AN INAUGURAL ADDRESS ON PATHOLOGY, PAST AND PRESENT.

Delivered in the Course of General Pathology in the University of Edinburgh.

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GOING back to the standpoint, that pathology is the investigation of deranged *life*, of abnormal *living* processes, it will be obvious to you that morbid anatomy alone, even combined with histology and chemistry, cannot be our guide beyond a certain point, that knowledge limited to structure cannot serve to show us fully how function and living action are affected. In some cases, indeed, our present morbid anatomy fails us entirely, as in the case of epilepsy or of typhus fever; though we hope, with better methods, to discover their organic cause. But even in the simplest cases, where our induction seems to be a direct one from anatomical changes, we find that we are in reality presupposing a knowledge of function. Take, for example, the simple case of impaction of a calculus in the ureter. By simple mechanical pressure of the pent-up urine, the pelvis and calyces dilate, the kidney-substance gives way, and gradually atrophies, and at last remains as a sort of shell of tissue, which for all intents and purposes of renal function is effete. Surely, you will say, morbid anatomy shows us all this at a glance. But you have assumed a knowledge of the function of the kidney in secreting urine, and the possibility of its partially continuing its functions for a time, even when the outflow of urine is checked. And if you go more deeply, and inquire what are the subsequent intimate changes in the structure of the organ, and what the effects upon the system, you will find that you are involved in a multitude of complicated pathological problems. And if you would trace back the disease to its source, you must determine what constitutional causes led to the formation of the calculus, by what physical or chemical processes it came to be formed, and why and how it found its present lodgment.

Thus it is that to make morbid anatomy and histology worthy of the name of *pathological* anatomy, we require the knowledge of function and its mechanism. We must know where and how altered structure is connected with perverted function whether as cause or effect, and this we owe to physiology and to comparative and experimental pathology.

There has been too great a tendency to overlook this vital fact, and to regard the investigation of structure as the be-all and end-all of pathology. It has unfortunately by many been thought enough that we should know the naked eye and microscopic appearances of diseased organs, without any intelligent idea of how they are brought about, or in what relation they stand to the phenomena of disease. We have sought rather to find in structure the characteristics of disease, than to make it a guide to the understanding of disease. We have been passing through what we may call the slough of histology. For example, the tubercle-capsule of Lebert, the cancer-cell, the giant-cell, the microcyte, all have had their day as absolute criteria of particular diseases. But I will go further and say that, in a great part of our microscopical work on diseased organs, we have been too apt merely to observe visible changes, without paying attention to the more important processes which underlie them. Yet surely this should not be. We must and ought to study structure and chemical composition as thoroughly and deeply as possible, by all the means in our power, but we must not rest there. It is the great merit of Virchow's great work, that, passing by the mere study of structure for structure's sake, he sought to show how the morbid change had been developed, what was its bearing upon living action, and in what way it stood related to normal processes of evolution, growth, and function.

I have said that in great measure we owe this further connecting link between morbid anatomy and pathology to physiology, comparative pathology, and experimental pathology.

Physiology is the first great guide. Normal development and normal life in all its departments have their imitations in abnormal growth and abnormal life, whether excessive, perverted, or deficient. Transfer

some morbid growths to the embryo, and what is disease becomes healthy development. Magnify and transfer the normal secretion of milk and you shall have, under different conditions, a fatty degeneration. Even inflammation—that great bone of contention—seems to be ranging itself by degrees as a greatly exaggerated physiological process. Indeed, it is by our knowledge of the normal structure, composition, and function of every minutest part that we gain our knowledge of what is disease, and in part of how it is brought about.

Hence it is that every physiological discovery, however minute, becomes of vital importance for the advance of pathology. Many discoveries, which seem of small importance in their physiological aspects, become of great value in the field of pathology.

Pathology, in its turn, enlightens and advances physiology. The subtle processes of disease often reveal normal structure far more fully than the most skilful manipulations of the histologist upon healthy tissues, and follow out the tract of dissections which no scalpel could trace. Waxy degeneration of the liver, and the course of secondary degenerations in the spinal cord, afford striking examples. So, too, the reactions of disease, aided by simple micro-chemical reagents, serve to distinguish varieties of chemical composition too minute for analysis. Pathology, too, often corrects physiological theory as regards function. It has been well said, that the value of an hypothesis consists, not in explaining the instances which have preceded it, but in standing the test of subsequent instances. Pathological observation has thus often served to demolish hypotheses which had stood the test of instances specially designed to try their strength.

If I were asked what is the present standpoint of pathology, I should unhesitatingly say that it is the physiological, or if you will, the biological standpoint. In other words, pathology is governed by no theory, and limited by no methods, other than those which equally govern and limit physiology. If a cellular physiology could suffice to explain all the phenomena of healthy life, a cellular pathology might equally serve for disease life. And whatever method or instrument of research is requisite for the full investigation of the phenomena of healthy life in all its manifestations, is equally or still more requisite for studying the phenomena of disease life.

It is from this point of view that the study of clinical medicine and pathological experiment are, in my opinion, the inseparable adjuncts of pathological study. That would be a strange physiology which should conduct its study on dead animals alone, and no less strange a pathology studied only on dead subjects.

The history and course of each particular case, the hereditary antecedents, the physiognomy and conformation, the symptoms and their order and mode of death or recovery, are so many phenomena of disease life, which we must minutely study in order truly to understand the pathology of each particular case, and rightly to connect structure with function. If we could, after opening the body-case, set the body-machine going again like a watch and observe how the wheels interlock, or where the obstruction is, or, separating one part, set that in action, and so piece by piece discover where and how its stoppage came about, we might rest content with morbid anatomy. But the human machine, once run down or stopped, can only be set in action again by the hand of the Creator. We can and must imitate the action by study upon inferior machines; but, precious as such results are, they will not and cannot fulfil all the conditions of the diseased human body.

I have shown how physiology and pathology must go hand in hand, and that the discoveries of physiology are essential to pathology; and this leads me to say a word on the subject of experiments on animals, both physiological and pathological. No one who knows anything of the history of physiology can for a moment question that it is by this means that a large part of our most important knowledge has been gained, and that it could have been gained in no other way. And no one can study or teach pathology, without constantly referring to and making use of the knowledge thus gained. He is worse than a coward, who, knowing this, and making use of his knowledge, would claim for himself, whether directly or by implication, any higher moral ground, because he is not personally engaged in such investigations.

We cannot, if we would, do without the knowledge acquired for us in this way by physiologists. If we could pull out all that has been built upon this knowledge, our fabric of pathological science would totter and fall, just as would the whole of modern medical science if it could eliminate all that physiologists and surgeons and pharmacologists have gained for the benefit of humanity by experiments on animals.

But pathological experiment has its own proper work. In this country, for the time, it is so seriously hampered, that research by its means has become almost impossible. Science does not walk easily in fetters, even if adjusted with the sanction and co-operation of its votaries. It has indeed been objected that we cannot induce in animals

the natural processes of disease, and that the results of experiments on animals are fallacious when applied to man. In a certain sense this is true, for, of course, as in all other experiments, we require the use of judgment and discretion. But the statement is very largely grounded on a sort of belief that, as man is mentally so far superior to the lower animals, he must likewise be widely removed from them in general organisation and structure.

It is by the study of Comparative Pathology that we have come to learn how intimately the processes of disease in the lower animals may resemble those in man, and it is by experiments upon the diseases which they have in common with man that we have come to appreciate those differences in constitution, and in reaction to disease, which enable us in a great measure to control the results of experiments.

Comparative pathology, that is, the study of the diseases of the several classes of animals, and the study of the same disease in its reactions upon different classes of animals, is to a very large extent a growth of late years. Just as I have remarked that the growth of human morbid anatomy followed in the wake of the progress of normal anatomy, so has the study of comparative pathology followed the development of comparative anatomy, comparative physiology, and comparative embryology.

It is true that a study of diseases of animals has been to some extent conjoined with the study of comparative anatomy and physiology, and that Harvey, Hunter, and Jenner were well aware of the valuable information to be derived from a comparison of human with animal pathology. It was well known that some of the lower animals were subject to certain morbid growths and parasites analogous to those which afflict man, such as warts, cancers, and hydatids; and that some animal diseases, such as hydrophobia, could be communicated by inoculation to man. And, long before Edward Jenner discovered that cow-pox could be transferred to man, it was suspected that small-pox was primarily an animal disease.

But we have only recently come to understand the full bearing of those endemics and pestilences which have in all ages desolated the animal world, and to see that we stand on common ground with the brute creation in being subject to the same or to analogous plagues, and that by the study of these, under their simpler conditions, we may hope to throw light upon the forms affecting man. It is in this branch of comparative pathology—that relating to infectious and contagious diseases—that we see best the value and importance of experimental pathology, in the direct benefits which it confers on the whole brute creation, as well as upon man. And it is in this field that have been gained some of the most remarkable triumphs of modern pathology, which bid fair to revolutionise the science and treatment of infectious disease.

Gentlemen, I have no idea of giving you now any description, however summary, of the past and present state of what has recently been called "bacterial pathology". But, as it is to myself a subject of intense interest, and one upon which attention and expectation are now largely centred, I may venture in a few words to indicate its importance to you as a subject of study, and to point out its bearings on the pathology of the future.

We find the germs of the discoveries on this subject in three different sets of observations. Common observation on epidemic and malarial diseases had brought the conviction that the *materies morbi*, the contagium or seed of these diseases, must be something infinitely small, light, and portable, capable of floating in the air, of remaining long dormant, and, on finding a suitable soil in the human body, of producing a certain definite series of symptoms, occurring often with great regularity in the time of appearance and order of development. In the case of some of these diseases, the virus, whatever its nature, was not exhausted in the body, but multiplied ten thousandfold, and, as in the case of small-pox, one might inoculate a certain definite minute quantity and produce a local disease, which, by contagion* to other healthy persons, might cause hundreds of cases, in each of which the poison was reproduced. Clearly, then, it was also capable of indefinite self-multiplication under suitable conditions, and must be something more than a mere chemical poison.

This, then, was the starting-point of the germ-theory as applied both to zymotic diseases, such as measles and scarlet fever, and to certain wound-infections, such as erysipelas. But microscopic research failed to detect these germs, and, though the theory was discussed and maintained, it could not yet assume a definite scientific form.

Then came the great discoveries of Pasteur† on fermentation, and the recognition of bacteria as the accompaniments and apparent agents

of putrefaction. The idea that each infectious disease might be a sort of fermentation produced by a fungus, now grew into a more definite shape, and the germ-theory received expansion upon this basis. You may some day read the history of the many germs and fungi which were discovered and lost again, and I will not detain you with the many marvels which were seen, or believed to be seen, under the microscope. But, all the time, the true was being worked out with the false, though the erroneous observations of some, and their contradiction by others, have tended to make many scientific men disbelieve both true and false.

The first accurate light upon the question came in the investigations upon anthrax or splenic fever; and, out of the multitude of results of research on this and other contagious diseases, I shall venture to select by way of illustration one in which I am especially interested. In 1850, the presence of a minute foreign organism of a rod shape in the blood of animals dying of this disease was discovered by* Rayer and Davaine. Davaine gave to these bodies, which he showed to be of vegetable nature, the name of bacteridia,† to distinguish them from bacterium termo, which they resembled except in being devoid of movement. Then came the discovery that they could be cultivated artificially in fluids outside the body, and the demonstration by Koch that they formed seed-spores which could remain a long time dormant, but under suitable conditions grow and multiply. With this also came the perfecting of the proof, afforded mainly by experiment with the artificially grown fungus, that the fungus or bacillus was the essential virus of the disease.

Here, then, was one instance—but a solitary one—in which a disease, having many characters of a contagious disease, was proved to be due to a fungus, which, when inoculated, gave rise to the disease, and was reproduced in the blood. But, long before this proof had become complete, the researches of Klebs, Panum, Bergmann, Sanderson, and many others, had shown that the bacteria of decomposition were apparently the active agents in what we know as blood-poisoning following wounds, and that similar organisms were to be found in some of the allied diseases, such as diphtheria and erysipelas. Now, so far as we are acquainted with the history of these diseases, they have this sharp distinction from the zymotic diseases, that they do not give any protection from a future attack, and that they are essentially allied to putrefaction, both in their causes and phenomena. The admirable scientific and practical experiments which Lister worked out when a professor in this university, and the investigations of Koch on wound-infections, have established with certainty the fact that these blood-poisonings are effected through the agency of bacteria. Might it not then be that splenic fever was merely one of these common blood-poisonings, and that its study could throw no light on the zymotic diseases? In animals, it appeared to be communicable by ordinary ways of infection or contagion, but to man only by inoculation; and it was seriously questioned whether, even in the lower animals, it could be produced except by inoculation.

The question was in this state until about three years ago, when it was discovered by Dr. Sanderson and Mr. Duguid that a cow might be inoculated with splenic fever from a guinea-pig, and, though suffering severely, not die of the disease. In continuing these experiments, I found that a cow once so inoculated resisted the results of further inoculation to a very remarkable degree; in other words, that, practically, it could thus be rendered insusceptible to future attack of the disease. This fact at once showed that splenic fever followed the same rule with regard to protection as the ordinary zymotic diseases, and did away with one of the barriers to the acceptance of the bacterial germ-theory.

In making a series of experiments with a view of obtaining, in a suitable form for inoculation, this virus modified by transmission through the guinea-pig, I found that, if one cultivated the bacillus under particular conditions, it gradually lost its activity, and at last became practically inert. It at once occurred to me that, by making use of this fact, I might obtain a virus so far modified as to be sufficient, when inoculated, to ensure protection, and yet not to endanger the life or safety of the animal inoculated. And this, I found, could be done with success.‡

M. Pasteur has recently published the results of a very large series of experiments made by a precisely similar method, and with results fully confirming those which I published more than a year ago. And, although I venture to claim for England whatever merit may be due to

* The discovery is usually attributed to Pollender, but his independent discovery was not made till 1855.

† The name *Bacillus Anthracis*, given by Cohn the botanist, is that by which this organism is now usually known.

‡ *Journal of the Royal Agricultural Society*, vol. xvi, part i, April 1880, and vol. xvii, part i: *Proc. Roy. Soc.*, June 17th, 1880; *Lancet*, December 18th, 1880, and January 1st, 1881; *BRITISH MEDICAL JOURNAL*, December and January 1880-81.

* This, I need hardly say, was the reason why inoculation of small-pox was made penal.

† Published 1857 to 1861.

priority of the discovery, I none the less rejoice that the facts should have been so fully established in France. My experiments were made with a small and inadequate sum of money furnished by the generosity of a private society, and in the face of all the difficulties interposed by law; whilst M. Pasteur is encouraged and abundantly supplied with means by the liberality of the French Government.

But I must not now dwell upon the many points of interest opened up by recent discoveries on bacterial contagion. What I wish to emphasise is the immense field of research which is opened by these discoveries, and the hopeful anticipation of the possible prevention and remedy of a multitude of the most deadly scourges of our race. And all this, indeed all the certain progress in this field of research, which, bear in mind, promises as much for the animal world as for man, has been the outcome of experiment on animals. Every step in these inquiries is necessarily made by inoculation of living animals, and every result must be checked by the same means. If experiments on animals were stopped, or even if, in other countries, they were subjected to the same restrictions as in England, I can honestly say, speaking from experience, that I believe these inquiries, which may save hundreds of thousands of lives of both cattle and men, would be practically arrested, or would at least take many years for their development. And it is not only in this more direct manner that such discoveries are of interest; for they promise, I need hardly tell you, to throw great light upon the whole question of contagion. Much has yet to be learnt, much to be made certain, many conflicting testimonies to be reconciled, before we can fully accept the bacterial hypothesis of zymotic infection; but we may yet look hopefully forward to its establishment.

I have thus briefly referred to some of the main branches of pathological investigation; and I have incidentally referred to the relations of physiology to pathology. But there is one subject which must not pass unnoticed—viz., What is the relation of pathology to therapeutics? I think it is true to say, that it is by the intimate study of pathology that we must hope for advance in the scientific application of remedies. Up to the present time, pharmacology is mainly chemical and physiological, whilst treatment is mainly empirical; in other words, most of our acquaintance with the mode of action of drugs is based on experiments on healthy animals, whilst most of our actual use of them in disease is based on experience or on theory. That there are notable instances in which knowledge of physiological action has led to correct application in disease everyone knows—such, for example, as the use of nitrite of amyl, of digitalis, of jaborandi, and of salicylic acid. But these triumphs have been based either on a knowledge of the intimate nature of the morbid process, or on a happy combination of knowledge of physiological action with a speculation on the pathology of the disease which turned out to be correct. In the latter case, the experiment has solved the pathology of the disease as well as its remedy, just as we may open a box and solve the structure of its lock by trying, out of a number of keys, one which we think to look about the right size and shape.

But how shall we hope for scientific advance in therapeutics? Pathological experiment is exceptionally possible; the pharmacologist does his best in discovering all he can of the physiological properties of drugs; the therapist exerts his knowledge, ingenuity, and experience in practical application. But he who can say, "Here lies the centre and source of the disease, and this is its precise mode of development and the way in which function is affected; this is the point which you must touch, and in such a way must you touch it"; it is only he who can say this who bridges the gulf which separates empirical from rational therapeutics.

And, lastly, I come to inquire what is the present position of pathology in relation to medical education and practice.

I have shown that the separation of pathology from physiology became essential, partly in consequence of the growth of both subjects, and partly from a divergence of their methods. The "Institutes of Medicine" arrived at a practical exclusion of pathology and therapeutics by the mere force of growth of its primary subject, physiology, and the requirements of its teaching. But other causes were at work. So long as pathology was regarded as a subject to be studied mainly on the basis of physiology, normal and experimental, aided by instances drawn from bedside experience and speculations upon them, so long only could they conveniently be studied together. But with the growth of the study of morbid anatomy and histology as the basis of rational pathology, showing as they did conditions inexplicable by, and unknown to, any physiological law, a temporary separation became inevitable; and pathology, following its own path through the dead-house and laboratory, has but recently emerged upon the same open

plain to which the more direct path of physiology had already led, and the two again walk side by side, mutually supporting and assisting each other, and in their turn aided by and aiding all the other branches of biology.

In a somewhat similar way, the teaching of pathology has become separated from that of systematic medicine. Not that it can be or should be excluded from it, but that its complete study requires a more extensive treatment. In most cases, the study of pathological anatomy was the first to receive special separate attention, and it is still so in many foreign and most English schools. In proportion to the increased attention to morbid anatomy as a subject worthy of special scientific study, apart from its obvious utility as a corrective to diagnosis and a guide to the course of individual cases, so did the difficulty of fully treating it in lectures on the symptoms and history of special diseases increase. Morbid anatomy in its turn threw light upon medicine, and by its means diseases formerly regarded as identical came to be separated; and their symptoms and course had to be discussed in greater detail and with increased care, and so the possibility of considering even all common diseases in one course of lectures became much diminished. The special training and methods of study increased the need of separation, and the development of pathological histology has made the necessity for division still more absolute.

In many English schools, the subject of general pathology is not specially treated, but retains its place as a part of systematic medicine and surgery. The separation and union with other branches of pathology is, I believe, more scientific and more beneficial. That this is so I make bold to maintain on these grounds. First, what we understand by general pathology is very largely based upon the study of pathological anatomy in its widest sense. Some have gone so far as to make the term general pathology almost synonymous with general pathological anatomy, an undoubted error. But, beyond question, the foundation of pathology must be largely laid in pathological anatomy, from which, moreover, it draws many of its illustrations.

In its study, too, general pathology has methods which are widely different from those of systematic medicine and surgery. It aims at the establishment of general as distinguished from special laws; it studies processes underlying widely divergent maladies; it seeks its proofs in all regions of life, whether in human physiology, in experimental and comparative pathology, in the processes of growth and degeneration in plants, and in the rare and costly experiments by which nature sometimes solves pathological problems at the expense of human suffering and life.

And if I may add a practical and utilitarian reason, a separate course of general pathology saves the double teaching of its subjects in special medicine and surgery. General pathology, like actual life, knows no distinction into the corresponding external and internal pathology. Its illustrations are equally drawn from both, and it teaches the changes and processes which are common to the whole system and to its several structures. Hypertrophy and atrophy, degeneration and repair, inflammation and morbid growths, know no separation into external and internal. General pathology is thus the common meeting ground of medicine and surgery, uniting the isolated discoveries of each into one harmonious whole. And it does more; for, introducing those arguments and discoveries afforded by general biology and by comparative pathology, it elucidates that which could not be explained by study on man alone.

Of the importance of morbid anatomy as a branch of medical education, I need not say more than I have already said. The history of pathology, and the immediate benefits to be gained from its study, as well as the requirements of examining bodies, have made it one of the ordinary branches of medical education. But whilst, in England, gross naked-eye morbid anatomy has been well worked at, especially in relation to clinical medicine and surgery, we have somewhat fallen behind in pathological histology and pathological chemistry. Perhaps the notion that we excel in clinical discovery, fostered by the great results attained by Bright, Addison, W. Jenner, Hughes Bennett, Murchison, Wilks, and many others, has led to some disregard of those improved methods of research afforded to us by science. And it must be added that these means have but recently arrived at such perfection as to enable teaching to be carried on with facility on a large scale. But certain it is that both in France and Germany the general knowledge of microscopic pathology has hitherto been far in advance, and the teaching much more thorough, than in England. That this has been so, is not to be attributed to any want of encouragement by example of the great discoverers of former or recent times. Going over the names of those in England who have been eminent as clinical surgeons and physicians of late years, I find very few who have not in their earlier and less occupied years been largely addicted to microscopic pathology, unless engaged in some other more special branch of

scientific investigation of disease. Jenner, Paget, Bowman, Gull, Lister, Wilks, Hutchinson, Bristowe, Quain, Hughes Bennett, Sanders, Grainger Stewart, and a host of others, might be adduced as instances. These men, following the example of Bright and others, have used the best and most recent means to study thoroughly and record completely all the phenomena of disease falling under their observation, and have proved in the warfare of practice that disease may be overcome by science better than by rude assault.

Nor has it been due to any want of enthusiasm on the part of students or of the younger generation of medical men, as is abundantly proved by the work done for pathological societies, and by the large number who for this very purpose have sought foreign schools to complete their studies. It is, I believe, entirely due to the neglect of teaching and examining bodies. This University, which is unique in having a professorship of pathology, also stands, I believe, almost, if not quite, alone in requiring any special examination in pathology, including morbid histology, for a medical degree. And this fact has reacted upon the teaching, which, in many schools, has been allowed to remain incomplete and inefficient. Attendance upon lectures on pathological anatomy is now required by many examining bodies; but I say, with some confidence, that, with one or two exceptions, there has scarcely existed, if there do now exist, in the London medical schools any course in which pathological histology is systematically taught so as to comprehend a practical study of the principal changes in all the important organs.

I speak thus distinctly upon the subject, because I am convinced of its importance, and desire to draw attention to it. It is to the honour of this University that pathology occupies so important a place in its curriculum.

We have thus glanced at the condition of teaching in relation to general pathology, morbid anatomy, and histology. There is, however, one subject upon which I must say a word, viz., pathological chemistry.

Much has been expected of pathological chemistry, yet hitherto it has made but small advances. It was expected that mere ultimate analysis would solve many pathological problems. When Bright gave the account of granular disease of the kidneys, it was thought that chemical analysis would decide what was the nature of the morbid granules, and thus settle the pathology of the disease. So, too, at a later period, it was thought that the discovery of some particular chemical product was distinctive of a particular disease, e.g., leucine and tyrosine in the urine as pathognomonic of acute yellow atrophy of the liver. Pathological chemistry has thus passed through the same phases of faith as pathological histology. It is becoming gradually recognised that pathological chemistry must stand on similar ground with morbid histology in its relation to physiology; that it must be by comparison with the normal chemical processes and chemical reactions in the body that the chemistry of disease must be investigated, rather than by means of ultimate analysis or of discovery of organic compounds peculiar to disease. Both of the latter have, of course, their own proper value.

Pathological chemistry thus waits for the advance of physiological chemistry, and the great difficulty and complexity of this subject make advance necessarily slow.

But perhaps you will ask what influence the study of pathology has upon the actual practice of surgery and medicine. Not uncommonly it is alleged that the special study of pathology is a waste of time, nay, positively injurious to the development of acquaintance with practical work. There is, in truth, a limit of time and energy both to students and practitioners; and, in the case of both, time and energy may be ill-apportioned for the practical object in view—the treatment of disease—especially when so many subjects must be crowded into so short a time.

But the rare facilities offered for the study of pathology during the student career, and the far greater difficulty in acquiring opportunities in after-life than is the case with many other subjects, render its thorough study at this time especially important, if it is worth studying at all.

No one, I suppose, questions the importance of carrying the studies of the bedside in fatal cases to the test of the *post mortem* room, or the advantage of gaining that acquaintance with the different appearances presented by diseased organs which will enable them to be recognised in after-life. These, and the supposed power of stating at a glance whether a microscopic scraping of a tumour is malignant or non-malignant, have been gravely asserted to me by a hospital surgeon as being "all that a student wants to know of pathology."

If there were no science of pathological anatomy, if all its multitudinous incidents were connected by no general laws, if there were no intimate connection between symptoms and structure, and no possibility

of tracing the processes of disease and connecting them with the changes in the organs, we might perhaps allow this. And if it were possible without any practical demonstration to teach what we know of the alterations of minute structure in disease, their origin and course, and the way in which these affect function, the study of pathological histology by students might be to a large extent given up. But, since we have eyes to see and hands to work, and the microscope enables us to apply both to the ready investigation and recognition of these processes, we prefer the practical method of study, as both easier and more effective, as well as more interesting, and of daily increasing value in after-life.

And will not that man who is acquainted with what has hitherto been learnt of the causes and processes of disease in its more widely distributed forms, of the laws which condition its occurrence, and the general course which it takes, be far more likely to take a rational view of the symptoms, and of the effect of remedies? Will he not see in each case, however trivial, the application of general laws? and, conversely, will he not often be able, in some exceptional occurrence, to extend those laws by fresh observation?

Thus, knowing the gross forms and results of disease, intimately acquainted with the conditions which give rise to them, the interactions of the several organs, the changes of minute structure which lead to impairment of function, guided by general pathology, his views corrected and enlarged by knowledge of the results of experimental and comparative pathology, the surgeon or physician will, in his everyday round of work, take rank as a scientific observer. No case, no symptom, will be trivial to him; each, unimportant though it may appear in itself, will serve as a guide to some more general or deeper seated cause; and, whilst he will be delivered from the tedium of routine, he will also be saved from its dangers.

Gentlemen, I have endeavoured to trace out to you something of the history of the chair during the fifty years of its existence, and to show you in brief outline how the subject of pathology has come to assume its present condition as a great and all-important branch of medical science. I have endeavoured to impress upon you the fact that it has intimate relations with all the other branches of your medical studies, between which, indeed, it forms the connecting link. The exact studies of anatomy, physiology, chemistry, and biology, have prepared you to enter upon this study, and in proportion to the extent and practical accuracy of your knowledge of these subjects will be the possibility of your advance in pathology. I have given you some faint idea of the importance of this study in its bearings on your future work, when you will have to do with the immediate study and treatment of disease.

Enter then upon your work, with the conviction that what you now learn is to form the groundwork of a study which will last you a lifetime, and lay the foundations as deeply and broadly as possible. Make it your object to advance the science of pathology by diligent and careful observation, in which everyone may assist, and avoid as far as you may all barren theoretical discussions.

If, in what I have said, I have in any way awakened an interest and quickened your curiosity by what may now seem in a measure obscure, no effort on my part shall be wanting to make clear to you, step by step, the science of pathology in all its branches.

Carry with you into your work, whether at the bedside, in the *post mortem* room, the laboratory, or the lecture-theatre, the belief that pathology is a living, not a dead study; let this belief make the routine of its drier bones instinct with life and action, and you shall find that the reality of its interest and its value immeasurably transcend what I have endeavoured faintly to depict.

COMMUNICABILITY OF SYPHILIS BY SUCKING.—In the *Giornale Italiano di Siresina* (1880, p. 15), Professor Scarenzio relates a case which, if free from error in observation, is of much importance. A healthy young woman, aged 19, married, in December 1874, a vigorous young man lately returned from his regiment. In September 1875, she gave birth to a weakly infant, which developed symptoms characteristic of inherited syphilis. When seven months old, its lips became the seat of erosions and ulceration at the commissures. At the same time, the mother, who had exclusively suckled the child, saw a chancre, accompanied with enlarged glands, develop on the right nipple, shortly followed by a characteristic syphilitic eruption. She gave birth to another syphilitic child in July 1877. The author infers, from this case, that a woman may bear a syphilitic child to a syphilitic father, and remain herself uninfected; and, further, that it is imprudent to cause a syphilitic infant to be nursed by its mother unless the latter should previously have exhibited symptoms of syphilis.