AN ADDRESS ON THE VALUE OF PATHOLOGICAL RESEARCH.

Delivered on January 20th, 1897, in connection with the Opening of the New Physiological and Pathological Laboratories in Queen's College, Belfast, during the celebration of the Jubilee of the College.

By LORD LISTER, P.R.S.

It gave me very great pleasure to witness the opening of the physiological and pathological laboratories yesterday by His Excellency the Lord-Lieutenant. Such an establishment is calculated to be of enormous advantage to the North of Ireland. The benefits which it will confer will be of various kinds. In the first place it will be of very great assistance to the medical practitioner in forming his diagnosis of the disease of the patient he has to treat. In these days the knowledge of pathology has made immense advances; and, at the same time, along with these advances in pathological knowledge, there has arisen increased complexity in the methods of examining pathological objects. Section cutting, staining, microscopic examination—these are matters of the utmost moment; and yet for the general practitioner there may be neither the apparatus nor the time requisite for that kind of investigation. It will, therefore, be of great advantage to the practitioner, when he has removed or in any way obtained a portion of a morbid growth, to send it to a central institution, and have absolutely definite information as to the precise nature of the disease with which he has to deal. Then, as regards the bacteriological department—there, again, diagnosis will be greatly facilitated. You are most of you aware that the diagnosis of diphtheria can now be made by bacteriological examination. It is of the utmost importance in the treatment of a case of diphtheria that its nature should be distinctly defined; that it should be known with certainty whether it is true diphtheria or a disease which closely simulates it, and may deceive the most experienced practitioner, and yet have none of the deadly characteristics of true diphtheria. Now for the future any medical man in the North of Ireland will only have to send, in a suitable tube, which will be provided by the institution, a little of the false membrane in the case with which he is dealing, and in a very short time he will have sent to him a bacteriologically-made diagnosis of whether it is a case of true diphtheria or not. Again, with reference to what is more immediately connected with the objects of this College, such an institute will be of very great help in the training of students in their education for the medical profession. In it the student will have the opportunity of practically studying the various forms of morbid growths and the diseases which are of the nature of microbes. These are days when the subjects of medical examination are becoming more and more complex, and the student is too much tempted to get up his knowledge in a superficial way, cramming to satisfy the examiner, rather than to obtain thorough-going practical information. That is more especially the case when the student is not examined by his own teachers, under whom he might work with some confidence that his labour would not be thrown away with reference to that really subordinate, but in his eyes vastly important, matter of the passing of his examination. May I venture to interpose a remark on that point, and to express the hope that the time is not very far distant when the great Northern metropolis of Ireland will have its own university, a true teaching and graduating university on the same lines as most of the German universities and the Scotch? But passing from that, independently altogether of the difficulty a student may have in preparing for examination by strangers, the great complexity of the subjects of medical education makes it extremely important that there should be afforded ample opportunities of practical study. The bacteriological department will be

of peculiar value in the education of the student. It will in the first place convince him of the reality of the microscopic foes with which we have at the present day so largely to deal—the microbes, which are the cause of so large a proportion of human disease. He will not only read that such things are, and when he gets into practice perhaps forget that they exist, but he will know them as acquaintances. He will see the evidence not only of their existence, but also of their effects. The bacteriological training will besides be of special advantage in teaching the student accurate observation and also dexterity of manipulation—both most important matters in a medical man's practice. If a student is told to prepare a culture of a particular microbe in a state of purity, in order to do that he must be very sharp indeed in his observations, and very clever, too, in his manipulations; and if he fails, the fact will very soon declare itself. There will be an impure culture, and instead of having only the one microbe he wished to cultivate, with its well-known special characteristics, it will be seen that he has allowed others to get in at the same time. His own imperfections will thus declare themselves; but he will persevere, and go on and on until he becomes perfectly competent to produce a pure culture. This will be of great importance in his education. There is another aspect of a pathological institute which I feel some delicacy in alluding to, because there are some people who take strange views with regard to these matters—exaggerated views. There are people who do not object to eating a mutton chop—people who do not even object to shooting a pheasant with the considerable chance that it may be only wounded and may have to die after lingering in pain, unable to obtain its proper nutriment—and yet who consider it something monstrous to introduce under the skin of a guinea-pig a little inoculation of some microbe to ascertain its action. Those seem to me to be most inconsistent views. With regard to all matters in which we are concerned in this world, everything depends upon the motive. A murderer may cut a man's throat to kill him; any one of you medical students may have to cut a man's throat to save his life. The father who chastises his son for the sake of the good of his morals is a most humane man; a father who should beat his son for the mere sake of inflicting pain upon him would be an inhuman monster. And so it is with the necessary experiments upon lower animals. If they were made, as some people seem to assume, for the mere sport of the thing, they would be indeed to be deprecated and decried; but if they are made with the wholly noble object of not only increasing human knowledge, but also diminishing human suffering, then I hold that such investigations are deserving of all praise. Those little know who lightly speak on these matters how much self-denial is required in the prosecution of such researches when they are conducted, as indeed they always are, so far as I am aware, with the object of establishing new truth. The exercise of a little charity might lead those who speak of us as inhuman to reflect that possibly we may be as humane as themselves. The profession to which I have the great honour to belong is, I firmly believe, on the average the most humane of all professions. The medical student may be sometimes a rough diamond; but when he comes to have personal charge of patients, and to have the life and health of a fellow-creature depending upon his individual care, he becomes a changed man, and from that day forth his life becomes a constant exercise of beneficence. With that beneficence there is associated benevolence; and in that practical way our profession becomes the most benevolent of all. If our detractors knew this, common sense would enable them to see that our profession would not be unanimously in favour of these researches if they were the iniquitous things which they are sometimes represented to be. I was reading the other day a very interesting account of Pasteur's work on rabies, written by one who was associated with him from an early period (M. Duclaux). It had been established that the introduction of a portion of the brain of a mad dog under the skin of a healthy animal was liable to cause rabies, and Pasteur had reason to believe that it was principally in the nervous centres that the poison accumulated. He felt a very strong desire to introduce some of the poison into the brain of an animal; but he was a peculiarly humane man. He never could

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shoot an animal for sport. He was more humane than the great majority of human beings; and for a long time he could not bring himself to make the experiment of trephining an animal's skull, and introducing some of the poison of rabies into the brain. He was exceedingly desirous of doing it to establish the pathology of the disease, but he shrank from it. On one occasion, when he was absent from home, one of his assistants did the experiment, and when Pasteur came back he told him that he had done so. "Oh!" said Pasteur, "the poor creature! His brain has been touched. I am afraid he will be affected with paralysis." The assistant went into a neighbouring room and brought in the animal, which was a dog. It came in frisking about and investigating everything in a perfectly natural manner; and Pasteur was exceedingly pleased, and though he did not like dogs, yet he lavished his affection upon that particular animal and petted it; and from that time forth he felt his scruples need no longer exist. The truth is that the pain inflicted by this process of trephining is exceedingly slight, and yet the operation is sometimes described as being a hideously painful one. That is a mistake. In point of fact the operation is always done now under anæsthetics, so that the animal does not feel it at all; but even without that the operation is not seriously painful. I look forward to the time when there will be an institute in connection with this College, where investigations of the kind to which I have referred can be carried on and where pathological knowledge of the first importance may be promoted. Think also of the practical advantages of an institution where the materials can be provided for the treatment of diseases on the principles which have been recently established. It appears to be now placed beyond doubt that that dreadful disease, diphtheria, may by the antitoxic treatment be reduced in mortality from about 30 per cent. to about 5 per cent. if the proper material is promptly used. It is exceedingly important that in a city like Belfast the supply of such material should be within easy reach of the practitioner—that he should not be compelled to send to London for the requisite serum, and thus lose much valuable time. Every hour that is lost in the treatment of a case of this nature is a very serious loss indeed. But it is by no means only in diphtheria that such an institute is likely to confer benefits of this kind. In the case of the streptococcus which is the cause of erysipelas and kindred disorders, including that very terrible disease, puerperal fever, there are very promising indications that the use of antitoxic serum will rescue patients from otherwise hopeless conditions. Let anyone picture to himself the case of a young wife after her first confinement afflicted with this dreadful puerperal fever, and doomed under ordinary treatment to certain death. The practitioner makes an injection of this serum under the skin, with the result that the lady rapidly recovers, and in a few days is perfectly well. Let any man conceive such a case as this, and all objections to the investigations necessary to bring about such a state of things must vanish into thin air. So soon as our poor selves are directly concerned our objections disappear. If a tiger threatened to attack a camp, who would care much about what kind of a trap was set for it, or what suffering the trap caused the animal, so long as it was caught? When the matter affects only the welfare of others, including generations yet unborn, the good done does not appeal to the individual, and the objector sees only the horrors of modern scientific investigation: of which horrors, however, he quickly loses the sense as soon as he becomes personally concerned.

On the occasion of the funeral of that illustrious investigator to whom I have before referred, I visited the Institut Pasteur, and there was shown preparations of the microbe of the plague discovered at Hong Kong in 1894 by M. Yersin. And I was told by M. Roux that M. Yersin, whom he knew intimately as formerly his colleague, had lately been treating in China several cases of that fearful disease with serum prepared at the Institut Pasteur on the same lines as that used for diphtheria. Cultures of the plague bacillus had been taken to Paris, and at the Institut, under the most rigorous precautions, the serum had been prepared. At the Institut they did not think they had succeeded in producing a very powerful serum judging from its action on animals; but in the human subject it seems to have proved most potent. M.

Yersin obtained serum sufficient for the treatment of twenty-six cases of the plague. The mortality from the disease at the time was above 80 per cent. The first case which he treated was that of a young man in whom a "bubo" characteristic of the disease was present, and the patient, already delirious, was completely despaired of. A little of the serum was introduced, and, to M. Yersin's absolute amazement, on the following day the young man was well, the bubo having almost entirely disappeared. And, moreover, of the twenty-six cases in which M. Yersin used the serum, twenty-four recovered; while in the remaining two M. Yersin felt that he was called in so late that their cases were hopeless. I would not have referred to these facts did I not know that the source from which they were obtained was absolutely trustworthy. We cannot tell how soon the plague may visit these shores. We know that in one of our great dependencies—Bombay—it is already prevalent in a very severe form, and has already cost many lives. We know that a ship may carry the disease; that rats are liable to contract it, and that a rat making its escape from a ship coming from Bombay, say, to the Thames or to Belfast Lough, may carry the plague ashore, and that the taint may be communicated to human beings, with dreadful results. I would not say that there are not slums in the city of Belfast which might harbour the plague. So you can easily recognise how vastly important it would be to have means at hand whereby, in the simple way I have described, the disease may be combated. I have, I think, said enough to show the vast importance of an institute of such a character, and I look forward to the time when you will have such an establishment, thoroughly equipped for its beneficent work.

There is another department in connection with medical education in the city about which I cannot speak in the same terms of praise as I can with reference to the new laboratories, and that is the hospital. No doubt the Royal Hospital, which I had the honour of visiting for the first time yesterday, is a fine institution; but it is altogether inadequate to the requirements of this great and rapidly-growing city. It is inadequate, whether for affording means of clinical instruction to students or for dealing with the diseases of your large and increasing population. But I am glad to know that there is a prospect of better things before long. I understand that it has been not merely contemplated, but determined, to build a large new hospital, provided the requisite funds can be obtained; and I have been informed that within six weeks of the initiation of the movement more than half the necessary sum has been raised. I have no doubt that the munificence of the merchant princes of Belfast will soon provide the balance. Therefore, whichever way I look at this jubilee, I feel that the College, more particularly with regard to its medical school, is entering upon a new era of prosperity. I rejoice with you in the fact, and I have felt it a great privilege to take part in your celebration.

[Since this address was delivered the last number of the *Annales de l'Institut Pasteur* has appeared, containing a paper by M. Yersin describing his experience above referred to. The details which he gives of the cases confirm in a remarkable manner the conclusion which the mere numbers suggest. Just as in diphtheria, and exactly as must occur if the antidote is really efficacious, the cure was most rapid when the treatment could be commenced on the first day of the disease; speedy also, but less so, when it was begun on the second day; and so from day to day till the fifth. Four patients were treated at this very late period, and the only failures were in two of these. More of the serum also was required in the more advanced cases. Equally striking was the manner of recovery. In none of the twelve cases in which treatment commenced within two days of the onset of the complaint did the bubo suppurate; and in those of a later period in which matter did form, the abscess closed rapidly after being opened, instead of healing tediously as it does when recovery takes place without this treatment; and the patients, instead of having a lingering convalescence, were healthy men and women in a time which was always relatively short, and astonishingly so when the treatment had been commenced early. These details are so extraordinarily confirmatory that, small though the number of

cases is, they carry conviction to my own mind. It gives me the most profound satisfaction to be able to state, on the authority of the India Office, that the Bombay Government intend to employ M. Yersin, now on his way to the stricken region, and to give a full trial to his method. I have also learned through another channel that within a fortnight of this time (February 1st) the serum treatment will probably have begun in Bombay.]

THE LETTSSOMIAN LECTURES

ON

DISEASES OF THE NOSE AND THROAT IN RELATION TO GENERAL MEDICINE.

Delivered before the Medical Society of London,

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LECTURE I.

MR. PRESIDENT AND GENTLEMEN,—When your Council did me the honour of requesting me to deliver the Lettssomian Lectures my first thought was, Had I anything worthy of presentation before so distinguished an audience? It then occurred to me that between the position of the Medical Society of London and my own there was a certain resemblance. The Society is always ready to receive papers on general medicine; at the same time it welcomes with equal pleasure the contributions of those of its Fellows who have devoted themselves to special branches of practice. My position is this: I am physician to a general hospital, and consequently all forms of disease come under my care. At the same time, in virtue of having held for nearly twenty years the post of Physician in charge of the Nose and Throat Department at the Westminster Hospital, I may be considered to have more or less special knowledge of the diseases of the nose and throat. This being our respective positions, I thought that I could not do better than submit for your acceptance some reflections on the relation existing between diseases of the nose and throat and general medicine, as in the dual capacity in which I stand I am perhaps better able to see the two sides of the question than either the pure specialist or the general practitioner.

There are two chief methods of treating the subject I have chosen. You can either briefly run over the principal general diseases and point out the nose and throat complications which occur during their course, or you can start with the various diseases of the nose and throat, and then mention the conditions under which they may be met. I have selected the former plan as being the more suitable for my purpose. I therefore propose to pass in review some of the principal general and local diseases of the body, and describe the various affections of the nose and throat which occur during their course.

If you will pardon a digression, I should like to take this opportunity of emphasising the importance of the laryngoscope as a means of diagnosis and treatment. I often hear it compared with the ophthalmoscope, and I have heard students say that, as they had not time to perfect themselves in both, they had chosen the ophthalmoscope. For the general practitioner, however, there can be no sort of doubt that the laryngoscope is immensely more useful than the ophthalmoscope. I am ready to admit that the ophthalmoscope is very often useful in settling a diagnosis, but, as far as I can learn, there are only two conditions in which the ophthalmoscope is essential to a diagnosis, namely, the presence of optic neuritis as indicative of some organic disease within the brain, and the occurrence of retinitis as an early sign of renal disease. Its use from a therapeutic point of view is extremely limited. On the other hand, I might well occupy the whole of one of these lectures in describing the use of the laryngoscope in the diagnosis and treatment of disease, and I know of no specialty in which even a moderate amount of knowledge is so sure of a good harvest as that of laryngoscopy. The general practitioner who has made himself familiar with the laryngoscope has largely increased his sphere of use-

fulness. Far be it from me to run down the ophthalmoscope; on the contrary, I hope that the time will come ere long when no one will be licensed to practise unless he can show that he is capable of using the laryngoscope, ophthalmoscope, and other instrumental means of diagnosis. The use of the nasal speculum and rhinoscope is so closely connected with that of the laryngoscope, that the student who learns how to use the latter will, as a matter of course, employ the former. This digression will, I hope, be pardoned, but I felt it a duty to speak plainly on the subject as, owing to the deficiency in the system of examination as now carried on, students are not induced to perfect themselves in the use of the laryngoscope.

Before entering upon a description of the nose and throat affections of the acute specific diseases I would like to accentuate the extreme importance of the nose and throat as the chief portals of entrance of the poisons, whatever they may be, which give rise to these diseases. Evidence is gradually being accumulated which points to the conclusion that people who suffer from nasal affections are more liable to contract infectious diseases, especially diphtheria, than healthy persons. In erysipelas of the face it is very frequently found that there is some chronic nasal affection and that the erysipelatous blush started from the nose. This I have often been able to demonstrate in hospital cases under my care. If we except waterborne diseases, such as cholera and dysentery, almost all the other infectious diseases are conveyed by the air, and hence the morbid agent usually enters by way of the nasal cavities and pharynx, and here it proliferates during the first stage of incubation.

Two cases of artificially produced disease of the nose brought forcibly before me the risk of operative procedures on the nasal mucous membrane in persons exposed to infectious diseases. In both these cases I had used the galvanocautery for the cure of hypertrophic rhinitis, and in both symptoms of scarlet fever manifested themselves two or three days after the application of the cautery. The first case might be merely a coincidence, but the second case was that of a medical man who, as house-physician at a London hospital, had been constantly exposed to the infection of scarlet fever without effect until I unluckily made a way, as I believe, for the entrance of the germs through the abraded mucous membrane of the nose.

The practical conclusion that I would draw from the above is the advisability of abstaining from operative procedures on the nasal mucous membrane during epidemics of influenza and other infectious diseases, as well as in the case of persons liable to be brought in contact with such diseases. I have also abstained from operating on medical students and others whose duties take them into the dissecting or *post-mortem* rooms. Lacunar tonsillitis occasionally follows intranasal cauterisation. I have seen it in one or two cases of my own, and numerous instances are to be found recorded in the various special journals.

The rôle played by the tonsils as a point of entrance of germs into the system is now becoming more generally recognised. Gerhardt has termed the tonsil a physiological wound, an inlet guarded however by leucocytes which protect the system against the entrance of these germs. If from any reason the energy of the leucocytes is diminished, or the tonsil is in an unhealthy condition, then the germs of diseases such as scarlet fever, diphtheria, and other infectious diseases gain access to the system. Tubercle bacilli can probably pass through the tonsils, and, without giving rise to any disturbance in them, may produce tuberculosis of the glands of the neck. Staphylococci, streptococci, and other micro-organisms can also find their way into the system through the tonsils. Adenoid vegetations in the nasopharynx have a similar action to the tonsils in this respect, and there can be little doubt that one of the beneficial results of Wilhelm Meyer's discovery will be a lessened amount of danger in cases of scarlet fever and diphtheria, and especially a great diminution in diseases of the middle ear.

As I have already pointed out, in a large proportion of the infectious diseases the morbid element is conveyed by the air, and consequently usually enters the system *via* the upper respiratory tract, hence it was to be expected that this region would show signs of irritation. The typical example of this is diphtheria, in which the disease in the first instance is a purely local one, consisting of a fibrinous exudation caused by