THE BRITISH MEDICAL ASSOCIATION.

Sixty-first Annual Meeting, at Newcastle-on-Tyne.

REPORT OF THE OTOLOGICAL SECTION.

THE Otological Section of the British Medical Association met at the College of Science, Newcastle-on-Tyne, on Tuesday, August 1st. The chair was occupied by Dr. HENRY BENDELACK HEWETSON, of Leeds who delivered the following address :—

The Teaching of Otology.

My first duty, gentlemen, in rising to open the meeting of the Otological Section of the British Medical Association is to acknowledge with deep appreciation the confidence which has been reposed in me in asking me to fill this chair as a representative of British otology, a position which I greatly value, not only so particularly from the "lustre which lies about the throne," honoured, as I am, by being called upon to preside at the *renaissance* of the Otological Section, but rather that it becomes a rostrum from which I may, I feel sure, with advantage ventilate many points of interest and importance relating to the advancement of aural surgery in the present century, some debatable, and others, more particularly those dealing with the larger and wider questions of education in the study of oto-rhinological surgery, which I trust you will agree with me in thinking are beyond the realms of debate.

We are met here to-day in this grand old city of Newcastle-on-Tyne, and although I cannot with some noted individuals who, wherever they go, claim that this or that locality is the very place from which they spring—my blood is not northern enough for this adaptability—still, as a Yorkshire neighbour, and with a cordiality which I will concede to no one, I join with Dr. Ellis and Dr. Macaulay in welcoming to Newcastle-on-Tyne British and foreign otologists, particularly Professor Giampietro, of Naples, and others who have travelled so far to attend this and previous meetings of the British Medical Association. And although I cannot claim to have sprung from Newcastle, in science Newcastle is universally claimed by virtue of its renown. Its great men who have been foremost in the inventions of the world have made it public scientific property, and here we are to-day, having been whirled from the four corners of the Empire, safely and surely, by that great locomotive agency which first saw light in this ancient borough, through the penetrative imagination and inventive genius of George Stephenson. The dread engines of destruction of Armstrong brood with silent power over our peaceful acquisition of knowledge, for the benefit of mankind, and the Selborne-like natural history pursuits of Handcock have founded, in concert with Hewitson the naturalist, a museum hard by, of which the city ought to be justly proud, being created by her noblest sons.

These acknowledgments, however, bald and passing though they be, are wrested from me even in an address on otology, since I am deputed.

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as it were, being a Yorkshire neighbour, to remind you that we meet here in an atmosphere of scientific thought and, through the gentler sister Durham, literary achievements; therefore I trust that you will on this account pardon my digression whilst reminding you of it.

In this special department the lectures on otology ten or twelve years ago, started by our worthy Vice-President, Dr. Ellis, in this town, were an effort, laudable in the extreme, to bring the study of otology to the front, which—shall I say to the shame of the city?—no longer exist, Newcastle being one of the many cities in which the great need of a regular course of otological lectures is as yet, I believe, unprovided for.

Of the high position which the profession of general medicine and surgery here holds it is not for me to speak, except, as I trust it will be accepted, as a tribute from a sister section to be dwelt on more fully and eloquently than in a short sentence of passing but none the less sincere appreciation.

In thinking over the best means of making an address such as this useful to otological science, and being determined that I would, if I were able, make it so, I revolved in my mind whether that end would be best attained by recounting what, I take it, is already known of the more recent progress in otological surgery, giving a summary of advance and so on, which is often the way with addresses of this nature. I was, however, arrested by the thought that although much has certainly been done in the last thirty years in the advance of otological work, the still further thought prompted me to ask the question: How is it that greater advance has not been made? To me it is deplorable that greater advance in the study of auri-nasal surgery has not been made. I do not so much mean in the case of individuals as amongst surgeons and practitioners in general.

It will be in the memory of most of you here—speaking of twenty to twenty-five years ago—how the study of otology, in England at all events, was scouted and jeered at in a quiet way, if not actually openly. Surgeons of the highest repute in some of the grandest work in the field of surgery would say—and I have heard many such remarks as these—"You can do nothing, it's an ear case"; "if you can't get an ear better by syringing, it is of no use trying to improve deafness"; remarks like these made with an air of contempt before students, damping their ardour (if they had any), as well as seriously warping their scientific judgment, because made by men whose skill in their own paths stood high. I heard these remarks, gentlemen, and determined that I would try my constant best to overthrow the spirit in which they were made, and I have now this opportunity, which I cheerfully embrace, of giving my experience of its effect on the science and art of aural surgery. There have flourished in Europe many otologists, whose work has been a steady protest against all this; men like Professor Politzer (who, by the by, very much regrets, in a letter to me recently received, that he is unable to accept the invitation I sent him to be present here to-day, since he had already arranged to go to Rome to attend the International Congress), whose work is a monument to his devotion and genius; my friend Professor St. John Roosa, of New York (who also writes regretting that he cannot be with us)—his work is

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also quite monumental in the science of otology. We must not forget Hinton, my old master, and Wylde; and, before him, Toynbee; or Grüber, Burckhardt-Marian, or Hartmann, or Moos, or Delstanche; or Professor Guye, whom we were to have had with us to-day, but who has unfortunately at the last moment, I am sorry to say, been prevented from giving the section the benefit of his profound and learned study of otological science. In England the names of more recent workers in otology rise to one's mind: Sir William Dalby, Professor Urban Pritchard, who holds so ably the only chair in otology which we in Britain can as yet boast of, and the first professorship, I need hardly tell you, of otology at King's College; and, if he will excuse my mentioning him last, my friend Mr. Field, of St. Mary's, who has done so much for otology, and who held this chair when I had the honour to be his vice-chairman at Leeds in 1890.

All these men, and very many others, whom time only forbids me to name, have struggled with their genius in a veritable quagmire of otological stagnation, which is even now like a field just beginning to be drained, but swampy still.

I do not put the matter one iota too strongly, as I will endeavour to show you; and in the pursuit of this subject I am drawn into the question of how far we, in our early student days, received instruction, even up to the then known standard of otology. How many thousands of practitioners will tell you, what you know to be too true, "that they had no opportunities in their student days for studying diseases of the ear." I may say for myself and contemporaries that there were no opportunities, had we wished to avail ourselves of them, in the quite ordinary course of a student's career, and the uselessness of treating deafness was constantly dinned into our ears.

Faulty Examination.—During the preparation of this address a young medical man, having recently obtained the highest possible degrees in medicine and surgery in England, whom I knew well, applied to me, asking my advice as to how he should proceed to treat cases of otitis in children, associated with scarlet fever, measles, and the like. I expressed my surprise that, having taken such high degrees, these subjects should not have been within the range of his reading and studies. I asked him if, in all the examinations he had passed so successfully, he had ever had a question set in otology. His reply was that *he had never been asked a single question in otology.* It is only natural that men should study as students those subjects which are found to "pay best" at examinations. The diagnosis and treatment of aural diseases is hardly referred to in qualifying examinations, although it is well known how many serious—nay, even fatal—cases are sure to fall under the observation of the general practitioner. If the examiners fail to set the questions, the student will hardly be prepared to spend time upon a science his ignorance of which, he well knows, will not in most instances seriously prejudice his chances of passing his examinations.

It was with these memories ringing in my ears that I undertook to touch in this address rather upon the weakness than upon the strength exhibited from an otological point of view in the training of medical men,

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in the middle period chiefly, of this nineteenth century. The effects of the absence of this training are as yet painfully evident, and freely, candidly, and generously admitted by some of the most worthy general practitioners with whom it is my daily privilege to confer. When I was attending the meeting of the International Otological Congress at Basle some years ago, it occurred in one of the debates how seldom aurists ever saw a case of otitis media in its association with an attack of scarlet fever, and in thinking this over I tried to recall how many I had myself seen since that date—1880, I believe. At the same time, I find—and it will be in the experience of all—that we are treating the disastrous results of scarlatinal otitis every day; their name is legion; and yet I could call to mind only one case in which I had ever seen in consultation a case of otitis media due to scarlet fever during the progress of the fever. This was quite recently. I was asked by Dr. Clayton, of Aberford, near Leeds, to see a young lady who had an attack of scarlet fever complicated by double otitis media with pus pouring out of her ears. I am glad to say that the result was as satisfactory as the experience was novel. In less than seven days we had been able to stop all otorrhœa, and in about ten days the child heard perfectly and the membranæ tympani were healed with no ill effects.

This is an instance which I will dilate on by suggesting the further question as to how many cases of scarlet fever become fatal because of the otic complications not being scientifically interfered with during the attack of scarlet fever. It will occur to many of my hearers, or readers, how many and many times over he has received cases of otitis media which have dragged on and on, hardly treated, hardly diagnosed possibly, with some hidden astrological folk-lore suggesting that "they would grow out of it," or, "if the discharge were stopped it would go inwards," notions too often agreed in tacitly until they drift on into mastoid trouble, again put off, and death. How many cases of mastoid or other trouble may we not all have seen which, if dealt with early enough, could very easily at first have been confined to their simple character. How many cases of naso-pharyngeal trouble, if treated intelligently early, would never have produced the serious deafness or the complications, as well as ill-development and blunted comprehension which accompany nasal stenosis. In the words of the late Sir William Wylde, "always attend to ear affections, however trivial they may appear; because you cannot tell *when* they will end, or *what* they will end in."

In the not very distant future I trust experimental research in laboratories, possibly by the aid of vivisection, will help us to clear up hidden difficulties, and make our subjective knowledge objective on such points as auditory vertigo and the like. We must not rely too much on irregular clinical demonstration, but rather on systematic courses of lectures with a clinical tendency and interest much more pictorial and illustrative than at present is in vogue. But to me there is an ever-increasing tendency to museum teaching and pathological and *post-mortem* demonstration. In most of our hospitals and newer medical schools, the fabric of the institution has been planned with the full conviction that they have been built for the future student's advantage in this respect. I speak from the experience

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of having recently assisted in planning the special eye and ear department's rooms in the New Infirmary extension at Leeds, and witnessing the splendid designs the Yorkshire College Medical Board have secured for the new Leeds Medical School. Also in other places the same spirit has guided the architects and their advisers—at Manchester, Newcastle, Liverpool, Birmingham, and elsewhere, where, thanks to the great public generosity, we have been able to push far beyond the borders of bygone requirements. Lecturing is not, in my opinion, an unmixed good, but I plead for the extension of lectureships on diseases of the ear in order to give point to the clinical teaching, as being on the side of order and discipline of thought, as well as placing the study of otology on a par with the study of ophthalmology, to which it is second neither in interest or importance; and in this I speak as an ophthalmologist, my appointments and training and practice combining both specialties.

My contention is that we must look to better medical education to accomplish all this, and do not let me be misunderstood for a moment; it is not the specialists themselves that can do this, except so far as they can by virtue of their position as professors, lecturers, and clinical teachers, train the student to know when and where the danger lies. I am not speaking of ills which are confined to the specialist's consulting room. I am alluding to diseases and congenital states which make the possessors prone to disorders occurring in the daily practice of every general practitioner in the world. These are the men to whom the public will fly in their trouble, and it is right that they should; it is the general practitioner who has to make the first diagnosis and decide on the importance of the case, and it has been the cry in Europe generally that the expert has frequently only been called to see the case when cure, through delay, has become impossible. I ask myself, and I ask you as professors and teachers of otological science, How is this to be remedied? True it is that to a large extent the remedy has already set in, and, with the extension of from four to five years in the student's curriculum more time and opportunity will thus be granted for the acquisition of knowledge in the field of the special branches, so as to make our students better general practitioners. I always find that the man who knows most is quicker to appreciate the value of another trained mind. Thus, to be quite clear, I am striving for the better education of students in special subjects to the end they may become more widely cultivated general practitioners. These are the men who are guiding the great medical and surgical work of the outer world, and it is to be hoped that the future education will widen and deepen their already wonderful versatility in dealing with the multitudinous forms of disease which are perpetually coming under their notice. One of the most interesting forms of advance lies in the establishment of post-graduate courses; and those of you who have had, like myself, the privilege of demonstrating to post-graduate classes, can well appreciate how great the need for such courses is, as they are in so many places, to the advantage of all concerned. The action of the licensing bodies, and requirements regarding the filling up of schedules in reference to the attendance of students upon special classes in otology, as in ophthalmology, will very much assist in the right direction.

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In England there has been a great advance these last ten years and upwards ; our hospitals have all their aural, ophthalmological, and other special departments, and there is now an army of ardent otologists teaching clinically and very admirably diseases of the ear, naso-pharynx, and throat which, for purposes of otology—whether anatomically or pathologically considered—are inseparable. I was led in the pursuance of these arguments to analyze the kind of teaching in this department going on in Great Britain and Ireland, and also, if I could, draw any conclusions from comparison—if not, as I suspected, by contrast—with the Continental work that was being done in this direction. I accordingly determined to investigate the whole question, and by the great courtesy and kindness of the deans of our medical schools of the United Kingdom and the principals of nearly all the German universities and schools of medicine, those in Austria, in Holland and Belgium, Italy and Poland, Sweden and Norway, Denmark, with one exception I have received lengthy and courteous replies to my circular letter, and the exception is in the case of the French schools. I have not had a reply from France of any sort or kind. My object was to find how far the study of otology was at this time recognized and fostered by a lectureship on otology or a professorship outside clinical work, which, in my opinion, loses much of its force and value by being in many cases the only form of aural training a student obtains whose attendance is not insisted upon hitherto by the licensing bodies—being at the option of the student. I applied to *thirty* medical schools and universities in the United Kingdom, and found that, out of the *thirty, one* only, as I hinted before, had a professorship of otology ; *six* out of the thirty had a systematic course of lectures by an approved lecturer, of course in proper combination with clinical training (one of the six has been appointed during the preparation of this address) ; and of the remaining twenty-three, fourteen only provided that otology should be taught clinically. I will not weary you with the special schools to which I refer, but all this information has been most kindly and generously placed at my disposal with the avowed intention of my making what use of it seemed to me well in bringing the subject before you.

Now for the Continental schools and universities. I will take those of Germany first (because they strike a severe contrast with Great Britain) along with the schools of Austria and Holland. *I received thirteen replies from German universities* and *twelve of them had a professorship of otology ;* in the other instance, the thirteenth, a celebrated otologist held a private clinic, and lectured regularly in a kind of way acknowledged by the superior body, as is proved from the fact that his lectures were held sufficient to fill the post of professor of otology, and were reported upon to me by the principal of the university in question. From Austria I have most kind letters, telling of their elaborate courses in otology—*five universities, every one having a professor of otology.* The remaining universities having a professor of otology are Turin, Liège, Amsterdam, Moscow, and Basle. I must here refer to the honoured name of Burckhardt-Marian, whose premature death deprived Europe of a splendid aural surgeon and Basle of its then professor of

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otology. I have no doubt I might have extended this list, but I chose an unfortunate season, last Easter, to make this inquiry, forgetting for the moment how many of the heads of leading bodies would be from home and would possibly never get my circular, being, I knew, the cause of their delay in replying in several instances.

If we are reviewing the strength of our naval or military forces, do we not look rather in true estimate of the strength to the weaker parts of the phalanx? So I trust you will take this all too imperfect review of the teaching possibilities in our schools of the science which we all have at heart, and for the furtherance of which we are met here this season.

If we are to expect more of the general practitioner we must teach him more as a student, and the more he knows the deeper and purer will have to be the knowledge and skill of the expert; and I trust that I shall offend no ears when I incline to the belief that no man should commence —nay, it is bad for his science if he does—his career as a pure specialist in any branch of medical science. A pyramid can stand only when it stands upon its base, it cannot stand on its apex. Circumstances, adaptability, and personal fitness may all tend to make a man gradually narrow —concentrated I would rather say—as his surgical pyramid grows upon his special leanings in practice. Sometimes his reputation and his professional brethren and the public almost compel it (as in the case of the late Sir William Bowman), but let it always be founded on the broad base of an enlarged scientific and professional early life and training. Then the ear, or the eye, or the throat are to the rightly-seeing mind, not merely the outline and limits of his professional prerogative, but rather interesting and highly-wrought organs, acting, whether it be in health, or whether it be in disorder, or in disease, as intricate agents, signalling, mayhap, the early signs sometimes, and ofttimes creating a vicious circle in the general economy of human life.

A New Tympanic Syringe.

Dr. MILLIGAN, who exhibited a new tympanic syringe, said:—In cases of suppurative disease of the middle ear, the first indication is to cleanse the tympanic mucous membrane in such a way that local applications may be applied directly to the diseased surface. The difficulties of thoroughly cleansing the parts are, however, at times very great. This is more especially the case when the accompanying perforation is small, or when it is situated high up upon the surface of the membrana tympani—*e.g.*, cases where the perforation is in the membrana flaccida Shrapnelli. In such cases the ordinary procedure of syringing the external auditory meatus is insufficient. Hardly any of the fluid finds its way through the small perforation into the cavity of the middle ear to flush the diseased mucous membrane. Washing out the middle ear by way of the Eustachian tube is, no doubt, a satisfactory method in many cases, but, unfortunately, many patients resent passing of the Eustachian catheter, the first essential for successfully carrying out this line of treatment. Intra-tympanic syringes for passing along the external auditory meatus and through the perforation into the cavity of the middle ear have been designed by various aural surgeons, among

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others by Hartmann, Blake, Politzer, and Pritchard, and have been of much service. These syringes are, however, somewhat difficult to manipulate, and have seemed to me, from the position in which they have to be held, to partially obstruct the view of the deeply-lying parts of the ear. In addition, it is difficult to study the instruments while at the same time the process of syringing is taking place. These difficulties are, I think, in a measure overcome by using an intra-tympanic syringe, fed from a lofty reservoir. The advantages of this intra-tympanic syringe are (1) that it can be held perfectly straight while the fluid is streaming from the reservoir into the middle ear; (2) that during the whole manipulation the point of the syringe is kept constantly in view; (3) that by altering the height of the reservoir the pressure of the outgoing fluid can be regulated according to the special requirements of any particular case.

Treatment of Chronic Suppuration by Excision of the Auditory Ossicles.

Dr. W. MILLIGAN, of Manchester, then read a paper on the treatment of chronic suppuration of the middle ear by excision of the auditory ossicles, in the course of which he said: In certain cases of chronic suppurative otitis media the diseased process is confined to those portions of the middle ear which are situated behind the membrana flaccida Shrapnelli. Whether the cause of this localized suppurative process is to be explained by the propagation of such inflammatory affections as eczema, or whether it is due to extension of disease *per tubam*, I do not at present stop to discuss. The first theory is warmly advocated by Walb; the second, or tubal theory, is the one more commonly accepted, however. Whatever may be the actual sequence of events in the production of suppuration in this region, all aurists are, at any rate, agreed as to the great difficulties encountered in its successful treatment. These difficulties of treatment are partly of a mechanical nature; are partly due to the anatomical arrangement of the mucous membrane in this part of the middle ear; and partly also to the pathological changes set up by existing mastoid processes. The recessus tympanicus forms the highest position of the middle ear, and is, when diseased, frequently shut off from the general tympanic cavity by the formation of inflammatory adhesions. This fact explains, in many cases, the uselessness of washing out the middle ear *per tubam* or of using Politzer's air douche as methods of treatment; from the one because the fluid fails to reach the diseased mucous membrane, and in the other the stream of air merely inflates the cavum tympani, and does not succeed in driving the purulent secretion from the recesses. In seventy-five per cent. of the cases examined by Schmiegelow air failed to pass from the Eustachian tube through the perforation in the membrana flaccida. Then again we find that the accompanying perforation of Shrapnell's membrane is too small, and situated at too high a level upon the surface of the membrane to permit of efficient drainage. Also, the anatomical structure of the region is such that numerous loculi are formed by folds of mucous membrane, which normally exist in this region, and the results of pathological processes

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are such that these localities, becoming shut off from one another, retain inflammatory products. In addition, chronic suppurative affections of the mucous membrane lead rapidly to caries of the surrounding bony parietes, from the fact that the mucous membrane is in reality the muco-periosteum of the part. The head of the malleus and the body of the incus being involved in these folds, and being kept constantly bathed in putrid pus, are prone to become diseased. Thus carious spots are frequently found upon these ossicles, either along or in conjunction with caries of the surrounding bony walls.

Ludwig, who has done excellent work in this department, states that, of the three ossicles, the incus is the one most frequently found diseased. In thirty-two cases of hammer-anvil extraction he found the incus carious in eleven, or thirty-four per cent.; both malleus and incus in fifteen, or sixty per cent.: the incus thus being carious in twenty-seven, or eighty-four per cent. of the cases.

The stapes, from the fact that it receives a double blood supply, is much less frequently attacked. When it is, however, the disease is confined to its crus. The number of different methods of treatment which have been advocated at different times by different surgeons is perhaps the best indication we could have of the great difficulties which are encountered in successfully combating disease in this situation.

There exist among us those who think that no form of procedure short of surgical interference is of any use whatever, while others, though by no means rejecting the employment of surgical methods, lean to a more conservative line of action, and prefer to try, for a time at any rate, some of the milder forms of treatment.

Such methods as syringing the external auditory meatus, the employment of Politzer's air douche, or even the washing of the middle ear *per tubam*, are in almost all cases, I think, insufficient of themselves to effect a cure, for reasons already mentioned. Washing out the diseased recesses by means of any of the intra-tympanic syringes now in use is a valuable method. This may be followed up by the insufflation of powders, as recommended by Bezold, Gomperz, and Liebenmann, or by tamponing of the part, as recently suggested by Gruber. Yet the most assiduous care on the part of the surgeon, and the greatest patience on the part of the patient, will fail to effect a cure, owing to the fact that localized carious areas exist either upon the ossicles, or tympanic walls, or upon both together, areas which resist local methods of treatment in the most stubborn fashion. So long as these foci exist, so long does the disease tend to perpetuate itself, and so long is the patient subjected to the risks incident to the presence of chronic suppurative middle-ear disease.

The question of excising the diseased ossicles, and any portion of the membrana tympanica which may remain so, was first proposed by Schwartze, and the operation has of late been frequently carried out. Indications for its performance are—(1) chronic purulency of the middle ear, with caries of the ossicles, and (2) presence of cholesteatomatous masses in the tympanic cavity. In favour of the performance of the operation, it may be said that in almost every case where it has been put

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in practice purulency has either been arrested or, at any rate, has been much diminished in amount. Such symptoms as headache, tinnitus, vertigo, and constantly recurring attacks of ear-ache, are also usually promptly relieved. Against the performance of the operation it may be said that in those cases where parietal caries existed at the same time the operation is insufficient to effect a cure.

It must be borne in mind, however, that by removal of the diseased membrane and the carious ossicles, either affecting free drainage, and that thus any accompanying carious foci are rendered more accessible to the spoon or small curette, and can therefore be much more thoroughly treated. The operation has now been so frequently performed, both at home and abroad, and the after history of the patients has been so carefully followed up, that it is now possible to gauge the various pros and cons, and to arrive at some definite conclusions as to its utility or otherwise.

Schwartze, Ludwig, Stacke, Grunert, Wetzel, Rheinhardt, Kessel, Sexton, Burnett, Colles, and many others, have published the records of their work with more or less gratifying results. Ludwig, in an analysis of thirty-two cases, obtained the following results :—

Cured	20 cases.
Uncured	11 cases.
Dead	1 case.

The death in this one case was not due to the effects of the operation.

In another analysis of forty-three cases, the following results were obtained :—

Cured	22 cases.
Uncured	5 cases.
Under treatment at time of report.....	9 cases.
Result unknown	5 cases.
Dead	2 cases.

In these forty-three cases the following results were found regarding the condition of the ossicles :—

Malleus healthy, incus carious in	12 cases.
„ carious, incus carious in	25 cases.
„ „ „ uncertain in	2 cases.
„ „ „ healthy in	1 case.

While in three cases the attempt to extract ossicula failed.

In forty-three cases recorded by Grunert, cases which were kept under observation for periods varying from one and a quarter to one and three-quarter years, there were 55½ per cent. of cures, and 44½ per cent. of failures. Among thirty cases by Rheinhardt there were sixteen cures, and the hearing power was improved in 50 per cent. of the number.

Dr. W. ROBERTSON said it would be admitted that Dr. Milligan had very fully, correctly, and lucidly represented opinion, both in England and on the Continent, on this subject. So long as the process of caries, or necrosis, is confined to the ossicles, their excision and removal might do

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good, but if disease is in the attic, and extending into the antrum per the aditus, then we could scarcely hope to cure the otorrhœa, which is really dependent on the deeper cause. The heads of the malleus and anvil bone form a floor to the attic, which, if removed, might lead to the proper drainage of the attic. It was important to consider the question of an anæsthetic. A general anæsthetic, he thought, was not required. It was to be feared that a mass of *technique* had been raised around this process, which, at best, was only an ameliorative measure. He had generally relied on cocaine, or a whiff of ether, which could be given in a more erect attitude. In using the hook to remove the anvil it must be carefully guarded, so that no injury happens to the tegmen tympani. The hook itself ought never to exceed three millimètres in height, otherwise the tegmen would be injured. The two instruments (intra-tympanic syringes shown by Dr. Milligan) were of really practical value, and formed a welcome addition to the aurist's armamentarium. A few years ago he (Dr. Robertson) introduced a less elaborate, but useful, intra-tympanic syringe, which had a movable point, by which irrigating fluid could be directed in any direction within the ear.

Dr. HILL remarked that he had performed the operation of removal of the ossicles in the middle ear, where suppuration was associated with pain. In his last case the treatment resulted in the cure of the discharge, and the total relief of pain, but the patient suffered from great prostration, and marked vertigo, and distressing tinnitus for nearly a fortnight, and the hearing power was decidedly worse. He thought the operation should not be undertaken without informing the patient that it was one in which hearing would not be likely to be improved, and that the defects might even be increased thereby.

Dr. BRONNER thought that the intra-tympanic syringe would be very useful. It was so easy to handle, and the pressure of the spray could be so easily regulated. As regards removal of the ossicula, he thought that although the operation was undoubtedly useful in some cases, still there was a great danger of recurrence. It had been proved that, in most cases in which the ossicula were affected, the wall of the attic and mastoid antrum were also diseased. In these cases the only radical mode of treatment was to open the antrum and establish free drainage. Of four cases in which he had removed ossicula several years ago, the membrane had healed in a few weeks, but in three of the cases there had been recurrence of the discharge after one year or more, and the mastoid antrum had to be opened. Dr. Bronner therefore thought that the most reliable method of treatment was to enlarge, if necessary, any opening in the membrane, and syringe the attic or middle ear, and if the discharge did not cease in two or three months, then to open the mastoid antrum and establish free drainage.

Dr. R. ELLIS said he would like the indications to be very clear before removing the membrane and ossicles. Of course Nature, they knew, extruded necrosed ossicles with safety, and here they had a hint. To operate if they were diseased was a procedure not to be undertaken lightly. To introduce a fish-hook-like instrument to catch, as it were, a

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minute bone, hurts, so to speak, one's surgical feelings. The question of hearing did not arise in his mind, but if life was considered to be in danger let them be removed.

Dr. ARBUTHNOT LANE considered that the bones of the middle ear were secondary in importance to the chronic purulent discharge. He thought that antrectomy gave better results both to the hearing capacity and to the subjection of the purulent discharge.

Dr. WARDEN looked upon the operation as a very serious one, which was not to be undertaken without first trying something of a less serious character. He never operated himself where he saw other chances of good, and he thought they should not look at this subject lightly. As they went on they might improve in the mode of treatment. Other modes of treatment might suggest themselves, and he hoped they would be considered.

The CHAIRMAN was gratified at the excellent discussion which had arisen out of the paper. There were, doubtless, serious results which might follow the operation favoured by Dr. Milligan, and he (the Chairman) thought it was their duty to their patients to point out the risks, and to inform them that the operation was not undertaken to improve the hearing.

Dr. MILLIGAN briefly replied.

Dr. W. ROBERTSON (Newcastle-on-Tyne) read the following paper on *Mastoid Operations.*

In no direction, perhaps, have more enlightened measures been added to the list of surgical procedures within quite recent years than in the treatment of diseases of the temporal bone. It does not suffice now to merely trephine the mastoid antrum for any and all affections betraying themselves in this region. The mere carrying out of different operations now recommended have borne fruit in the shape of a more exact pathological grasp of the conditions, and shown the necessity for a more finished diagnosis of any given case before the operation that it demands can be decided upon.

Briefly, the indication for opening the mastoid antrum, without reference to the mode of affecting primary and secondary inflammation of the mastoid, is in chronic discharges from the middle ear complicated with recurrent swelling over the mastoid; in chronic otorrhœa with pain in the mastoid, and where the otorrhœa is rebellious against the treatment directed towards the middle ear and *per tubam;* in severe long-standing pain and neuralgia with mastoid disease; in cases where lethal conditions exist from presence of putrid pus in the ear, and, again, in cases where the pus observed in the middle ear is found not to arise from thence. In the last instance, what may be termed prophylactic measures are those employed, the necessity for which is undeniable. In considering the mode of operation, the above may be divided into acute and chronic conditions affecting the antrum. For acute empyema of the mastoid a general consensus of opinion prevails amongst operators that Schwartze's operation, suggested by him twenty years ago, is the method of opening

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the antrum which most fully meets the exigencies of the condition. It has stood the test of time, and bears a record of recoveries which, of course, more recent methods could not produce. Such an operation is the more necessary in the presence of an acute process in the middle ear and antrum, inasmuch as the conducting apparatus contained in the former may be expected to recover, and resume its function.

There are a number of conditions that simulate mastoiditis and must be eliminated—viz., affections of the soft parts over the mastoid which give rise to swelling and abscess; raghades; eczema, and carbuncle—which are to be borne in mind. Suppurations of the parotid often give rise to fistulæ extending to the mastoid, which may not suggest any source. The condition of primary mastoiditis demands more consideration. The possibility of its existence cannot be denied, and it must be deemed rare.

The history of the case, and a careful examination of the middle ear must be duly investigated, bearing in mind that the surface affection of the mastoid may have actually originated in some deeper source of infection, and an actual collection of pus, calling for treatment, subtend the new superficial phenomena. Zaufal points out that the pneumonia bacilli may lie dormant within recesses of the temporal bone long after the middle-ear affection has become old and hearing restored, to break out when suitable conditions transpire. Such a sequence of events transpired in one of my cases. Originally the otitis subsided, to be followed in a short time by actual inflammation and pain in the mastoid. At the operation a large collection of pus was found just under the cortex, the elimination of which cured the patient, there being no palpable connection with the middle ear, which at the time was evidently, however, very diseased. In this case, no doubt, the pus overleapt the boundaries of the antrum, and rested in the walls that were opened for a time.

The swelling in the retro-maxillary space occasioned by the escape of pus from the perforation near the apex of the mastoid process is not to be confounded with phlebitis of the jugular, etc. Once pus gains freedom at this side of the mastoid, it may take a very free course, extending backwards to the occipital region, downwards amongst the great vessels of the neck, and then form a retro-pharyngeal abscess, prevented as it is from opening outwards. I need not here do more than mention, in passing, the dangers that are thought of in performing Schwartze's section of the mastoid, viz., wounding the lateral sinus, the facial nerve, or the semi-circular canal. The first offers the most cause for fear. In many temporals the sinus runs so deeply into the process as to leave a mere margin of bone between itself and the posterior meatal wall, which is certainly insufficient to allow all the section into the antrum from without. In the presence of such an accident which occurred to myself, in one of my cases, it is a consolation to know that, provided all due measures for disinfection have been adopted during the operation, plugging the wound with iodoform gauze, or better still with Horsley's antiseptic wax, tides over the occurrence safely. The fact that Schwartze has noted the time (eight days) at which operations may be

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resumed, suffices to show that it is a mishap which occurs now and then. To prevent wounding the facial in the stylo-mastoid foramen it is well to avoid cutting too low, especially in the depth of the bone, and to miss the semi-circular canal, to stop the section at the depth of the membrana tympani. The spina supra meatum marks the place where chiselling is begun. This is the nearest spot to the antrum, lying a little higher than the floor of the antrum, and marks the spot where Nature oftenest perforates the cortex. The safest and most suitable instruments for the section of the bone are the original instruments suggested by Schwartze, viz., the mallet and chisel, the dangerous nature of neighbouring parts forbidding the use of drills and trephines, so often suggested. With these no precise knowledge can be obtained, either with the probe or finger, as to progress made in the section of the ear.

As the change in the mastoid is not a carious process, but rather an absorption of the ear salts out of the large tissue, leaving this practically unaltered otherwise, and capable of becoming again ossified, extensive curetting is not indicated beyond what is necessary to secure free escape of suppuration. Free escape of diseased products is always possible through the somewhat prolonged use of the lead spigot to keep the mastoid wound open until the otorrhœa has ceased.

Another complication of the operation is penetration into the middle cranial fossa, an instance of which I lately heard of under the care of a competent surgeon.

The middle fossa was entered, and bleeding from the exterior through the perforation into the brain killed the patient in seven hours.

Küster, both in acute and chronic cases, recognizes removal of the posterior meatal wall. This operation seriously impairs the possibility of any repair, and succeeding functionating of the conducting apparatus in adult cases which is retained in Schwartze's operation, while in acute cases the greater part of the process of inflammation has fallen in the antrum and mastoid, and where the bonelets and membrane are not seriously damaged. Then Küster's operation is certainly a retrograde step, and unnecessary ventilation is caused where the posterior wall is involved, and there is the same objection to its removal.

The battle of the methods really begins when we come to consideration of the operation for diseases of the mastoid connected with chronic inflammatory process in the middle ear. Exudations vary in quality and quantity, and their diagnosis is not always possible, even by the most experienced aurist. Under the circumstances referred to, the following methods are employed: Stacke's operation for removing the bonelets and reopening of the atticus tympanicus; Schwartze's old method; Stacke's operation for opening the antrum and aditus; Küster's operation for removing the posterior wall of the meatus.

If in a case of acute otitis purulent matter continues to be elaborated in the middle ear, then there is cause to fear that some unusual process has arisen in the mastoid antrum; that there is some peculiar configuration in the cells of this bone that has contributed to the prolongation of the course of the disease in the locality, and hence of the acute otitis. When we come to inquire into the cause of any case of otorrhœa we

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often find the ear mischief to have lasted a long time and are carried back, it may be two or three years, to perhaps an occurrence of acute otitis from perhaps measles or scarlet fever. If it is a matter of difficulty to arrive at the root of the causation of acute empyema arising in the course of an acute otitis, then the difficulty is intensified where we come to deal with the more chronic conditions.

The majority of cases of acute otitis recover in from eight to fourteen days, as do also, but probably at a later date, the associated conditions in the antrum. To the question, "What are the additional causes that contribute to the occurrence of acute empyema of the antrum?" the answer is difficult. As diversified are the causes that lead to the continuance of the discharge in the form of chronic otorrhœa in acute otitis. The cause of the continuance of the discharge longer than usual is a severer process than usual in the antrum. This, becoming established, forms one of the causes of chronic otitis media. Gradually in the course of the inflammatory process in the antrum, associated with chronic otitis media purulenta, the outer wall of the antrum becomes absorbed until all traces of cells and septa are lost. So constant is this result that some have assumed it to be a peculiar anatomical condition. Such, it is needless to say, is not a fact. During the days the otorrhœa is allowed to progress repeated re-infection aids the process at work in the mastoid, while under-current diseases add to the quota of influences which contribute to the same end. Sequestra situated deep in the mastoid or isolated caries of the antral walls act in the same way. The formation of cholesteatomata, depending upon the site of the perforation in the membrana tympani, if we are to credit the surrogation theory of this condition, is another fertile source of irritation of the bony walls of the antrum aditus and walls of the tympanum cells, and of a continuance of the otorrhœa.

Tubercular infection of the middle ear and neighbouring part calls for special attention. To facilitate its progress or advent some peculiar want of vitality on the part of the mucous membrane and osseous tissue must be assumed. Instead of sclerosis of the bone and proliferation of the mucous membrane, destruction of the latter takes place, and caries and necrosis of the former freely occur. Operation in that case is beset with danger. Especially is curetting to be avoided. The want of development of adventitious barriers to protect important structures in the neighbourhood often leads to such complications as otitic brain disease and fatal hæmorrhage from the large blood-vessels.

Such, then, briefly are the conditions which are encountered in chronic diseases of the temporal bone—viz., sclerosis of the antral walls, with localized caries or necrosis, and proliferating mucous membrane, caries or necrosis in the aditus, outer wall of labyrinth or floor of the middle ear, caries or necrosis of the ossicular chain, implication of the attic and tegmen tympani. It would be impossible for me with the time at my disposal to fully describe the various operations proposed for these diverse conditions. The two operations proposed by Stacke will, I imagine, now be accepted as the most surgically practical. The first endeavours to lay the parts lying below the tegmen freely open up to the

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aditus. The auricle, along with the posterior and superior soft walls, are freely separated from the bone, and would leave the tegmen chiselled away. A free view of the cavum tympani is now obtained, and diseased bonelets, as well as granulations, cholesteatomatous masses, etc., are freely removed.

If the disease is found extending into the antrum the soft parts over the mastoid are retracted, a protector introduced into the antrum, and the outer wall of the mastoid chiselled off, converting the antrum into an open gutter, continuous through the aditus with the middle ear. Flaps are made from the posterior soft meatal wall to cover over exposed bone. Before doing so all disease must have been carefully removed from the bone, otherwise the end much desired will be obviated. Tampons are placed in the meatus to aid the operation, and healing of the flaps. In performing this operation I have, in every case, employed in addition, at first, a strip of gauze behind the auricle, and then a leaden nail just over the part of bone to which the flaps did not extend, being convinced of the necessity of maintaining the external opening with the mastoid beyond the time occupied in healing of the flaps. I have secured, in some cases, permanent fistulæ behind the ear, than which no better preventitive against recurrence of deep mischief again in the antrum is known. There are few cases of otorrhœa in which we may expect, where we find ossicles diseased, that to these structures alone the process is confined; nevertheless, the operation for their removal may be entertained. This has become surrounded by an unnecessary amount of *technique*. Cocaine applied directly to the parts suffices for the painless separation of the malleus, while for its ultimate extraction a few whiffs of ether may be given. Deeper narcosis is needless and objectionable. The anvil extractor (Ludewig's) must measure only three millimètres, otherwise the tegmen may be injured, and in using it, it must not be inserted too deeply into the middle ear, but kept rather close to the roof, where the anvil is more readily got.

These are processes which, while requiring considerable dexterity, may be looked upon as practically free from any of the dangers attendant upon Schwartze's section of the mastoid, and the facial and semi-circular canals are practically protected from danger. These operations are only indicated where the conducting apparatus has long become a mere obstructing factor beyond hope of repair. Hearing oftener than not is improved. Subsequent treatment is shortened, and permanent recovery is realized in a large percentage of cases. Recurrence of the disease cannot be so freely judged of, seeing that the operation, as regards statistics, is yet in its infancy.

Eustachian Synechiæ.

Dr. ROBERTSON then read a paper on the above subject. He said: Since drawing attention to the above condition in the Journal of the Association, some years ago, although it has received no recognition in recent text-books of otology, it has, I believe, been considered worthy of recognition at teaching centres. The lesion, as you are aware, arises in the following way: when the pharynx tonsil becomes abnormally enlarged

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in a naso-pharynx of, perhaps, restricted development associated with ostia tubæ protruding more than usually into this space, as is often noticeable in this crowded condition of parts, adhesions are apt to take place between tufts of the pharynx tonsil, overlying the upper limits of the ostia tubæ. According to the subsequent changes in the tonsil, these adhesions remain of a fleshy consistence, or, as the tonsil recedes and atrophies, they are found to resemble whiter fibrous bands, of a length corresponding to the limits of the space and the degree of retraction of the tonsil. This recession of the tonsil and retraction of adherent bands gives rise to various forms of deformity of the mouth of the tube, while the rosy red injection on the surface of the ostium is observed in the neighbourhood of the insertion of the synechiæ and thickening of the same. The former round character of the opening of the tube is, in these cases, always altered when the synechiæ are attached to the upper limbs of the valve; then the opening is triangular. When attached to the posterior aspect, then the opening becomes slit-shaped. It is difficult in any case to say how far these synechiæ function in the etiology of deafness. It will be admitted that, where these exist, the middle ear has for long, from other causes, been subjected to the evil influences of catarrh in the naso-pharynx, as these bands presumably arise in cases where extreme hypertrophy of the pharynx tonsil has been in existence. That these bands perpetuate catarrhal conditions in the tube on their insertion into it can be actually observed and demonstrated, which catarrhal conditions may be propagated from there into the middle ear. It will also, I think, be admitted that the distorted opening of the ostium will militate against the free egress of mucus from the tube, and hamper the free ventilation so necessary to the function of hearing. I must not omit to mention the thick fleshy adhesions formed by the meeting of thick bands of lateral granular pharyngitis with the lower aspect of the ostium.

In considering the question of how far in any case these synechiæ affect a case, or rather the share they bear in the etiology of the accompanying defects, the condition of the middle and internal ear must be investigated. In some cases synechiæ are discovered where little injury to the middle ear or hearing is apparent. Generally the case is otherwise, and we now and then come across cases where they are the only lesion discoverable, and associated with what can only be called tubal catarrh with depressed drum, etc., and where rupture of the synechiæ prevails, a few applications of the air douche restore hearing to a satisfactory extent.

In another class of cases these synechiæ are associated with a condition of middle-ear catarrh of a more insidious and less curable character, just as one might expect after so long an exposure of the ear to the repeated assaults of catarrh and swelling in the pharynx tonsil. Before even these synechiæ have been formed the ear has probably suffered severe change, evidence of which but emphasizes the imperative necessity of an early and complete removal of the pharynx tonsil. Where there is the association of the appearance of sclerosis of the tympana, or previous suppuration within the tympana with these synechiæ, it is not to be looked for that the mere treatment of the latter will affect a great

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improvement, but as the diagnosis of any case narrows itself down to the existence of mere tubal catarrh it can be safely stated that the severance of these synechiæ will immensely favour the desired result.

This brings me to speak of the mode of treatment best suited to destroy these bands. I have found the use of the galvano-cautery impracticable and useless. A much more complete destruction of these structures is necessary than could be possibly effected thereby. The finger is the best means to effect this, carried up to the bands, which are readily felt and made to rupture as completely as may be. The extent of rupture is often considerable. The finger is carried round the tube so as not only to rupture those attached superiorly, but also those extending from behind and from lateral granular pharyngitis inferiorly. There is often considerable bleeding, which of itself often acts beneficially on the ear. Subsequently the periphery of the tube is daily swabbed with a four per cent. solution of nitrate of silver to remove the collateral hyperæmia of the mucous membrane which is present. The air douche, with catheter, or Politzer's bag is, of course, to be used. Where only tubal catarrh has been the cause, recovery is rapid and satisfactory, and even in more advanced and chronic conditions the same treatment must be carried out.

Dr. ROBERTSON then read the following paper *On Implication of the Ear by Disease of the Nose and Naso-Pharynx*. I can offer no better proof of the origin of the deafness in these cases than the demonstration of the rapid cure of the ear, following upon the cure of the nasal affection, and *per contra* where no success attended the merely local therapeutics of the ear. As a firm believer in the secondary implication of the ear from intra-nasal conditions, I here offer in these cases indubitable proof of the existence of this inter-concurrence, and evidence of the necessity for disease in its continuity being brought under an uninterrupted observation.

As regards the influence of nasal diaphragms, I can offer you two illustrative cases. The main lesion of the ear rests in the tubal catarrh, occasioned by the abnormal obstruction to respiration through the nasal passages. On both sides of the passage collection and decomposition of discharge arise, which might well affect the ear in all the different ways by which infection is occasioned—that is to say, *per tubam*, and by the blood-vessels and lymphatics. In each of these two cases, upon perforating the diaphragm and restoring patency, the hearing spontaneously improved. Presumably the tubal catarrh resolved itself, and normal tendency to aeration and secretion was restored within the tympanum.

With regard to the other cases, I have noticed a great tendency for the ear to become involved in cases of suppuration in Highmore's antrum. In the milder affections of the ear in this state we may discover tubal catarrh with depressed drum, and the anomalies of hearing connected with a deficient aeration of the cavum tympani. Tinnitus is present and the blush on the membrane, suggestive of impending dry catarrh in the drum cavity. A judicious treatment of Highmore's antrum fortunately interrupts the process in the ear and leads to cure. It is probable that here the catarrhal condition of the middle turbinal is communicated to the region of the

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ostium tubæ, and then propagated to the middle ear. So far no bacterial infection has taken place directly or otherwise. With a freer flow of pus from Highmore's antrum into the nose, acute purulent inflammation of the ear is a constantly impending danger, and it is probable that in these cases a primary cause is the *congestio ex vacuo* arising from a precursory tubal catarrh. We have in such cases a history of tinnitus, and fulness of the ear. Nothing cures the ear complication quicker in these cases than the immediate and satisfactory opening of Highmore's antrum. Where ozæna and disease of Highmore's antrum are combined, the ear, in my experience, is especially apt to become involved during the course of these conditions. Here, again, the only hope for permanent and complete recovery as regards the ear is to be found in radical treatment of the antral and nasal conditions, which alone restores the ear to health, without the aid of further aural therapeutics.

In chronic interstitial and purulent ethmoiditis, with or without polypi, there will be found in many cases more or less implication of the middle ear. In both instances there is no doubt bacterial infection which may readily get conveyed, directly or by the blood or lymphatics, to the ear. The mucosa of the pharyngeal vault in either of such cases has its vitality impaired, a condition which ultimately leads to thickening and swelling of the ostium tubæ. This at once lowers the vitality of the mucous membrane of the tympanum, and prepares the way for bacterial infection and subsequent otitis.

The last condition, and one prone to communicate evil effects, is suppuration within the sphenoidal sinus. One such case I can show. Here the tympanum is in a high grade of congestion. When the patient presented herself she complained of loud beating in the right side of the head, roaring tinnitus, deafness, and right nasal obstruction.

On examining the right nostril, it was totally obstructed by a hard induration of the lower turbinal. On scoring this deeply with a knife, and distending the nostril with an antiseptic plug, in a day or two I got the nostril somewhat dilated, only to find an indurated swelling of the middle turbinal, which was similarly treated. I now got a view of the interior of the nostril, and, with a probe, found pus and necrosis in the sphenoidal sinus. The nostril was now patent, and could be freely douched. A day or two afterwards the hearing returned. Examination of the membrana tympani showed redness and depression. Crusts, shell-form, in the post-nasum, but not to the same extent as formerly. The intra-nasal condition continues to improve. In this case paracentesis of the right membrana tympani allowed the escape of a considerable amount of viscid secretion, which immediately cured the irritating tinnitus which remained after hearing was bettered.

Dr. WARDEN rose for the purpose of making a few observations with regard to the papers read by Dr. Robertson. It was really absolutely impossible to discuss properly the whole of the subjects so ably opened out, for each subject dealt with would take at least an hour to discuss. He felt himself to be in a perfect labyrinth. Here were three or four important and deep subjects which they had to discuss in an hour or two. He really did not know what point to touch upon.

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The CHAIRMAN suggested that, as the question of mastoid operations was to be dealt with on the following day, the discussion on that subject should be deferred. This was agreed to.

Dr. MILLIGAN quite agreed the finger process was the best to rupture the bands, as mentioned in the paper. He was surprised that the subjects dealt with had not had more consideration in the past, but believed that now attention had been drawn to them they would be studied more carefully.

Dr. BRONNER said they were very greatly indebted to Dr. Robertson for the excellent papers he had given. He was glad that Dr. Robertson had called their attention to the intimate relations between diseases of the nose, the naso-pharynx, and the middle ear. Many cases of middle-ear disease were caused by the injudicious use of the nasal douche in cases of diseases of the nose.

Dr. JONES was of opinion that deviation of the nasal septum often kept up middle-ear inflammation in an indirect way by interference with treatment. Where there was secretion in the naso-pharynx, it was better to avoid, if possible, the use of Politzer's method of inflation, as by doing so the objectionable secretions must always, unavoidably, be forced into the Eustachian tube. It thus became necessary for this reason alone, when the Eustachian catheter could not be passed, to excise the projecting portion of the septum. He cited several cases illustrative of this.

The CHAIRMAN, in a few remarks, paid a high tribute to Dr. Robertson for his excellent paper.

The section then adjourned for the day.

Thursday's Proceedings.

Mr. W. ARBUTHNOT LANE, M.S. (London). *On the Symptoms and Treatment of Septic Infection of the Lateral Sinus, as illustrated by ten cases.* ("Brit. Med. Journ.," p. 561.)

1st. That septic infection of the lateral sinus is always due to the extension of an inflammatory process from an abscess between the bone and dura mater, through the wall of the sinus.

Therefore, the symptoms which result from the infection of the blood in the sinus are preceded by and are associated with those due to the presence of a subdural abscess, or rather, to speak more accurately, an extradural abscess.

2nd. The symptoms which a subdural abscess presents are dependent almost entirely on the fact of the dura mater being involved, and the chief indication of this condition is deep-seated pain and headache radiating from the seat of inflammation.

Therefore, it is impossible to determine in many cases whether one has to deal with a patch of inflamed dura mater, without the existence of an abscess, the inflammatory process having extended from the antrum to the dura mater in its immediate vicinity, or with a case in which the inflammation has been more intense, and pus has already formed. In either case, the patient derives immediate relief from operative inter-

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ference, and though in the former case the degree of inflammation in the dura mater may not be sufficiently intense to result in the formation of pus, yet one has no guarantee that it will not develop, and then, if not removed, it will very probably terminate the patient's life.

3rd. A subdural abscess may produce death by producing a suppurative arachnitis, or, by infecting the contents of the lateral sinus, it may produce death by pyæmia. The abscess may, however, discharge itself through the antrum, middle ear, and meatus, or through the mastoid cells, or through the mastoid bone, by absorption of the superjacent bone, or through the opening for the mastoid vein. Still this course should not be counted upon, and even if it does take place, it is most advisable to perform antrectomy.

4th. In a large subdural abscess, besides the presence of the deep-seated pain and radiating unilateral headache, you may have a varying degree of inflammation of the arachnoid cavity, producing symptoms of arachnitis. These vary considerably in severity, probably in a direct relation to the area and intensity of the inflammation, and are represented by headache in the lower and back part of the head, retraction of the head, etc. When the dura mater is much inflamed, optic neuritis is usually present. The amount of deep-seated pain and headache present in inflammation of the dura mater seems to bear a direct relation to the degree of the inflammation, and the extent of the area of this membrane involved.

5th. Whether, in the case of a subdural abscess, the mastoid process be tender or painful on pressure depends entirely upon its structure. If there be no mastoid cells, as is frequently the case, the mastoid process may be pressed on or manipulated forcibly without the patient experiencing any discomfort; even when this symptom is absent, if the mastoid process be struck smartly with a pleximeter, deep-seated pain and tenderness is at once experienced.

6th. Whether a subdural abscess produces an infection of the contents of the lateral sinus or not, depends to a great extent on the situation of the abscess. For instance, such an abscess in the posterior fossa may not overlie the sinus at all, or, on the other hand, its area may be very limited, so that its floor may be formed entirely by the outer wall of the sinus. A subdural abscess usually develops in a case of chronic purulent otitis, and complicates one of the many attacks of pain, etc., these patients suffer from. Rarely, however, it follows immediately upon a first attack of inflammation of the middle ear.

7th. The symptoms of septic infection of the lateral sinus develop upon, and are superadded to those of subdural abscess. They consist solely of irregular, rapid fluctuations of temperature, very often amounting to a well-marked rigor, but not necessarily so. Of course, at a later period, other symptoms, due to the formation of secondary foci, etc., arise; but before these appear, apart from these fluctuations in the temperature, there is no other symptom that I am aware of.

8th. For this development of secondary foci elsewhere, it does not seem necessary that throughout the whole course of the case there should be any naked-eye evidence of thrombosis. Inflammation of the walls of the

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sinus, intense enough to cause only an opacity of the intima, may be sufficient to produce, and can continue to produce secondary foci, even after the subdural abscess, which originally determined the inflammation of the wall of the vein, has been thoroughly cleared out.

9th. Unfortunately, too often, septic thrombosis of the lateral sinus escapes notice till too late, for, as in the more simple antecedent condition subdural abscess, the surgeon frequently expects to find tenderness or swelling of the mastoid process, pain on percussion, pain or swelling in the position of the internal jugular vein, etc., none of which are necessary symptoms of this condition. The explanation of this was fully pointed out in an abstract of clinical lectures on inflammation of the middle ear and its complications, published in the "Lancet," September 26th, 1891, and in other papers. It would seem usual that the less extensive the thrombus that develops the more virulent are the clinical symptoms of septic infection, the thrombosis being apparently an effort on the part of the organism to lock up the intruding micro-organisms and destroy them. It occasionally happens that when there is obvious thrombosis of the lateral sinus, and clinical evidence of it as evidenced by the temperature, such thrombosis will cease to produce symptoms when the subdural abscess has been thoroughly evacuated by surgical interference, or spontaneously. In septic infection of the sinus, apparently without thrombosis, ligature of the internal jugular vein after the subdural abscess has been evacuated may stop the rigors only after the sinus has become thrombosed, but not till then.

10th. Again, ligature of the vein and sinus in a case of septic infection, apparently without thrombosis, may not stop the progress of secondary foci, even though coagulation takes place in the sinus, owing to the extension of the septic process along the petrosal sinuses to the cavernous sinus.

11th. When extensive thrombosis exists, it does not seem necessary to remove the whole of the proximal and distal portions of the clot. This was illustrated more forcibly still by a remarkable case published by Mr. Parkin, of Hull, in the "Lancet" of March 11th, 1893. In that he found that the jugular vein was thrombosed beyond the lowest point at which he was able to ligature it.

12th. The same case showed very well that the presence of secondary foci of septic infection does not preclude the possibility of recovery, provided the further supply of septic emboli be stopped.

13th. However advisable it may seem to ligature the internal jugular vein beyond the limit of the thrombus, and perhaps to remove its proximal part, there is no evidence to show that the complete removal of the distal portion of the clot is necessary, or that leaving it produces any effect that is prejudicial to the health of the patient.

14th. In spite of the variations in the activity and character of the conditions which result from septic infection of the lateral sinus, it would seem that the most scientific and most certain measure to adopt in every case is—after performing antrectomy, which is a necessary antecedent of every operation of this sort—ligaturing the internal jugular vein, and clearing out the extradural abscess, to remove as much as possible of

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the proximal portion of the clot, then the whole of the distal portion, or, if there be no thrombosis, to slit up the sinus beyond the limits of the abscess wall, and plug it with gauze and iodoform.

I cannot close this paper without again expressing our indebtedness to Mr. Horsley for his original suggestion, which has opened up such a large field for operative measures, not only in cases of septic thrombosis, secondary to middle-ear disease, but also, as I have shown, in similar conditions in other parts of the body, all of which had for so long been regarded by surgeons as hopeless, and were consequently relegated to the care of the physician, who, with all his skill, was unable to influence the course of events by drugs.

Mr. HUGH E. JONES (Liverpool) followed with the following *Case of Septic Thrombosis of the Lateral Sinus*, in which he tied the internal jugular vein, and cleaned the clot out of the sinus, but death followed a week later from extension of the mischief to the opposite lateral sinus. ("Brit. Med. Journ.," p. 563.)

After a few remarks by the Chairman in praise of the concise way in which everything had been put before them in the papers,

Dr. A. BRONNER (Bradford) drew attention to the great difficulty in diagnosing thrombosis of the lateral sinus. He mentioned several cases in which rigors and severe pain seemed to point to disease of the lateral sinus, and in which scraping out the middle ear or the mastoid cells at once removed the symptoms. It was, therefore, perhaps risky to at once open the cerebral cavity and puncture the lateral sinus. He thought it very remarkable that the opening of the cranial fossa and the puncture of the sinus, surrounded as they were by fœtid pus, should not be more frequently followed by fatal results.

Dr. ROBERTSON followed, and said he was sure they were all very much indebted to Mr. Lane for this almost, he might say, epoch-making paper with reference to the disease to which it referred. It would be something of an important event if it came to be the case that they were able, from the symptoms he had, to diagnose exactly the time when the dura became affected in cases of chronic suppuration of the middle ear.

Dr. WALTON BROWNE next gave a brief history of a case of a young man in which two prongs of a fork two inches long penetrated in front of the tragus and passed downwards and backwards into the mastoid cells. The prongs were lodged for nineteen months and eventually successfully removed, their presence causing no serious symptoms.

Pilocarpin in Aural Affections.

Dr. ELLIS read a paper by Dr. G. Metcalfe, surgeon to the Newcastle-on-Tyne Throat and Ear Hospital, on "The Use of Pilocarpin in Aural Affections." In the course of it he said that pilocarpin was used in ear disease hypodermically and locally by introducing it through the Eustachian tube into the middle ear. In employing the hypodermic method one third of a grain was given daily until the case ceased to improve, but was discontinued at the end of a fortnight if there was no improvement. It was safer to begin with a smaller dose—one-tenth of a grain—and increase it rapidly to one-third of a grain. On receiving the

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injection the patient either retires to bed until the perspiration has ceased, or lies wrapped up on a couch in a warm room for one or two hours. Sometimes a dose of sal volatile or other stimulant is previously administered to counteract cardiac depression, but is not usually necessary. In making local applications the Eustachian catheter was passed in the ordinary manner. Then his own method was to inject into the catheter, with a hypodermic or other suitable syringe, about six drops of a one in forty solution of the drug, and then to force it onwards by the air douche until it is demonstrated that a portion has arrived in the middle ear. These applications were made twice or thrice a week to each affected ear. The effect of the drug commenced and was most marked in the head, and thence extended downwards throughout the whole body. The local applications stimulated the parts to which they were applied.

It had been shown by Prof. Politzer, and confirmed by the observations of Drs. Barr, Field, Bronner and others that the daily hypodermic injection of one-third of a grain of pilocarpin cured certain cases of inflammatory syphilitic and hæmorrhagic deposit in the labyrinth, especially when of recent and sudden occurrence, and when the tuning-fork was heard longer opposite the meatus than on the mastoid. These cases he believed to be exceptions. He quoted the following cases as instances of failure. ("Brit. Med. Journ.," p. 570, 1st col.) In old-standing syphilitic cases, and in cases resulting from meningitis, he had never observed the slightest benefit from pilocarpin medication.

Progressive sclerosis of the middle ear was not amenable to this remedy. In chronic middle-ear catarrh with co-existing internal deafness he had had many cases which improved slightly for a week or so under subcutaneous injections alone, but they afterwards relapsed and the continuation of the treatment was of no benefit. The majority of these cases were not in the least improved by pilocarpin hypodermically, though many of his patients received the injections daily for six weeks. The other method of using pilocarpin recommended by Politzer, namely, by injections through the catheter into the Eustachian tube and middle ear, had yielded him some favourable results in chronic middle-ear catarrh, either with or without labyrinthine symptoms, after routine treatment had failed. He injected into the catheter about six drops of a one in forty solution of pilocarpin, and then forced it onwards with the air-tag. A slight improvement in hearing-power very frequently resulted. When from Eustachian obstruction air entered the middle-ear with difficulty, after injecting the solution, air frequently passed freely and easily. This effect was immediate, and was probably due to the mechanical force of the fluid overcoming the obstruction. He was inclined to think that the results obtained in mixed middle-ear and labyrinthine cases by some observers who had used hypodermic injections and injections *per tubam* concurrently, had been brought about by the local applications to the Eustachian tube and the middle ear, and not to the subcutaneous medication. ("Brit. Med. Journ.," p. 570, 2nd col.) He thought that pilocarpin medication to the tympanum and Eustachian tube was often a useful method of treating chronic tympanic catarrh when routine treatment had failed. Pilocarpin drops, eight grains to the ounce, with glycerine and

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water, applied to the external auditory meatus in dry conditions of the meatus and membrane, often afforded some relief, but he had never noticed any good effects when given by the mouth. There was a great difference between the action of different samples of pilocarpin. He had often found one-tenth of a grain produce free perspiration when in the same series of patients a quarter of a grain obtained from another source had produced no effect.

Dr. WM. HILL, in opening the discussion, said he believed he was the first to inject a patient in this country according to Mr. Field's method. It was a hospital patient, and he must say that at the end of three weeks there was a great improvement, so far as he could gather. Mr. Field's percentage of successes with pilocarpin injections, which appeared higher than most other observers, was probably due to careful selection, and from the fact that he had dealt with such a large number of cases. Dr. Metcalfe had done well to test the use of Eustachian injections through the catheter, apart from hypodermic injections. Mr. Field had used the two methods concurrently in the same patients, and it was impossible in any given case to say which method was responsible for the improvement. A large percentage of failures must be expected in the present imperfect state of our knowledge, but the question had been advanced a stage by Dr. Metcalfe, and the thanks of the section were due to him for bringing the paper forward.

Dr. WARDEN remarked that with regard to private patients they would not stand daily injections, and hospital patients often got out of the way and were lost sight of. He was sorry that Mr. Field was not there, because from what he (the speaker) heard, his expectations were rather giving way. (Dr. HILL: "No, I think not.") He thought the internal treatment was well worth trying, and he was trying it. He had seen beneficial effects in one or two cases.

Dr. MILLIGAN was pleased to hear Dr. Metcalfe's paper, and to learn that he had had successful results, but he was bound to say that his own experience of pilocarpin was decidedly disappointing. He had tried it in numerous cases, but the result had been such as not to warrant his persevering with the drug. He thought that in many cases where good results had been recorded the improvement was not so much due to the effects of the drug as to the regular catheterization and politzerization which had been employed at the same time. Such papers as Dr. Metcalfe's, however, were very valuable, as throwing light on the subject, and it might show that the drug was beneficial.

Dr. ROBERTSON corroborated what had been said.

Dr. ADOLPH BRONNER had tried pilocarpin subcutaneously in many cases. The most suitable were those of disease of the internal ear of recent origin, especially if due to syphilis. The internal use of pilocarpin did not prove very successful.

Mr. RICHARD ELLIS, in replying, agreed upon the whole with the conclusions arrived at on the paper. He had, he said, seen very many of Dr. Metcalfe's cases, and he was personally aware that Dr. Metcalfe had treated a very large number of cases by the pilocarpin method. He (the speaker) believed that a very large number of cases would derive as

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much benefit from some of the old drugs—guaiacum, for instance, or full diaphoresis by the pack or Turkish bath.

The Surgical Treatment of Mastoid Disease and its Complications.

Prof. WM. MACEWEN, M.D. (Glasgow), introduced a discussion on "The Surgical Treatment of Mastoid Disease and its Complications." In doing so he said he supposed that the heading "Mastoid Disease," which had been put down for discussion, meant the extension of the middle-ear disease to the mastoid region, and that it included, for the most part, infective disease of the middle ear, and excluded tubercle and carcinoma. In the first place, with regard to the pathology of pathogenic infective disease, he found, as he had no doubt was the common experience, that the greater majority of these diseases travelled from the middle ear to the mastoid antrum and cells, and that they invaded, after destruction of the mucous membrane, the bone and dura mater, the membranes of the brain. In many instances, after erosion of the bone, masses of granulation tissue extruded themselves from the dura mater, which, on removal by absorption, prompted re-infections by a fresh surface coming into contact with the infective material pent up in the middle ear.

Speaking generally, he agreed with Schwartze in his recommendations as to the time that operations should be performed in infective purulent diseases of the middle ear, and in such cases the mastoid antrum and the mastoid cells ought to be thoroughly ablated. He then referred to the surgical anatomy of the mastoid region, pointing out the relative positions of the mastoid antrum, the sigmoid sinus, and the facial canal, and he showed that the safety zone lay in a space which he had operated in for the last ten years, and found that he was always successful in striking the antrum, and which he named the supra-meatal triangle. This triangle was free from the sigmoid sinus, and if one operated at the upper and external part of it, he was free from the facial canal. The facial canal lay at the floor of the passage between the antrum and the middle ear, and traversed the floor of this passage to the inner side. As a rule, by opening the antrum the attic of the middle ear was exposed by enlarging the opening, the osseous opening forwards. After exposing the attic the ossicles were removed, and the whole of the granulation tissue of the middle ear cleared out. After this was done the tegmen of the attic was scrutinized by an efficient light, and, if eroded, was freely opened up, the granulation tissue removed from the dura mater, and the brain laid bare, and, if necessary, opened into. The abscess in the brain could be tapped from this region, but it had also to be opened above in order to remove sloughs of cerebral tissue, which could not otherwise come away. The sigmoid sinus was likewise dealt with in cases where the disease had spread in this direction. In all these cases it was necessary to remove the focus of infective matter in the bone, and to cut off the parts by which they travelled from the brain, and therefore, although the opening might be made into the abscess from the squamous part of the temporal, the pathway by which the affection travelled into the brain would require also to be dealt with. With regard to the infective thrombus of the sigmoid sinus, he preferred to lay the

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sigmoid sinus freely open, to turn out the contents, to separate the outer wall of the sinus, and to involute this membrane upon the inner walls of the sinus itself, retaining it in this position by means of abundant powder of iodoform and boracic acid, and also by iodoform gauze. He preferred this method to ligaturing the internal jugular, because the ligaturing of the internal jugular did not wholly arrest the infective matter from getting into the lungs as it passed by the large veins at the base of the skull, passing through the anterior and posterior condylar foramina, and so into the vertebral and subclavian. But there were cases where the internal jugular vein was involved, and in such a case he would advise the application of a ligature to the internal jugular.

With regard to the mastoid antrum, after having freely exposed the whole of the cavity and ablated its connection with the mastoid cells as well as the mastoid cells themselves, he did one of two things. If the whole of the disease was removed he stuffed the part and allowed it to heal by granulation tissue from the bottom, so that the masses of fibrous tissue formed in the spaces formerly occupied by the antrum and cells: or, where the disease in the petrous portion of the temporal bone had not been thoroughly evacuated on account of the depth of the situation and the intricacies of the passages in which it lay, in that case he preferred to keep a permanent opening between the petrous bone and the external part of the head behind the ear, and he did this by "papering" the passage by means of epithelium spread both from the middle ear and the skin without.

With regard to the results, he had operated upon eighty cases of mastoid disease alone, and in those where the disease had already been obliterated by the operation he found a permanent cure resulting, but in those where the disease had spread into the petrous portion it was necessary to keep this opening permanent, and there was in a good many such an amount of discharge. With regard to meningitis following upon infective disease of the middle ear, although at first he had had a doubt as to the propriety of operating where infective purulen meningitis had developed, he now had no hesitancy in performing such operations, and in the great majority of them he found very excellent results. The disease, although present to a marked extent, had been arrested by this. In cerebral abscess there was no difficulty about performing the operation. It was one of the most satisfactory operations that could be performed upon the head, because it was urgently required. They were taking away a pathological product, and the results were eminently satisfactory. With regard to sigmoid sinus he had to make a like remark, provided always that the case was got prior to implication of the lungs.

Prof. VICTOR HORSLEY followed. He regretted that he had only had the opportunity of hearing half of Prof. Macewen's address, but he might say that his experience of these cases coincided almost entirely with everything that had been said. He, however, wished to propose other points for discussion by the section. The first and most important, so far as the interests of the patient were immediately concerned when the case was one of simple otitis media purulenta, was the question of

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how long effort was to be made by ordinary antiseptic treatment to get the cavity to heal up before the radical operation of clearing the tympanum and mastoid is undertaken. He suggested that one year would be a convenient limit, and that if the granulations had not subsided, and if cicatrization did not occur within that limit, the antrum of the mastoid should be laid open, and the opening continued into the tympanum so as to make one space of both cavities. In this way the grave risks to life of persistent discharge from the ear, such as blood-poisoning, destruction of the bone, blocking of the venous sinus, inflammation of the membranes of the brain, and cerebral abscess, could be avoided.

As the operation of opening the mastoid was unattended with any risk to life, it was obvious that the only possible drawback to undertaking a radical cure was the chance of damaging the hearing, which was, of course, already disordered. On this point his experience showed that the hearing was sometimes perfectly normal after the operation, was sometimes improved by the operation, and was sometimes to a certain degree diminished. It was, therefore, quite clear that the question of risk to the hearing was not an important one, and ought not to contra-indicate the operation which is undertaken to remove the risk to life which these patients run.

In connection with this point he expressed his opinion that there was no advantage in leaving the stapes in position, and he quoted a remarkable case in which the tympanic cavity had been scraped out no less than three times, and in which, nevertheless, the hearing was perfectly preserved. After speaking of the value of prolonged drainage in bringing about a radical cure, and referring to the fact, also observed by Prof. Macewen, that the best results were obtained in cases where the bone of the mastoid region had been more attacked than the bone in the petrous portion, he proceeded to discuss the treatment of the facial nerve, and pointed out that where the nerve had been exposed by disease, twitching of the facial muscles if an instrument were passed across it would warn the operator of its proximity, and so avoid any accident to the nerve itself. In very distressing cases of the complete destruction of the nerve by tubercular disease, he believed there was some possibility of restoring it by nerve-grafting in a suitable case. He then passed to the dangerous complication of blocking of the venous sinus, and thought that in these cases the jugular vein should be ligatured in the neck to prevent the clot becoming loose, and cause embolism of the heart or lungs. The brilliant results obtained by Lane and Ballance showed the value of the measure, and the criticism that had been passed upon it from the point of view of the connection of the sinus with emissary veins had no foundation, because the clot in these cases often extended beyond the veins in question, and consequently he thought that the ligaturing of the jugular in such cases saved the patient. He agreed that in cases of abscess of the brain the cavity of the ear must be completely opened by the operation and disinfected, at the same time that the matter is let out from the brain.

After remarks by Dr. H. E. JONES—

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Dr. ROBERTSON said that, in listening to the operative *technique* referred to by both the professors, he had been somewhat disappointed at finding no mention of a very important method of opening the mastoid antrum described by Stacke. For those members not quite conversant with the exact position of these neighbouring structures, Stacke reduced, he thought, a great deal of the complications to a minimum. They knew that if the protector was introduced simply into the antrum, one or two of the most dangerous accidents could be successfully obviated. At any rate, they could never injure the facial nerve. Of course this operation of Stacke's was only applicable to chronic cases.

Mr. RUSHTON PARKER thought it was desirable to fix upon some routine treatment, on which reliance could be placed, in cases of otitis media before resorting to operation. He practised and advocated the use of carbolized glycerine (one in twenty), as suggested to him by Mr. Pagan Lowe, of Bath, in preference to antiseptic injections, which could not act thoroughly before the mastoid opening was made, and tended to drive inwards without removing the septic agents and products confined in the lung cavity. If suppuration were not speedily checked by this means, especially if febrile symptoms supervened, he would advise early opening of the mastoid region by a small gouge. Even after successful opening of the mastoid region thus affected, the febrile symptoms sometimes continued several days before disappearing altogether. In dealing with lateral thrombosis, he appreciated highly Prof. Macewen's proposal, not necessarily to tie the jugular vein, substituting local occlusion by exposure and plugging, but he must remind the section that such ligature was advisable if the thrombus extended into the neck.

Dr. WM. HILL showed a number of specimens of the temporal bone, prepared some by Mr. Jackson Clarke and some by himself, which bore out many of the anatomical points raised by Prof. Macewen. In most of the specimens the postero-supero-meatal triangle could be well seen, and when this portion of the bone was removed, as in some of the bones shown, the temporal antrum was found at a variable depth beneath.

Dr. MILLIGAN thought that the tympanic attic should be opened up and explored in those cases of chronic suppurative middle-ear disease at the same time as the antrum is opened. The attic formed such an admirable space for the production and propagation of the septic material that it should be the surgeon's aim to thoroughly cleanse it of all its putrid contents. If necessary, removal of diseased ossicles should take place at the same time. The hearing process in such cases was sometimes remarkably benefited, especially with regard to the power of appreciating conversation. The method advocated by Stacke of dividing the posterior meatal wall and folding the flaps backwards into the cavity of the bone formed during the process of opening the antrum was useful. He thought that in all cases where the intra-cranial abscess was diagnosed and operated upon, the mastoid antrum should be opened at the same time. In all chronic cases the antral mucous membrane was affected, and, unless the part was cleared of disease, recurrence might quite possibly take place.

The CHAIRMAN, after expressing his appreciation of addresses and

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discussion, said Mr. Victor Horsley had touched upon one point that was especially interesting, and that was the time for performing operations. He (the speaker) also asked them to consider how far these attacks of influenza affected the time movement, and went on to say that the teaching of the German schools should be balanced. The Germans now, especially in the Berlin school, looked upon the mastoid antrum as a thing to be opened. He thought that they as British surgeons seemed inclined to strike a balance between that and too-long-delayed operations.

Prof. MACEWEN, replying to Mr. Victor Horsley, said that in the first place there was a difficulty in being quite sure of the position of the facial canal in cases of sclerosed mastoid. In ordinary cases, however, the facial canal was well-marked, and especially relatively to the tissue by which it was surrounded. The twitching of the facial nerve produced by the touch he always asked the chloroformist to watch for, and advise him at any time that such occurred. In this way the operation was a marked advantage. The dressings he usually applied on the operating table, and the parts were not again touched for a fortnight, or sometimes three weeks, unless there was some cause, such as high temperature or discharge.

Friday's Proceedings.

On the chairman (Mr. H. BENDELACK HEWETSON) taking the chair on Friday morning, a demonstration was given and discussion opened by Dr. MACINTYRE on the *Pathogenic Organisms of the Upper Respiratory Tract, with special reference to Diseases of the Naso-Pharynx and Ear.* He afterwards opened a discussion on the *Etiology of Diseases of the Naso-Pharynx and Ear, with special reference to the Bacteriology of these regions, and its importance in Treatment.*

The demonstration consisted of a large series of drawings and photographic slides, illustrating the principal organisms which have been found in the upper respiratory tract. Specimens were shown illustrative of the parasitic or saprophytic organisms which are considered non-pathogenic. A large number of drawings were also shown of those which are now accepted as pathogenic. Sections were also shown, demonstrating the passage of micro-organisms from the surface to the interior of the body, with the subsequent development within.

In introducing the subject, Dr. Macintyre said the discussion was more or less limited to the pathogenic forms, but without a knowledge of the ordinary bacteria no progress can be made in the life-history of those organisms which it is our special function to consider. Further, no sooner has one embarked upon the study of the pathogenic organisms in this or any other part of the body than he is confronted with the question, What are pathogenic forms? The difficulties in this way were great, and the state of our present knowledge quite insufficient, because it was evident that some organisms, apparently parasitic and quite harmless in the host, may under altered conditions of the surroundings or life-history produce products of a destructive nature. Further, it has even been suggested that some organisms are perfectly harmless in the

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body until others are introduced, and, conversely, some organisms when introduced into the body were rendered less powerful by the introduction of other forms, or even the products of other forms. It was for this reason that in the demonstration which he had given the non-pathogenic as well as the pathogenic organisms had been exhibited. While a large number of apparently harmless organisms can be found in the nose, mouth, and throat, it could not be said that many of the pathogenic organisms are to be found in these parts of the body in health. The mouth was perhaps the most interesting in consequence of the number of organisms being numerous. This fact can be explained by the very many different things containing organisms which must naturally pass through any part of the alimentary canal. This was an important part of treatment, because, owing to the number of accessory cavities in the region of the nostrils (where microbic organisms might lodge), it was absolutely necessary in making wounds in the region to attempt as far as possible an aseptic condition. The paper was divided as follows :—

1. The consideration of the principal micro-organisms of interest to ear surgeons.

2. A reference to the affections which in all probability will be ultimately classified as bacteriological in origin.

3. Indications for treatment.

In connection with the first heading, the causes which favour the development of the different organisms were considered, as well as the forms which had been found in different pathological states. Special reference was made to those found in inflammation, the suppurative processes, erysipelas, diphtheria, and others representing the acute forms of disease. Reference was also made to the causes of affections such as tubercle, syphilis, rhinoscleroma, and other diseases of a chronic nature.

In the second place, the effects of such diseases as measles, scarlatina, gout and rheumatism upon the mucous membranes of the naso-pharynx and middle ear were carefully considered. Lastly, the indications for treatment were gone into, special reference being made to the best methods for obtaining as far as possible aseptic conditions in the nose, mouth, and accessory cavities.

The discussion on Dr. Macintyre's paper was opened by Dr. W. ROBERTSON. He might say that it was well-nigh impossible in the time they had to do justice to the excellent and elaborate paper that had just been read by Dr. Macintyre. He had rightly remarked that they knew nothing, or, at any rate, very little, of the manner in which such diseases as scarlatina brought about the implication of the middle ear. It was just possible that these general diseases reduced the energy of life and the natural immunity of the organ, and in this way pathogenic organisms floating about gained an entrance through the part which had been impaired by general disease. They knew that, amongst other things that were classed under immunity, the unbroken epithelium of the mucous membrane offered much obstruction to the increase of any kind of germ, but, unfortunately, it turned out that such germs as diphtheria and tubercle had the power of in some way bringing down the energy, and in this way they could get in. Dr. Robertson went on to refer to the

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remarks of Dr. Macintyre as to germs of disease being difficult at times to find, and then dealt with the surgical aspect of the question. He could only join with others in thanking Dr. Macintyre for the great trouble he had taken in exposing those beautiful specimens, which were an education in themselves, and for the extreme trouble he must have taken to bring such an exhaustive paper before the section.

Dr. R. ELLIS could not refrain from expressing his admiration of the enthusiasm that had prompted Dr. Macintyre to bring this splendid paper. The work shown in it must have been immense, for it teemed with points of interest, and he would like to have the paper to study for a week. There was one point he might refer to, arising out of Dr. Macintyre's remarks, and it was a matter of great importance. He quite agreed with the writer of the paper that it would be better if they had means of getting specimens examined and verified; it would be better for practitioners, and better for patients. If it could be done, the sooner it were done the better, for it was very important.

Dr. MACKENZIE also paid a tribute to the work of Dr. Macintyre.

Dr. WARDEN believed that Dr. Macintyre's name would go down to posterity as the originator of this splendid subject. There was no doubt whatever in his (Dr. Warden's) mind that the time would come when this theory, more than a theory, would be adopted universally. He had no doubt this was the beginning of one of the greatest discoveries that had ever taken place, and he could not express his feelings too strongly in thanking Dr. Macintyre for his splendid achievement.

Dr. MILLIGAN said that the importance of examining purulent discharges from the ear for tubercular bacilli was of great value, both from a theoretical and clinical point of view. That bacilli were difficult to find in such cases he admitted, but suggested that examination of the granulation tissue proved at times more fruitful of discovery. He considered that in tubercular disease of the middle ear early involvement of bone was more frequent than in non-tubercular cases, and that consequently more radical forms of treatment should be resorted to.

Dr. BRONNER said he would like to call attention to the good work they had done in the otology section during the three days' meetings. They had had Dr. Macintyre's paper that day, which had been most instructive and of great scientific value; on the previous day they had papers of great surgical importance, showing when they ought to interfere. The work they had done would compare favourably with any other section of the meeting, and proved that special sections could be of very great importance, not only to specialists, but to the general practitioner.

The CHAIRMAN briefly spoke, after which Dr. Macintyre replied.

Prof. GIAMPIETRO.

One of the visitors to the section was Prof. Giampietro, of Naples, whose appearance was greeted with applause. He presented a paper on *The Dangers and Limitations of Politzer's Method.*

The CHAIRMAN, addressing the professor in French, gave him a hearty welcome to England, and to the meetings of the Medical Association.

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Professor GIAMPIETRO, who also spoke in French, thanked the Chairman for his kindly remarks. He would have been most happy to have joined in, and taken part in their discussions on the very important subjects which had been under their notice, but he did not understand the English language. He had, however, written a paper in his own language, which conveyed his ideas on one or two of the topics they had discussed. He would, for his part, rejoice to see the time when there should be brought about a congress of doctors, having for its object the advancement of their science, interchanging opinion in one language, and so helping to make medical men into one large family.

Dr. BRONNER, addressing Prof. Giampietro in French, said they had listened with pleasure to his remarks. The paper which had been written would be read with pleasure, and the suggestions made would be heartily approved by those who had heard them.

Dr. BRONNER'S paper on *Notes of Sixty Cases of Diseases of the Mastoid Process, in which the Antrum was Opened*, was taken as read. The paper stated that as regarded the method of operating there could be little doubt that the method described by Schwartze was by far the best. The skin over the mastoid process was shaved and disinfected, and a vertical incision was made down to the bone behind the attachment of the auricle and extended to the apex of the mastoid process. The periosteum was then cut through and detached, and the edges of the wound drawn back by hooks. The bone was exposed and carefully examined to see if they could detect any fistula or small area of diseased bone. If that were the case, the opening was enlarged with the sharp spoon to such an extent as to permit of the introduction of the finger, with which they could feel if there was any loose bone. When there were no external signs to guide them, they made an opening in the bone behind the upper margin of the external meatus. Thin layers of bone were removed, the direction of the opening being downwards, forwards, and inwards, and in most cases they reached the antrum or at least some mastoid cells. They then tried to open up a free communication between the middle ear and antrum. It was, however, of importance to know when they should operate. In these cases they could not do better than again carefully follow the indications suggested by Schwartze; where there was any doubt as to whether they should operate at once or wait, the best plan was to operate. They could not do very much harm by operating too soon, but they might risk the life of the patient if they waited too long.

Votes of thanks to those who had officiated brought the meetings of the section to a conclusion.

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