Remarks

ON

APPENDIX DYSPEPSIA.

By B. G. A. MOYNIHAN, M.S., F.R.C.S.,

SURGEON TO THE LEEDS GENERAL INFIRMARY.

THE term "dyspepsia" was used by the older writers to indicate a variety of conditions, believed to be always functional in character, in which disturbances of "digestion" were the main features. If the older works on medicine, such as Budd's, Trousseau's, Brinton's, and Sir Thomas Watson's, are consulted—and this may profitably be done, and will indeed prove a delightful and absorbing recreation—it is seen that a considerable space is devoted to a description of the various forms of "dyspepsia." The work of the surgeon, human vivisector as he is, has enabled him to make an intimate study of the "Pathology of the Living," and has newly conferred upon him the power of discovering that the term "dyspepsia" has been used to denote a group of symptoms which can now positively be ascribed to demonstrable lesions in other organs than the stomach. The "acid dyspepsia" in its characteristic, protracted and recurrent form is recognized as being due to a duodenal ulcer; the "flatulent dyspepsia," when severe, persistent, and repeated, is frequently due to stones lying within the gall bladder.

In the vast and unexplored territory formerly known by the name "dyspepsia" certain areas have been carefully surveyed and their exact features determined and accurately recorded. But the area still awaiting the intrepid discoverer is enormous; indeed the work already accomplished seems little more than a beginning. That beginning has, however, been made with sedulous care, and the clinical results which have accrued are indeed most satisfactory, and are an inspiration and incentive to further research. So is the prophecy of Brinton being realized, who wrote fifty years ago:

As the progress of scientific medicine has gradually revealed the morbid anatomy of the digestive canal, and thus detected structural disease with increasing accuracy and frequency, the vague (but useful) term "dyspepsia" has acquired a continually more restricted meaning. Nor can we doubt that it is destined to still further limitation; and that, as advancing knowledge brings us better means of investigation, and so enables us to discover and distinguish structural changes of which we now can only observe the functional results, the aggregate of maladies called dyspepsia must undergo successive subtractions, tending more or less completely to its total subdivision into special maladies, and to the removal of this term from our nosology.

During the last few years I have been brought by degrees to recognize that in many of the intractable cases of indigestion, where a lesion of the stomach, duodenum, or gall bladder might not unreasonably have been supposed to exist, no structural alteration could therein be found. On further investigation an appendix, obviously diseased, was discovered, and its removal was quickly followed by a complete relief of all former disabilities. This experience did not come in any degree as a surprise, for I had long recognized that the "bilious attacks" of children, the sharp abdominal pain, headache, vomiting, languor, and brief malaise, often associated with constipation, and ascribed to an unwholesome meal, culminated sometimes in a flagrant and obvious attack of acute appendicitis for which an operation, then or in a later stage of the disease, was performed. After the loss of the appendix no more is heard of the "bilious attacks," which before have been so frequent. When I am now told, in a case of acute appendicitis in a child, that there has been this earlier history, I am accustomed to predict that the future will be free from these troublesome complaints.

The close investigation of the anamnesis of the cases to which I am now anxious to call attention reveals the fact that there are several types of "appendix dyspepsia," types which differ from one another in some striking particulars, but which yet resemble one another in many conspicuous features.

In what is, perhaps, the most interesting group of all these there is a very close mimicry—indeed, very often an exact reproduction—of those symptoms which have

long been attributed to "gastric ulcer." The symptoms are pain, which comes on soon after food, usually within half an hour to one hour, but sometimes later, sometimes earlier, and usually with caprice. There is here no fixed interval of relief after a meal, as is constantly the case in chronic gastric ulcer. The patient will say that the pain comes "at any time" after a meal. The pain is epigastric; it is rarely felt elsewhere, though it may spread over the abdomen to one or both sides, or, rarely, to the back; pressure often gives great relief to it for the moment. It is always worse on exertion and after exercise; a game of golf, an evening's dance, a day's hard physical work will always excite the pain or increase the severity of that which food has caused. Flatulence, the belching of gas, and sour eructations may all be present, and vomiting is not infrequent. In the vomited matter and in the contents removed from the stomach after a test meal there may be an increased amount of free hydrochloric acid. Epigastric tenderness is sometimes, indeed generally, present, and in two recent cases of my own was well marked beneath the left costal arch, so that, in both cases, I had been led to diagnose an ulcer on the lesser curvature of the stomach. Tenderness is not present in any other part of the abdomen, though it is a frequent experience to find that the patient complains of epigastric discomfort, his "usual pain," he may say, when pressure is made over the appendix. Nausea is not infrequent, and haematemesis may occur. In perhaps a dozen cases of my own the haemorrhage from the stomach has been considerable—that is to say, a quantity in excess of a pint has been vomited at once. In one case I visited the patient at her own home with her medical attendant, and we saw that about 3 pints of blood had been vomited in twenty-four hours. Patients who suffer from these symptoms are said to have "gastric ulcer"; indeed, no other diagnosis would seem permissible or possible to the majority of physicians. The symptoms, in nature and degree, are those which would satisfy the most exacting German clinician. After the "attack" has passed away the patient's health may greatly improve, but there is never the same absolute return to complete unthinking health as is seen in cases of duodenal, and less commonly of gastric, ulcer. There is always, I find, epigastric uneasiness, some concern as to the quantity or quality of the foods to be taken, and red meat especially seems to be avoided by many patients. The regurgitation of bitter fluids and a burning of the throat are taken to indicate a persistent acrimony of the gastric contents. The exacerbation in the symptoms which is described by the patient as an "attack" may occur infrequently or at short intervals. Something depends on the nature of the life the sufferer leads, but more upon the care with which food is taken. It is quite common to hear that the first attack occurred "when I was quite a child"; ages of 7, 11, 15, and so on have been given to me as indicating the time of the first onset of indigestion. Sometimes, though this is quite exceptional, the beginning is made to date from an acute illness, which inquiry may indicate as having been due to appendicitis. In by far the great majority, however, the onset is insidious, its exact beginning unknown, and its earlier developments imperfectly remembered.

The complete clinical picture, it will be seen, suggests a diagnosis of gastric ulcer; but close inquiry discovers some discrepancy. In gastric ulcer there is order and method, as an almost invariable rule, in the appearance of the symptoms; in the condition I describe there is caprice. In gastric ulcer there is frequently a seasonal variation—an improvement in warm weather, a special liability to chills, or damp, or colds. There is, moreover, a tendency for exercise and fresh air to relieve the symptoms. In "appendix dyspepsia" there is no note of seasonal differences, and exercise always makes the condition worse. Vomiting in cases of chronic ulcer, whether of the stomach or of the duodenum, is infrequent; in many cases of appendix dyspepsia it is the most constant of all symptoms. It occurs for long periods after each meal, generally one or two hours after the meal has ended, and it is the one conspicuous means by which relief from pain or distress is obtained. The amount of food returned is always small, but on the instant of its regurgitation some release from pain, fullness, or discomfort is experienced.

In several of my cases a diagnosis of gastric ulcer has been made by one or more physicians, and patients have been in the medical wards of hospitals or in private homes to undergo a rest cure, with the limited dietary and rectal feeding, in the orthodox way. One patient, a private case, had three such courses of treatment for "gastric ulcer," the last of which endured ten weeks.

I hold it to be axiomatic that if a gastric ulcer has produced symptoms of a severe character over a period of years, 5, 10, 15, 20, or more, the ulcer is one which will have reached the serous coat, and will have so involved the wall of the stomach as to make the ulcer palpable, visible, and demonstrable.

On opening the abdomen of a patient whose type-history I have described, no flaw can be discovered in the stomach even after the most minute and most meticulous care has been expended. There is no thickening, no whiteness, no puckering, no adhesion. The stomach looks in every particular quite normal. But if it be allowed to lie quietly for inspection (and it is better to watch it while the abdominal wall is raised up, before the organ is handled) a most interesting condition is displayed. The stomach in its pyloric half is seen to be in vigorous and excited action. At the point where the vertical and horizontal parts of the stomach merge a contraction starts and spreads towards the pylorus, and at last involves all the pyloric antrum. The stomach becomes thick, contracted and pale; its muscle is evidently in a state of strained and vigorous action, and the channel through it is almost obliterated. On the cardiac side of this area of spasm the stomach is quiet, a little distended even, and shows no movement. I described this condition for the first time in 1904¹ in the following words:

On several occasions during the last few years I have watched the stomach intently for several minutes, and have seen the onset, the acme, and the gradual relaxation of a spasmodic muscular contraction in its walls. Quite gradually the stomach narrows, and the wall becomes thicker and almost white in colour; when taken between the fingers the contracted area feels like a solid tumour. The spasm may be so marked as to prevent a finger being invaginated through the segment affected. The appearance presented is very striking. I have seen it in the body of the stomach and at the pylorus, but never at the fundus. As slowly as it comes on the spasm quietly relaxes, and the stomach assumes its usual form.

When this condition is seen it may be predicted that a lesion will be found in the appendix. As Bishop Butler tells us, "probability is the very guide of life," and the appendix is selected as the seat of an organic lesion in such a prediction because it is found to be the cause of a "pyloro-spasm" far more frequently than any other part. The symptoms in the condition I have described are referred to the stomach, I believe, partly on account of the turbulent condition of muscular over-action at the pyloric portion of the organ. What is the reason for this spasmodic contraction? The explanation is to be found in the work of Pawlow, Starling, and Cannon. Pawlow demonstrated that the action of the pylorus was controlled by stimuli excited both on the gastric and on the duodenal side. On the gastric side an acid reflex causes the pylorus to open, and at the moment when, by a series of rhythmical contractions, the muscular wall of the pyloric antrum has squeezed a portion of the prepared contents onwards to this point. A jet of acid chyme is projected into the duodenum and there sets up at once a reflex, which closes the pylorus until the acidity is neutralized by the alkaline juices poured out through the bile papilla (bile and pancreatic juice). The pylorus is kept closed until the change in the condition of the duodenal contents gives the signal for its release.

W. B. Cannon and F. T. Murphy² in a most interesting article describe a series of experiments carried out upon cats. In the cat, ordinarily, food begins to leave the stomach within ten minutes of ingestion, as is shown by examination with x-ray screen after an opaque food (bismuth and potato) has been given. After a high intestinal operation—an end-to-end anastomosis, for example—the food begins to leave the stomach only after five or six hours. The delay is not due to etherization or to division of the abdominal wall; it is dependent upon an alteration in the action of the pylorus. After the operation peristaltic waves are seen to be coursing regularly over the stomach to the pylorus, precisely as they do in health. The difference is in the fact that the pylorus refuses to

relax. Cannon and Murphy then show that the protective mechanism of the pylorus is beautifully proportioned to the needs of the intestine, for it is exerted during almost precisely that period (six hours) which is necessary for the repair of the intestinal injury. The function of the pylorus would, then, appear to be this: That, being controlled by stimuli aroused both on its proximal and distal sides, the distal stimulus, undoubtedly the more important, in altered conditions of the intestine, may be so insistent that relaxation is prevented and a firmer action is excited. The pylorus, that is to say, acts as a guard to the bowel distal to it, and it is probably true to say that its protective control extends to the whole of the mid-gut.

The occurrence of haemorrhage, even profuse and recurrent haemorrhage, in these cases of "appendix dyspepsia" is at first thought difficult perhaps to understand. But it is an observation which has often been made in the *post-mortem* room that patients may bleed to death without any lesion being discoverable in the stomach, and a large number of cases are recorded by surgeons in which an earnest search in the interior of a stomach from which blood has freely poured has failed to disclose any breach in the continuity of the mucosa. In many instances the stomach is said to be bleeding from many tiny points—the mucous membrane is weeping blood. Unfortunately in these cases no special attention seems to have been paid to the intestine and appendix. Haemorrhage we know may be excited by causes which do not leave any mark upon the stomach wall. Post-operative haematemesis, for example, as described by von Eiselsberg in 1899, may follow abdominal operations, and may prove fatal after hernia operations and the like, and yet no gross lesion of the stomach can be seen. And in a certain proportion of cases of acute appendicitis and of acute cholecystitis I have known haematemesis usually slight, but rarely severe, to occur. Exactly how the haemorrhage is caused does not seem clear; it may be sepsis, as Rodman suggests, or embolism of the artery of the stomach secondary to thrombosis in the omental branches, as von Eiselsberg considers possible, or to toxic influences which we do not at present understand; but the fact that gastric haemorrhage can occur in association with acute intestinal lesions does not admit of doubt. It is interesting to consider whether it is possible that the condition produced in the stomach which leads to the haemorrhage, being itself the result of an inflammation in the appendix, may not be the initial stage in the development of an ulcer in the stomach; the area involved in the production of the bleeding having its resistance so lowered that the gastric juice is able successfully to attack it. That acute ulceration of the stomach (a lesion in which there is destruction only of the mucosa, the serosa being unharmed) occurs in intestinal lesions—for example, typhoid fever, and in acute specific fevers—is well known. The lesion is probably toxic, as the work of Turck suggests, but is possibly of an infective origin. It is accordingly not improbable that in some cases of haematemesis due to appendicitis, a structural lesion may be present in the stomach. But in the cases to which I desire especially to draw attention the stomach is healthy, the appendix alone is diseased.

In a brief but most interesting article,³ Dr. Hale White asks the question: "Are not some patients said to be afflicted with gastric ulcer really suffering from a different disease?" In this paper he relates many instances in which a diagnosis of ulceration of the stomach had been made, in which also haematemesis had occurred when no perceptible lesion was present. The answer I would suggest to the question is: "Yes, they are suffering from appendicitis." The following cases may be quoted as examples of this form of the disease:

CASE I.

Mrs. H., aged 52, sent by Dr. Ellis, Halifax, for at least twenty years has been liable to "bilious attacks" accompanied by severe headache and dizziness. At first symptoms consisted of a feeling of epigastric discomfort and pain coming on about one hour after food, frequently followed by the vomiting of a few mouthfuls of food and mucus which gave relief. These attacks used to come on at intervals of about a month, and varied in severity and duration. Sixteen years ago a severe illness (rheumatic fever) accompanied by much vomiting.

Twelve or fourteen years ago very severe attack accompanied by vomiting of dark fluid, probably altered blood. Seven years ago hysterectomy was performed by Mr. Moynihan, and since

that time the attacks have been more frequent and more severe. Pain, she states, has come on from half an hour to one hour after food. There is at first a feeling of tightness in the chest, which is followed by pain in the epigastrium and round both costal margins, passing to between the shoulders; this is accompanied by distressing flatulence and belching and followed by vomiting; the vomited material recently has consisted mainly of bile, and sometimes has been considerable in quantity. The pain is relieved by vomiting, and if this does not occur usually diminishes before the next meal. In the intervals between the attacks she has been fairly well, and has managed to do her house work, although she has been compelled to limit her diet very much, and has lived mainly on slops, Benger's food, etc.

Seven weeks ago a severe attack; was kept in bed on fluids for three weeks, and then an attempt was made to start solids again, but this brought a recurrence of pain and a return to fluid food was made. Has lost weight considerably during last twelve months.

On Examination.

A rather thin woman. No tumour palpable; stomach slightly dilated; some tenderness on pressure below and to right of umbilicus.

Operation, January 31st, 1909.

Stomach, duodenum, and gall bladder normal. Appendix long and showing several diverticula (?) near its tip; no adhesions. Appendicectomy.

Pathological Report: Appendix.

The specimen is an appendix measuring $3\frac{1}{2}$ in. by $\frac{1}{2}$ in. At a point $\frac{1}{2}$ in. from the tip is a small excrescence about $\frac{1}{2}$ in. in diameter. Around this excrescence and extending over this lower third of the surface of the appendix the vessels are dilated, congested, and tortuous. On splitting open the specimen the lumen was found to be patent for only 1 in. from the severed end. This portion was covered with mucous membrane and not injected; the lower $2\frac{1}{2}$ in. formed a solid fibrous cord. A piece from the tip was removed for microscopical examination.

Microscopical sections of the nodule show that it is a small fibro-myoma. There is no trace of any glandular epithelium or lymphoid tissue in the sections. At the edge of the section and at the foot of the small excrescence is a strip of necrotic tissue which suggests that the tortuous vessels may have been thrombosed.

Dr. Ellis writes on December 2nd: "I have seen Mrs. H. today. She has gained 12 lb. in weight. She is quite well, and has no pain."

CASE II.

M. C., aged 54. Twenty years ago he began to have indigestion—that is, a certain amount of discomfort after food, with the bringing up of wind and a little mucus; there was never anything he could call pain. Eighteen years ago he had mucous-membranous colitis occurring in spasms lasting three or four days each; each attack was caused immediately by worry and strain, both mental and bodily. He has never vomited. His complaint is chiefly that, after food, at a time from a few minutes to an hour or so, he begins to have discomfort, flatulence, bringing up wind and passing it downwards, and occasionally he eructates a little acid mucus. At no time has he had acute pain. Food does not relieve him, but dry food suits him the best. (For eighteen months he has had a morning cough and a chronic pharyngitis.) Six years ago he was in hospital in Glasgow, and had his stomach washed out regularly for dilatation. He has never had jaundice or anything to suggest gall stones.

He has been under the care of a large number of doctors, some have told him his stomach was dilated, others have said the trouble is in his lungs.

He has seen specialists for his throat, and they say his stomach is the primary cause. He says the right lower half of his abdomen has always been sensitive to touch; on pressure there he complains of epigastric pain.

Operation.

Incision through right rectus below umbilicus. Appendix found tied tightly down to the brim of the pelvis and tautly stretched. At its termination it was slightly clubbed and firmly adherent. It was 3 in. in length, and the surface was covered with minute excrescences of a paler colour. Appendicectomy performed. There were several caseous glands along the ileo-colic artery. The appendix showed on subsequent examinations chronic inflammation in all its coats. The distal end was greatly thickened and the cavity dilated. There were many diverticula. The patient experienced relief almost at once, and has taken food better and with greater comfort than he did for years before.

CASE III.

C. N., female, aged 25, admitted July 21st, 1909. Eight years ago began to suffer from anaemia and indigestion. Pain and a sense of heaviness came on soon after food, occasionally vomiting occurred, and always gave relief. After a few months vomiting became frequent, and after a hearty meal some return of food was always observed. At first there were exacerbations, usually about three a year, when the pain and vomiting became much more severe. Five years ago in a very severe attack she vomited blood twice or thrice. She was then in bed for seven weeks. Four years ago haematemesis occurred again more

profusely, and she underwent a "cure" of ten weeks' duration in which she was treated by restriction of the diet and nutrient injections. She was in hospital for five weeks. After this she was easier for a few weeks, but the symptoms then returned and continued up till March, 1909. Then a much more severe attack of haematemesis occurred, and she was in bed under treatment for nine weeks. The pain comes on either immediately after food or within half an hour; it is sometimes "gnawing," or there is a "feeling of distension and weight." The pain lasts one to two hours, is always relieved by vomiting, and is always made worse by more food. During all these years constipation has been severe, and enemata are given regularly. On examination there was slight dilatation of the stomach and some tenderness in the epigastrium. Pressure in the right iliac region caused epigastric pain. At the operation no lesion was found in the stomach, duodenum, or gall bladder. The appendix was sharply kinked and firmly adherent in its proximal part. It was removed, and the pathologist reported "examination shows the mucosa to be thickened all the length of the appendix, and there is a small old haemorrhage half way along the length of the tube. There is marked inflammatory infiltration of the submucosa." Within a few days of the operation the patient began to ask for more food, and has since eaten well with absolutely no discomfort. She had not been free from symptoms for more than a "few days" for seven years.

In a smaller number of cases a distant or a close resemblance to the symptoms of duodenal ulcer may be present. The patient then complains of pain coming usually one to three hours after a meal, not constantly, but capriciously. There is complaint of flatulence, belching, some acidity, and constant epigastric or general abdominal discomfort. The symptoms extend over many years, and in some degree are always present. A good example is the following:

CASE IV.

W. W., aged 28. For several years has had "indigestion"—he thinks it dates from an attack of pain which woke him up in the middle of the night when he was 12 years of age. He has pain usually late in the mornings, at 11 or 11.30, and again at about 8 p.m. At these periods, about two to three hours after a meal, he begins to feel "blown out" and "as if he would burst"; sour and acid eructations occur, and sometimes vomiting, which always brings relief. If he empties the stomach by vomiting, he feels ease at once, and is able to take another meal in a few minutes. He has not found that dieting makes much difference to his symptoms; if anything, he is rather easier if he keeps to fluids. Appetite is good, so he prefers to eat a good meal and let some of it return if he gets uneasy. He has only been awakened twice by the pain in the night; on both occasions it was very severe, and was referred to the epigastrium; brandy relieved it in a few minutes. On both occasions he was able to go to work the next morning. He is anxious to have relief by some means, as he is "never comfortable."

At the operation an incision through the right rectus at the umbilical level revealed no structural alteration in stomach, duodenum, or gall bladder. A very well-marked pyloro-spasm was watched for three or four minutes. The appendix was found very firmly bound down to the iliac fossa for one inch after leaving the caecum; this portion was narrow, thin, and compressed. Beyond the adhesion the appendix was greatly distended, full of cheesy faecal material, containing seven concretions, and the walls were "as thick as the small intestine." The pathologist reported that the submucous coat was densely infiltrated throughout with inflammatory cells. There was no ulceration. The contrast between the thin compressed portion of the appendix and the distal free portion was very evident.

In this case the diagnosis of appendicitis had been made, but in an earlier case I had made a diagnosis of duodenal ulcer, and had found as the solitary organic lesion an appendix firmly adherent. The patient was a lady whom I saw with Dr. Godfrey of Scarborough. Both he and I and a well-known London physician had concluded, after hearing the detailed history, that the case, by reason of the long persistence and severity of the symptoms, was one for which surgical treatment should be adopted. The usual incision for the performance of gastro-enterostomy was made, and at once a busy contortion of the pyloric antrum was evident. I knew what this meant, and after displaying a healthy stomach, duodenum, and gall bladder, I verified my instant prediction and exposed a thick white appendix, the seat of ancient disease, firmly bound down by many complex adhesions.

The following is another case in which there is some resemblance to the symptoms of duodenal ulcer:

CASE V.

E. M. H., female, aged 42, seen with Dr. H. J. Roper. Patient admitted complaining of pain in the body and indigestion. She is a woman of medium build, looks a little pinched about the face, but does not think she has lost much weight recently. She has had a dietary treatment for some time. No signs of

jaundice. There is a moderate amount of fat about the body wall.

Up to three years ago was perfectly well and never complained of indigestion in any form. Three years ago she began to have "indigestion" or "trouble in the body." This came on when she was in bed at night, generally about 10.30 p.m., and she generally took her last meal about 8.30 p.m. She did not complain of a great pain, but rather of an uneasiness and abdominal discomfort with a blown up feeling and tightness. There were no vomiting and no sour eructations. This condition lasted about six months, and during that time the "indigestion" got slightly worse. Then for six weeks patient took to her bed complaining of acute pain. The pain seems to have been nearly always present, but at night time, about 10 to 11 o'clock, became worse. Sometimes it would become worse during the afternoon, often about two hours after a meal. She did not vomit and never brought up any sour material into the mouth. The motions were not noticed to be darker in colour at any time. Since then up to five weeks ago has been going about and attending to her work—she is a matron at a school. But she has continually complained of the pain, which seems to have come generally within two hours of a meal; she kept a record on paper of the times of onset of the pain. During the last five weeks she appears to have been slightly worse, and she has noticed that the pain comes on sometimes almost immediately after food and sometimes one hour later. She was on milk diet for many weeks. The pain is described as being like a hot iron being passed through the body to the back to the right of the umbilicus.

At the operation the stomach, duodenum, and gall bladder were normal. A moderate degree of pyloric spasm was seen. The appendix was normal in its first inch, beyond that it was greatly dilated, thickened, its vessels engorged, and its colour very florid. At the junction of the normal and pathological portions there was a single band of adhesions and a kink. Sections of the distal portion showed "a well-marked chronic inflammation especially in the submucous layer."

There are cases, again, in which the symptoms do not resemble those aroused either by gastric or duodenal ulcer. The complaint again is of "indigestion," of discomfort after food, inability to eat generously, flatulence, aching of the body, occasional colic with diarrhoea which relieves it, and "mucous colitis." Palpitation is not seldom present also, and seems to the patient to be dependent upon the filling of the stomach; as a result the meals taken are often small in quantity, less than enough to appease the patient's desire. In this group of cases a history of an attack of appendicitis, before the onset of the dyspeptic symptoms, may be obtained; or a story may be related of an acute illness, attended by abdominal pain, diarrhoea, and vomiting, which has almost certainly been due to an inflammatory attack in the appendix.

The appendix, when examined before and after removal, may present almost any degree of abnormality. I have twice found it to be tuberculous, on several occasions to be filled with pus, and in every case to show indisputable evidence of ancient disease. The most frequent of all the changes found is this: For the first inch or rather less from its caecal attachment the tube is thin, pale, and narrow; adhesions commonly bind it to the caecum or to the iliac fossa, or, rarely, to the abdominal wall. Beyond this first inch the appendix is enlarged, its walls greatly thickened, and its cavity, which is greatly dilated, contains one or more concretions, or a thick, offensive, and possibly purulent fluid. The distinction between the two portions of the appendix—the one thin, pale, and empty, the other turgid, grossly enlarged, and overfull—is striking. At the junction between them a strong, firm adhesion may be found. In other cases the appendix is club-shaped, with a narrower pedicle and a large free extremity. In all forms its lumen is obstructed either by a definite constriction or by external attachments. On section the walls show the evidences of old inflammation, and the submucosa especially seems to bear the traces of this attack.

In some of the cases, though these are few, the appendix itself appears to differ little or not at all from the normal. It is merely adherent for an inch or more at the caecal end. These adhesions are of course abnormal, for there is no process of "physiological fusion" in the region of the appendix or of the caecum, and any adhesion implicating the former is certainly pathological. The microscopic examination of such an appendix does not fail to show that old and probably long-continued inflammation has had its seat in the walls of the little tube. It is the rule for the appearances to be those due to a long continued smouldering inflammation rather than to a single flagrant attack. Among my specimens are two exemplary instances of diverticula, the appendix being studded with the minute

excrescences due to hernial protrusions of the mucous membrane.

A far greater amount of information, based upon observation both before and after operation, is necessary before the exact characters and precise frequency of this condition of "appendix dyspepsia" can be gauged. The number of investigators, too, needs increasing. The range of observation during the progress of an operation for supposed gastric disorders needs extension. Of the facts that dyspepsia, often confidently assumed to be the effect of a gastric lesion, may be dependent upon nothing else than a structural change in the appendix, and that the symptoms are completely relieved by ablation of this part there can be no question. The typical "gastric ulcer" of the medical textbook, in my view, is frequently the appendix. The bearing of this statement upon the need for and the efficacy of the diverse systems of medical "cures" is obvious.

I cannot refrain from wondering in what proportion of cases of "gastric ulcer" treated medically there is truly a structural change in the walls of the stomach. Though the diagnosis is probably quite frequently wrong, the treatment by rest and a restricted dietary can do nothing but good to an inflamed and adherent appendix. If, therefore, relief, fugitive or permanent, should follow upon this treatment, the diagnosis of a gastric lesion is by no means thereby confirmed.

CONCLUSIONS.

The following conclusions may be stated:

1. The symptoms of both gastric and duodenal ulcer, especially the former, may be exhibited with great fidelity in cases where no structural lesion can be found in these parts.
2. In many of the cases of "gastric ulcer" in which the symptoms pain, vomiting, haematemesis are present, and in many cases of intractable dyspepsia of a capricious kind, the only pathological change discovered during operation is a chronic inflammation of the appendix.
3. Removal of the inflamed and obstructed appendix is generally followed by a complete and instant relief of all former dyspepsia. The cessation of symptoms may, however, come only by degrees and with the lapse of many weeks.
4. No operation for supposed gastric or duodenal ulcer is complete until an examination has been made of the appendix, small intestine, and mesenteric glands (that is of the midgut).
5. If in such an operation no lesion can be found in the stomach or duodenum, it is not permissible to perform any operation such as gastro-enterostomy. This operation has results not surpassed by any other when performed in strictly appropriate cases. It is worse than useless in chronic appendicitis.
6. The mimicry of the symptoms of gastric ulcer in these cases is due to an exaggerated action of the pylorus. This tumult of contractile activity can be recognized when the stomach is inspected.
7. Investigation is necessary to ascertain the frequency with which the mucous erosion of the stomach (the "acute" or "medical" ulcer) is dependent upon a primary lesion in the appendix or intestine.

REFERENCES.

- ¹ BRITISH MEDICAL JOURNAL, 1904, i, p. 414. ² *Annals of Surgery*, 1906, i, p. 512. ³ *Lancet*, 1901, i, p. 1819.

DRS. CALABRESE AND BURRO have lately published a report on the antirabic vaccinations carried out in the Antirabic Institute of Naples during the three years 1906-08. The total number of bitten persons who were treated was 2,616; of these 851 were inoculated in 1906, 992 in 1907, and 773 in 1908. Most of the patients belonged to the city and province of Naples. Of the total number 1,122 were bitten by animals experimentally proved to be suffering from rabies; 1,001 by animals who showed the clinical symptoms of rabies; and 493 by animals which were only suspected of having the disease. There were only 12 failures, giving a mortality percentage of 0.46. From the time the institute was opened in August, 1886, till December 31st, 1908, the total number of cases treated was 8,446, with a mortality of 0.53 per cent. The highest mortality has always been among persons bitten on the face, the lowest being among those bitten through the clothes.