainage than the temporo-sphenoidal. Of thirty-one cases of temporo-sphenoidal abscess where the abscess was opened and drained, seventeen recovered (55 per cent.). Of eight cases where cerebellar abscesses were opened and drained only three recovered (37.5 per cent.). It is possible that in the future more frequent brain exploration in the doubtful cases will increase the chances of recovery.

After-Results.

Attempts to follow up cases of the hospital class are notoriously unsatisfactory. Headache and a mental instability, well described as childishness, persist for some time, but no gross sequelae have been encountered. One case died subsequently of malignant endocarditis.

Incidence of Sinus Thrombosis in Brain Abscess.

In our series of cases sinus thrombosis was a concomitant complication in 33 per cent. of the cerebellar abscesses and 15 per cent. of the temporo-sphenoidal. This increased frequency in cerebellar abscesses is explained by the fact that the lateral sinus is a very frequent source of cerebellar infection. This point is of great practical interest in the consideration of the brain lesion, where the symptoms of sinus thrombosis may mask those of the brain abscess, or their urgency result in an insufficient examination of available signs before, during, or after operation. Recovery took place in two of these double lesions. This association may also be expressed by stating that in fifty-seven cases of sinus thrombosis brain abscess occurred sixteen times (30 per cent.). Combined cerebral and cerebellar abscesses have not occurred. Three cases of occipital abscess have been discovered at necropsy.

LATERAL SINUS THROMBOSIS.

The incidence of lateral sinus thrombosis, excluding cases with brain abscess, is shown in Table III.

TABLE III.—*Lateral Sinus Thrombosis.*

Excluding cases with brain abscess, 41 cases. Incidence in mastoiditis 4.9 per cent. Mortality 75 per cent. No cases with ligature of internal jugular vein without exploration of sinus.

	Total Cases.	Acute.	Chronic.	Recovery.		Death.	
				Ac.	Chr.	Ac.	Chr.
A. Sinus not explored; vein not tied—that is, doubt in <i>ante-mortem</i> diagnosis; S.T. on necropsy	15	11	4	—	—	11	4
B. Sinus explored and vein not tied	15	4	11	1	5	3	6
C. Sinus explored and vein tied ...	11	1	10	—	4	1	6
Total	41	16	25	1	9	15	16

Lateral sinus thrombosis alone occurs in about 5 per cent. of all cases of mastoiditis, and is more common in the course of chronic than acute disease, although in this relation the difference in incidence is not so marked as in the case of brain abscess. The mortality is 75 per cent.

Acute Mastoiditis.—This complication was found in sixteen acute cases, only one of which recovered. The reason for this is found by reference to Table III. In section A are the cases where the sinus was not explored, and the jugular vein not tied. The majority of this class are acute cases. Scrutiny of the records shows us that the majority of these patients were children, and in most the course of the disease was atypical. In such cases the simple mastoid operation was performed for acute mastoiditis, after which the temperature continued to be intermittent and the child to be slightly indisposed. No rigors occurred. In many a perisinus abscess was exposed, but the condition of the sinus at operation was not considered to justify exploration. This exploration was postponed on a "wait-and-see" policy until the onset of bronchopneumonic signs or metastasis proved the true state of affairs, after which treatment was of no avail.

Chronic Mastoiditis.—The cases where treatment was directed to the sinus thrombosis are enumerated in Table III, and the results are more satisfactory. These are largely chronic cases. Generally speaking, in the acute case the onus to reduce the mortality rests with the surgeon, in the chronic with the physician. As far as can be judged, in the chronic case the high mortality does not depend so much upon the type of infection or the mode of treatment adopted as upon the delay before these cases come for treatment. In most, a history can be obtained of recent severe prostrating illness; there is not the story of vague indisposition which often precedes the more definite symptoms of intracranial abscess. Most of this series had a history of pyrexia over a long period; many had repeated rigors. It is lamentable that these cases were not sent for treatment, say, after the first rigor, when evacuation of a perisinus abscess would possibly have preceded an uneventful recovery, as has occurred in many cases classed initially as uncomplicated.

Treatment.

As indicated above, exploration of the sinus must not be postponed long in those acute cases with intermittent temperature, even though the condition of the sinus, if this was exposed at a previous operation, did not seem to indicate it. Thrombosis can be present in a pulsating sinus which has a normal tunica adventitia. Exploration by incision is the only satisfactory method.

The bulk of the enormous literature on sinus thrombosis concerns ligature of the jugular vein and the indications for it. Recently Laurens has condemned the procedure as unnecessary, and there are grounds for this statement. Inspection of Table IV shows that there is not much difference in the mortality rate between the series in which it was tied and that in which it was not. In our opinion the indications for ligature are few, but can be well defined, and there is no question as to the usefulness of the procedure in cases where these indications are present. The vein should be tied:

(1) When on exploration of the sinus the clot cannot be entirely removed from the lower end.

(2) If, after complete emptying of the sinus on exploration, a rigor occurs, or an intermittent temperature persists for more than forty-eight hours.

Ligature or any operative intervention after the onset of the pulmonary signs of pyaemia entails a high operative risk. Two out of three deaths under anaesthesia in this series were such cases.

MENINGITIS.

Purulent meningitis, uncomplicated, is the most uncommon complication, and occurred in only fifteen cases—an incidence of 1.75 per cent. "Serous" meningitis was found in six other cases, which were operated upon with good

results. The term "serous" has been used with hesitancy. All these cases had typical meningeal signs and symptoms, and on lumbar puncture a milky fluid was obtained under pressure, which in one case gave organisms on culture. These cases progressed favourably after evacuation of the extradural abscess present. Throughout this paper the aim has been to emphasize a disregard for meningeal symptoms. Whilst accepting the clinical entity *meningitis* as a terminal stage in extradural abscess, intercranial abscess, and lateral sinus thrombosis, we wish to point out that purulent meningitis alone is a very rare condition in the *post-mortem* room. Abscesses before rupture can give a clinical picture of meningitis, including a milky cerebro-spinal fluid, and the serous effusion following the irritation of an extradural abscess is accompanied by a similar symptomatology. Comparable conditions can be found in the peritoneal cavity serous effusion with local abscess and a tendency to limitation of extension in the early stages of disease. Nowadays no case of peritonitis is abandoned; similarly the condition which is known clinically as meningitis is an indication for immediate intervention.

Septicaemia and Pyaemia without Sinus Thrombosis.

These cases described by some authors have been extremely rare in our series. In two cases of septicaemia following operation the subsequent autopsy was negative. In two other cases thrombosis of the jugular bulb was present without changes in the sigmoid sinus, and in one of these cases exploration of the sinus was negative, bleeding being obtained from the lower end. Pyaemia was present in both cases.

Seven cases in the complicated series were probably cases of sinus thrombosis cured by Nature after removal of the focus of bone infection by operation. Each recovered and the sinus was not explored, so that only the clinical course justified a diagnosis of probable sinus thrombosis on account of similarity to those cases of sinus thrombosis which were treated as described elsewhere. Two developed empyemata, one a pulmonary infarction and serous effusion, two had multiple pyaemic abscesses, and two had repeated rigors with a positive blood culture. The lesson learnt has been the necessity for a close watch on the pulmonary condition in cases of sinus thrombosis with pyaemia. Empyemata have been discovered for the first time in the *post-mortem* room, and the influence which they must have had in bringing about a fatal result can only be conjectured.

UNCOMPLICATED CASES.

The mortality rate in the uncomplicated cases is 2.25 per cent. Nine out of a total of fifteen deaths were cases of tuberculous mastoiditis. Excluding these the mortality becomes 0.9 per cent., which is a figure representing the operative risk. One nephritic case died of pulmonary oedema, two rachitic children of acidosis, and one patient of bronchopneumonia. Autopsies were not available in the other two cases. A review of the cases as a whole presents no feature of interest. Under this section two other aspects of the subject are included:

1. *The Prognosis as to Hearing after the Radical Mastoid Operation.*—It has been noticed that the power of hearing is better in those cases with a slight discharge following the radical mastoid operation than in those cases where the cavity is absolutely dry and epithelialized. To obtain a perfect epithelial covering in the cavity it is necessary to curette the inner wall and to cause the formation of a barrier or stricture by scar tissue at the auditory end of the Eustachian tube—with adverse effects on the auditory structures on the inner wall of the middle ear. Most patients with chronic otitis of a severity to warrant the radical operation would be content to sacrifice any usefulness of the ear for hearing for cessation of the discharge. In cases, however, where the function is of importance, the better hearing power of a moist cavity must be borne in mind. These remarks hardly apply to the emergency operation, where the total eradication of disease is indicated.

2. *Streptococcus mucosus Infections.*—A peculiar type of otitic infection was described by Viennese authorities in which the *Streptococcus* or *Pneumococcus mucosus* was found. Several of these cases have occurred, more frequently during the spring epidemic of otitis media. A history of earache is obtained, with or without slight discharge and consequent relief of pain. At a period varying from ten days to six weeks after the onset the patient complains of severe pain behind the ear. On examination a normal or scarred tympanic membrane is seen, with signs of acute mastoiditis, which are frequently atypical. A swelling far back over the position of the mastoid foramen indicates the probability of perisinus suppuration in many cases. Operation reveals extensive bone necrosis and sometimes caries, whilst the bone fragments are soaked in thin pus with a highly characteristic odour. Complications are common. The organism is usually to be obtained in pure culture on account of the absence of a contamination from the auditory canal. Special examination must be made, as it is likely to be mistaken for a common form of streptococcus. It is a member of the group which links together the streptococci and pneumococci, possesses a capsule, is bile-soluble, but occurs in chains. Several varieties have already been classified.

Table IV shows a mortality rate of 14.1 per cent. among all cases of mastoiditis requiring operation, due largely to the high incidence of complications and to the high death rate of such cases.

TABLE IV.—*Death Rate and Gross Complication Incidence in Mastoiditis.*

Disease.	Uncomplicated.		Complicated.		Total Cases.	Total Deaths.		Percentage Complicated to Total Cases.
	Cases.	Deaths.	Cases.	Deaths.		No.	%.	
<i>Acute.</i> Simple mastoid	400	No. 5 %	49	No. 36 %	451	No. 41 %	9.1	10.9
Hearth's operation	2							
<i>Chronic.</i> Radical operation	262	10 3.8	57 98 66.3	360	75 20.8			27.2
No operation ...			11					
Total ...	664	15 2.25	147 101 69.0	811	116 14.1			18.1

CONCLUSION.

In this paper an attempt has been made to draw conclusions from a series of records frequently far from complete. Every attempt has been made to avoid reference to authorities and to personal views, recording only the lessons and results afforded by the available material. We feel that the subject-matter will be of use to others because of the better results obtained in the treatment of cases not included here—treatment based on conclusions arrived at whilst this summary has been in progress. Emphasis is to be laid on the following points:

1. The importance of regarding meningeal symptoms as an indication for operative intervention rather than a contraindication.
2. The necessity for brain exploration in doubtful cases.
3. Examination for multiple complications in any complicated case.
4. Early sinus exploration in cases of acute mastoiditis where, especially in children, thrombosis tends to be a "quiet" lesion.
5. The need for education to an appreciation of the danger signal in chronic suppurative otitis media equal to that obtaining at the present time in intra-abdominal disease.

We wish to thank Mr. E. W. Bain for his permission to include case reports and results in the statistics, the staff of the pathological department for their help in autopsies and the like, and the past resident staff of the Leeds General Infirmary, without whose notes this paper would have been impossible.