that direction, and I believe that if I had not removed the scapula, I could not have covered the wound with healthy skin.

I have not sought with any great minuteness to ascertain whether any similar case has been recorded in surgical works, *i.e.*, where such an operation has been performed, not for injury, but for disease. We are aware that in military practice immense damage has been inflicted upon the parts around the shoulder-joint. Large portions of bone and soft structures have been removed, and occasionally recovery has followed, and a useful limb has been preserved. But here, sad as it is to sacrifice the upper extremity, more particularly when, as in the present instance (as you will see for yourselves when the patient comes in), the use of the right limb is imperfect, the exigencies of the case will, I trust, justify in your opinion the very serious treatment to which I felt bound to subject this poor man.

ON THE *POST MORTEM* EXAMINATION OF THE EAR, AND THE FREQUENCY OF DISEASE IN OR NEAR THE TYMPANUM.*

By DAVID FOULIS, M.D.,
Pathologist in the Glasgow Royal Infirmary.

IN the course of *post mortem* research, one is struck by the difficulty which surrounds the investigation of the internal ear, and also by the indifference about it manifested by those engaged in general practice; and yet the diseases of the ear are not only very important in themselves, from the inconvenience caused by pain or by interference with the hearing, but, as is well enough known, ear-disease is a standing menace to the life of the patient, involving as it does the possibility of extension to the meninges or even to the brain. It is important, therefore, to have an easy and sure method of examining the ear in the dead body, in order to increase, if possible, our knowledge of the relation of ear-disease to other diseases of the body, to gain some idea of its relative frequency, and to gather hints for its treatment during life.

Turning now to the best authorities, I do not find any directions given such as are applicable to the ordinary cases of *post mortem* examinations. The latest authority, and perhaps the best on purely pathological anatomy, is Dr. Orth of Berlin. At page 86 of his work, he says: "It is but seldom that the *inner ear* presents conditions which are of interest to the general practitioner; but, if an examination be desired, it may be made as follows. The whole petrous bone should be separated from its attachments by two saw-cuts which come together in the sella turcica; and it may then be removed from its place, put in a vice, and sawn through from the posterior border of the external to the anterior or inner border of the internal auditory canal. The internal parts are thus laid open, and the drum-membrane left nearly intact.....An admirable view of the inner ear may also be obtained by removing the roof of the tympanic cavity, which is easily done [by either bone-scissors or mallet and chisel]." (*A Compend. of Pathological Anatomy*, by Joh. Orth; American translation; Boston, 1879.) For more minute directions, the reader is referred to Professor Lucae's article in Klebs's *Handbuch der patholog. Anatomie*, Band i, where a careful description is given of the removal of the petrous bone with chisel and saw, and of the mode of dissecting it bit by bit after removal. (See also Virchow's *Archiv*, Band xxix, s. 33.) Very excellent instructions are also given by Toynbee in the *Transactions of the London Pathological Society* (1853, vol. iv), which are, in the main, very similar to those of Lucae. Voltolini gives a method not widely different from the above in Virchow's *Archiv* (Band xviii, s. 38, 1862); and, lastly, von Tröltsch details the *post mortem* examination of the ear in his *Lehrbuch der Ohrenheilkunde* (6th ed., 1877), from which I may quote one paragraph. (See also Virchow's *Archiv*, Band xiii.) After telling us to remove one or both temporal bones entire with the saw, etc., he says (page 588): "If it is desired to avoid all and every outward trace of resection of the skull, we might leave the squamous portion *in situ*, and with hammer and chisel separate the pyramidal part from it at the inner half of the external meatus just in front of the membrana tympani.....In the same way divide the connections of the pyramid (petrous bone), and with the assistance of the knife remove it. In doing this, however, fractures of the bone are readily produced in places where they are not wished for; and one must abandon a part of the external meatus, which may interfere with the completeness of our inspection, especially if suppuration or sinuses, with secondary abscesses, exist in or near the external auditory canal. This was the manner in which Wendt was accustomed to remove the petrous bone; but, taking

both together, whereby too, while avoiding any external disfigurement, he obtained a full view of the nose and throat." The whole of the petrous bone, tympanum intact, having been removed in one or the other way, full directions are given by von Tröltsch for the further examination of the inner ear in successive portions.

It will be seen that all these authors have in view a very minute dissection of the inner ear; and the details, though varying slightly, have this basis. For aural work, accordingly, where the ear is the focus of attention, or where a previous clinical history has specially attracted notice to it, and where time can be afforded for carrying out these minute instructions, nothing more could be desired. But let any one engaged in pathological work try to put such methods into habitual practice, and he will inevitably find that he cannot apply them in any but a very few cases. The time occupied by them is considerable, regard being had to the many other points which must be noticed in a necropsy; and the restrictions placed by friends of the deceased deter one from very free excision of parts of the skull. I have, therefore, been led to use a simple plan for splitting open the tympanum *in situ*, which, during the last thirteen months, has stood the test of an extended trial so well that, I think, it may be recommended as useful for ordinary *post mortem* purposes; and, as I cannot discover a reference to it in any publication, it is perhaps worth while to record it.

Fig.—Modified from Quain's *Anatomy*, to show the site of the incision and the view obtained by it after the petrous bone has been split open. On the right side No. 12 is placed on the eminence, on the outer slope of which the incision A.B. is made; and on the left side the bone is shown laid open, and the membrana tympani, etc., exposed.

Referring to the woodcut (adapted from Quain's *Anatomy*), it will be seen that the incision A.B. runs, in an antero-posterior direction, along the outer margin of the eminence caused by the superior semicircular canal on the upper surface of the petrous bone. When the skull has been opened, the brain removed in the usual way, and the dura mater torn off the base, this eminence is, in the great majority of cases, quite distinct; and in those in which it is less well-marked, there is still sufficient indication of it to guide the chisel. The incision is made with the ordinary *post mortem* chisel, the cutting edge of which is applied as along the line A.B., parallel to the sawn edge of the skull, and perpendicularly to the anterior surface of the petrous bone. A smart blow or two with the mallet is sufficient to drive the chisel through the bone, and to detach the inner part of the petrous bone, which may then be levered or pulled further towards the middle line of the skull (as shown in the woodcut), so as completely to open up the tympanum. On the outer side, the membrana tympani is left intact with the malleus and incus; while on the loosened piece of petrous bone are to be seen the stapes and the parts forming the inner wall of the tympanic cavity. These parts having been examined, the loosened petrous fragment may be torn out, and, by a further splitting up with the chisel, the state of

* This paper was written in March 1880, when also the method was demonstrated to the Glasgow Pathological and Clinical Society.

the cochlea and semicircular canals can be ascertained in an approximate way. The whole procedure need not occupy more than a minute or two; and, after a few trials, the tympanum can be opened with perfect accuracy.

Following this plan, I have examined the ears of one hundred and twelve bodies, with the result that, in seventeen cases, definite changes have been detected in or near the tympanic cavity. A very brief summary of these seventeen cases will show the nature of the lesion and its relation to other diseases in the bodies. I give them in the order in which they occurred.

1. Stricture of urethra; peritonitis: lining of right tympanum highly injected, and a thin purulent fluid in the tympanic cavity.
2. Disease of knee-joint; abscesses in the cellular tissue of thigh; both tympanic cavities full of muco-pus.
3. Phthisis pulmonalis; tubercular ulceration of bowel; lining of both tympana highly injected, and mucus in both; lining of right tympanum coated with a layer of soft grey lymph.
4. Fracture of skull, clavicle, and ribs; fracture of right petrous bone; right membrana tympani torn; right tympanum full of red blood-clot; left ear normal.
5. Tubercular peritonitis; semicircular canal of left ear seen to be nearly obliterated, and the petrous bone very dense and flattened; tympana normal.
6. Fracture of left side of skull; left auditory meatus full of cerumen; left tympanum normal; right tympanum full of pus.
7. Phthisis pulmonalis; recent pleurisy; left middle ear full of muco-pus, the bone near it dense and ivoryed, the ossicles destroyed, the membrana tympani perforated; right middle ear normal.
8. Tetanus; lining of both tympana injected.
9. Phthisis pulmonalis; pus in right tympanum.
10. Wound of scalp; erysipelas of left side of scalp; stricture of urethra; hypertrophy of heart and bladder; chronic nephritis; right ear normal; left tympanum full of pus, membrana and lining injected, of a dull purple colour; no wax in the meatus externus.
11. Pericarditis and pleurisy from exposure to cold; lining of right tympanum injected.
12. Old softening in corpus striatum; lining of both tympana injected and the ossicles matted together.
13. Bronchitis and emphysema; lining of both tympana deeply injected.
14. Sarcoma of leg; amputation; secondary sarcoma of lung; pus in mastoid cells on right side.
15. Wound of face; erysipelas of right half of scalp; lining of right middle ear highly injected, and right tympanum full of viscid mucus.
16. Erysipelas of scalp; mucus in right tympanum, and its lining injected and velvety.
17. Phthisis pulmonalis; pus in mastoid cells and in both tympana; no injection of lining of tympana.

The numbers are, of course, too small to allow very definite conclusions to be drawn from them; but they indicate that serious disease of the ear may be in progress without attracting attention—for, in most of the cases recorded here, no suspicion of ear-disease was entertained. Then, again, the frequency of the ear-complications is a little startling. Further study can alone decide whether the percentage given (15 per cent. nearly) is usual; but *à priori*, one would not suppose that one in seven of all persons dying had inflammation or other abnormal condition of the ears. Apart from the series of one hundred and twelve hospital cases, I have had opportunities of inspecting the inner ear in a number in private practice, with practically the same results as to relative numbers.

Of the affinities of otitis, etc., the seventeen cases given tell, of course, but little. Five of them were examples of tubercular disease of the lungs or other organs, though in no case were miliary tubercles visible in the tympanic mucous membrane. Three cases of erysipelas of the scalp came to the section table during the year, each of them complicated by an extension of the inflammation into the inner ear of the side on which the erysipelas was most marked. This would be an important point to attend to in the treatment of that condition of the scalp, with a view to early evacuation of mucus or pus pent up in the tympanum. It is also worth noting that three instances are recorded in the list, of inflammation of serous membranes and joints coincident with acute otitis.

The object of this paper, however, is to insist on the propriety of regularly including the inner ear in *post mortem* inspections, and to indicate a means of doing this quickly and fairly accurately, even in the course of a hurried necropsy, without causing any disfigurement. The cases in which the ear is the main object in the inspection I would deal with after the manner recommended by Toynbee and other aurists; for in splitting the petrous bone, as above described, something of the

integrity of the part must be sacrificed, more especially as regards the joint between the incus and stapes. But when the ear is a subordinate factor in the case, the method which I use gives a very fair insight into those lesions which have a more direct bearing on the cause of death of the patient.

CLINICAL MEMORANDA.

ATROPIN AS A PREVENTIVE AGAINST THE CARDIO-INHIBITORY EFFECTS OF CHLOROFORM.

I NOTICE, in last week's number of the *BRITISH MEDICAL JOURNAL*, that, in an account of an inquest on the body of a man who died the week previous, at the West London Hospital, during the administration of chloroform, it is mentioned that after the heart's action had suddenly stopped, besides the employment of artificial respiration, the other means taken to effect resuscitation were the hypodermic injection of atropin, and the application of the galvanic battery to the cardiac region. Now, since it is well known that atropin paralyses the cardiac inhibitory apparatus, and since it is probable that death, in these and similar cases, results from a stimulation of this apparatus, either directly by the drug, or, it may be in some instances, in a reflex manner, by the stimulation of abnormally excitable afferent nerves during the actual performance of the operation, there undoubtedly seems good reason for the employment of atropin. But, clearly, it should always be given immediately before the administration of chloroform, as a *preventive*; for if the heart's action have completely stopped, the circulation having once ceased, of course no cure is possible; and even if the inhibitory action has only much slowed, and weakened the heart without having actually arrested it, the absorption of the atropin would probably be too long delayed to be of any avail.

With regard to the other remedy—the application, namely, of the galvanic current to the cardiac region—the effect of direct stimulation of the heart is so opposite, according to the part which happens to be brought under the influence of the excitation, that it is no exaggeration to say, that the treatment is at least as likely to arrest a beating heart as to set an inhibited one in activity.

My attention has for some time past been directed to the probable value of a prior dose of atropin, as an antidote to the cardio-inhibitory effects of chloroform; and I have made a number of experiments, as yet unpublished, on the subject. Their general result has been to confirm the conclusion which might have been drawn from our previous knowledge of the respective actions of the drugs in question.

The precaution would only be of value in those cases in which, with the greatest care in administration, death is liable to ensue from the sudden arrest of the heart's action; but, since the idiosyncrasy cannot be detected beforehand, the atropin should never be omitted. If the vapour of chloroform be inhaled to such an amount as to paralyse the respiratory centre, the prior administration of atropin would not be successful in preventing this result, which ought never, of course, to be allowed to happen.

E. A. SCHÄFER, F.R.S.

Physiological Laboratory, University College, Oct. 5th, 1880.

THERAPEUTIC MEMORANDA.

THE INUNCTION OF CASTOR-OIL AS A PURGATIVE.

IN a case of acute desquamative nephritis in a child five years old, where I wished to act speedily upon the bowels, and had tried to administer the usual purgative powders and draughts (but had failed, owing to the struggles of the child, which neither promises of rewards nor of punishments would subdue), I ordered the inunction, with a warm hand over the abdomen, of one-third of an ounce of castor-oil. The result was a free action of the bowels five hours afterwards, followed by two other movements during the day.

Dr. Ringer, at p. 318 of the latest edition of his *Therapeutics*, does not appear quite satisfied as to the possibility of the oil acting in this manner; and having tried and found it so successful, I wish to record the fact, believing that we have in this method a means of purging children (and possibly adults) which must be valuable to those who suffer from the horrible nausea which usually attends the administration of castor-oil by the mouth.

JOHN MCNICOLL, L.R.C.P. and L.R.C.S.Ed., Ormskirk.

THE Tulloch Scholarship (in anatomy, physiology, and chemistry) has been awarded to Mr. S. Brookfield; and the Charlton and Dickinson Scholarship (in medicine, surgery, and midwifery) to Mr. W. G. Black, who has also gained the Gibb Scholarship (in pathology).