

An Address

ON

ERRORS OF DIAGNOSIS IN MEDICINE.

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By J. R. BRADFORD, M.D., F.R.C.P., F.R.S.,
Professor of Medicine in University College, London.

MR. PRESIDENT AND GENTLEMEN,—In seeking a subject upon which to address you in response to the kind invitation of yourself and the Council of the Society I thought it desirable to choose one of general interest, and therefore I have selected after consideration the subject of "Errors of Diagnosis in Medicine." This is a matter of importance to all practitioners, not only from the frequency of our errors dependent largely on the complexity of the subject of medicine, but also, I think, because every one will admit that we learn more from a consideration of our errors than from the study of cases where the diagnosis is verified. One of the great advantages of hospital practice lies in the fact that we can so frequently verify our diagnosis. I think it is very uncommon for a *post-mortem* examination not to reveal something that was quite unsuspected even in those cases where the diagnosis may be looked upon as practically accurate. This, of course, is especially the case where as a matter of routine a complete pathological examination is made, however localized the fatal disease may have been. It is impossible to exaggerate the importance of this procedure if we desire to place medicine on a secure basis. One of the great advantages of the surgeon or the gynaecologist lies in the fact that he is constantly able to correct or amplify the conclusions that he has formed by the actual study of the parts exposed in an operation. It is unnecessary at the present day to dilate on the great improvements that have taken place in the art of diagnosis or on the fundamental importance of diagnosis in the practical treatment of disease. Almost all real difficulties in practice arise from doubts and uncertainties, not to mention errors in diagnosis.

The diagnosis of disease is based either on a study of the symptoms or of the physical signs, and as I have pointed out elsewhere there seems to be an increasing tendency to rely more and more on physical signs and less and less on symptoms. This change is, of course, mainly due to improvements in the methods of examination and the various instruments that are now available for this purpose. Still, the study of symptoms ought never to be neglected, since many diseases only produce symptoms, and in many where the physical signs are marked they only become obvious and easy to detect in the later stages, and it may be at a time when the opportunity for successful treatment has passed. Thus the study of symptoms also is of fundamental importance.

Errors in diagnosis may arise from a great variety of causes, some of them dependent no doubt on ourselves, others on the statements of the patients and others, intrinsic to the very nature of the disease itself. Some errors—perhaps most—are avoidable, but still a considerable number of errors—at any rate in medicine, and especially in visceral diseases—are quite unavoidable in the present state of our knowledge, owing sometimes to the complexity of the conditions present, sometimes to the association in the most remarkable manner of very rare diseases in one and the same patient, and sometimes—what is perhaps still more common—the fact that ordinary diseases may run an extremely anomalous course or produce anomalous signs. Thus, I remember the case of a patient who suffered from a diffuse malignant infiltration of the stomach producing the so-called leather-bottle stomach; when first seen the gastric tumour was detected and the diagnosis of malignant disease of the stomach made. A few months afterwards she again came under observation with enlargement of the liver, ascites, and dropsy, and the diagnosis was confidently made of secondary deposits in the liver, but on *post-mortem* examination the gastric carcinoma was found to be of the rare diffuse form, and the enlargement of the liver was dependent on a hydatid. An error of diagnosis in such a case as this was probably unavoidable, as there was not only the great rarity of the association of hydatid disease with cancer but the further extremely rare phenomenon of a hydatid in the liver, causing ascites and general anasarca from pressure on the vena cava.

Putting aside rarities such as this we may consider first of

all errors of diagnosis arising from the mistakes that arise in the interpretation of symptoms.

Neglect of Symptoms.

Many of our most serious errors arise from neglect of or paying little attention to the statements of patients with reference to their symptoms. Thus such a serious disease as angina pectoris may be entirely overlooked owing to insufficient importance being attached to the statements of patients as to precordial uneasiness. In all cases of dangerous or even of fatal angina the pain or discomfort is not necessarily severe, and attention should be directed rather to the situation of the discomfort than to its severity. Thus, fatal cases of angina associated with extensive fatty degeneration of the heart have often been entirely overlooked, and the discomfort that existed attributed to myalgia, when a very slight study of the characteristic distribution of the pain, not only in the chest but down the arm, should at any rate have aroused suspicions of the presence of angina. Vomiting is a symptom frequent in its occurrence and often apparently trivial, but sometimes of great importance in diagnosis. Many a case of cerebral haemorrhage ushered in by vomiting has been erroneously looked upon as mere dyspepsia or indigestion from overloading of the stomach. I have known of a case of cerebral haemorrhage fatal in some four hours from its onset where such an error was made owing to the severity of the vomiting at the onset and where the entire train of symptoms of vomiting, followed by drowsiness and coma, were attributed to such gastric disturbance.

Another symptom which is often neglected and may be of great value in diagnosis is the occurrence of retention of urine in cases of local peritonitis, or even sometimes in cases of general peritonitis where the disease is running a more or less latent course. A patient with a perforated duodenal ulcer and with his abdomen full of pus once walked into hospital presenting no very obvious signs of profound illness, and seeking advice simply on account of inability to pass water. No doubt it requires considerable discretion to attach just the right degree of importance to patients' statements, but it is probably always very unsafe to neglect a patient's symptoms simply because obvious signs of serious disease are not present at the time.

Many errors in the interpretation of symptoms arise from bad cross-examination, with the result that undue importance is attached by the patient to the questions, and by the practitioner to the answers. In order to elicit a history it is of course essential to have a suspicion of the nature of the ailment for which the patient is seeking advice, but it is very necessary to so frame the questions as not to suggest the answers. This is, perhaps, most important in eliciting a history as to pain, the questions as to this should always be framed in such a manner as not to suggest the situation in which the pain is expected to be. In some instances it may even be advisable to put the question in a negative form.

Absence of Symptoms.

A far more important cause of error in diagnosis is the very frequent presence of serious organic disease without the occurrence of symptoms of sufficient intensity to attract notice, and we should never allow the absence of symptoms to influence our opinion unless definite signs pointing to the existence of disease are also absent. No doubt in the majority of cases of latent organic disease slight symptoms may be present, but the point of fundamental importance is that the leading symptoms characteristic of the malady are very often absent. Latent forms of common disease are seen not only in numerous chronic, but also in many acute, affections. Thus general suppurative peritonitis, dependent even on such a serious lesion as perforation, may be present, and yet the cardinal symptoms, pain and vomiting, may be entirely absent. No doubt in many of these cases the peritonitis involves mainly, if not entirely, the visceral peritoneum; in others, perhaps, the virulence of the inflammation has led to the destruction of the nerve-endings; but whatever the explanation, it is a fact of the utmost importance that the abdomen may be full of pus, and a perforation of the stomach, duodenum, or intestine exist, with few or no symptoms.

Although acute diseases occasionally run a latent course, this very much more often happens in the case of chronic maladies. I will only mention a few: cerebral tumour, abscess of the brain, and the more rare condition of cerebral aneurysm may all reach a high degree of development, or may even run their entire course without the production of any symptoms sufficiently severe to attract attention. Every one

has seen or heard of cases of cerebral abscess running a latent course, and either discovered accidentally in the *post-mortem* room or else causing death, perhaps suddenly by rupture into the ventricles, and some have gone so far as to say that cerebral tumours perhaps more often exist without producing symptoms than with the well-known clinical picture of headache and vomiting associated with their presence.

Amongst affections of the chest apt to run a latent course pleural effusion is especially worthy of attention, as it is no uncommon thing to see cases where a gradual effusion has taken place into the pleural cavity and no marked symptoms have been produced till one side is full. This perhaps is especially seen in cases of valvular disease of the heart, but it is not uncommon as an accompaniment of tuberculous or of malignant disease. In many of these cases the physical signs ultimately produced are rather anomalous owing to the large amount of fluid present, and this characteristic, together with the absence of symptoms, is often responsible for errors in diagnosis.

Amongst abdominal affections, gastric ulcer, cirrhosis of the liver, tuberculous peritonitis, renal disease, may all be quoted as common instances of very serious organic diseases liable to run a latent course and not producing characteristic symptoms. Even in such a common and severe affection as cancer of the stomach it is not rare for the disease to advance to a very high degree of development without producing any serious symptoms, and I have known of a case of extensive cancer of the stomach that sought advice simply and solely on account of a secondary deposit in the umbilicus which the patient attributed to the rubbing of a button, where death occurred within a few days owing to profuse haematemesis.

Some of the most typical instances of latent disease are seen in renal affections. Thus Bright's disease and granular kidney are both of them very apt to run a latent course, and in many instances the first warning of the existence of such a serious malady is the occurrence of acute uraemia, or it may be an acute inflammatory complication, such as pericarditis, pneumonia, etc. Other renal affections running a latent course are such diseases as cystic kidney, double hydronephrosis dependent on pelvic disease; the latter perhaps is especially important to recognize, as very often the prognosis of the pelvic disease is falsified, owing to the latent renal affection.

The importance of recognizing the frequent absence of symptoms in gross organic disease lies in the fact that we must never allow the absence of symptoms to lead us to neglect examining the patient. In most of these latent diseases definite physical signs revealing the presence of serious organic disease can be elicited.

Perhaps the most important source of error with regard to the interpretation of symptoms arises from the attribution of acute symptoms to the onset of acute disease, whereas in a very large number of instances acute symptoms arise in the course of chronic disease, or, as just mentioned, in that of latent disease. Observations of this kind can be made in almost all chronic diseases, but they are especially noticeable in some affections of the nervous system. A sudden onset of paralytic or other signs is often regarded as dependent on a vascular lesion when we really have to deal with such a condition as tumour or abscess of the brain, or even in some instances with meningitis. In some of the rare forms of meningitis it is not uncommon for the first onset to be marked by the occurrence of palsy, closely simulating in its suddenness a vascular lesion. A still more striking instance is perhaps afforded by the occurrence of epileptiform seizures in an apparently healthy person, which, instead of being dependent on epilepsy are really due to uraemia from chronic progressive disease of the kidney. Such epileptiform seizures may also be the first phenomena to attract attention in such a condition as general paralysis of the insane, or even in disseminated sclerosis, and both these diseases may readily be overlooked if we are in the habit of regarding acute symptoms occurring in the apparently healthy as always dependent on the onset of acute disease.

Some of the most remarkable instances of the occurrence of acute symptoms in the course of chronic diseases are afforded by diseases of the abdomen. Thus, every surgeon recognizes that cases of acute intestinal obstruction occurring suddenly, and in those apparently healthy, are sometimes dependent on obstruction produced by tuberculous peritonitis of a most chronic character. Again, there is a remarkable variety of acute general peritonitis, often suppurative, and not dependent on any gross perforation which is associated

with cirrhosis of the liver, especially, perhaps, in young persons, and where, prior to the onset of the peritonitis, there have been no reasons to suppose the existence of grave underlying disease. In many cases the occurrence of acute symptoms in the course of chronic disease is dependent really on the malady having run a latent course until some complication has developed. This is well seen in cases of gastric ulcer where perforation occurs. In a large proportion of such cases there have been no symptoms to attract attention to the possibility of the presence of a gastric ulcer prior to the perforation.

Many other instances of the onset of acute symptoms in the course of chronic disease could be quoted, but I will only mention some cases of spinal disease where paraplegia occurs quite suddenly, simulating an acute transverse myelitis, and yet the nervous lesion is dependent on such a chronic and progressive disease as malignant disease of the spine or even aneurysm. Instances are met with where one or other of these maladies has produced extensive destruction of the bones of the vertebral column without leading to the production of any marked symptoms until paraplegia has suddenly occurred. In one instance that I know of, though sarcoma of the spine was present, the patient practically presented no symptoms until, on turning one day in bed, fracture of the spine with complete paraplegia suddenly developed.

To turn now to the consideration of errors in diagnosis that may arise from errors in the interpretation of physical signs.

Want of examination is perhaps the most fertile cause of errors in diagnosis, and one for which, of course, we are ourselves solely to blame. Numberless cases of carcinoma of the stomach or of the rectum especially are overlooked owing to want of examination, and in the former disease it is no uncommon thing for cancer of the stomach to be overlooked when the mere inspection of the abdomen would reveal the condition, without any palpation, the mass being actually visible through the wall. No case of a patient presenting gastric symptoms should ever be dismissed without an examination of the abdomen. Numberless cases of cancer of the rectum are also looked upon simply as due to piles owing to want of examination. It is probably unnecessary to dwell at any length on this subject of want of examination, and I need only further emphasize the great practical importance of always examining the urine as a mere matter of routine, and, although it may be a counsel of perfection, it is yet very desirable to examine the fundus oculi.

Mistakes in diagnosis arise not only from want of examination, but also from what may be called the *want of repeated examination*. In many organic diseases, especially acute diseases, the physical signs do not become well developed until several days or sometimes several weeks have elapsed. Pneumonia may be taken as an instance of the first and tuberculous of the second. Many who are alive to the danger of confounding pneumonia with meningitis in children still fall into the error owing to not making repeated examinations. Thus, perhaps, at the onset pneumonia is suspected and the chest carefully examined and nothing found. The symptoms become more marked and the diagnosis of meningitis at first only hazarded is subsequently believed in when a second examination of the chest after the lapse of a few days would have revealed the physical signs characteristic of pneumonia. We must all of us be aware of errors of this kind, and it cannot be too much insisted on that physical signs do not necessarily occur until a considerable time has elapsed since the onset of the malady.

Repeated examination is also necessary, because in organic disease the signs are sometimes transitory, or at any rate not persistent. One of the best instances of this is afforded by the physical signs seen in disseminated sclerosis. The ankle clonus, the diplopia, even the hemiplegia so often seen in this disease, are variable and transient in their occurrence, and repeated examination is most necessary in order to detect their presence. Similarly, no one could safely exclude the presence of granular kidney owing to the absence of albumen in the urine from a single examination; further, in such a well-marked condition as aortic regurgitation there can be but little doubt that the murmur is far more readily audible on some occasions than on others. This is well known in the case of mitral murmurs, especially, perhaps, in mitral stenosis, but it is also a characteristic of some of the slighter cases of aortic regurgitation. Hence repeated examination is not only necessary at the onset of acute diseases in order to avoid errors, but it may also be necessary in order to determine the existence of chronic and progressive maladies.

The study of physical signs may also lead us astray owing to

the fact that they alter considerably at different stages in one and the same disease. Perhaps the best illustration of this is afforded by the abdominal physical signs in cases of perforation. If such a case is seen early the abdomen is apt to be rigid and retracted, at a slightly later stage it may be almost normal, being neither distended nor retracted. Later still the well known clinical picture of distension of the abdomen with absence of the liver dullness will be present. If this fact of the alteration in the character of the signs be neglected valuable time may be lost, as it is quite possible to suspect or even to diagnose with certainty the presence of perforation long before the rigidity of the abdominal wall has passed off. In connexion with this subject it may be pointed out that diminution or disappearance of the liver dullness is a more important sign of perforation when associated with a retracted condition of the abdominal wall, or, at any rate, when it is present in the absence of general distension of the abdomen. Cases are seen sometimes of perforation with very great diminution in the area of the liver dullness, if not of complete disappearance, where the abdomen is otherwise natural, neither distended nor retracted, and where pain and tenderness may be absent. In such cases as these the diminution or disappearance of the liver dullness may be the solitary physical sign that draws attention to the very serious and dangerous condition in which the patient is. It is possible that in many of these cases where other symptoms are absent the peritonitis is limited to the visceral peritoneum.

There are numberless instances in which the alteration of physical signs at different stages of the malady may cause errors in diagnosis. Time will not allow me to allude to many of these, but I may draw attention to the fact that in some cases of pneumonia, during the stage of resolution, cavernous breathing, sometimes almost of an amphoric type, may be heard, together with such an abundance of bubbling râles as to lead to the idea that the whole lung is breaking down, and that one is dealing rather with a tuberculous than with a simple pneumonic infiltration; and yet in the course of a few hours, or at most a day or two, the signs all clear up, and the subsequent history as well as the previous course of the illness show that one has been dealing with pneumonia.

Erroneous Interpretation of Physical Signs.

Another very common source of error is, of course, the erroneous interpretation of physical signs, and perhaps this applies more especially to the chest, and, most of all, to fluid in the chest. At the present time our teaching lays down certain so-called characteristic signs of fluid in the chest, but these—as every one knows—are apt in different cases to vary considerably, and, for my part, I think it would be simpler if, instead of talking of the physical signs of fluid in the chest as a whole, we were rather in the habit of detailing the physical signs characteristic of the different conditions and positions in which fluid is present in the chest. In other words, the physical signs depend very largely not only on the amount of effusion present, but especially on its anatomical relation to the surrounding structures.

Thus the physical signs of an empyema are often quite different to those of a pleural effusion. This does not depend on the fluid in the one case being purulent and in the other serous, but to a far greater extent on the fluid in the one case being localized and in the other case free. With an ordinary pleural effusion the lung, as is well known, is compressed towards the root or pushed upwards, whereas in the case of an empyema the purulent effusion is, so to say, hung up between the chest wall, on the one side, and the lung on the other side. This is probably the reason why breath sounds are absent in one case and loud tubular or blowing breathing is so often heard in the other. It is very unsatisfactory to have to teach that fluid in the chest may be accompanied by absence of breath sounds or by loud tubular breathing, and such apparent uncertainties as this make the student regard the whole subject as an airy fancy; but if we do not describe these physical signs as those of fluid in the chest, but talk of the physical signs of a simple free pleural effusion, on the one hand, and of those of empyema on the other, the gain is great; and we further emphasize the well-known fact that empyema is infinitely more likely to be confounded with pneumonia than the latter with pleural effusion. The physical signs of fluid, then, depend to a great extent on the anatomical relationships of the fluid. Further, the physical signs of a moderate effusion are totally different to those of a very large effusion. In the latter case loud bronchial breathing is very apt to be

heard, perhaps all over the chest, owing to the free conduction of the sounds through the fluid; and hence, again, large pleural effusions are apt to be confounded with solidification of the lung.

Another fertile cause of error in diagnosis of diseases of the chest is an erroneous interpretation of skodaic resonance. This is a physical sign of great value, but in order to detect it light and careful percussion must be employed.

To pass from diseases of the lungs, it is well to remember that aneurysms of the aortic arch are liable sometimes to increase in an anomalous fashion and to produce physical signs which may be readily misinterpreted. Aneurysms of the arch usually enlarge upwards and forwards and present to the right of the sternum; such cases give rise to little difficulty. Exceptionally, however, the main growth takes place in a downward direction and to the left, so that the pulsating tumour presents to the left of the sternum in the precordial area, and the heart may be displaced in such a fashion that the aneurysmal pulsation occupies more or less the situation of the normal cardiac impulse. Such cases are often extremely difficult to recognize.

Pericardial effusion, if of a latent type, may present many points of resemblance both in physical signs and symptoms to those of dilatation of the right side of the heart. Indeed, cases of chronic bronchitis and emphysema associated with dilatation of the right side of the heart may sometimes present very close resemblances to the train of symptoms and signs seen in a large chronic pericardial effusion. This is one of the many reasons why it is much safer to treat a large pericardial effusion by incision than by paracentesis pericardii, and serious accidents may happen from paracentesis where such an error in diagnosis as just mentioned has been made.

In the case of diseases of the abdomen, the number of errors in diagnosis from erroneous interpretation of signs is so great that it would be quite impossible to deal with them here, and I will only draw attention to one or two. In some cases it is difficult to distinguish between an abdominal growth and a mass that is liable to be produced as a result of various chronic inflammatory processes. This may be seen not only in diseases in the vicinity of the appendix, but also in the great thickening that sometimes takes place round about a gastric ulcer, the gall bladder, or the pancreas. In many of these conditions the mass may be so hard as at once to suggest the presence of growth. The normal pancreas is not uncommonly palpable in patients with thin abdominal walls; it is often exceedingly hard and may be mistaken for a growth, but of course such an error is much more likely to be made when the organ is enlarged from chronic pancreatitis; many of the cases of supposed recovery from malignant disease are undoubtedly to be explained by such errors.

Strange as it may seem, movable kidney is often confounded with new growth. This mistake is apt to arise for several reasons. Many patients with movable kidney are wasted and not a few present marked gastric symptoms from dilatation of the stomach, and after all a pyloric tumour may sometimes present points of superficial resemblance to a movable kidney. At any rate the mistake is not infrequently made.

In some instances considerable difficulty may be experienced in distinguishing between splenic and renal tumours. This arises principally from the fact that in exceptional cases splenic enlargement does not follow the usual course, in an oblique direction across the abdomen, but the spleen becomes more or less vertical in position; in such instances there may be considerable resemblance to a renal tumour.

Mimicry in Disease.

We have now considered the errors that may arise in the interpretation of symptoms and of physical signs, but in addition to these there are many other causes of errors in diagnosis and in many of these conditions it is not so easy to avoid falling into error. Amongst the first in importance is what may be called perhaps mimicry in disease. We meet with at least two forms of this; functional diseases very often produce a clinical picture closely resembling that of organic, and in the second place organic disease of one organ may produce effects mimicking organic disease of some other and distant part of the body.

The mimicry seen between functional and organic diseases is especially important owing to the fact that not only may there be considerable points of resemblance between the two, but also because it would seem that in some instances definite organic diseases in the initial stages of their evolution present nothing but so-called functional symptoms or signs. The difficulty in distinguishing between functional and organic

diseases is recognized in the case of the nervous system; but, as a matter of fact, this difficulty is also experienced in many other maladies—as, for instance, in diseases of the heart, and also in diseases of the kidneys.

No better instance in the case of the diseases of the nervous system could be quoted than the very close resemblance sometimes seen in the phenomena of functional and hysterical palsies on the one hand and the phenomena of disseminated sclerosis on the other hand. Many of the errors in confounding these two maladies arise from the neglect of the fact already mentioned—that in disseminated sclerosis the signs may be transient, and hence the disappearance of a certain physical sign for a time is not to be regarded as conclusive evidence of the functional nature of the malady.

In the case of diseases of the nervous system the usual mistake is to regard what is really an organic disease as a functional affection, although of course the opposite error is occasionally made. In some organic diseases the incipient stages of the malady are often mainly characterized by the occurrence of functional effects, and a notable instance of this is seen in the case of general paralysis of the insane, where it is by no means uncommon for the earliest manifestations to be of a neurasthenic type.

Passing on to the consideration of other affections, it may be noted that the more severe effects produced by tobacco on the heart may sometimes closely resemble the signs and symptoms of mitral disease, the heart may become dilated, the pulse irregular, and even a murmur be present, and yet the whole condition be functional and transient; with the cessation of the cause the heart soon returns to its normal condition.

In diseases of the kidney so-called functional or postural albuminuria may be confounded with the albuminuria of the granular kidney, since the latter may present well-marked postural characteristics, being most marked in the morning and diminishing or disappearing in the late afternoon. In other words, the postural characteristic is not necessarily to be regarded as a sign of so-called functional or physiological albuminuria. Further, many a patient with granular kidney or some other forms of chronic Bright's disease may present at the time when he seeks advice only so-called neurasthenic symptoms.

These instances are sufficient to illustrate the point that errors in diagnosis may arise from confounding functional and organic diseases.

Mistakes may not only arise from confounding functional diseases with organic affections, but also from organic disease in one organ simulating an affection of some distant organ. Numerous instances of this are seen in medicine, and some of our gravest errors in treatment arise from mistakes of this kind. One of the best known instances of this kind of error is afforded by the confusion which sometimes exists between typhoid fever and meningitis. Although usually there is really no great resemblance between these two maladies, sometimes there is a marked similarity, especially at the onset, and it is a mistake that is far more likely to be made in the case of children than in adults. In fact, it may be said that it is an error that is really more associated with the age of the patient than with the particular disease, as there are a number of affections which may simulate meningitis very closely in the case of children. This error may be made not only in the case of enteric fever, but also, as is well known, in the case of pneumonia, and to a less degree with other affections, as, for instance, otitis. The more usual error is to diagnose meningitis when either enteric fever or pneumonia is really present; but sometimes the mistake is made in the opposite sense, and typhoid is diagnosed when meningitis is really present complicating such a condition as tuberculous disease of the abdomen with tuberculous enteritis. No doubt modern methods of diagnosis, and especially the occurrence of the Widal reaction, diminish the frequency with which such errors as these are made, but the difficulty very often is most marked during the first week of the illness, when the Widal reaction is often absent. In the case of pneumonia the mistake can be avoided, as already pointed out by frequent examinations, and very frequently a shrewd guess that the affection is really pneumonic, and not meningeal, may be hazarded from the presence of the characteristic frequency of the respiration seen in pneumonia.

One of the most difficult class of cases is that in which otitis dependent on pneumococcal infection is present, together with high fever, really dependent on the onset of pneumonia, but where sufficient time has not yet elapsed for the development of the characteristic pneumonic signs. Such cases are very

apt to be diagnosed as otitis complicated by meningitis. A few days' delay will often reveal the true nature of the case, but on the other hand such delay is dangerous if the ear affection is really complicated by some intracranial affection.

Another most important group of cases is that in which inflammatory mischief in the chest—as, for instance, pleurisy or pneumonia—simulates an acute abdominal affection such as peritonitis. It is now well recognized that basal pleurisy is extremely liable to be accompanied by symptoms referred to the abdomen, such as pain and even tenderness; and, inasmuch as the onset of acute inflammatory affections is very liable to be accompanied by vomiting, the occurrence of pain, tenderness, and vomiting, is very prone to suggest an acute local peritonitis when an examination of the chest reveals commencing pleurisy or pneumonia. Laparotomy has been performed more than once under the impression that typhilitis was present, when pneumonia was really the cause of the abdominal symptom. Sometimes such errors are made simply from want of examination of the chest, but in rare instances the physical signs in the chest at the onset are very slight and may even be absent. Such mistakes are most likely to be made in cases of right-sided pleurisy and pneumonia, but errors of a similar kind may be seen in other thoracic diseases. Thus pulmonary thrombosis and pulmonary embolism may sometimes be ushered in with very severe pain in the upper part of the abdomen, and the degree of collapse may be so great as to suggest the possibility of the occurrence of a gastric perforation. I have known a case of pulmonary embolism dependent primarily on thrombosis of the iliac vein in chlorosis to be mistaken for perforation of a gastric ulcer, and have seen more than one case of thrombosis of the pulmonary artery where the pain was entirely referred to the epigastrium and upper abdominal area. Another thoracic disease, which may cause very severe pain referred to the abdominal area, is pneumothorax, and I have known an instance where the occurrence of pneumothorax in a case of early phthisis was erroneously diagnosed as renal colic owing to the pain, very severe in character, being referred to the left hypochondrium and lumbar region.

In many of these cases of abdominal pain in thoracic diseases the explanation is to be sought in the anatomical distribution of the lower intercostal nerves. These nerves supply the abdominal wall, and, inasmuch as they are only covered by the pleura in the posterior part of their course, the inflammatory mischief in the chest may directly implicate the trunk of the nerve and so cause the reference of the pain to the apparently anomalous situation.

In pelvic diseases pain is often referred down the leg, and, therefore, is apt to be mistaken for sciatica. This is a very serious error, as most of the pelvic diseases causing referred pain in the leg are of a severe type. Such important diseases as caries of the spine, malignant disease of the rectum, and malignant disease of the bones of the pelvis, may all produce symptoms closely simulating so-called sciatica; and although when the patient is first seen the serious organic disease underlying the pain may not have produced signs sufficient to cause their detection, yet repeated examinations at suitable intervals will often enable their presence to be detected. Most of the mistakes of this kind arise either from the serious causes being entirely overlooked, or else from the want of repeated examination; nothing being found the first time, it is too hastily assumed that no serious cause is present.

Many other instances might be quoted illustrating the confounding of one organic disease with another, but I will only emphasize the great danger there is of confounding carcinoma of the stomach with chronic gastritis. We do not usually experience much difficulty in distinguishing between cancer of the stomach and ulcer, but there is often great difficulty in distinguishing between cancer and simple gastritis.

Anomalous Symptoms in Common Diseases.

Another potent cause of error in diagnosis arises from the fact that many common diseases are apt to exist in anomalous forms, and it is more especially common for their onset to occur in an anomalous manner. Thus enteric fever may begin in a great variety of ways very different from the typical insidious onset, and it is important to remember that at its onset anomalous initial rashes may be present very closely resembling those seen in measles and in scarlet fever. If this is not recognized very serious errors may be made affecting not only the patient but the community. In some instances enteric fever may begin with marked joint symptoms, pain

and even effusion into some of the joints being present and producing a considerable resemblance to rheumatic fever. Usually some symptoms very soon occur that show that the case is not one of ordinary rheumatic fever or of scarlet fever or measles, but the fundamental point is that we should not adopt any form of treatment which may be harmful should the case turn out to be one of enteric fever.

Tuberculous peritonitis is a disease that is apt to be very protean in its manifestations, sometimes coming under observation simulating cirrhosis of the liver, in other cases presenting resemblances to malignant growth, in others simulating acute intestinal obstruction under a band.

Again, many very chronic diseases of the nervous system, tabes for example, sometimes may have an apparently sudden onset, in other words the patient quite suddenly becomes ataxic, although it is not very obvious to what this sudden onset of symptoms is due. On examination such patients show well-marked signs of the disease, and very often a history is obtained that points to the conclusion that the malady has really long been present. It cannot be too frequently urged that acute symptoms may occur quite suddenly both in the course of chronic and of latent diseases as well as at the onset of acute maladies.

Errors Dependent on Treatment.

We must also, I am afraid, admit that some of our errors in diagnosis are dependent on our treatment. It is well recognized that some of the most disastrous errors in the diagnosis of abdominal diseases arise from the too-ready administration of morphine to relieve the pain, so that all the symptoms and sometimes even the signs of the underlying condition are masked.

Belladonna is a drug which not uncommonly produces very marked symptoms in the course of its use in the treatment of disease. Thus, meningitis may be erroneously diagnosed in a case of phthisis where the whole trouble is really dependent on the employment of belladonna administered to relieve the cough. Again, in Graves's disease the use of belladonna may produce excitement almost of a maniacal kind and simulating very closely the profound psychical disturbance that is seen in the more serious forms of Graves's disease.

Alcohol is not uncommonly pushed to an extent to produce coma, which is then regarded as dependent on the underlying malady, and sometimes anomalous symptoms may be dependent, as every practitioner knows, on the patient secretly obtaining some variety of alcohol.

The Natural History of Disease.

In order to avoid as far as possible errors in diagnosis, we must not only be cautious in interpreting the value of symptoms and careful in our examinations to detect physical signs, but it is of paramount importance to be familiar with the natural history of disease, and especially to know thoroughly the various modes of onset of particular affections, and the very diverse clinical pictures that are produced by one and the same disease in different individuals. Gastric ulcer, phthisis, malignant endocarditis, general paralysis of the insane, tuberculous peritonitis, and granular kidney are all instances of common maladies which may present very different modes of onset, and it is far more important to recognize the various clinical types or groups of symptoms presented by common diseases than to remember all the various symptoms which may be produced by any given disease. The important point is that these symptoms may in different instances of the same disease be differently grouped. Thus, one patient with gastric ulcer will present symptoms of a hæmorrhagic type, another simply those of chronic gastritis, a third perhaps will only present signs of anaemia, and a fourth no signs at all until a perforation occurs. What is true of gastric ulcer is true of many other common chronic diseases, and the importance of studying the natural history of acute or chronic diseases cannot be overestimated if we wish to avoid errors of diagnosis.

DESTRUCTION OF A BRAZILIAN MEDICAL SCHOOL.—The Medical College of Bahia, Brazil, with all its equipment and valuable library, was almost totally destroyed by fire in March. The loss of the reference books and numbers of rare works of the early masters and files of medical journals is irreparable, but the Government is already taking steps to replace the building and to equip it with modern appliances. The official medical journal published there—the *Gazeta Medica da Bahia*—was founded in 1866, and is now in its thirty-seventh volume.

SOME OBSERVATIONS UPON THE MICRO-ORGANISMS OF MEAT POISONING AND THEIR ALLIES.

By H. DE R. MORGAN,

M.A. Oxon., M.R.C.S. Eng., L.R.C.P. Lond., D.P.H. Camb.

[From the Bacteriological Department, Lister Institute of Preventive Medicine.]

THE typical representative of the bacterial flora of the normal intestine is the colon bacillus, its natural habitat being the digestive tract of man and animals. The typhoid bacillus is the most familiar example of those organisms which from time to time invade the intestine of man and produce disease. The colon and the typhoid bacillus, besides this contrast in infective properties, present biological and cultural features by means of which they can be differentiated outside the body. In addition to these established types, there occur in the healthy, and diseased, intestine a large number of organisms of an intermediate character, some approaching to the colon, others to the typhoid type. The colon group, for example, has been found to embrace a number of varieties of undoubtedly the same species. These varieties do not, however, appear to possess any special pathological significance. On the other hand, there occur amongst the intermediate forms, species of micro-organisms with distinct pathogenic properties for man and animals, of which the dysentery, the hog cholera, the meat poisoning and the paratyphoid group have now been identified. It has further been shown that relationships exist between certain of these groups of organisms, as evidenced by the possession of common biological properties. This is particularly the case with regard to the agents of various septicaemias in the lower animals, notably the hog cholera group, and the affinity its members bear to the meat poisoning, and paratyphoid, group of bacteria.

The life-history of such of these organisms as are pathogenic for man and their possible derivation from animal sources—cattle and swine—is a subject that merits careful and prolonged investigation. The problems raised are akin to those met with in other fields of research on the inter-communicability of disease agents—for example, bovine and human tuberculosis, rat plague, and human plague. The refinement of bacteriological methods has enabled a considerable advance to be made in the classification of the septicaemic organisms, whilst the agglutination test has furnished a delicate method of sifting out the homologous species of such pathogenic bacteria. At the same time but little definite knowledge exists as to the distribution of these organisms outside the actual morbid process.

The main object of the present research was to investigate the distribution of organisms of the meat poisoning and paratyphoid groups, more particularly in the intestines of healthy animals. I have endeavoured to determine in how far the organisms isolated from the normal intestine conformed in type to those met with in certain septicaemias of animals, and in meat poisoning, and paratyphoid infections in man.

HISTORICAL.

Meat poisonings are those diseases in man, usually epidemic in character, due to the consumption of meat from unhealthy animals—generally cattle (cow, calf), and more rarely the horse, pig, and goat. The animals commonly suffered from enteritic or septic processes. The agents of these diseases in animals produce at times in man a septic or infective enteritis.

Ostertag¹ records from 1880-1903 ninety outbreaks of this form of meat poisoning, with about 4,000 cases. One may assume that the number of unrecorded cases was also considerable.

The symptoms vary in character and severity, and three forms of the disease have been described, namely, a gastro-enteritic, a choleraic, and a typhoid.

An important fact to be noted is that such cases of poisoning are not due to putrid meat or its toxins. The meat appears to be healthy, and is without smell or unpleasant taste. The poisoning is due to virulent bacteria present in the meat which invade the intestines and body.

One must differentiate from this another form of food poisoning due to a *post-mortem* multiplication of saprophytic bacteria in a foodstuff, resulting in the production of highly toxic substances. The latter is usually termed allantiasis, botulism, or sausage poisoning. The disease is caused by eating decomposed sausages, or other forms of preserved meat