

An Address

ON

THE VALUE OF  
PATHOLOGICAL AND X RAY EXAMINATIONS  
IN ABDOMINAL SURGERY.

*Delivered at the Dorset County Hospital, Dorchester, at  
the Opening of the new Pathological Department and  
X Ray and Electrical Rooms on Sept. 21st, 1921,*

BY JAMES SHERREN, C.B.E., F.R.C.S. ENG.,  
SURGEON TO THE LONDON HOSPITAL, ETC.

SURGERY has a fascination possessed by few occupations. By its aid diseases and injury, incurable by nature alone or aided by altering the constitution of the body fluids, can be eradicated or assisted in such a way that natural processes are enabled to bring about a cure. This work can be carried out so that its benefits are obvious to the naked eye; it is the one direct method we have to-day of combating disease which is already established in the body. Enthusiastic as we may be about operative methods of treatment, we all look forward to the day when the causes of surgical diseases are known with certainty and measures can be taken to prevent their development. It is, however, only with the help of departments such as it has been my privilege to open to-day that this can be brought about. The establishment of these in hospitals and the recognition of the invaluable aid they can give is one of the greatest advances in modern surgery.

Surgery has many branches; that dealing with the abdomen is the one in which I take the greatest interest and led to the title of this address. It would, perhaps, be an exaggeration to say that there is no such thing as abdominal medicine, but the abdomen is a region of the body that should be approached with a surgical mind. Many lives would be saved and much suffering avoided if this were done. How many cases of carcinoma of the stomach, to take a common example, have been told that there was nothing seriously wrong, finally to seek surgical aid when the condition was too far advanced to be benefited. How many tragedies does this not call to mind! I recently saw a gentleman with an enormous inoperable mass in the abdomen who, on retiring from business nine months previously, developed suspicious gastric symptoms. His medical attendant wished him to see a surgeon; the patient's friends said "No—he will surely be operated on." He was diagnosed flatulent dyspepsia—allowed to go for a trip round the world and returned inoperable. Never a month passes but I see cases of this nature.

The surgeon is the only individual who has the correlated knowledge of symptoms, signs, and the actual condition of parts as seen during life. This clinical knowledge cannot be possessed by the physician. We have too often heard it said of patients—"he was afraid to go to a surgeon as he would be certain to operate." The public seem to think that surgery is synonymous with operating; this fallacy ought to be seriously combated. The modern surgeon is not an operating machine, although if he has to bring this art into play he should have a rapid and sure technique with the power of quick decision when faced with the unexpected.

THE STATUS OF A HOSPITAL DEPENDENT ON ITS  
SPECIAL DEPARTMENTS.

One judges of the value of the work done by a hospital, not by the beauty of its wards or the up-to-date nature of its operating theatres, valuable as these are in treatment, but by the special departments, particularly those for pathological and X ray investigation, and the use that is made of them. Without the facilities given by these, not only can

there be no life in our work but no progress; the dry bones of surgery can only live when breathed upon by knowledge gained from such investigations.

Surgery is now so wide that no one individual can thoroughly master the whole of it and be equally at home in the cavity of the skull and in the abdomen; of those special branches of medicine dealing with the departments of which I have been speaking still less are we able to do the work ourselves even had we the necessary training. Team work is inevitable. It is, of course, impossible to have a team without a head; a cricket team without a captain stands as little chance of winning matches as a ship in which all men are equal has of ever reaching its destination. The only individual who possesses the necessary knowledge is the clinician; he alone knows the nature of the symptoms and realises, perhaps dimly, their meaning, and as a result of that valuable asset, clinical experience, he can determine the nature of the investigations required for diagnosis and of the special forms of treatment that may be requisite. His must be the guiding hand.

Before discussing the great value of these methods I should like to emphasise that, in the abdomen, the history as given by the patient must ever be the most important factor in diagnosis, which would, in most cases, be impossible on pathological and X ray investigation alone. In some branches of surgery the history may not be so important to diagnosis. X ray examination reveals the fracture and its nature; microscopic examination of a portion of an ulcer of the tongue tells us that we are dealing with malignant disease. But in investigating abdominal disease we cannot obtain such direct evidence, and these methods have to be fitted in with the history which is usually the last court of appeal. The functions of a pathological laboratory are manifold; not only have histological investigations to be carried out, often at short notice, but bacteriological and chemical. The clinical pathologist needs to be familiar with every method of investigation.

SPECIAL INVESTIGATIONS IN ACUTE CASES.

In acute abdominal emergencies no time should ever be wasted. A careful history must always be taken; this, with the symptoms and physical signs and examination of the urine, which ought never to be neglected, must be our guide. After all our reliance must be on ourselves. To await some special form of investigation while peritoneal infection or damage to intestine is possibly increasing is quite unjustifiable. In the less acute cases we may obtain much help; where no great danger is anticipated by delay every endeavour should be made to come to an accurate diagnosis before the abdomen is opened. For example, acute tuberculous peritonitis may sometimes lead to the suspicion of typhoid, a disease of protean types. Our laboratory colleague at once is able to tell us the blood reaction and its degree.

In the diagnosis of complications arising during recovery after operation we may get much help. To take, as an example, the disease of which there can be no doubt that surgery in the first few hours is the only justifiable treatment—appendicitis. Unfortunately we do not get all as early as this, and it is these late cases that often tax our skill to the utmost if we are to bring them to a successful termination. All may not be going well, there is a rise of temperature perhaps to 100° each night, and rectal examination and examination of the chest does not reveal the cause; a blood count will give us the warning of the formation of a residual abscess. Again, when there is suspicious dullness at the right base without displacement of the heart, X ray examination of the chest may show us the situation of the fluid—above or below the diaphragm. If below, we know from experience that it is certainly pus and also the great danger of delay—in these cases following appendicitis. I am a whole-hearted sceptic as to the value of vaccine treatment, in acute abdominal conditions at any rate. I have never known it do good so shall not discuss it.

X ray examination is invaluable in cases of acute right-sided pain, so often diagnosed incorrectly as appendicitis. At every period of duty at hospital when the house surgeon is new I am asked to see these cases of acute pain in the right iliac fossa as appendicitis, which they certainly are not; of the nature of some of them I am still uncertain. All with any surgical experience of the abdomen will recall cases in which the appendix was removed and a stone was later found in the ureter and had to be treated by operation or passed naturally, and many more in which the appendix was removed without relief for pain confined to the right iliac fossa. X ray investigation and careful examination of the urine will prevent the former mistake being made.

We must always be on the alert for tubal pregnancy and disease in women: these are frequent causes of unilateral pain, but tubal disease does not usually require immediate operation. One serious condition requiring immediate interference which may give rise to right-sided pain is perforation of a duodenal ulcer. In cases in which this is subacute and the fluid escapes slowly it may trickle down on the outer side of the ascending colon and give rise to right-sided symptoms; knowledge of this fact will prevent these cases from being overlooked.

#### SPECIAL INVESTIGATIONS IN CHRONIC CASES.

I will now pass to the type of case in which special investigations are so often necessary; in at least 90 per cent. of chronic cases we should have recourse to the pathological or X ray department at some time during the illness, either for diagnosis, prognosis, or both. Chronic abdominal diseases fall into two groups, those in which the diagnosis can be made by clinical methods—particularly careful history-taking—and those in which the symptoms are not clear and do not conform to those of any named disease. It is in the latter group that special methods of investigation are so helpful, although they should never be neglected as confirmatory evidence in the former.

I should like to give two examples from the latter group to illustrate my meaning. Both were women with left-sided pain, and in both the pain was diagnosed as renal in origin. The history in neither was typical; the pain—in its site and spread—did not have all the characteristics of renal pain; neither did it have the characteristics of pain due to the disease from which the patients were found eventually to be suffering—in one, an hour-glass stomach with a posterior ulcer eroding the pancreas, in the other malignant disease of the splenic flexure of the colon. By X ray investigation the correct diagnosis was made, which enabled me to carry out operative treatment successfully knowing beforehand the condition with which I had to deal.

#### VALUE OF X RAYS IN ABDOMINAL DIAGNOSIS.

In speaking of the value of X ray work in abdominal diagnosis one naturally starts with its earliest victory—that of revealing calculi in the urinary passages; this of itself is of the greatest value, not only in those elusive cases of right-sided pain, but also in many left-sided. Disease of the stomach, gall-bladder, and the appendix may all give rise to pain in the left iliac fossa and a suspicion of ureteric calculus raised, to be settled by this method of examination. This left-sided pain in chronic posterior gastric ulcer and in diseases of the gall-bladder is more common than is generally realised. It is unfortunate that so far X rays cannot reveal gall-stones for us with the same accuracy as they do stones in the urinary tract. The frequency, however, with which they are demonstrated is yearly increasing with greater knowledge and improved technique. While from time to time we are able to get positive results, the constitution and size of gall-stones differ so much that no reliance should be placed on negative reports; and we must always bear in mind that the causes of biliary colic are numerous and that a typical attack is not neces-

sarily diagnostic of gall-stones. We have, therefore, to rely on our history, symptoms, and physical signs; we must make our diagnosis of biliary colic from history and symptoms, and occasionally are able, from symptoms and signs, to determine, definitely, its cause. If the diagnosis of biliary colic is to be correct, we must realise that the pain never starts in the gall-bladder region, but is epigastric or right round the waist as a band, in the back, and occasionally the left side.

The introduction of X ray investigation of the alimentary tract after an opaque meal has advanced our knowledge of abdominal anatomy and physiology, and, in certain cases, is a great aid in diagnosis. It has also the somewhat doubtful advantage that a shadow of the viscera can be depicted in a photograph that may be presented to the patient showing the dropped stomach or the dropped colon, whichever it happens to be the fashion to treat. The whole subject of visceroptosis is so complex and bound up with the well-being of the abdominal autonomic nervous system that it is very difficult to believe that any form of operation fixing ptoses of this description is likely to be of permanent good; in fact, more harm than good has been done in many of these cases. It is a treatment that should only be carried out as a last resort. I am not yet convinced that the mere fact that the stomach or cæcum is lower than is considered normal is any sign of disease.

X ray examination after an opaque meal may confirm the opinion formed that the case is one of visceroptosis, and, thus, if other disease can be excluded, in my opinion unlikely to be helped by operative treatment. We must guard against a too ready acceptance of this diagnosis. The symptoms of the condition are so various that it is difficult to be certain, and I always remind myself that the fact that a patient has visceroptosis does not shelter him from other more serious abdominal disease. Gall-stones, which it frequently mimics, are not infrequently found, and I have known carcinoma of the stomach overlooked in these patients, as it probably would not have been had an opaque meal been given.

#### ROUTINE X RAY EXAMINATION IN A GASTRIC CASE.

The opaque meal should be given six hours before the patient is to be examined. The first point to note is the rate of passage of the meal through the intestinal canal, much more important above than below; normally the whole of it should have left the stomach in five hours and the head of the meal should be half-way across the transverse colon. Any residue in the stomach is evidence of gastric stasis and denotes some organic lesion, the nature of which may be at once apparent by definite signs indicating the presence of carcinoma or ulcer. But these may exist without stasis; in this case a residue may sometimes be seen in the crater of an ulcer. The actual time taken for the material to leave the body is not important; there are such wide variations in individuals of normal health. It is important, however, that there should be no undue delay in the small intestine; such delay is, however, rare. The question of intestinal stasis and its treatment is so involved and of so controversial a character that I could not profitably discuss it briefly. I would, however, remark that I believe it is rarely necessary to operate, and that the failures of operative treatment far exceed the successes.

After these points have been noted, if the diagnosis is not clear the patient is again given a meal, and the tone, peristalsis, and position of the stomach first investigated. Filling defects indicative of growth, niches or accessory pockets, direct evidence of ulceration, may be noted, or the presence of a bilocular or hour-glass stomach. In the organic type the two pouches are rarely seen filled simultaneously, the fluid not infrequently being held in the upper for a considerable time before passing into the lower. The spasmodic type in which the stomach is  $\omega$ -shaped does not necessarily or usually denote an ulcer.

I have very briefly sketched out what should be looked for in the routine X ray examination of a gastric case. Before dealing with its value in diagnosis in the various gastric lesions I must speak shortly of its utility in diseases of the colon.

#### VALUE OF X RAY INVESTIGATION IN DISEASES OF THE COLON.

Except in the unusual cases in which we wish to estimate the stay of intestinal contents in this part of the alimentary canal, the opaque material is usually and, in my opinion, better administered by enema. We are able to demonstrate angulations, enlargements, and the changes caused by diverticulitis, all of the utmost importance. In the diagnosis of carcinoma it may be of the greatest help. Every suspicious case should be so investigated by X rays as a routine. Here, again, I would warn against accepting a negative finding if it does not agree with the clinical diagnosis. The possibility of carcinoma of the lower bowel should never be dismissed until examination with the sigmoidoscope has been carried out.

Malignant disease of the colon is very amenable to surgical treatment and the prognosis is good; yet how seldom do we see cases of this disease when they are really operable, not because the condition does not produce symptoms, either pain or diarrhoea, but because so little attention was paid to them. Every complaint of abdominal pain or discomfort or of anything abnormal should call for investigation by all the means at our disposal. This is one of the reasons for the statement at the beginning of my address—all abdominal cases should be considered surgically.

The early symptoms of carcinoma of the colon are usually irregularity of the bowels or painless diarrhoea. Sometimes there is colicky pain—general, or it may be in the right iliac fossa. This site for the pain has caused many errors in diagnosis; for example, I was asked to operate on a patient for intestinal obstruction on his landing from New York, after a recent operation in Canada, for "appendicitis." On seeing the patient I found that the appendix had been removed for pain confined to the right iliac fossa, due to carcinoma of the pelvic colon. This is by no means an uncommon error. Much more generally recognised is the difficulty in diagnosis between certain cases of carcinoma of the cæcum and a mass due to disease of the appendix. In both there may have been attacks of colicky pain in the mid-line. I have known mistakes made in both directions. Usually the history and physical examination is sufficient to enable the diagnosis to be made; X ray examination after an opaque enema usually clinches it at once, revealing in the one the irregular filling defect, in the other the narrowing of the cæcum from external pressure.

Left-sided pain is rarely a symptom of carcinoma of the pelvic colon; it is much more common in disease of the gall-bladder and stomach. I have had several patients with gall-stones sent to me as carcinoma of sigmoid. Adult patients with looseness of the bowels must be seriously investigated, and X ray examination is one of the most valuable methods and should never be neglected.

The help given by the investigation of the stools, not only in inflammatory disease of the colon but in pancreatic and obstructive jaundice, is often of the greatest use in diagnosis and treatment.

#### PATHOLOGICAL CHEMISTRY OF THE STOMACH.

It is no exaggeration to say that without access to a pathological laboratory efficient abdominal surgery is impossible. In dealing with diseases of the stomach chemical pathology is of great assistance. I attach importance to the examination of the gastric contents after a test-meal, both in diagnosis and prognosis. I have been in the habit of employing the Ewald test breakfast. With regard to the fractional test-meal much work is still being done and valuable physio-

logical information obtained, but for surgical work it has, at present, no advantage over the simpler method of examining the gastric contents one hour after the meal. Some years must elapse before sufficient observations, checked by operative investigation, have given data to render it so satisfactory a guide.

Certain precautions are necessary; the meal must be examined in the same laboratory under the same staff. All mine have been done by Dr. P. N. Panton in the manner which he described with Dr. H. L. Tidy. It has its greatest use in diagnosis, in chronic duodenal ulcer, and certain cases of carcinoma, in prognosis, after gastric operations.

Considerable discussion has taken place with regard to the action of gastro-jejunostomy in bringing about the healing of an ulcer and in preventing the formation of other chronic ulcers elsewhere. I have shown by numerous specimens, obtained post-mortem, and by examination at operations performed for other conditions up to 11 years after, that chronic ulcers of the stomach and duodenum if they are "free" will heal and remain healed after a gastro-jejunostomy correctly performed. Also that the formation of ulcers in the region of the anastomosis is dependent upon gastric acidity. The operation is not entirely, or, in my opinion, chiefly mechanical; the change it produces in the chemistry of the stomach is of great importance. By the new opening it allows rapid emptying of the stomach and counteracts pyloric spasm, but before long food leaves again by the pylorus with no ill-effect. It should immediately abolish the free HCl and diminish by from half to two-thirds the total gastric acidity. This it does in at least 90 per cent. of cases, and in these success is certain; no fresh ulceration can take place under these circumstances unless unabsorbable material has been used. This lowered acidity is permanent; at least I have known it persist for 11 years after gastro-jejunostomy.

There are many interesting details with regard to what prevents, in some few cases, lowered gastric acidity after gastro-jejunostomy. There is one very fertile cause that I must mention—pyloric exclusion. No attempt should ever be made to bring this about. If ulcers in the pyloric region have to be directly dealt with it should be in such a manner that the pylorus is enlarged and not excluded. Every patient upon whom gastro-jejunostomy has been carried out for the cure of ulcer should have a second test-meal 14 days after operation, and if gastric acidity is not lowered, although the original ulcer will heal, fresh ulceration in the region of the anastomosis may occur unless medical measures can be found which will bring about the desired change. Test-meals are, therefore, of great importance in prognosis.

#### BLOOD EXAMINATION.

I must deal briefly with one other side of pathological work—blood examination. The abdominal crises of tabes have led many surgeons astray, and many gastro-jejunostomies were done for this condition when the indications for its performance were less sure than now. Still, it does present puzzling features and the only rule is always to suspect. Examination of the central nervous system should be part of the routine in investigating every chronic abdominal case. A Wassermann reaction and examination of cerebro-spinal fluid may be necessary to confirm our suspicions. Again, we are sometimes puzzled, and have opened an abdomen for a mass in the gall-bladder region, with symptoms suspicious of gall-stones, which proved to be a gumma, when the diagnosis would have been clear had we been thinking of this condition and had a Wassermann done.

Syphilitic disease of the stomach should be borne in mind. Last summer a patient came to England from abroad to consult me with regard to the possibility of removal of a large tumour of the stomach, thought to be malignant. On examining there was a gastric tumour with all the characteristics of a carcinoma of that organ. I also found a swelling in

the left epididymis, associated with a large hydrocele which I considered was syphilitic. There was no history of this disease and he had a perfectly healthy family. The X ray examination seemed to confirm the suspicion of carcinoma, but there was a positive Wassermann, and on anti-syphilitic treatment the tumour had disappeared completely in three weeks.

The surgery of the spleen is now becoming one of the commonplaces of life in the work of an abdominal surgeon. Many of its diseases are curable by operative means. Without blood examination we should be helpless. In splenic anæmia, with its leucopenia with relative increase in lymphocytes, the enlarged spleen can be removed at slight risk with the prospect of cure. The patient is saved from gradually increasing ill-health and the later development of Banti's disease. The change in the blood after splenectomy is rapid and striking; within a few weeks the white cell count has returned to normal. The blood changes in splenomegalic jaundice are typical before operation, and equally striking is its post-operative recovery.

By our blood examination we are warned away from the enlarged spleen of splenomedullary leukæmia with its 100 per cent. death-rate. In the cases of latent carcinoma of the stomach with marked anæmia, blood examination at once tells us that it is not "pernicious" and hence should raise the suspicion of carcinoma.

#### POST-OPERATIVE INVESTIGATIONS.

I have dealt only with some of the more recent methods; of the no less important examination of fluids and solid materials removed at operation you are all as familiar as I. As reminders I might mention that the discovery of typhoid bacilli when the biliary passages are drained, or in stones removed at operation, enables us to take precautions against infection. The report on the fluid evacuated from the cyst confirms our diagnosis of its pancreatic origin, and the finding of malignant cells in a portion of tissue removed at an exploration gives us the indication for correct treatment.

#### SPECIAL LESIONS.

Of all simple gastric diseases amenable to surgical treatment chronic duodenal ulcer is the most common; fortunately it is also the most easily diagnosed and has the best prognosis. Ninety per cent. at least are cured by gastro-jejunostomy, and less than 2 per cent. are failures. In this disease hyperchlorhydria is the rule, except immediately after a hæmorrhage. In a fairly large experience I have only met with two cases in which gastric acidity was lower than normal, excluding those with enormously dilated stomachs due to cicatrization of old ulcers, in whom chronic gastritis may diminish gastric acidity; even in these the acidity is usually above normal.

With the "typical" history and the hyperchlorhydria, the diagnosis is more certain than that of any other simple abdominal condition. Unfortunately, only about 75 per cent. of cases have this "typical" history; in others the symptoms may suggest gall-stones or chronic gastric ulcer. I have recently operated on two patients in one week, both of whom had normal gall-bladders drained elsewhere and the ulcer overlooked. It is, however, by no means unusual to get coexisting gall-bladder disease. Jaundice as the result of the presence of a chronic duodenal ulcer is a far from uncommon complication, but one that rapidly clears after gastro-jejunostomy.

The right-sided pain may suggest renal colic. Several patients have come under my care with this diagnosis, who proved on investigation and operation to have chronic duodenal ulcers. The test-meal here is of the greatest assistance. We must, however, bear in mind in anomalous cases that an oxalate calculus in the kidney may give rise to hyperchlorhydria and hunger pain. In doubtful cases I always have the urinary tract X rayed. X ray

examination after an opaque meal adds nothing to our certainty of diagnosis in the majority of cases and is not necessary; a hypertonic stomach with rapid emptying is the rule, and it is unusual to find direct evidence of the ulcer.

#### *Chronic Gastric Ulcer.*

In chronic gastric ulcer the test-meal is unfortunately of no diagnostic value; as a rule the condition is little removed from normal. Occasionally in ulcers that are active there may be hyperchlorhydria; in others, particularly with hour-glass stomach, there may be an absence of free HCl and a low total acidity. These cases are often diagnosed as carcinoma. In chronic gastric ulcer in men, in whom it is so much more common, the history is often as diagnostic as in chronic duodenal ulcer, but in women it may present extraordinary difficulties and certainty may be impossible.

The only direct evidence is that which may be obtained by X ray examination. The large penetrating ulcer and the constricting ulcer should be well seen. The small chronic ulcer on the lesser curvature, about the size of a shilling, that has passed through all the coats of the stomach may be demonstrated but is often missed. In every anomalous upper abdominal case X ray examination should be carried out. It must not be allowed the final word, for at the present time we cannot say that if X ray fails to reveal it no ulcer is present. The evidence must be balanced with that obtained by other means, particular importance always being attached to the history. In this connexion it must be remembered that the stomach is very responsive to lesions elsewhere in the abdomen, themselves curable by operation but not capable of X ray demonstration.

#### *Carcinoma of the Stomach.*

We now pass to a consideration of carcinoma of the stomach. The death-rate from this disease is unjustifiably high; yet it is safe to say that the greater part of it is preventable, since more than half the cases arise from a pre-existing chronic gastric ulcer. Early and efficient treatment of this condition will save many lives. In carcinoma originating without previous history of gastric trouble, the percentage of cases operable when first seen by the surgeon is appallingly low. This is not, in most cases, the fault of the patient, but of the profession. The patient usually seeks advice early enough, but the symptoms are so slight as not to be generally recognised and thus valuable time is lost. The usual history is that medicine is given, then a change of air ordered, or pyorrhœa is diagnosed and more valuable time wasted until the inevitable tumour can be felt.

There is only one safe rule—every case of digestive discomfort arising in an adult who has previously been in good gastric health, must be looked upon with suspicion. The first thorough examination will find or eliminate obvious causes—teeth, overwork, alcohol, disease of the genito-urinary or nervous systems—and the patient will be weighed. It is not humanly possible to examine by test and bismuth meals every case of this nature, but in those in whom thorough examination has revealed nothing to account for the symptoms these investigations should be done at once. In the remainder, what we consider the cause should be dealt with and treatment adopted for a month. If at the end of that time the patient is not well, sooner if he is not improving, test and bismuth should be given. In this type it is usual to find that free HCl is lost early, and that the total acidity is low. I consider this sufficient evidence to justify operation—if we wait for absolute certainty it usually means death to the patient. If an adult previously in good health develops discomfort after food, for which no cause can be found, and the test-meal reveals an absence of free HCl and a low total acidity, operation should be carried out without delay. Occasionally in growths near the pylorus there is, in the early stages, a great increase of gastric acidity; to know this should be sufficient.

I have never had an opportunity of seeing the result of X ray examination in an early case; at the time I most often see the patients the diagnosis is so obvious that it is usually a waste of time to have this done. It has been stated that X ray examination is useful in judging of the operability of a case of carcinoma of the stomach. This may be so in a few instances, but had I acted on this assumption many patients who are well to-day would have been dead or leading miserable lives as invalids. Never defer operation because it is the opinion of the X ray colleague that no growth is present or the case is inoperable. I have several times known cases of simple chronic ulcer returned from X ray examination with the definite diagnosis of inoperable malignant growth, and cases of carcinoma with the report "no evidence of any gastric lesion." A case should only be judged inoperable before opening the abdomen if enlarged glands are present above the left clavicle, or if rectal examination, which should be a routine in every abdominal case, reveals secondary deposits in the pelvis.

In the more common type of carcinoma, that following a many years history of chronic ulcer, the test-meal is of no value; the result is the same as that found in chronic ulcer without this complication. In the same way the opaque meal may not help—simply showing the crater of an ulcer or being returned as negative. This is as we should expect when we consider the difficulty even after the abdomen has been opened; in some cases it is only on microscopical examination that the diagnosis is made. It is the history that usually makes one suspicious that this complication may have occurred. After a period of years in which the patient has had attacks of pain at a regular hour after food, lasting meal after meal, day after day for weeks, with or without occasional vomiting, interspersed with periods of perfect or almost perfect digestive health lasting for months, an attack comes which, instead of passing away in the usual time, continues, or the symptoms alter, the pain becoming constant. Change in the nature of the symptoms, or their continuance, points to some complication having occurred, either adhesion to and erosion of neighbouring organs, particularly the pancreas, or the development of a stricture, hour-glass stomach, or the onset of carcinoma. X ray examination may help, but symptoms such as these mean that a long delayed and long necessary operation must be done.

#### Gall-stones.

Little help can be obtained in the diagnosis of gall-stones from X ray or pathological investigations. It may be possible in the future to say as the result of X ray examination that no stones are present, but this, although of value, would not exclude serious disease producing biliary colic. Many anomalous symptoms owe their origin to cholelithiasis; I have already mentioned attacks of pain in the left iliac fossa. I have published several cases in which the symptoms of carcinoma of the stomach were mimicked with exactitude; in gall-stones low gastric acidity is the rule and absence of free HCl common. Occasionally the regularity of the pain is such that the inevitable diagnosis is chronic gastric or duodenal ulcer. When we remember how frequently gall-stones are found complicating other abdominal diseases, the problem becomes more difficult. It holds a lesson for us all—never be content with the lesion found; if the condition of the patient will permit the whole abdomen must be examined. This warning is particularly necessary in dealing with disease of the appendix. No term has been more abused than chronic appendicitis; it has been made to cover many sins other than its own. Appendicular dyspepsia is a very real condition—diagnosable usually only by exclusion—and none of its symptoms are referable to the right iliac fossa. I teach at hospital that it is legitimate to diagnose appendix dyspepsia but not to act upon it. By this I mean that one should not in these cases remove the

appendix through a small incision in the right iliac fossa; the whole abdomen should be explored through a right paramedian incision in which the rectus is pulled out. By this method the size of the incision is of no moment in the strength of the abdominal wall after operation; the muscle falls back into its place and ventral hernia is impossible.

#### CONCLUSION.

I am afraid my remarks have been rambling, and for this I must apologise. I hope I have been able to point out a few of the great advantages of such departments as I have opened to-day in one small branch of surgery. Their utility, not only to the hospital, but to the whole district served is so great as to be inestimable.

## The Milroy Lectures

ON

### RESPIRATORY EFFICIENCY IN RELATION TO HEALTH AND DISEASE.

*Delivered before the Royal College of Physicians of London*

BY MARTIN FLACK, C.B.E., M.B., B.CH OXON.,  
WING COMMANDER, ROYAL AIR FORCE MEDICAL SERVICE.

#### LECTURE II.—(Concluded).\*

##### SPECIAL ROUTINE TESTS.

##### *The Endurance or "Fatigue" Test.*

THE test of sustaining 40 mm. of mercury with the breath held arose out of an endeavour to see if any noticeable fatigue could be elicited by getting the subject to blow every few seconds the mercury as high as possible, thereby getting a fatigue curve. This proved to be too wearisome, so the idea came to hold the mercury at a given height as long as possible. The height of 40 mm. was fixed upon, partly because certain subjects could not blow the mercury much above this height, but also because it was thought that this pressure, besides throwing a certain amount of work upon the expiratory musculature, would also cause a distinct but not unbearable or dangerous resistance to the circulatory through the lungs, thereby possibly giving value to the test as throwing light upon the circulatory condition of the subject. The idea of counting the pulse arose from this point of view, and it has proved to be a valuable adjunct to the test. The subject has no control over the behaviour of his pulse, and it has been found that the fit man differs very greatly from the unfit man in this respect. In the fit man the rate of the pulse every five seconds is not materially affected during the time that the mercury is sustained; in the slightly less fit the pulse rises gradually in rate until just before the end. The average time for the fit individual is 50 to 60 seconds. In a man probably unfit for flying, on the other hand, the pulse is immediately increased in rate and may stay so, with variations due mainly to error in counting by five seconds, as, for example, from seven per second before the test to 10, 11, 10, 11, 10, 9, 10 in five-second periods during the test. This type of response, however, is certainly not so definitely an expression of unfitness as one in which, after a transitory period of quickening, the pulse rapidly falls to the initial rate or even below. This type of response has been found to be associated with the most marked cases of flying strain. The length of time during which the mercury is supported is short, 15 to 25 seconds, and in that time the pulse-rate, in five-second periods, may vary from 96 per minute to 144 or 156 per minute and fall again to 72. Such cardio-motor instability is very

\* Lecture I. and the first part of Lecture II. were published in THE LANCET of Sept. 17th and 24th respectively. Lecture III. will appear in a coming issue.