mined, and purulent fluid was seen issuing from the vagina. She made a straightforward convalescence.

Immediately the tubes were removed, Dr. Maclean, pathologist to the hospital, made preparations of the pus, and found myriads of micrococci and abundance of gonococci. Subsequent interrogation elicited from the girl that she was cognisant of a vaginal discharge for three months before she was suddenly seized with the acute abdominal pain which prostrated her.

It is of course uncommon for the surgeon to be called upon to operate in the early stages of gonorrhoeal peritonitis, and I take it that in this case the symptoms were exceptionally severe. At any rate, as far as my reading goes, I have not met with records which demonstrate so positively the presence of gonococci in relation with the pelvic peritoneum.

CASE IV.—ACUTE SEPTIC SALPINGITIS.

A married woman, aged 22 years, mother of one child, was sent into the Chelsea Hospital for Women suffering from very free uterine bleeding and a painful lump in the left iliac fossa. She had for three months noticed a profuse acrid vaginal discharge. On admission she was very ill, and her temperature was 102°, pulse 130, and an extremely tender swelling could be made out on each side of the uterus and filling the rectovaginal fossa. After resting a few days in bed the temperature subsided somewhat, and coeliotomy was performed. Two large sausage-shaped Fallopian tubes were disengaged from the pelvis and intestines to which they adhered. There was some oozing from the floor of the pelvis, which needed the use of a drainage tube for two days. Convalescence was rapid and uneventful.

The tubes were soft and succulent, and in the dilated parts easily accommodated my thumb. The mucous membrane was soft, shreddy, and infiltrated with blood; there was free blood within the tubes. The right tube presented a peculiar condition; its free end was expanded into a cyst, as large as a baby's fist, filled with gummy blood-stained fluid; the inner wall of the cyst was quite smooth, and at the spot where it became continuous with the tubal wall the fimbriae projected into it, as shown in Fig. 3.

fig. 3.—A Fallopian tube and ovary from a case of acute salpingitis. The tubal fimbriae project into a smooth-walled cyst of uncertain origin.

I have not seen a similar condition, nor can I venture on an explanation in regard to its mode of origin. The contents of the tubes were submitted at once to a bacteriological examination, and swarms of micrococci were found; in many places they were disposed in pairs, but we could not be sure they were the diplococci of gonorrhoea. Although the bacteriological evidence did not decisively prove that this extensive change in the tubes was due to the gonococcus, it clearly demonstrated that the lesions arose from septic infection, and the surroundings of the patient induced me to presume that a male urethral discharge was the source.

THE Public Health Committee of the Edinburgh Town Council have recommended that Dr. John Wyllie should be appointed to succeed Dr. Claud Muirhead as Consulting Physician to the Edinburgh City Hospital for Infectious Disease.

AN ADDRESS ON SOME ASPECTS OF DISEASES OF THE NERVOUS SYSTEM AND THEIR STUDY.

By W. R. GOWERS, M.D., F.R.S.

Delivered at the Inauguration of the First Session of Systematic Instruction at the National Hospital for the Paralysed and Epileptic as a recognised Medical School, October 5th, 1896.

[ABSTRACT.]

DR. GOWERS began by stating that the duty had been laid upon him of offering a cordial welcome to all who had come to make acquaintance with the hospital as a place of study, or to renew the acquaintance that had been made before. They were now beginning to use the vast educational capacities of the hospital. During the last nine years nearly 2,500 students and practitioners had attended the practice, and that not superficially, since the average times of attendance of each had been nearly ten. Such teaching had, of necessity, been merely clinical and casual. The hospital had now been recognised by the authorities as a place where fifth-years' students might pass part of their last year. This had entailed the addition of organised systematic teaching to that which had long been carried on there, and also the necessity of charging a small fee for the instruction, which would now be made much more complete.

PROPOSED ARRANGEMENTS.

In addition to the in-patient and out-patient practice (which has been declared by many students to afford a better opportunity than is to be found elsewhere in Europe for gaining familiarity with diseases of the nervous system), in addition to the clinical instruction as given heretofore in connection with these, the weekly clinical lectures would be continued in the spacious theatre, provided by the far-seeing liberality of the Board of Management. But further, systematic instruction would be given in such subjects as the investigation of symptoms, general and special, together with the anatomy and physiology, general and special, of the nerve centres needed to understand and interpret these symptoms. How much such special applied knowledge is needed many a student can testify.

Further, the need for the thorough knowledge of ocular symptoms, of the changes in the internal apparatus of the eye, of recognition, adequate and accurate, of ocular palsies, isolated and combined, and the various and significant alterations to be observed with the ophthalmoscope, would all be the subject of special instructions. The varied disturbances of hearing, and their relation to disease, would be considered, and so also would the very important symptoms presented by the throat, and especially by the larynx, which supplies some of the most important indications. In each special department the hospital was fortunate in the service of men of the highest eminence. Besides such special help, the use of electricity in diagnosis and treatment would be the subject of full and practical instruction by members of the staff; while for instruction in the pathology of the nervous system, general and special, there were facilities of an unusual character that should insure actual familiarity with the subject, even that of microscopic character, to every student.

The clinical clerkships open to the students, alike in the wards and the out-patient room (the lecturer observed), possess peculiar educational value, because the previous training undergone enables more responsibility to attach to them, and more to be learned by them, than at most hospitals. The investigation of the case, past and present, the record of the facts, and the subsequent consideration of them by the physician as well as of the reasons for the diagnosis reached, involve an education of peculiar value to the student in his last stage of singular value. The in-patient clerkships promote the profound study of disease in its varied relations, while those in the out-patient room develop the special value of this class of work, the doing what must be done in a limited space of time adequately and

accurately, so that the power is gained of seizing the essential, of neglecting the unimportant, and of making no grave mistakes. Always difficult, the training in this that is afforded by diseases of the nervous system is unequalled. Time is inelastic, quantity is at the cost of quality; pressed as all are by suffering humanity, no small part of the art of life is to do that which is necessary for the largest number, and to achieve the nearest approximate success when some failure is inevitable. In this the power of discernment afforded by the out-patient room is of inestimable service, and the work of the out-patient clerk is an education of the highest value.

Before passing to some special aspects of the diseases of the nervous system, Dr. Gowers referred to the opportunity for original microscopical research afforded by the microscopical laboratory and museum provided by the Board of Management. While experiments on animals never had formed in the past, nor could form in the future, any part of the work of the hospital, there was an immense opportunity for advancing our knowledge of disease by microscopical investigation, the power of which was ever growing. In addition to the material accumulated and the appliances provided, those who carried on original research there would have the advantage of the pathologist as director, and some members of the staff as advisers, all men whose work had achieved for them a more than European fame; and it was not unreasonable to hope for a steady stream of discovery, and that the institution would become a source of knowledge in the diseases of the nervous system equalled by few Continental laboratories.

THE STUDY OF SPECIAL CLASSES OF DISEASE.

The great advantage of the special study of any class of disease is that it induces definite familiarity with them, and with the methods of dealing with them. This is felt by the student who presents himself for examination. He is certain to have to deal with some questions or cases of diseases with which he feels at home. Moreover, the advantages that can be gained by special study should be sedulously cultivated. They are many and various. Habits are begotten that are wide in application and of great value. Of these, one (specially important in relation to nervous diseases) is the method of diagnosis, especially of degenerative and functional affections. That which is generally first thought of should be the last—to give the disease a name. "What is the affection to be called?" should be the latest question. The seat of the morbid process should be discerned from the symptoms that are presented; its nature should be inferred from their onset and course, and also from any traceable causes; and its tendency estimated from the way in which it has progressed. Then, and not till then, should a name be sought for. In a large proportion of these diseases, names and types, by which maladies have to be learnt, are useless, because of the infinite variety in which the form and seat of morbid processes are combined, and the limited number of names and types that can be remembered causes the attempt to name to be a source of as much error as of truth. The discernment of nature and of seat takes the practitioner direct to those elements of the malady which determine its forecast and its treatment, and, in the case of many, a name is the last thing that need be thought of for wise and effective treatment. This is one feature of the work here that often especially strikes the student.

Another important lesson that is obtained, when diseases are observed on a large scale, or at least should be obtained, is the habit of forming a mental picture of the morbid process or processes that are at work in the production of the symptoms, and of thus discerning clearly how far the symptoms that manifest the malady depend on the primary process, or on one that is of secondary nature. The symptoms themselves depend chiefly on interference with the function of the nerve elements. In many diseases, especially those that are degenerative and functional, this is the primary morbid process. But in the large classes of vascular diseases, of connective tissue changes, of meningeal disease, of bone diseases, in almost all true syphilitic diseases, and in many others the symptoms are due to processes in the nerve elements, which are processes secondary to those outside. This is obvious if a mental picture is formed of the lesion—for instance, arrest of conduction in the cord causing the paraplegia which manifests a compressing gumma, or the palsy

due to necrotic softening when an artery is closed by embolism, or by syphilitic disease of its wall. The mental picture will show clearly what may be done, and will prevent many an error. A case was narrated in which life was certainly saved by the prompt treatment of syphilitic disease of a basilar artery, of which some twigs were probably reduced to impermeable threads, but in which no prolongation of such treatment could have removed the residual symptoms.

After giving some further illustrations of this, the lecturer proceeded to point out that the need for special study of the diseases of the nervous system is not likely to cease, for neurology must ever advance, with new knowledge and new perceptions, not at once assimilated. An instance of this is presented by the new conceptions grouped around the word "neuron."

NEURONS.

Histologists have shown, on grounds we cannot dispute, that the branching processes of nerve cells, the "dendrons," are not continuous with the ends of other processes, either short dendrons or long fibres ending in the grey matter. The two are in contact, not continuity. A nerve impulse arises in the ends of the branches by the stimulus of that in the termination of the adjacent branch, without continuity of structure, and the impulse is not simply "conducted." These dendrons and also the "core" of the axis cylinder process—formerly thought to be a conducting unit—are also found to be a collection of conducting fibrils, each a separate, and indeed separated, conducting path with definite destination. But these fibrils seem to pass, all of them, through the body of the nerve cell, alike those of the dendrons and of the "axon," or chief axis cylinder process. These processes are all essentially parts of the cell, but we can no longer think of the cell body as the source of the nerve impulses which traverse the fibrils. Fascinating as was that conception, with its analogy to a voltaic cell, it must vanish, and we must regard the cell body with its nucleus as merely the vital nutritional centre, on which depends the life of the whole neuron, cell body, and all processes, long or short. Note how this enables us to understand the occasional contrast in direction of conduction and degeneration; the arrest of secondary degeneration at the limit of the vital influence of the nucleated cell body in the spongy grey substance, where it meets that of another; how much more clear it makes the peripheral nerve degeneration at the part furthest from the vital centre of the unit; how it explains the disparity, so often seen, between the nerve energy which reaches the grey matter and that developed in it. Note how easier it is to conceive the instant renewal of the molecules lost in functional action at the ends of the dendrons in the spongy grey matter than in the enclosed body of the nerve cell; how connecting neurons explain the perfect co-operation of various parts of the brain, and how the multiplicity of conducting paths makes it easy to conceive the marvellous localisation of sensibility as well as the immense multiplicity of various coactions. But this new knowledge changes altogether our conception of many maladies. It explains the entire lack of all morbid anatomy of such diseases as chorea, epilepsy, and paralysis agitans, for we have hitherto been looking in the wrong place, and have scarcely yet learned the alphabet by which to read the words that may perhaps be written in the true locality.

SPECIAL HOSPITALS AND GENERAL MEDICINE.

Less has been heard of late concerning objections to special hospitals, and certainly that at which they met, so far as the advance of medical science is concerned, might be left with confidence to the judgment of the profession. But the degree and extent in which the special involves the general are increasingly conspicuous with every growth of knowledge, and so also is the more important fact that the wide view through a narrow orifice is often clear and well defined.

The nervous system itself, in the influence it exerts, and in the response it gives, corresponds with the whole frame, and the symptoms of its derangement have become of extreme importance as the chief, or even the only, evidence of the presence of toxic agents in the blood. This is, indeed, one of the most conspicuous and important of modern medical discoveries. The cardinal fact is this: Among the struc-

tures of the nervous system, between which no difference in aspect can be discerned, chemical agents have affinities for some and not for others. No difference can be detected, even in minute aspect, but these structures differ in their function, and those that so differ, differ also in susceptibility to chemical substances. The presence of atoms of one substance, or the arrangement of the atoms of another in molecules, entails a difference in the influence on the living structure. The effect of this is, first, to derange function, and then to alter nutrition; at last, such molecular change may result as to amount to structural alteration, and to produce what is called degeneration. This, following structures of like functions, is termed "systemic."

TOXINS.

If a small dose of atropine enters the blood it passes, diluted to an almost inconceivable degree, to every part of the nervous system, and yet acts alone on the structures within the eye. Curare also, reaching all parts, acts only on the terminations of the motor nerves. Alcohol, by its presence in the blood, affects the peripheral nerve endings, sometimes those of the muscles of the limbs, sometimes those of sensation. The same fact is true of arsenic, unlike alcohol as it is. But many of these toxic agents not only may act chiefly on the sensory nerve endings, but on certain of these sensory nerve endings. Those which are the most susceptible are the terminations of the nerves within the muscles—those that convey impulses to the centres—impulses produced by muscular action. These nerves may suffer chiefly or alone. Their impulses guide muscular co-ordination; loss of them causes ataxy, and thus from both alcohol and arsenic we may have a peculiar "pseudo-tabes," which resembles in a remarkable degree locomotor ataxy. The revelation is carried further by the fact that the same condition of pseudo-tabes may occur as a form of the paralysis that follows diphtheria. Here we have some definite ground to go upon, which gives us a fresh, and almost startling, light on this series of phenomena. Diphtheritic paralysis has been proved to be the result of a chemical substance, a modification of albumin, generated by the action of a ferment, which passes into the blood from the organisms in the throat. These facts, proved beyond question by Martin, show how slight a change in chemical composition will convert a nutritive material into a poison and has a wide significance.

Many other acute diseases besides diphtheria may be followed by similar changes in the nerves, and we cannot doubt that these are due to similar toxins, similar poisons, due, directly or indirectly, to the organisms of the disease. Alcohol itself is but a product of the growth of organisms. The organisms of syphilis have yet, perhaps, to be discovered, yet the lessons of post-syphilitic tabes are too clear to be ignored. We must regard the diseases as due to toxins, produced by a slight modification of otherwise harmless substances. These toxins act on the nerve structures, and thus they are revealed. They constitute an important chapter in pathology, inasmuch as their influence is bilateral and is symmetrical. These effects are thus distinguished from other morbid processes, and are in contrast to the effects of other blood states, such as rheumatic and gouty poisons, which affect the connective tissues first, the nerve elements only secondarily, and whose effects are generally one-sided and random in distribution. The evidence thus afforded as to both cause and effect is of the utmost practical importance. We meet with similar symmetry and similar limitation to function in many other states, both when a poison may have been taken in from without and when there are abnormal chemical processes in the body, such as may give rise to toxic agents, of which we at present know little or nothing. No abnormal chemical process can take place producing one substance without other substances being produced at the same time. That which is most conspicuous may be least influential. The material that causes tetanus is only one of several toxins, generated in unequal quantity, but equally toxic. That which is so potent a cause of the neuritis in diabetes bears no relation to the amount of sugar in the urine, but is, as it were, a by-product, not related in quantity to the sugar. So we have the characteristic diabetic neuritis when there is only a trifling amount of sugar, and it may be absent when there is much. So it is with other substances. The poison we can

trace may only be slight evidence of the more active poison we cannot trace.

The excess of uric acid in gout must be accompanied with an excess of other substances, and probably with the formation of some that are quite abnormal, which vary in amount in different individuals, and vary also in toxic power. It is common to meet with such evidence of toxic action in the gouty, sometimes grave, and often manifested by the subjects of the inherited disease. Some cases of chronic Bright's disease present symptoms of this character which can only be explained by the presence in the blood of abnormal toxic agents, different from the causes of uræmia. Many facts also more than suggest that the effects of cold on some individuals may induce not only the toxic agent to which acute rheumatism is due, but also poisons acting symmetrically on the nerves. A most intense case of universal peripheral neuritis was lately in the hospital, excited one wet night, in an alcoholic woman, through a leaky roof.

No branch of medicine is of more urgent importance to the practitioner in his daily work. But it is through the nervous system that the influence of such agents is discerned, and familiarity with them is essential for such discernment. For nearly half a century no vista has been opened up of equal practical importance. Nor is it an accident. It is because the nervous system is, and must ever be, that which acts and is acted on, and the special study of its morbid states must transcend any other branch of medicine in importance both theoretical and practical.

JUDGMENT AS TO OPERATIONS.

After referring to the opportunity of studying the latest development of the surgery of the nervous system, the lecturer pointed out the high importance of the opportunities afforded for the study of the indications for and against an operation and the forecast of the ultimate result. The questions for and against an operation must present themselves even to those who might not be called on to perform an operation itself. The experience gained at the hospital might give them more ability to do this than the fullest life-work could do alone. Moreover, in the isolation that would be the lot of some, the experience of the surgery of brain and spine might prove invaluable in the ability to relieve by operations, on which otherwise they would not venture.

In conclusion Dr. Gowers said if that which had been said was commonplace—"I aspire to no higher standard—so, too, is life; so, too, is death; but neither, on that account, has less keen interest for us, and the fact that it is commonplace should not hinder us from efforts to preserve the one and to postpone the other. That which is common in place is altered in effect when the place is changed. Forces that are uniform are ever altered in effect by conditions that are changing, and the old in this world is ever new."

A CASE IN WHICH THE SPINAL CORD OF A RABBIT WAS SUCCESSFULLY USED AS A GRAFT IN THE MEDIAN NERVE OF A MAN.

By MAYO ROBSON, F.R.C.S.,

Senior Surgeon to the General Infirmary at Leeds; Professor of Surgery in the Yorkshire College of the Victoria University; and Hunterian Professor, Royal College of Surgeons of England.

THE following case, which I have hitherto not reported, but which I intended to describe at the International Medical Congress in Berlin, will, I think, be found to present several points of interest; and the delay in reporting it will, I trust, have enhanced the value of the present paper, since I am able to give a description of the case after an interval of six years.

In February, 1889, I read a paper before the Clinical Society of London on a case of nerve grafting, which was, I believe, the first case in which the operation had been carried out in the human subject. Although it was difficult to explain the rapid return of function in the arm after the operation, there could be no question as to the result, which, from a report received three years afterwards, had become perfect. In July,