An Address

ON THE

POSITION OF PATHOLOGY WITH REGARD TO CLINICAL DIAGNOSIS.

DELIVERED BEFORE THE BRISTOL MEDICAL SOCIETY

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THE subject of my address is one that has for a long time engaged my thoughts, but before expounding my views I have waited in the hope that someone more intimately associated with pathology would take up the matter. My remarks are the outcome of convictions that increased experience has made me feel it a duty to express, and if the expression of my views should lead a little way towards a closer *rapprochement* between the work of clinicians and pathologists I shall have accomplished all that I can hope for.

Since I first began the study of medicine—in the early Seventies—I have witnessed many fundamental changes both in the practice of our art and in the ethical relations of the members of the profession.

In my early days the antiseptic treatment of wounds was unknown, and many regions of the body now operated on with confidence were then only attacked by surgeons in case of dire necessity.

When stomach surgery was unknown it mattered little whether a pyloric stenosis was simple or malignant, as a fatal termination was inevitable in either case; nor, as a rule, was there much object in diagnosing between a simple and a malignant gastric tumour, for neither could be removed.

When the functions of the pancreas were unknown its diseases naturally hardly entered into the mind of the practical physician, and, in fact, it is only very recently that surgery has had anything to do with this important viscus. Similar observations might be applied to many other organs in the body, as the gall bladder, liver, and duodenum. The purpose, therefore, of an accurate diagnosis was often rather theoretical than practical, so far as the well-being of the patient was concerned.

At the present time, however, so much benefit can be conferred by surgery on many diseases which were formerly absolutely hopeless, that an accurate diagnosis is now a necessity, as it paves the way to successful treatment. We cannot, therefore, afford to leave any stone unturned that will give us any assistance, and I shall hope to show that as yet we do not make all the use we might of pathological investigation to aid our clinical observations.

Our methods of diagnosis have vastly improved, so that diseases, many of which were formerly unrecognized or imperfectly understood, can now be readily differentiated and treated at an early stage with every prospect of success. This is in a great measure due to the advances made in the last quarter of a century in the science of pathology. As I look back and think what a comparatively small part pathology played in medicine in my early days, I realize how much we owe to those who have devoted their time and energy to widening its boundaries.

It is now a truism, to which I think none will take exception, that a sound knowledge of medicine is fundamentally based upon an accurate acquaintance with the pathology of the diseases we are called upon to treat. Without it treatment must of necessity be empirical and carry with it the penalty of empiricism—an inability to deal in a rational way with anything that falls outside one's previous experience.

Given, however, the pathology of a disease, its treatment may be based upon a definite reasoned plan, which can be varied as circumstances may require; not only so, but provision can be made for those complications which our knowledge of the morbid anatomy, bacteriology, or chemistry of the disorder may suggest are liable to occur.

In the days of Hunter and his school the whole of pathology was embraced in morbid anatomy. Now we call to our aid the microscope, the test tube, and all the various forms of apparatus and methods of research employed in histology, chemistry, bacteriology, and physics, to throw light on the obscure places in disease

and to help in our treatment of suffering humanity. From histology we have learnt much as to the nature of tumours, and we have seen the processes accompanying the phenomena of inflammation. The intimate structural changes associated with various degenerations have been discovered, and the presence of parasites has been demonstrated in certain diseases concerning which we were formerly in ignorance.

By means of the microscope the differentiation of various diseases of the blood has been rendered possible, and, no less important, the changes induced by inflammatory lesions and other pathological changes have been worked out.

The rise of bacteriology opened up an entirely new field, which has not only revealed to us the cause of a large number of infectious diseases, but, thanks to the work of Lister, has given to the world the inestimable boon of antiseptic and aseptic surgery. The deep debt that preventive medicine owes to bacteriology is likely to be equalled or even excelled in the realm of treatment; for not only have bacteriologists shown us how to treat infectious diseases, such as diphtheria, by antitoxic serums, but we have had demonstrated to us recently how the tissues can be rendered immune to various infective agents by inoculation under suitable conditions that can be determined with accuracy by the method of blood examination devised by Professor A. E. Wright.

The contributions of chemistry and physics to our knowledge of disease are no less important. By the use of electrical methods we are now able to investigate the condition of nerves and muscles in health and disease; the *x* rays have given us radiography, and by the application of cryoscopy we are able to determine the molecular concentration of the blood and urine, and the changes brought about in them by departures from normal conditions. The chemistry of the body is as yet in its infancy, but it has, I think, a great future before it. At present its practical usefulness is largely confined to the examination of the urine, faeces, and, more rarely, other exudates and transudates; but in the theory of disease it has helped, and is helping, in the elucidation of many obscure problems, such as glycosuria, Graves's disease, myxoedema, Addison's disease, pernicious anaemia, etc.

The results of these and other improvements have been not only to establish our conceptions of disease on a more secure and scientific footing, but also to place in our hands accurate methods of diagnosis undreamt of thirty years ago. It is now not enough to trust to clinical acumen alone, however keen and well-trained it may be. We owe it to our patients that every means possible should be taken to correctly diagnose their maladies and relieve them of their afflictions. The successful physician or surgeon in these days is he who is sufficiently liberal-minded to employ the aids of diagnosis that science has placed at his disposal, and who deliberately invokes their aid whenever circumstances may require. We are all painfully aware how often the physical examination of a patient leaves us in doubt as to the correct explanation of the symptoms of which he complains, and how such a doubtful case may drag on from week to week, and even from month to month, without any definite conclusion being reached. In cases such as these, and many also of a more acute type, an appeal to the microscope, the test tube, the spectroscope, or the culture tube, guided by a sound knowledge of pathology, will often conclusively settle the diagnosis, or at least yield information which will prove of value in forming an opinion. One would think that it was hardly necessary in these days to insist on the importance of employing accurate methods of diagnosis, but I have repeatedly seen such unfortunate mistakes made from a failure to make use of modern methods even by those from whom one might have expected better things, that I feel it is necessary to emphasize the great importance to be attached to laboratory investigations in skilled and reliable hands. Only recently I was asked to see a lady who had been for many months under treatment in various countries without deriving any benefit. Various diagnoses had been made, including gall stones, gastric ulcer, appendicitis, and floating kidney. On examining her, I found tenderness over the course of the colon with other symptoms of colitis, for which she had been treated without avail. I advised the patient to send a specimen of the faeces to a pathologist for careful investigation to

see if the cause could be discovered. He reported that the conditions found chemically suggested a diagnosis of chronic colitis, but that large numbers of the ova of *Trichocephalus dispar*, *Oxyuris*, and *Ascaris lumbricoides* had been discovered microscopically. The diagnosis of colitis was thus confirmed, and a probable explanation of the condition was furnished, enabling efficient treatment to be carried out.

Another case well illustrates the advantage of making use of every available means of arriving at a correct opinion. A lady of 48, suffering from deep jaundice of five months' standing had been seen in different parts of Great Britain by a number of medical men of eminence, who had all agreed as to the advisability of operation in consequence of her condition being better than might have been expected after jaundice had existed for five months had the cause depended on cancer. A chemical examination at my request of the urine and faeces threw so much additional light on the case that I had not the slightest hesitation in diagnosing cancer of the head of the pancreas and in advising against operation. This, however, did not satisfy the patient, who, with the support of her medical advisers, wished to have an exploratory operation done. On opening the abdomen, there was found a very hard nodular growth of the head of the pancreas undoubtedly malignant. The absence of adhesions and the presence of a distended gall bladder afforded clear evidence that gall stones had never been present.

Until within a few years many patients died from chronic interstitial pancreatitis, under the supposition that they were suffering from malignant disease, and, although the observations I made when I had the honour of bringing this subject before the profession in a lecture given in London in July, 1900, were the result of clinical observations, yet until working at the subject pathologically for a long time with my friend Dr. Cammidge I had no positive data that would guide me in distinguishing between the cases that were malignant and therefore could not be benefited by surgical treatment and those that were simple and could be cured by operation. As the result of pathological investigations we are now usually able to definitely determine the diagnosis before operation. This was well shown in the case of a gentleman, between 50 and 60, suffering from deep jaundice, great emaciation, enlargement of the liver, and very slight tenderness, in which the almost complete absence of pain and the presence of infective cholangitis suggested cancer of the head of the pancreas. The patient had been given up as hopeless before I saw him; but an analysis of the urine revealed a well-marked pancreatic reaction, and, the crystals being acicular and dissolving within half a minute in dilute sulphuric acid, showed that the case was in all probability not malignant but inflammatory. I therefore operated, and found considerable enlargement of the head of the pancreas, due to the impaction of a gall stone in the pancreatic portion of the common bile duct, the removal of which cured the patient, who is now in excellent health.

In another case, besides some enlargement of the liver and gall bladder, the spleen was also enlarged and the jaundice was of the dark variety; moreover, oedema of the feet was present, with profound anaemia and great debility. In this instance also pain was and had been a very slight feature of the case. It was entirely owing to the pathological evidence that I was led to operate and to remove a gall stone from the pancreatic portion of the duct, which it had blocked, thus setting up a chronic inflammatory enlargement of the gland. The patient is now in excellent health.

In other cases of jaundice associated with intermittent fever and rigors, in patients who had resided abroad and were supposed to be suffering from ague with consequent liver symptoms, an examination of the blood showed the absence of ague organisms, and a pathological investigation of the urine and faeces led to the diagnosis of interstitial pancreatitis, with the result that definite surgical treatment was able to be carried out successfully. It would be easy to multiply such cases to show how important it is that the work of the clinical physician or surgeon should go hand in hand with that of the pathologist.

If time permitted I could give the details of many other

cases in which I have been able, by making use of the results yielded by chemical, bacteriological, or histological methods, to arrive at a correct diagnosis in cases which would otherwise have remained obscure or been incorrectly treated; but it is not necessary for me to multiply examples, as I am sure that on the general utility of the methods of clinical pathology we are in agreement.

It does not follow, however, that because we recognize the advantages to be gained in the abstract from modern methods of diagnosis we are able without outside assistance to give our patients the full advantage that may be obtained from them. This partly arises from the methods being now so numerous that, although we may be acquainted with them in a general way, one sometimes finds a difficulty in deciding which particular form of investigation is likely to be most advantageous, and partly from the high degree of technical skill required to carry many of them to a successful issue. There can be no disgrace to any one who, having pursued the case as far as he can without having arrived at a good diagnosis, says that he needs the additional help that a pathologist can give him. I have never found this to do the slightest harm, but, on the contrary, I have found that the patient is only too anxious to avail himself of such additional help.

In the early days of pathology, when a knowledge of histology was the chief requirement, it was possible for each to be his own pathologist; but with the rise of bacteriology and the application of many complicated chemical and microscopical methods to clinical research, it has become impossible for one man to act both as a clinician and pathologist. The result has been that both in our hospitals and in private practice there has arisen a class of practitioners who now devote themselves especially to this branch of medicine. The growth of specialism in medicine in recent years has been deplored by some members of the profession, but it appears to me that it is a practical necessity brought about by the force of circumstances. What we call the advance of civilization in the social world consists largely of the growth of specialism, and if we accept the teachings of evolution in the organic world we find that a similar law holds good. Devolution is the natural result of progress, and division of labour is the invariable consequence of complexity.

I remember in my younger days how one and the same consultant would give an opinion in medical, surgical, and gynaecological cases, and was also ready to deal with patients suffering from diseases of the eyes, ears, larynx, etc. At the present time these and many other subjects are the field of work of a larger or smaller group of specialists, who have devoted their attention particularly to one or other class of work, and no doubt, on the whole, to the benefit of the public. It is now practically impossible for any single man to keep himself thoroughly abreast of the rapid advances being made in all branches of medicine, and the attempt to do so can only result in a superficial knowledge which, while useful enough in itself, does not qualify him to speak with authority. Such being the case, it is possible that in the course of time the subdivision of medicine will become more marked even than it is at present.

The well-informed general practitioner knows, or should know, something of everything so far as his profession is concerned, but, when he specializes, he is then expected to know everything of something.

Specialism, no doubt, has its drawbacks, and the chief is that a man who devotes his attention entirely to one subject is apt to magnify its importance, and to overlook symptoms of other disorders that he is not interested in. This difficulty is most pronounced in those who specialize early, and there is much to be said for the method that has prevailed in the United States of a man only taking up a special line of work after he has devoted several years to general practice. He then tends to take a wider and more comprehensive view of cases that may present themselves to him, and avoids the pitfall of narrowness.

However it may be attained, specialism in medicine is an accomplished fact, and a glance down the list of constituent societies of the proposed Royal Society of Medicine will show how numerous are the various lines of special practice now fully acknowledged by the profession.

The fault of specialism to which I have just referred—namely, narrowness of view—is particularly liable to

develop in those who devote themselves entirely to laboratory work, and have no personal interest in the patients from whom the samples they investigate are derived. The tendency completely to divorce applied pathology from clinical practice, which has been manifest in recent years, is one that is, therefore, I think, to be deplored. It is a custom that is contrary to the interests of our patients, and unsatisfactory from the point of view of medical science. It is a generally accepted rule that a diagnosis should hardly ever be founded on any one symptom or any one method of examination, and it is only when the results of several coincide that it is safe to form a positive opinion. Yet we often see a specimen sent to a clinical laboratory without any information as to its source or of the clinical condition of the patient, and find that an opinion is expressed or a diagnosis made on the results of this examination alone. If the human bodies were machines with interchangeable parts, and the laboratory methods we employ were perfect, such confidence might be justifiable; but, unfortunately, we are only too well aware that no two individuals are exactly alike physically, and therefore, probably, chemically also, so that one is bound to consider the individual as well as the disease from which he is suffering. It is true that clinical pathology has made enormous strides in recent years, but those who are best qualified to judge will be the first to acknowledge that every test has its fallacies, and that, although laboratory methods are of the utmost value in careful hands, their results must always be considered in relation with the clinical symptoms, and the effects of the personal factor must always be allowed for. It is not enough to allow only for the personal element in the patient, that introduced by the observer must not be lost sight of. Applied pathology is a subject that requires a special training, and calls for not only manipulative skill, but sound judgement and a comprehensive view of medicine. An analysis made by one who does not possess these qualifications is liable to mislead rather than to guide, and I am confident that the suspicion with which many medical men regard the results of laboratory investigations, especially in certain departments of the work, arises from the custom that in some cases obtains of delegating the work or a large portion of it to persons who, however excellent their manipulative skill, are not competent to take a comprehensive view of the results, and consider their relation to clinical data. Hospital patients are in this respect in a much better position than their wealthier brethren treated in private. Every well-equipped hospital has now on its staff one or more members who undertake the clinical pathological work, and when an examination is required in a difficult or doubtful case by the physician or surgeon in charge, the patient can be seen in consultation with the pathologist, the methods that are most likely to give information in that particular instance can be discussed, and, when the examination is completed, the results can be considered together from the clinical and pathological side by those respectively responsible. The personal factor is thus reduced to a minimum, for one person only need be responsible for the collection of the material and the examination of the specimens—a matter of no small importance in bacteriological and blood examinations; the technique is uniform, and the clinical condition of the patient can be allowed for in forming an opinion on the laboratory results.

An attempt is now being made by some pathologists—I know of several in London, and doubtless there are others in the great medical centres—to offer to patients in private the advantages which hospital patients at present enjoy. They are prepared to see a patient with his medical attendant, advise as to the most promising methods of investigation, collect their own specimens, and, after personally carrying through the required examinations, join in an opinion based on both the pathological and clinical aspects of the case.

It is a welcome attempt to reunite two branches of medicine which were becoming dangerously divergent, and as time goes on I think the openings for such a class of consultants will become more numerous.

A section of a tumour may be made while the operation is in progress, and the extent and nature of the interference may be determined by the conditions seen under the microscope; a blood examination may be made by the patient's bedside, or a series of chemical or bacterio-

logical investigations may be made to clear up an obscure case with a much greater probability of success than if an isolated specimen had been sent for examination to a laboratory, where its individuality might be submerged.

I recently operated on a case which well illustrates the advantage to be derived from a microscopical examination during the progress of the operation. The case was that of a patient who presented a round, smooth swelling in the anterior abdominal wall, apparently involving the liver. There was a divergence of opinion as to whether this was malignant or inflammatory. Under these circumstances, the colleague with whom I was undertaking the case agreed that I should ask a pathologist to be present at the operation so as to make a microscopical examination of the tumour as soon as it was exposed. On cutting into it the appearances at first sight suggested that it might be actinomycosis, though there was still a question of sarcoma, tubercle, or breaking-down gumma. The naked-eye characters of the material left us in doubt, but the microscopical appearance and the marked thickening of the vessels pointed to its being a gumma. The subsequent course of the case under antisyphilitic treatment abundantly confirmed the correctness of the diagnosis, which the history before operation had not been sufficient to determine.

In another case of tumour of the upper end of the tibia, suspected to be sarcoma, after an incision into the swelling there was still uncertainty until a small piece was excised and examined immediately by a pathologist, who pronounced it to be inflammatory and not malignant, whereupon the bone was trephined and an abscess found in the head of the tibia, thus enabling the limb to be saved.

In the case of amputation of the breast for carcinoma, an immediate examination of the glands highest in the axilla is frequently of service, as showing whether it is necessary to proceed further and remove the glands above the clavicle. It not infrequently happens that the clinical characters and even the naked-eye appearances of a tumour of the breast when exposed leave the operator in doubt as to the nature of the growth, and consequently as to the desirability of performing amputation or simply removing the tumour. An immediate examination of a section under the microscope is under such circumstances of very great assistance, and may at times enable a breast to be saved that in case of doubt might have to be sacrificed. Further examples might be readily furnished, but these will serve to show the advantage in certain classes of cases of being immediately associated with a pathologist during the time of operation.

It has been objected that supplying a pathologist with the clinical details of a case is likely to bias his judgement, and that an opinion based on chemical or bacteriological grounds alone is more likely to act as a useful check on the clinical diagnosis. Such an argument might be justifiable if the object of all pathological investigations were merely to afford confirmatory evidence of inferences which were already fairly well established; but this is not by any means the case. As often as not the pathologist is called upon to supply the basis on which a diagnosis may be formed, or to discover the meaning of obscure or abnormal symptoms; in circumstances such as these it is essential, therefore, that every facility should be given for a broad view being taken of the case. In clinical medicine I should imagine that every one would protest against being obliged to diagnose all scarlet fever cases from an examination of the tongue alone, or gall stones by being allowed to inspect the eyes for jaundice; but similar problems are often set the pathologist, and he or his methods are blamed if in a certain proportion of cases failure follows.

Applied pathology, as I have pointed out, is a special branch of practical medicine requiring special experience and training, and calling for many qualities, some innate and others acquired, in those who would practise it successfully. This is a fact that as yet appears not to be generally recognized. One has only to look at the salaries offered in the advertisements appearing in the journals to find evidence of it. In most cases a man is asked to devote the whole of his time to the work for a stipend of even £80 or £100, or at the most £150 a year—a sum practically the same, or a little less, than that given to a

house-surgeon or physician in many hospitals, when it is taken into account that the post of pathologist is usually a non-resident appointment. Need one wonder that a difficulty is sometimes found in filling these posts, and that when filled the results are not always entirely satisfactory. So long as inducements are only held out to senior students or to those who have just obtained their diploma, only such can be expected to apply for the posts or to undertake the duties, with the exception perhaps of a few enthusiasts who really love the work. To the average man at the present time surgery and medicine appeal much more strongly than pathology, at least from a pecuniary standpoint, so that even supposing that he has had the opportunity of becoming practically acquainted with the many details of the technique now required, there is no great inducement to take up an appointment in which his knowledge can be applied. The result is that such appointments are only filled with difficulty, and that those who take them are often lacking in experience. Further, since there is generally no advantage to be gained by holding the post for any length of time, it is quickly resigned for a more lucrative branch of practice. That the experience gained in such an appointment may be of great value to the individual, there is no doubt, but the present state of affairs neither tends to promote confidence in clinical pathology nor offers much opportunity for its advancement in this country in the future. If pathology is to take the position which the important part it now plays in diagnosis and treatment entitles it to, some attempt will have to be made to induce a larger number of men to qualify themselves for the work, and their labours will have to be more generously recognized by the public and the profession. They must be able to regard it as the aim of their professional career, and be prepared to devote their lives to perfecting their knowledge and furthering the progress of their special branch of science. The state of pathology at the present time is very similar to that which existed some years ago in the field of anaesthetics. Almost every one was then thought competent to administer chloroform or ether, and the duty was relegated to recently qualified men, students, or even theatre attendants. Now the anaesthetist is chosen with as much care as the surgeon, and the work is recognized as being of such a delicate character that only those who have gained skill by thorough training are competent to undertake it.

Only those who have had the experience of both the old and new methods can realize the difference that this change has wrought in the surgeon's work. The responsibility and anxiety that hampered his work under the old régime have now given place to confidence and freedom from worry that allows of his undivided attention being concentrated on the operation. This division of labour ensures better immediate results and subsequent freedom from complications. Just as any one was thought good enough to give anaesthetics in the old days, so it would appear to be now considered a matter of little importance to whom we entrust the performance of pathological investigations, yet on the reports resulting from such an examination depend very vital issues; for instance, in the case of examining portions from a curettage may depend the question of hysterectomy being necessary; on the careful analysis of the stomach contents after a test meal may hang the question of the presence or absence of cancer; on a blood examination may depend the diagnosis of typhoid, and on the microscopical investigation of a breast tumour may depend the amputation of the mammary gland.

If such examinations are made without any personal responsibility, or are made wholesale instead of with reference to the individual, very serious mistakes not only may be made, but have actually occurred. Such mistakes could be avoided were the investigations made by a competent pathologist giving his individual attention to the case. It is no doubt true that most students who have gone through the medical training now required for qualification can cut a section, make a blood count, or recognize a typical diphtheria bacillus. So long as every physician and surgeon was a pathologist this perhaps was all that was necessary; but as the boundaries of the subject have enlarged, and the liability to fallacy of many methods once hailed as infallible has been recognized, it has become evident that much more than this mechanical duty is required. A pathologist must now not only be

able to supply accurate data, but he must be capable of drawing conclusions in the light of his own experience which will guide and assist the physician or surgeon. Until this is fully recognized, and some steps are taken by hospital authorities to improve the position of their clinical pathologists, the difficulty that some have experienced in finding competent men to fill their posts is not, I am afraid, likely to diminish.

While considering hospital and other public and quasi-public appointments, I should like to mention another matter of some importance. I refer to the practice of some institutions of employing pathologists at fixed salaries, and, by undertaking outside work at comparatively low fees, seeking to aid their revenues. This is, I think, an undesirable practice, and one which should be discontinued. Such an arrangement, while perhaps satisfactory from a business point of view to the institutions concerned, is hardly compatible with the principles that usually guide the conduct of the medical profession. It results either in the pathologist becoming an involuntary contributor to the funds of the institution in which he is employed, or it creates an abuse of the revenue of the profession by allowing investigations to be conducted at low or nominal fees, without distinction of class or position, for those able to pay a reasonable sum. I think that a similar abuse arises in those cases where the members of the staff of a hospital hand over material from their private cases to the hospital pathologist, and expect him to examine and report on it gratuitously.

In private practice the pathologist who does not come into personal contact with his patients is at a disadvantage as regards the determination of what may be considered a reasonable fee. For those who see cases in consultation, and carry out the more intricate and responsible examinations there is, I think, no great difficulty, for they can follow the ordinary rules of consulting practice, but in cases where minor and routine investigations, carried out solely in the laboratory, are alone required, it is not an easy matter to formulate an equitable scale of fees. The accepted practice hitherto has been to fix an arbitrary scale of charges, governed apparently by the time required for the examinations and the intrinsic cost of the materials required, allowance being made in those instances where a number of similar specimens can be grouped together. Such an arrangement can hardly be considered satisfactory, unless pathology is to be considered a mere retail business that can only be made to pay by small profits and quick returns. Nor is it satisfactory from a professional point of view to see various institutions, such as public health laboratories, hospitals, private laboratories, and wholesale and retail drug houses, advertising their scale of charges in competition with one another, as is now too often the case; for pathology, like other branches of medicine, should not be carried on as a mere business. While it is most desirable that poor patients should not be deprived of the help afforded by pathology, yet it seems anything but desirable that wealthy or well-to-do patients should be paying adequate fees to their medical or surgical advisers, and a mere pittance—perhaps even half-a-crown—to the pathologist, on whose findings may hang very vital issues.

The medical man in charge of a case cannot be expected to pay for any necessary pathological examinations out of his own pocket, nor do practitioners wish to make a profit out of such examinations as may be required by their patients, yet under existing conditions in the advertising laboratories we find that a poor patient is charged the same fee for a pathological examination as a wealthy person. The specimens from both probably receive the same attention in the laboratory, but considering that the scale of fees appears to be arranged in most instances on a basis which will just pay expenses, or only prevent a loss by the aid of subscriptions or subsidies, it is probable that if the wealthier patients had the importance of the pathological investigation and the advantage of a personal opinion explained to them, they would as a rule be glad of the opportunity offered them of receiving more individual attention and paying a larger fee. It has been my experience that such in fact is the case.

In my own practice I find the help afforded by pathology of very great value, rendering my work much more certain and definite; and when I suggest to patients, as I frequently do, that a pathological examination of the excreta or of the blood or of pathological

products is essential or desirable, and I give them the address of a pathologist whom they may confidently consult for the work, I seldom find that they neglect the opportunity of having further light thrown on their disease.

In suggesting some readjustment of the fees paid by the public for pathological examinations, and advocating wherever possible a more generous recognition of the skill and experience required for such work, I refer especially to those examinations which are only of moment to the individual. Investigations that have a bearing on the health of the community should, I think, be considered separately.

A considerable number of municipal and county authorities have within recent years started laboratories in which bacteriological examinations are made for practitioners practising within their boundaries. If, as should be the case, these laboratories confine their work strictly to notifiable diseases and examinations such as that of public water supplies, their enterprise is most commendable, and one can only hope that in the immediate future similar laboratories will be established in every district. An infectious disease such as diphtheria or typhoid, once it is epidemic in a community, is only eradicated after much delay, and with the loss of many valuable lives. It is a great cost to the persons concerned and the ratepayers of the area affected. It is, therefore, in the interests of all that such diseases should be prevented from obtaining a foothold, and that every case should be diagnosed as early as possible. No expense should be spared; in fact, it is an economy both of lives and money to keep at bay infectious disease, nor should the individual who has been unhappy enough to contract an infectious disorder be penalized. It is the duty of the community to provide, free of charge, for all its members the means by which an accurate diagnosis may be made, and every facility should be given for the early examination of suspicious cases, especially when they occur amongst collections of children or under other conditions where there is a tendency for such disorders to spread rapidly. It is also the duty of the community to determine in every case that a patient who has been isolated for an infectious disease is no longer capable of acting as a bearer of infection on his discharge. In those instances where by a bacteriological examination of the throat, nose, urine, etc., this can be done with considerable certainty (although, perhaps, at the cost of considerable time and trouble, as several successive examinations may be required), it is hardly fair that the patient should be called upon to pay for thus protecting the public; it is a duty which may reasonably be undertaken by those in whose interest it is required.

The responsibility attending bacteriological work of this character is considerable; for if a case is correctly diagnosed as diphtheria, for instance, it may cause considerable inconvenience and expense to the individual, whereas, on the other hand, if a case is declared not to be diphtheria or to be free from infection after an attack, when this is not really so, it may prove a source of danger to the public. Appointments to posts the successful working of which may mean so much should be made with great care, and every means should be taken to induce the best possible type of men to seek and hold them.

It is probable, I think, that in the future the application of pathology to clinical practice will be divided into two main branches: (1) That relating to infectious diseases and matters concerning the public health, and (2) investigations of a private character in which the individual alone is concerned. The former will be conducted in public laboratories provided with competent staffs paid by the municipal or county authorities, the latter will be provided for by private enterprise under the conditions of ordinary practice. The dividing line between the two types of work is sufficiently well marked to avoid confusion, but I think it important that it should be clearly laid down that the work of municipal or county laboratories must be strictly limited to public health matters. Unless this is done, there are some who are not likely to discover for themselves that an arrangement which applies to infectious disorders does not also include the histological examination of tumours or the chemical examination of the urine. A fundamental axiom both in public and private work is that examinations should not

be made for private individuals. The public are not in a position to appreciate the difficulties that sometimes beset the diagnosis of disease, both clinically and in the laboratory, so that unless the rule of never supplying a pathological report to any but medical men is rigidly adhered to, undesirable results are at times likely to ensue. Such a line of conduct is more difficult to enforce in public health work than in private practice; for while the former is supported out of the rates and paid for by the public, those who practise in private are at liberty to refuse the fee offered for an examination unless it is undertaken at the instance of a medical man. On their side, clinicians should offer every facility to pathologists of forming an accurate opinion, and should recognize that in a certain proportion of cases, more especially where bacteriological examinations are required, it is not justifiable to express a positive opinion merely as the result of a single experiment, and that to arrive at a reliable diagnosis often requires a considerable time.

Investigations of a private nature, not involving public health questions, should be conducted at the expense of the individual requiring them, and in those of a more difficult and complicated character, especially when the clinical diagnosis depends on the result of the pathological findings, it seems to me desirable that the pathologist should be met in consultation.

The laboratories to which material collected by the medical attendant of the case may be sent by post will, no doubt, continue to be of value for routine work and examinations, where the importance of a personal opinion is not so great.

For those unable to afford even a reduced fee, which pathologists, in common with all members of the medical profession, are no doubt willing to accept in deserving cases, the pathological departments attached to hospitals should be open. Hospital laboratories should not compete with private practice in pathology any more than they should in clinical medicine. In the early days of clinical pathology the necessary facilities and skill for carrying out many investigations were only to be found in the laboratories of the better-equipped hospitals, but this is no longer so. Private enterprise has made good the deficiency, and there is now no need for the laboratories of charitable institutions to be used to benefit others than those of the class for whom the wards and outpatient departments are provided. An important function of hospital laboratories, especially those in the large centres of population, should be to afford a practical training for men who desire to devote themselves to pathology as a profession. By acting as assistants in the various departments into which some of the more advanced laboratories are now divided under those responsible for their management, they should be able, in the time usually devoted to a resident appointment, to have obtained a sufficiently good knowledge of the practical application of bacteriology, chemistry, histology, and physics to clinical medicine to permit of their satisfactorily filling the post of pathologist to one of the smaller hospitals, or going as assistant in a public health laboratory.

Clinical pathology is as yet but a tender shoot from the parent stem of medicine. How it will grow and what form it will ultimately assume no one with certainty can predict. That it is destined to increase in importance there can be little doubt, but, in attempting to assume the rôle of prophet, I am conscious that it is a difficult and may be a thankless task, yet I feel that the present is an opportune moment for presenting my views on the subject; while a branch is yet young it may be bent, and undesirable leanings be corrected.

I have pointed out what seem to me the drawbacks that attend the practice of pathology at the present day; and, although I am not vain enough to imagine that my opinion will be generally accepted, I hope that this address may arouse interest in the subject, and lead to some improvements in practice.

THE REGULATION OF MARRIAGE.—From the New York *Medical Record* we learn that a Bill has been introduced in the Albany State Legislature prohibiting the marriage of imbecile, epileptic, insane, or feeble-minded persons, and making it a felony for sound-minded persons to marry or live in the marital state with feeble-minded, insane or epileptic persons, or to assist such a marriage.