compound comminuted fracture; free incisions and removal of minute fragments of bone are attended with relief of pain and promote healing.

In dealing with wounds caused by projectiles there are some facts that quickly impress themselves on the mind. The size of the skin wound that admits the missile is no indication of the amount of damage sustained by the tissues, hard and soft, in its track. No attempt should be made to ascertain the amount of damage by manipulation, by insertion of a finger into the wound, nor by a probe. An *x*-ray examination saves infection, pain, and much misery.

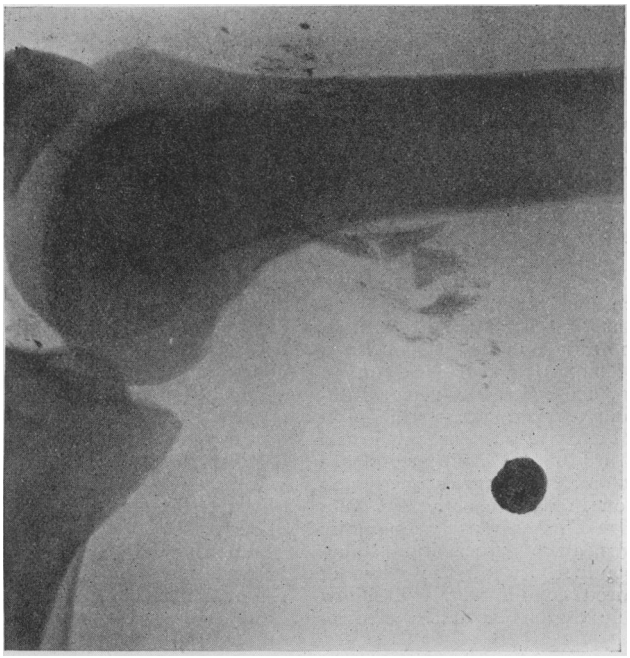

Fig. 6.—The femur of an officer wounded at Ypres. A shrapnel bullet had entered the thigh, traversed the femur, and lay under the skin in the popliteal space.

A bullet moving with a high velocity will traverse a limb and perforate a large bone like the femur and cause very little disturbance; or it may catch a nerve, an artery or a vein and produce instantly unmistakable signs. A man under my care received a bullet wound just below the angle of the left orbit, it emerged between the right styloid and mastoid processes, causing palsy of the right facial nerve. He soon became convalescent, but the facial paralysis persists. The small amount of injury that puts a soldier out of action has also impressed me. A bullet hits a man on the tip of the finger, carries off the nail, and splits the terminal phalanx. We have had many injuries of this kind; they quickly become septic, and the soldier is invalided with a whitlow for several weeks. In these apparently trivial cases an *x*-ray examination is exceedingly useful.

Incidentally references have been made in the notes of the cases in this lecture to the modes of treating septic wounds so frequent in the soldiers wounded in this war. It is of course impossible to treat such wounds aseptically. The employment of antiseptic solutions is urgent, and it is remarkable how quickly the wounds clear up under solutions of carbolic acid, boracic fomentations, and especially hydrogen peroxide. Tincture of iodine has proved very useful, and especially a combination of carbolic acid solution (1 in 60) and tincture of iodine a drachm to the pint. The wise surgeon does not put his whole trust in any routine measure whether it be styled antisepsis or asepsis. He adapts his methods to the necessity of the case. It has been suggested that the value of antiseptic methods is underrated by some surgeons and runs the risk of being forgotten, and, decades hence, some enterprising surgeon will rediscover it. The idea is unthinkable. Antisepsis cannot be rediscovered for it cannot be forgotten.

THE THRESHOLD OF DISEASE.

AN ADDRESS DELIVERED TO THE MEDICAL SECTION OF THE ROYAL ACADEMY OF MEDICINE IN IRELAND ON NOVEMBER 20TH, 1914.

BY

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MEDICAL science seems likely to advance in three directions—namely, first in gaining better knowledge of the causation of disease; secondly, in the acquisition of facilities for more prompt diagnosis; and, thirdly, in the discovery of improved methods of treatment. It is to the second of these topics that I propose to direct your attention to-night.

Early diagnosis of disease is, we are all agreed, a matter of vital moment. It is important mainly for two reasons—first, because the neglect or misinterpretation of early symptoms often turns a slight case into a serious one; and, secondly, because the efficacy of treatment is in many cases proportionate to the promptitude with which it is applied. Amongst the "calamities of medicine"—to use Paget's phrase—failures to make and act upon an early diagnosis take a prominent place. Time lost in the field of disease is seldom regained, and the loss is both one of safety to the patient and of credit to the physician.

Let us first glance at a few of the simplest and most obvious cases before we penetrate to the heart of our subject. Chronic dyspepsia is the blight of innumerable lives, but its first beginnings are simple enough and tractable enough. The dyspeptic, unlike the poet, *fit non nascitur*. He does not often owe much to heredity. Either he has incurred dietetic error, or he has prematurely used up his original stock of nerve force. He may have eaten and drunken not wisely but too well, or, on the other hand, insufficiently; or neglected those important aids to health which the dental art supplies; or his nervous energies may have been dissipated too soon by work, worry, or pleasure. Whatever be the cause, his digestive efficiency does not fail suddenly. The machine creaks often before it refuses to move. But the admonitions are commonly neglected. A timely warning to such persons to regulate their diet, take care of their teeth, and conserve betimes their nervous energy would save them much suffering, and, incidentally, deprive the world of a good deal of the literature of pessimism. Gout, unlike dyspepsia, owes much to heredity. It often gives warning betimes of the coming disasters to joints, kidneys, and circulation—warnings too generally ignored until the hour of nocturnal torture strikes. The late Lord Dufferin once said that his ancestors had drunk so much wine that he was obliged to drink water. Not all the scions of a gouty ancestry show a like power of self-control. An early diagnosis of a gouty tendency and of incipient gouty manifestations, and suitable action thereon, will not always banish the enemy, but they may do something to keep him at bay. The chronic bronchitic has many warnings before his malady takes final hold. The victim of chronic rheumatism commonly makes light of his malady in the stages when treatment would be most efficacious. There are obvious cases which suggest their own moral. I pass on to consider some more difficult problems.

I wish to deal with a few cases where the failure to make an early diagnosis is due, not to the carelessness of either patient or doctor, but to the inherent difficulties of the case. I have selected four examples where an early diagnosis raises problems, always difficult, sometimes insoluble, and I have purposely selected them from widely different departments of medicine. The cases are as follows:

(*a*) Endocarditis.
(*b*) Cancer of the stomach.
(*c*) Disseminated sclerosis.
(*d*) Pulmonary tuberculosis.

I believe we may study with profit the problem of early diagnosis in these four diverse fields.

(*a*) ENDOCARDITIS.

When a patient is suffering from acute or subacute rheumatism we may consider the question of cardiac involvement from three points of view. We may ask, What are the probabilities of the case, based upon statistics? or we may take account of signs and symptoms; or we may seek aid from such instrumental methods of investigation as the polygraph and the electro-cardiograph. As regards the first point, while I cannot go the whole length with Dr. Norman Moore in affirming that the involvement of the heart is an integral element in every case of acute or subacute rheumatism, I regard such involvement as extremely common in the adult and almost the rule in the child. We are justified in strongly suspecting the heart in every case of acute or subacute rheumatism, and such suspicion is specially strong in the case of the child or young adolescent. On the signs and symptoms of early cardiac involvement I need not dilate. They are familiar to you all, but I should like to press the point that even slight physical signs, a little muffling of the first sound at the apex, a trifling increase in the area of superficial cardiac dullness, a slight degree of arrhythmia, are commonly very significant. How far the polygraph and the electro-cardiograph will help us in the detection of early valvular or myocardial changes it is, perhaps, premature to say. Neither of these instruments helps to recognize mitral regurgitation, which is by far the commonest lesion in such cases. But in a certain undetermined proportion of cases of early rheumatic endocarditis there are changes in the myocardium, sometimes involving impaired conductivity of the wave of contraction, and such impaired conductivity will show itself either in the polygraphic tracing or in the electro-cardiogram.

The importance of early diagnosis in endocarditis would be difficult to exaggerate. Dr. Caton has done good service in insisting upon the necessity for prolonged rest in such cases, and the good results which may be expected from it. Careless treatment of these patients, a too optimistic attitude, a premature return to work, spell disaster in the future. Timely watchfulness will be well repaid.

(*b*) CANCER OF THE STOMACH.

The early diagnosis of this lesion is beset with the most formidable difficulties. The onset may be marked by symptoms of irritable dyspepsia and pain in the epigastrium, or by loss of weight, anaemia, and debility, or by a vague failure of the general health. I have not found the history of a previous gastric ulcer of much help in diagnosis. Marked and somewhat abrupt loss of appetite, especially for flesh meat, is a frequent and significant symptom, on which considerable reliance may be placed, if the anorexia is not otherwise explained. Loss of weight, even at an early stage, is usually pronounced, and is progressive from week to week and month to month. The examination of the gastric contents may assist. Some differences of opinion exist regarding the value of the HCl content. My experience of this test is that it possesses a real, but limited, value. In the great majority of cases of gastric cancer I have found an absence of free HCl, but it is also absent in many other conditions, such as pernicious anaemia, cirrhosis of the stomach, and in some cases of dilatation of the stomach and of chronic dyspepsia. The absence of the free acid must therefore be interpreted with caution in a doubtful case. On the other hand, no case has come under my observation where a normal acid content has coexisted with gastric cancer, though such cases have been reported by various observers. They are probably rare, and we shall hardly err in regarding the presence of free HCl as valuable evidence against the existence of gastric cancer. The bacteriology of these cases, and especially the weight to be attached to the presence of the Oppler-Boas bacillus, are still matters of controversy. Vomiting may be an early symptom, but more usually develops after some progress of the disease has occurred. Haematemesis is rarely, in my experience, an early symptom. Some epigastric tenderness may develop early, but a definite tumour belongs to the fully developed stage of the disease. I might suggest the following rule of practice: "If a patient, especially of the male sex, who is over 50 years of age, and who has previously enjoyed a normal digestion, somewhat abruptly develops a marked distaste for food, especially for flesh meats, suffers from discomfort after meals, and perhaps occasionally vomits, begins to lose weight rather decidedly, and exhibits some degree of anaemia and debility—then, in the absence of some other obvious explanation, such as alcoholism, cirrhosis of the liver, or renal disease, the suspicion of incipient gastric cancer is strong." An examination of the blood should not be omitted, although the evidence thus obtained must be interpreted with caution. Broadly speaking, the patient suffering from incipient gastric cancer develops a decided and progressive secondary anaemia. The subject of chronic gastritis or chronic dyspepsia has no constant or significant blood changes.

The question of the handling of these cases of incipient gastric carcinoma, where the diagnosis can be made with reasonable probability in the absence of tumour or other gross signs, involves a very difficult problem both for the physician and the surgeon. To procrastinate until the proof of disease is complete is a feeble policy involving a disastrous loss of time. Exploration, which is unattended by serious risk, seems justifiable, but physicians will be governed largely, in their recommendation of such procedure, by surgical experience regarding the results of the operative treatment of gastric cancer. The following figures are reported by Osler from the clinic of the brothers Mayo: In 39 cases whose condition was known, who had been operated upon over five years before, 7 were alive; of 64, condition known, over four years, 13 alive; of 88, condition known, over three years, 18 alive and well.

Whether better results are likely to follow the adoption in certain cases of Schlatter's radical operation of the removal of the entire stomach the future will decide.

(*c*) DISSEMINATED SCLEROSIS.

The morbid anatomy of this affection, consisting as it does of small patches of sclerosis scattered irregularly through the brain, brain-axis, spinal cord, and sometimes the cranial nerves, prepares us for great variations in the symptoms and modes of onset of the disease. Few, if any, diseases present so varied a picture, and in few is error in diagnosis more probable or more frequent. Buzzard is probably correct in affirming that every physician is at some time or another mistaken in relation to the early diagnosis of the disease. When early diagnosis is in question we must dismiss from our minds the classical picture of disseminated sclerosis as described in textbooks —namely, intention tremor, nystagmus, scanning speech, and spasticity of the lower limbs. Any or all of these symptoms may be absent at this stage. Rather must we inquire for transient disturbances of vision—amaurosis or diplopia—temporary impairment of bladder control, paraesthesiae of one or more limbs, diminution of the abdominal reflexes, loss of tone of the sphincter iridis, shown by failure of the pupil to remain contracted in presence of the stimulus produced by light, giddiness, emotional instability. Here we have a group of symptoms, none of which, taken singly, is capable of any confident interpretation, but highly significant when taken as a whole. Transient paresis and a sense of fatigue in the legs may appear early. In a case of doubt the alternative possibilities of the case must be borne in mind. Most of the organic lesions of the nervous system are easily excluded. Paralysis agitans will hardly cause serious difficulty, the age law being commonly decisive. Hysteria is the most fertile source of error, and the difficulty of distinction is much increased by the fact that young female "disseminates" sometimes develop a seemingly hysterical psychosis. But hysteria never exhibits the group of early symptoms which has been enumerated, and at a later stage nystagmus, pallor of the optic disc, and ankle clonus make the distinction easy.

How far early diagnosis may enable us to deal effectively with disseminated sclerosis is doubtful. The causation of the disease is most obscure. There is no known toxic factor. Infective diseases, chills, shock, mental stress have been blamed, but on doubtful evidence. Syphilis has no influence. The course of the disease is so variable and periods of remission so common that treatment may easily get the credit which belongs to Nature. But it seems reasonable to hope that the early recognition of these cases, the removal of sources of nervous strain and the adoption of a well-ordered hygiene may improve the prospects of these unfortunate patients.

(*d*) PULMONARY TUBERCULOSIS.

I pass on to the most important case of all. The early diagnosis of pulmonary tuberculosis is a matter of vital importance because of the frequency of the disease, and of its comparative curability in the incipient stage. An immense amount of work has been done in recent years in connexion with this subject, and many attempts have been made to find a short cut to a prompt and secure diagnosis. I have to essay the difficult task of evaluating these methods, which time is not available to describe in detail.

We may attempt to solve the problem of the early diagnosis of pulmonary tuberculosis by the following methods:

1. By an analysis of symptoms, history, and physical signs.
2. By an examination of the sputum.
3. By radioscopy and radiography.
4. By the tuberculin tests of Koch, von Pirquet, Moro, and Calmette.
5. By an examination of the blood after the method of Arneth.
6. By agglutinin and precipitin reactions on the lines of Widal's valuable test for typhoid fever.
7. By the fixation of complement test on the lines of Wassermann's well-known test for syphilis.
8. By the opsonic index method.

Most of these methods are too familiar to you to require any description. Arneth's method is, however, new and not widely known, so some account of it may not be inappropriate. Briefly, this observer hopes to find a diagnostic clue to tuberculosis, and to its activity and course, in changes which he describes in the neutrophile leucocytes. Arneth divides these cells into five groups, namely, those in which the cells have one, two, three, four, five or more nuclei. He finds that in health these groups form approximately 5 per cent., 35 per cent., 41 per cent., 17 per cent., and 2 per cent. In the very earliest stage of pulmonary tuberculosis, when the general health is still unaffected, these various groups preserve their normal ratio, but so soon as signs of general infection occur this ratio is disturbed. The first group rises to 15 per cent., the second to from 36 per cent. to 46 per cent., while the third group falls slightly, and the fourth and fifth groups fall more decidedly. In more advanced cases with active symptoms the first group rises to from 28 per cent. to 52 per cent., the second group to from 37 per cent. to 53 per cent., while the third group falls to 10 per cent., and the fourth and fifth groups tend to disappear altogether. It is claimed for this method that it gives us an accurate indication of the intensity of the infection and of the reaction of the patient's organism, and that hence it affords a useful guide to prognosis. In favourable cases, where recovery is in progress, the condition of the neutrophile leucocytes is said to tend to revert to the normal.

Arneth's method is comparatively new, and has not been extensively tried in this country. It is attractive, and may contain some amount of promise, but it is not easy to believe that the changes in the leucocytes which are, no doubt, reactive in character, are quite specific for tuberculosis in contradistinction to other infections. As I have not tried the method, I pass no judgement upon it.

Radioscopy affords interesting information in cases of pulmonary tuberculosis, but there is still a good deal of doubt as to its value in incipient cases, and the interpretation of the skiagram is often a matter of great difficulty. Amongst the earliest changes are a fine mottling in some of the characteristic areas, the dark lines due to the peribronchial fibrosis usually present, and, especially in children, the shadow cast by swollen bronchial glands. Impaired movements of the diaphragm are likely to develop later. Unfortunately the sources of fallacy are numerous, and the skiagram does not help us to differentiate between old healed lesions and recent active lesions. The method is one which appeals to the *x*-ray expert and the pulmonary specialist, but is not likely ever to become generally available.

The various tuberculin tests, regarding which such high hopes were once entertained, have proved disappointing. A little reflection will convince us that they suffer from an inherent and incurable defect. They all depend upon the principle that the organism once infected by tuberculosis has become hypersensitized to the action of tuberculin. But this hypersensitization may depend upon the presence of an obsolete and healed lesion in lung, or gland, or bone. As 70, 80, or 90 per cent. of our city populations—the exact figure does not affect the argument—are, or have been, the subjects of tuberculous infection, a positive reaction to tuberculin gives us little information of real value, and may easily mislead as to the correct interpretation of the case before us. To put the matter in another form, tuberculin reactions do not distinguish between tuberculous *infection* and tuberculous *disease*, which is precisely the point which is really at issue. A negative reaction may be allowed some weight, but in ordinary city practice a positive reaction is the rule.

I need not say anything about the value of a routine examination of the sputum. The discovery of tubercle bacilli is decisive, and bacilli may be found in quite early cases, although at this stage their absence, and, indeed, the entire absence of sputum, is quite common.

The attempt to discover a reaction based upon the agglutinins and precipitins in the blood of tuberculosis patients—that is, a reaction analogous to Widal's valuable test for typhoid fever—has so far led to no fruitful result, and there seems to be no probable future for this method.

The latest suggestion of a specific test for tuberculosis is on the lines of the well known Wassermann reaction which has proved so useful in the recognition of syphilis. The theory is that the serums of tuberculous patients contain an antibody capable of fixing complement in the presence of tuberculin. Positive results have been claimed for this method in proportions varying from one-quarter to three-quarters of the cases. It is affirmed that a negative result goes far to exclude tuberculosis. This method is quite new; it is still in the experimental stage, and it would be premature to express any opinion upon its probable usefulness.

The opsonic index method, the technique of which is now generally known, seems to yield interesting information in the hands of the pathological expert, but the results are very conflicting, and the method is unsuitable for general adoption.

A review of the foregoing methods will probably convince us that no sure short cut to a summary diagnosis of incipient pulmonary tuberculosis is at present available. Laboratory methods may give us a valuable suggestion or a useful caution; they can seldom afford definite guidance. We are not yet absolved from the necessity of basing our opinion in large measure upon a careful study of history, symptoms, and signs. Let us inquire where we stand to-day in reference to these matters. Two types of incipient cases rise before the mind. In one type the examination of the chest is wholly negative; in the other, slight but significant departures from the normal are present; in both symptoms, perhaps slight and not very characteristic, will be found. What are we to say of these cases where symptoms excite suspicion, while signs are negative? A vague failure of general health in a young adolescent may have many explanations, but the suspicion of pulmonary tuberculosis will be strong where we find the syndrome of loss of weight, slight afternoon pyrexia, cough, and acceleration of the pulse. There is often a history of slight haemoptysis, which the patient frequently assures us "came from his throat" or "was due to his teeth." To this symptom much weight may be justly attached. Night sweating is occasionally an early symptom, and when present is most significant. Digestive disturbance may appear early and may strengthen the diagnosis, but it is often absent. On these points there will probably be no difference of opinion.

Acute divergence of view emerges, however, when we ask the question, What are the earliest physical signs of tuberculous invasion of the lungs? A formidable list of authorities might be quoted who maintain that the earliest signs are auscultatory. Strümpell says, "The auscultatory signs in the beginning of the disease are in general more certain and easier to recognize than those from percussion." Cornet says, "In the earlier stages of the disease percussion does not help very materially." Wilson Fox says, "Percussion at the apex is often unaffected in the early stages." West says, "The physical signs yielded by auscultation are not only the earliest to be detected but remain throughout the disease the most important." Osler says, "Dullness is rarely present in early cases." In sharp conflict with the above views we

have the opinion of an imposing array of observers who insist that the earliest signs are those yielded by percussion. Aufrecht affirms that percussion "offers positive information much sooner than auscultation." Krönig says "it is a very widespread error to expect to find the earliest physical signs by auscultation." In England D. B. Lees and Clive Riviere have warmly advocated a similar view. Powell says cautiously that "at this stage (namely, the incipient stage) the physical signs are but slight; the percussion note at one apex is slightly impaired and the respiration weaker, the inspiration being wavy or even jerking. There are usually a few rhonchi present, which, if limited to that apex, are very significant." My own belief is that auscultatory changes are in general prior to any appreciable muffling of the percussion note, and of auscultatory changes I believe the earliest to be a modification of the respiratory murmur either in the direction of weakness or harshness, with commonly some disturbance of the respiratory rhythm. Crepitation comes later.

The early diagnosis of pulmonary tuberculosis in young children is a separate problem, and one of no little difficulty. In these patients tuberculous infiltration of the lungs does not commonly show that preference for the apices which is so constant a feature in the adult. The disease is more diffusely disseminated or may specially affect the roots of the lungs. The tracheo-bronchial glands are frequently involved, and may afford useful physical signs. The symptoms are often marked, and progress rapid. The physical signs often trouble us not by their latency or deficiency, but rather by their abundance and by the difficulties attending their interpretation. The problem which most often arises is this: the child has a broncho-pneumonia, arising out of one of the exanthemata or otherwise, and is doing badly. The question is whether the pulmonary condition has been throughout or has become tuberculous. In many of these cases physical signs are indecisive, and symptoms are capable of more than one interpretation. Osler hardly exaggerates when he says that in some of these cases time and the results of treatment alone can decide the diagnosis. The examination of the sputum, when it can be obtained, may, of course, settle the problem. I would suggest the need for caution when dealing with obscure pulmonary conditions in young children, and the desirability of not prematurely affixing the tuberculous label. Goodhart is undoubtedly right in holding that a good many suspicious cases ultimately clear up and come to nothing.

Before dismissing the subject of the diagnosis of early pulmonary tuberculosis I would like to record my conviction that quite early cases are in the majority of cases amenable to treatment. The human body, in spite of superficial appearances to the contrary, is really somewhat tolerant of tuberculous infection, but to succeed we must begin operations before gross physical signs have developed. Many years ago I had occasion to visit that veteran of our profession, Sir Hermann Weber, and our conversation ran mainly on the subject of pulmonary tuberculosis. As I parted from him at his own door his last words to me were "Get them early." In that, and not in any novel or heroic methods of treatment, lies at once our safety as physicians and our best hope for humanity.

Time will not permit us to consider in detail the numerous other cases where an early diagnosis is a matter of vital moment or is beset with peculiar difficulties. But I should like to emphasize my conviction that in researches in this field, both from the clinical and the pathological standpoint, lies one of the best hopes for the future of medical science. The public must learn that for disease to be countered successfully it must have early recognition and timely treatment. Our hospitals are full of the wrecks of humanity, which we may, indeed, often patch up with more or less success, but which can never be restored to integrity.

Prevention is best; early diagnosis is next best; late diagnosis is too often only a *pis aller*. How different from their usual fate would be the destiny of the diabetic, the tabetic, the subject of granular kidney or of arthritis deformans, if these conditions were recognized at their earliest manifestations! But the diabetic commonly only seeks advice when thirst, polyuria, and progressive emaciation can no longer be ignored. The tabetic regards his early pains as "only rheumatism." The victim of granular kidney waits until his headaches, dyspepsia and visual troubles force themselves upon his reluctant attention. The arthritic makes light of early symptoms which too surely portend ultimate disablement. We must take care that to the ignorance of the public is not superadded any negligence on our part, any cavalier treatment of apparently trivial ailments, any neglect of significant symptoms. The out-patient room of one of our great hospitals is an excellent field for learning to distinguish promptly between the trivial and the essential, between some trifling ailment and the slight but significant manifestations of grave disease. It is a field to which the beginner and the junior student are, with curious perversity, often assigned. Rather it is the advanced student who has learnt his business in the wards and has already accumulated some fund of practical experience who will there find his natural sphere and opportunity.

One of the problems of present-day medicine is to draw a just line in the diagnosis of disease between the clinician and the pathologist, between the hospital ward and the laboratory. It is most desirable that a fair balance should be maintained, and that there should be rational and sympathetic co-operation. The pathologist has not that first-hand knowledge of disease in the living subject which is so important. Dead-house appearances represent the late results of disease, not its origin or course. On the other hand, the clinician cannot hope to keep pace with the rapidly developing and ever-increasing complexity of modern pathological technique, though he may aspire to understand its methods and appraise its results. His skill in these matters, occasionally exercised, cannot compare with that of the man to whom they are a daily routine. In such matters as the examination of the sputum, the Widal test for typhoid fever, or the Wassermann test for syphilis, the laboratory can give us inestimable aid. But I would plead that in the last resort diagnosis is the business of the clinician, and that the final test is bedside experience. While we examine blood, sputum, urine, gastric contents, cerebro-spinal fluid, etc., let us not forget to examine the patient. The old physicians who had not even a stethoscope or a clinical thermometer—not to mention an ophthalmoscope, laryngoscope, gastroscope, sphygmomanometer, polygraph, electro-cardiograph—were often extraordinarily shrewd judges of disease. Even Hippocrates may still be read with profit, and with a chastened sense that after more than 2,000 years of the triumphant march of medical science he may still be able to teach us something. His first famous aphorism is familiar to us all, but will bear repetition: "Life is short; the art is long; occasion sudden; to make experiments dangerous; judgement difficult. Neither is it sufficient that the physician do his office unless the patient and his attendants do their duty, and that externals are likewise well ordered." Perhaps his thirteenth aphorism is less familiar. It runs as follows: "Old men easily endure fasting, those who are middle-aged not so well, young men worse again than they, and children worst of all, especially those who are of a more lively spirit." These echoes from the great age of Greece still strike the ear pleasantly, reminding us that medical insight is not the exclusive property of the moderns. And the English Hippocrates—Sydenham—is not yet wholly obsolete. To come nearer home, Graves on Fevers and Stokes on the Heart may still stimulate our minds, and make us proud of Irish medicine. Their pathology may need revision, but their clinical insight was rarely at fault.

You will remember that the first great aphorism of Hippocrates affirms that it is not sufficient for the physician to do his part, that the patient also has a duty to perform. In this matter of early diagnosis we are largely dependent upon the intelligence of the public. We cannot advise until we are consulted. We cannot detect the subtle premonitions of disease if these are disregarded by the patient. I hold it our duty to inculcate a timely watchfulness—quite distinct from fussy anxiety—in matters pertaining to health. And in these matters the consultant needs the aid of the general practitioner, who is usually the first to have cognizance of the facts.

Obsta principiis is a very old and, I think, a very excellent medical maxim. The medical practitioner is too often in the position of the foolish virgins in the

parable—he arrives too late. But the responsibility is not usually his.

I submit these considerations—most of them familiar and obvious—to your judgement, believing, as I do, that in the early recognition of disease and the prompt adoption of remedial measures lies the secret of much of the efficacy of our art.

ACUTE APPENDICITIS AND ACUTE APPENDICULAR OBSTRUCTION.*

[WITH COLOURED PLATE.]

BY D. P. D. WILKIE, CH.M., F.R.C.S.,

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MOST medical men are now agreed that for acute appendicular trouble the only safe course is immediate operation. If this be granted, the all-important matter is the accurate diagnosis of such trouble in its early stages. Reliable diagnosis can only be based on a clear understanding of the pathology of the early stages of acute appendicular trouble, and it is as a contribution to this part of the subject that I would lay before you certain facts.

When we find that patients suffering from acute appendicular disease present during the early stages of such trouble symptoms differing widely, the natural presumption is that the morbid processes responsible for such symptoms also differ. The mere fact that all eventually tend toward a dangerous peritoneal infection is not sufficient reason to class them all under the one generic term "appendicitis."

The appendix as part of the intestinal canal is liable to certain pathological changes. From its structure and relations it is specially liable to be the seat of ulceration and inflammation, but as a hollow viscus it is also liable to acute obstruction of its lumen. Now whilst blockage of the lumen of the appendix has been regarded by many pathologists and surgeons as an important contributing factor in the etiology and in determining the course of appendicitis, acute appendicular obstruction as a distinct pathological and clinical entity has not been recognized or given the attention which its importance demands.

Benda,[1] Klauber,[2] and recently Heile have all laid stress on the obstructive factor in appendicitis, but have not clearly differentiated between the two conditions, primary inflammation and primary obstruction, as clinical entities. If we set out by recognizing two definite types of acute disease of the appendix—namely, acute inflammation and acute obstruction—then not only does the understanding and the teaching of the symptomatology of acute appendicular disease become much simplified, but the early diagnosis of such disease becomes inevitably more confident and more correct.

Some years ago, when it was customary for surgeons to have to deal with the secondary effects of acute appendicular trouble, this distinction between inflammation and obstruction was impossible; now, however, we should have to deal with the primary appendicular disease when the distinction is tolerably easy and all-important.

It is difficult to realize and still more difficult to teach that we may have an acute inflammation of an organ without any rise of pulse or temperature, and yet it has been necessary to recognize this in the case of appendicitis.

So far as my observations go they indicate that we never meet with a primary acute inflammation of the appendix without a prompt rise of both pulse and temperature. It is the rule, however, in cases of acute appendicular obstruction to have at the outset no appreciable rise of pulse or temperature, and it is ignorance of these important negative signs which has so often led to fatal delay. We must recognize that if acute appendicitis is a serious condition, acute appendicular obstruction is usually more serious, and is the one in which the call for immediate operation is more clamant.

* The experimental work referred to in this paper was carried out in the laboratory of the Royal College of Physicians, Edinburgh. The expenses of this research were defrayed in part by a grant from the Carnegie Trust.

The essential distinctions between the two conditions may perhaps be best emphasized by two illustrative cases.

CASE I.—*Acute Appendicitis.*

A. H., female, aged 31, had felt out of sorts for two days, and on the evening of the second day she began to have pain in the right side of the abdomen and vomited. She went to bed, and her doctor was called in the same evening. He found her looking flushed but not very ill, with a temperature of 100° F. and pulse of 94. There was some tenderness and rigidity in the right lower quadrant of the abdomen. Hot fomentations were applied, and trional gr.10 given by mouth. Seen early on the following morning, the patient was found to have slept little, was still flushed, temperature 100.5°, pulse 100, whilst the tenderness and rigidity in the right iliac region were more pronounced. Operation was advised, and was carried out in hospital two hours later. Some turbid fluid was found free in the abdomen; a considerably thickened, red, and inflamed appendix was removed, along with an inflamed and adherent portion of omentum. On splitting the appendix its walls were found greatly thickened and oedematous, the mucous lining was turgid, and in two places ulcerated and covered by a layer of muco-pus (see Fig. 1).

CASE II.—*Acute Appendicular Obstruction.*

M. H., male, aged 30, on returning home from a football match was suddenly seized with acute abdominal pain which doubled him up, and he vomited. After lying down for half an hour the pain had almost completely passed off, and he accompanied a friend to the railway station, a mile away. Whilst there he was again seized with acute griping pain, and vomited several times. He came home in a cab and lay down, but the pain continued very severe. At 8 p.m. the doctor was called in. He found the patient suffering acutely from pain in the umbilical region, the abdominal muscles were rigid, more especially on the right side, and there was marked tenderness at a point midway between McBurney's point and the umbilicus; pulse 80, temperature 98°. Heat was applied to the abdomen, and the doctor returned in two hours. The patient had meanwhile had an hour's relief, but was again suffering acute pain; the abdomen was still tender and rigid, whilst the pulse and temperature were normal. A surgeon was called in an hour later, when, as the patient's condition was unchanged, operation was decided on.

The abdomen was opened at 2 a.m.—that is, nine hours after the onset of symptoms. A large distended appendix, green in colour and with a faeculent odour, was delivered through the wound. The proximal half inch of the appendix appeared normal, then there was a slight constriction, and beyond this the organ was three times its normal diameter, tense almost to bursting, and stippled with little yellow areas of focal necrosis on a ground of dark green. The appendix was removed, and the patient did well. On opening the appendix it was found that the distended portion contained faeculent material under great tension, a concretion having become impacted in the constriction, causing an acute obstruction. Apparently the course of events in this case had been that a preceding unrecognized attack of appendicitis had resulted in a constriction, and beyond this a concretion had formed. Then, probably as the result of straining at the football match, some faecal matter had been forced into the appendix beyond the stenosed area, and had been locked up there by the ball valve action of the concretion.

SYMPTOMS OF ACUTE APPENDICULAR OBSTRUCTION.

The first and essential symptom is pain, which as a rule comes on suddenly, is very acute, and is most pronounced in the umbilical region. The pain may be intermittent as in the case cited above, but not infrequently it is constant, though becoming worse at times. Vomiting is usual, but not invariable. Tenderness over the appendix is always present in greater or less degree, and rigidity of the right rectus is usually well marked, though in some cases it may be deceptively slight. The pulse and temperature are of no diagnostic value, for though both may rise within a few hours of the onset of the obstruction, this is not the rule, and when present is usually an indication of a spread of infection through the devitalized wall of the obstructed organ. Obstruction of the appendix does not necessarily produce a reflex paresis of the intestine, and thus the bowels may act even though rapid changes are taking place in the appendicular walls. The distinctive