required in view of the unfortunate fact that in a certain proportion of cases so-called cured patients have committed suicide.

Unfortunately, until a specific has been discovered which cures malignant disease without having recourse to the knife, total laryngectomy will remain a cruel necessity in cases of extrinsic cancer of the larynx. From my own statistics above quoted, however, it will have been seen that fortunately the extrinsic variety is by far the rarer of the two by which the larynx may be attacked; and I feel sure that I shall have the sense of this meeting with me when, in conclusion, I express an ardent hope that every practitioner should endeavour to diagnose the intrinsic variety at so early a time that thyrotomy will suffice, not only to save the patient, but also to help him to an amenable existence afterwards. Fortunately I can say that, to conclude from my own experiences, this desirable improvement in early diagnosis has made material progress during the last few years. Still much remains to be done in this respect, and I cannot better end my introductory remarks than by the expression of a fervent hope that this discussion may give a fresh impetus to early diagnosis and immediate thorough removal of the disease by thyrotomy in cases of intrinsic cancer of the larynx.

NOTES AND REFERENCES.

- ¹ Indications for the Complete or Partial Extirpation of the Larynx. *Transactions of the International Med. Congress*, 1881, vol. iii, pp. 251-266. ² *Die Laryngotomie zur Entfernung intralaryngealer Neubildungen*. Berlin, August Hirschwald, 1878. ³ Those who wish for information on questions which will not be at all, or hardly at all, touched upon in this paper, I may refer to the following communications of my own in which these questions have been fully discussed:—(1) *Die Frage des Ueberganges gutartiger Kehlkopfgeschwülste in bösartige*, etc., Berlin, A. Hirschwald, 1889. (2) The Results of Radical Operation for Malignant Disease of the Larynx, etc., *Lancet*, December, 1894. (3) Zur Frage der Radicaloperation bei bösartigen Kehlkopfneubildungen, etc., *Archiv für Laryngologie*, 1897. (4) The Indications of Thyrotomy, *Lancet*, 1900. (5) Introductory Remarks to a Discussion on the Operative Treatment of Malignant Disease of the Larynx, *BRITISH MEDICAL JOURNAL*, October 31st, 1903. (6) An Address on Cancer of the Larynx, *Lancet*, November 5th, 1904. ⁴ *Archiv für Laryngologie*, vol. vi, p. 384. ⁵ *Handbuch der praktischen Chirurgie*, Dritte Auflage, 1907, Bd. II, pp. 242-244. ⁶ *Internationales Centralblatt für Laryngologie*, vols. v and vi, 1889. ⁷ *BRITISH MEDICAL JOURNAL*, October 26th, 1895, p. 1034. ⁸ *Proceedings of the Laryngological Society of London*, December, 1899, p. 15. ⁹ *Ibid.*, December, 1903, p. 51, and June 3rd, 1904, p. 187. ¹⁰ *Internationales Centralblatt für Laryngologie*, etc., vol. v, 1889, pp. 318-319. ¹¹ *Transactions of the American Laryngological Association*, 1900 and 1902. ¹² *Lancet*, November 5th, 1904. ¹³ *BRITISH MEDICAL JOURNAL*, November 24th, 1906, p. 1483. ¹⁴ A case of Partial Extirpation of the Larynx for Epithelioma of the Left Ventricle of Morgagni. Recovery. *Transactions of the Clinical Society*, vol. xx, 1887. ¹⁵ One Case of Auto-inoculation in Laryngeal Carcinoma and Two Cases illustrating the Danger of Intralaryngeal Interference in Cancer of the Larynx, *Transactions of the Clinical Society of London*, vol. xxii, 1889. ¹⁶ Introductory Remarks to a Discussion on the Operative Treatment of Malignant Disease of the Larynx, *BRITISH MEDICAL JOURNAL*, October 31st, 1903. ¹⁷ *Proceedings of the Laryngological Society of London*, December, 1906, and January, 1907. ¹⁸ A Case of Cancer of the Larynx Cured by X Rays, *New York Medical Journal*, December 6th, 1902. ¹⁹ Treatment of Cancer of the Larynx by Subcutaneous Injections of Pancreatic Extract (Trypsin); A Case of Growth supposed to be Carcinoma; Cure, *New York Medical Record*, November 24th, 1906. ²⁰ *Handbuch der praktischen Chirurgie*, 3te Auflage, 1907, Band II, p. 244. ²¹ *Monatsschrift für Ohrenheilkunde* 1904, p. 155. ²² *Loc. cit.*, pp. 245, 246. ²³ See my paper in the *Lancet*, 1894, tables, Case 7. ²⁴ See the papers by Dr. John Mackenzie, already referred to, as well as the papers by MM. Le Bec and Real, October and December, 1903, in the *Annales des Maladies de l'Oreille et du Larynx*. ²⁵ *Loc. cit.*

INTERNATIONAL DERMATOLOGICAL CONGRESS.—The sixth International Dermatological Congress will be held at New York in the autumn of 1907. The date of opening will be September 9th and the Congress will remain in session for a week. The President is Dr. James C. White of Boston; the Secretary-General, Dr. John A. Fordyce of New York. Papers may be presented in writing in the English, French, German, Spanish, or Italian languages, and may be discussed in the language most familiar to the speaker. Members desiring to present papers must communicate the title to the Secretary-General before May 1st, 1907, and send an abstract to him before that date. The themes selected for formal consideration are: 1. The Etiological Relationship of Organisms Found in the Skin in Exanthemata; to be presented by Professor W. T. Councilman of Boston. 2. Tropical Diseases of the Skin; to be presented by Dr. H. Radcliffe Crocker of London, Professor G. Riehl of Vienna, Dr. William Dubreuilh of Bordeaux, Dr. W. R. Brinckerhoff of Honolulu, and Dr. J. H. Wright of Boston. 3. (a) The Possibility of Immunization against Syphilis; to be presented by Professor A. Neisser of Breslau, Professor Ernest Finger of Vienna, and Dr. L. E. Leredde of Paris. (b) The Present Status of our Knowledge of the Parasitology of Syphilis; to be presented by Professor Erich Hoffmann of Berlin.

UNDER the will of the late Miss Helen Halyburton Symers of Dundee, who died on Nov. 26, 1906, the Royal Infirmary, Dundee, receives a sum of £1,000.

The Hunterian Lecture ON DUODENAL ULCER AND ITS TREATMENT.

DELIVERED BEFORE THE HUNTERIAN SOCIETY OF
LONDON.

By A. W. MAYO ROBSON, D.Sc., F.R.C.S.

THE serious character of ulceration of the duodenum and the frequency with which it is overlooked until dangerous complications have supervened, would afford a sufficient excuse for taking it as my subject this evening, but I would also mention as other reasons, the facts that I was requested to take up a practical subject, and that it has fallen to my lot to have had considerable experience of duodenal ulcers and their complications.

Until quite recently peptic ulcer of the stomach with its various complications quite overshadowed the similar conditions in the first portion of the duodenum, and though we now know how common ulcers of the duodenum are and that they not infrequently prove fatal as the result of hæmorrhage, perforation, or other complications; our increased knowledge of their frequency and importance has chiefly been the result of investigations made during surgical operations.

This subject is one of many in which pathology based on autopsy has been corrected and simplified by biopsy or the study of disease in the living body, by actual observations made during the performance of abdominal sections; for instance, in some of the most recent works on medicine, observations based on *post-mortem* pathology give the proportion of duodenal to gastric ulcers as from 1 in 50 to 1 in 10, yet operative experience shows that in a large proportion of cases duodenal and gastric ulcers co-exist and that the real proportion of duodenal to gastric ulcers is 1 to 2 or thereabout.

The statistics of Drs. W. J. and C. H. Mayo show that in their last 200 cases of operations for peptic ulcer 86 were duodenal; of these, 27 involved the pylorus, and 9 had a separate and distinct ulcer of the stomach and duodenum.

It is a curious and as yet unexplained fact that, while gastric ulcer is common in women, duodenal ulcer is more frequently found in men. At the Rochester Clinic, of the total cases of duodenal ulcer operated on, 73 per cent. were males and 27 per cent. females; but in my own practice the proportion has been even larger—86 per cent. of males to 14 per cent. of females.

It is not so very long since the surgeon, when dealing with an acute abdominal lesion, often deliberately ignored the duodenum, just as formerly the pancreas; and, in fact, it may be said that perforated duodenal ulcer is to the surgeon almost the newest of the many possible causes of acute peritonitis, now capable of being treated rationally with a reasonable prospect of success.

Now that the importance of duodenal ulcer has been grasped, we have no cause to complain of want of recognition, as shown by the number of cases of perforating ulcer reported—unfortunately, however, for the most part unrecognized before the catastrophe of perforation had occurred. Fortunately, however, the reports of large numbers of cases of duodenal ulcer that have been treated before rupture or other complication show that ignorance and want of appreciation of the importance of the condition is gradually passing away.

It is in some respects unfortunate, both from the pathological and surgical point of view, that the duodenum was considered by the older anatomists as simply one of the essential divisions of the intestine and that the error is still perpetuated; for the portion of the duodenum as far as the point where Dr. Ochsner has shown the presence of a sphincter, just below the entrance of the bile and pancreatic ducts, has quite as much to do with digestion as has the stomach itself; and both physiologically and pathologically that portion partakes more of the character of the stomach than of the intestines, the small bowel proper, in fact, only starting below the sphincter just mentioned. Developmentally also, this point is marked out as the place of junction of the foregut and the midgut, so that the portion of duodenum from an inch below

the entrance of the bile ducts ought to be considered as part of the jejunum.

It has hitherto been the custom to classify together ulcerations of the stomach and duodenum, and as they frequently coexist and probably own a common cause, hyperchlorhydria, there is apparent justification for that arrangement.

The symptoms of the one and of the other differ, however, materially, for while gastric ulcer is usually diagnosed early, the ambiguous character of the symptoms of duodenal ulcer often makes its diagnosis difficult; and while gastric ulcer is distinctly amenable to medical treatment in the earlier stages, it is questionable if, when once peptic duodenal ulcer has passed to the stage of being recognized by definite symptoms, it is ever really permanently cured by medical treatment alone.

Moreover, the chief complications of duodenal ulcer, though similar to those of gastric ulcer, are as a rule much more serious in their results, haemorrhage from duodenal ulcer being much more often rapidly fatal, and perforation occurring in a more insidious manner and with a greater tendency to a lethal ending, even when surgically treated.

On these accounts, therefore, I think we may with advantage describe diseases of the stomach and duodenum separately.

The clinical history of duodenal ulcer is in my experience much more indefinite than is the history of peptic gastric ulcer, and though I am inclined to think that definitely characteristic symptoms may be elicited by exact questioning in by far the greater number of cases before serious complications supervene, yet the fact remains that mistakes in diagnosis do occur, and that in many cases, beyond a certain amount of so-called dyspepsia, often put down to excessive acidity, the first signs demanding serious attention are those of severe haemorrhage in the shape of haematemesis or melaena, or the equally or perhaps more serious symptoms of perforative peritonitis.

In looking through the notes of my cases, it is astonishing to find how long in many of the cases the symptoms had persisted and been treated medically under the designation of acid dyspepsia, gout, neurosis, gastroduodenal catarrh, biliary colic, chronic appendicitis, or catarrh of the appendix, colitis, etc. In some of the cases a ten, fifteen, twenty, or even thirty years' history of dyspepsia had been given, with characteristic symptoms throughout and with irregular intervals of relief by treatment and of relapses every few weeks or months.

Many cases of duodenal ulcer have been diagnosed and treated throughout as gastric or pyloric ulcer; first, because the two frequently coexist; secondly, because in about 90 per cent. of all cases the ulcer is situated within an inch of the pylorus; and thirdly, because the complications in both resemble one another very closely.

SYMPTOMATOLOGY.

Although duodenal ulcer as usually diagnosed is seen for the most part in the middle-aged, it may occur at any period of life, from the newly-born infant to extreme old age; and from the history given me by many patients dating back to youth, I am inclined to think that it is much commoner in early age than is generally recognized. Several pathologists have reported cases of ruptured duodenal ulcer between the ages of 10 and 20, and others have been recorded so late as the ninth decade. I have operated for duodenal ulcer at the age of 16, and in a patient over 70.

There is no disease in which for diagnostic purposes it is more important to have the history carefully ascertained, for in many cases it gives a typical picture enabling a diagnosis to be surmised without even seeing the patient, though, of course, a physical examination is necessary to confirm it, and occasionally further help may be obtained by laboratory investigations in completing the diagnosis.

Pain.

Pain is the most important symptom. As a rule it has decided relations to meals, though unless there is associated gastric ulcer, the patient will say that he has no pain after food, the fact being that the pain usually starts from two to three or even four hours after a meal, that is, when the stomach is pouring into the duodenum

its irritating acid contents, which come into contact with the ulcerated surface. The fact that the pain is relieved by food is easy of explanation, for when more food is introduced into the stomach the acid becomes absorbed by it, and the pyloric orifice closes for a time; moreover, the acid that has already passed into the duodenum then becomes mixed with the alkaline bile and pancreatic fluid, and relief is obtained for a short period, so that it is common to find these patients complaining of pain about 11.30 to 12 in the morning, about 5 or later in the afternoon, and in many cases either just before retiring to rest, or later when they have been asleep for a short time. This night pain has been a marked symptom of many of my cases, and is explained by the patient going to bed with the evening meal still in the stomach; and only when digestion has been completed and when the acid stomach contents pass into the duodenum is the patient awakened if he has gone to sleep, or kept awake if he has retired late. Such patients usually have a biscuit or some milk by their bedside for the relief of pain in the night, while others will take carbonate of soda and water, and others, again, will obtain relief by inducing vomiting should that not occur spontaneously. The pain is due almost wholly to the irritating effect of the acid on the opened ulcer, but it is also partly due to spasm of the pylorus and to dragging on the adhesions which are often present.

That pain is chiefly due to the acid is shown by the relief obtained by taking anything that will dilute or neutralize it, or by the relief obtained by vomiting or by lavage of the stomach.

The pain usually starts a little above and to the right of the umbilicus, and may be paroxysmal and agonizing in character, or in others merely a dull ache. In some cases it is continuous for a day or two or longer, and then passes off to recur at longer or shorter intervals, but it is only in the later stages that it gives no respite. At first the respite may be so long, from three to six or even twelve months, that the patients think themselves well, and are apt to disconnect the former from the present seizures, until repeated recurrences force into prominence the relationship.

Radiation of Pain.

There is much less tendency for the pain in duodenal ulcer to radiate than is found in gastric ulcer or in biliary colic, though, if radiation takes place, the pain usually passes round to the right side, simulating to a certain extent gall bladder trouble; but a careful inquiry will usually elicit the fact that the pain does not radiate to the right subscapular region, but in a direction towards the right loin. It may radiate across the epigastrium, simulating stomach trouble, or into the caecal region, simulating appendix pain, or very occasionally along the right genito-crural nerve, resembling renal trouble.

Intermittency of Attack.

The presence of duodenal ulcer is usually characterized by periods of comparative good health intervening between the acute seizures; these intervals may extend to weeks, or in some cases even to two, three, six, or twelve months, and, beyond a little flatulency or discomfort, there is nothing to be complained of, the patient usually considering himself well until a recurrence of pain reminds him of his trouble.

Tenderness.

Tenderness can generally be elicited to the right of the middle line, usually just above and to the right of the umbilicus, in the same situation that tenderness is found in cholelithiasis; but the tenderness is often more diffuse than in gall bladder trouble and extends downwards further on the right side of the umbilicus, this being more marked when ulcers are on the anterior or outer wall of the duodenum, especially if there are peritoneal adhesions. When an ulcer is situated on the inner or posterior part of the duodenum, tenderness is much less distinct, and may be only elicited, if at all, on deep pressure.

Rigidity.

Rigidity of the right rectus is usually well marked during the exacerbation, and may be constant if the ulcer is on the anterior or outer part of the duodenum and if there are peritoneal adhesions, but the symptom is not so marked when the ulcer is on the posterior or inner wall.

Flatulence.

Flatulency is an important symptom, and is most marked at the time when the pain is present; in fact, by exercising tension it tends to intensify the pain. It has seemed to me that gas formation is more marked in duodenal than in gastric ulcer.

Dilatation of the Stomach.

Spasm of the pylorus generally accompanies ulcer in its vicinity, and as the most common site of duodenal ulcer is just beyond the pylorus, there is usually a tendency to pyloric spasm, which in its turn leads to dilatation of the stomach. During the exacerbations the stomach may be ballooned, and its outline can then usually be distinctly made out, when it will be seen to be dilated down to or beyond the umbilicus.

Hyperchlorhydria.

Excessive acidity of the gastric juice usually accompanies peptic ulcer of the stomach or duodenum, and leads to spasm of the pylorus and to so-called heartburn—a common symptom in this condition.

Tumour.

When the rectus is not too rigid to prevent deep palpation, a distinct feeling of fullness may sometimes be felt, and if the adhesions are extensive the swelling may give rise to the suspicion of tumour, but this is exceptional.

Vomiting.

Vomiting has been given by some authorities as a prominent symptom. It certainly does occur in duodenal ulcer, but I think it will be found that acid eructations and heartburn are more frequent symptoms than vomiting, and that where vomiting occurs gastric ulcer is a frequent complication. In some cases vomiting is self-induced in order to give relief, and to this end the patient will drink quantities of hot water so as to produce emesis. The vomit is usually very acid, but generally does not contain blood unless the retching is so violent that the duodenal contents are vomited. It may, however, in advanced cases be coffee-ground in character, and may assume the form of profuse haematemesis.

Haematemesis and melaena must be mentioned as symptoms, but should not be waited for in order to complete the diagnosis, as they more properly come under the serious complications.

Appetite.

In many cases there is a good appetite and a keen desire for food, which gives relief for a time, and it is usually only when the fact is grasped of the food leading to pain some hours later, that the patient voluntarily limits his intake, which then interferes with his nutrition.

Constipation.

Constipation is a very common symptom, and as the patient usually finds himself better when the bowels are open, it is usual to find the subject of duodenal ulcer addicted to taking a saline aperient almost every morning.

Loss of Weight.

It is astonishing for how many years a patient will go on with symptoms of duodenal ulcer, having exacerbations alternating with relief for a few weeks, and yet nutrition may not be seriously interfered with, though interference with rest, the recurrence of pain, the flatulency, and the general distress, may lead to mental depression and to inability to carry on the ordinary duties of life satisfactorily.

Biliary and Pancreatic Catarrh.

Seeing that the bile and pancreatic ducts open into what one may term the gastric portion of duodenum, one cannot wonder that duodenal ulcer should often be directly associated with catarrh of the bile ducts and of the pancreatic duct; hence it is not uncommon to find a slight icteric tinge almost constantly present in these patients, and on making a chemical examination of the urine and faeces to find evidences of altered metabolism and impaired digestion of fat characteristic of interference with the functions of the pancreas, symptoms that have their significance when a diagnosis is being considered. It is also usual to find indican in the urine, pointing to the presence of intestinal catarrh. A more serious form of interstitial or even suppurative pancreatitis may also

arise from an extension of the ulcer directly into the pancreas.

Latency of Symptoms.

There can be no doubt that in a certain proportion of cases duodenal ulcer may be present without symptoms, until haemorrhage or perforation reveals its presence. This latency is probably usually associated with low acidity, with absence of spasm of the pyloric sphincter and with absence of adhesions, but I think it will be found on strict inquiry that real latency of symptoms is much rarer than is usually taught.

Chemical Findings.

Excess of free HCl in the gastric contents after a test meal may be the only test worth noting in ordinary duodenal ulcer, unless there is marked dilatation of the stomach with stasis, as occurs in more advanced cases, when lactic or other organic acids may be present and yeast cells or sarcinae be found. Blood may be found in the stomach contents or in the faeces, and is an important sign. The presence of indican in the urine is significant of intestinal catarrh. The presence of an excess of urobilin may indicate catarrh extending to the bile ducts, and the presence of pancreatic crystals, as shown by Cammidge's test, may point to catarrh extending up the pancreatic duct.

COMPLICATIONS.

The most serious complications occurring in duodenal ulcer are those of haemorrhage and perforation; but there are also other serious complications, such as anaemia, sometimes so severe as to resemble the pernicious type; cicatricial contraction, leading to stenosis and to secondary dilatation of the stomach; jaundice, due to chronic catarrh of the bile ducts, to pancreatic trouble, to stenosis of the papilla, or to adhesions compressing the duct; pancreatic catarrh due to extension of inflammation along the duct of Wirsung, or interstitial pancreatitis due to persistent catarrh or to extension of the ulcer into the substance of the pancreas; subphrenic or other abscess; and disabling adhesions.

Haemorrhage.

Haemorrhage, which may appear in the form of haematemesis or melaena, is sometimes the first symptom to attract attention to duodenal ulcer, the patient having taken no notice previously of the dyspeptic symptoms that I have related.

In all probability there are few ulcers of the duodenum which do not bleed during some period of their existence, though in many cases bleeding is not noticed unless the blood is vomited; for it must be remembered that slight vomiting of blood always attracts the attention of the patient, but the presence of blood passed by the bowel is frequently overlooked. I have seen and operated on several patients in a state of profound anaemia who said they had never vomited blood or noticed any bleeding from the bowel, yet on strict inquiry I have been able to elicit the fact that on several occasions they have been seized with faintness, and afterwards the motions have been noticed to be black, though in other cases the loss of blood may have been constant, but so slight on any one occasion that free blood had really never been noticed in the motions.

Bleeding in the shape of slight oozing may persist for a long period in some of these cases, in such minute quantities that it is only discoverable by a careful microscopic or chemical examination of the motions, and this form may lead to such bloodlessness as to give rise to the suspicion of pernicious anaemia, which, however, a careful examination of the blood will refute.

The situation of the ulcer has doubtless much to do with the presence or absence of severe haemorrhage, and it is interesting to note, as has been pointed out by Dr. Soltan Fenwick, that in almost every instance of fatal bleeding the ulcer is situated on the posterior or inner wall of the bowel within 4 in. of the pylorus. I have noticed in operating on ulcers situated on the upper or anterior part of the first portion of the duodenum that bleeding has not been a prominent symptom.

The haemorrhage occurring in duodenal ulcer, if moderate in amount, is seldom revealed as haematemesis, as it usually passes downwards; but in the fulminating variety the blood will usually be vomited as well as passed by the bowel, though in one case of fatal haemor-

rhage from duodenal ulcer that I saw immediately after death, the patient died within a quarter of an hour of the first onset of faintness, and the whole of the blood had passed into the bowel, and had caused neither haematemesis nor melaena.

Although haemorrhage probably occurs in all cases of duodenal ulcer at one time or another, yet it is interesting to note that of the cases observed by Dr. Soltau Fenwick, bleeding was only recorded in 40 per cent., while it was observed by Dr. Graham in only 16 out of 46 cases, or 32.6 per cent.

Perforation.

Perforation of the duodenum constitutes one of the most serious and frequent complications. Its occurrence means to the patients the danger of sudden death from shock, or later from collapse due to toxæmia, or at the best it means a local peritonitis often ending in abscess. Dr. Fenwick recorded perforation in 53.5 per cent. of his cases, Chvostek in 42 per cent., Collin in 69 per cent., and Oppenheimer in 48 per cent.; but these percentages are all probably far too high if the less acute cases which are now more frequently diagnosed be included, as they should be, in the statistics. In my own experience of cases actually operated on the percentage of perforations has only been 10, though had none of the cases operated on and cured by gastro-enterostomy been allowed to pursue their course, the percentage of perforations would almost to a certainty have been very much larger. Weir gives an analysis of Collin's statistics as to the site of perforating ulcer of the duodenum as follows: The lesion was in the first portion in 119 cases; of these, 68 were in the anterior wall, 39 in the posterior, 10 in the superior, and 1 in the inferior. Of 8 cases involving the second portion, 3 were on the internal wall, 2 on the posterior, and 1 on the external. Of 4 cases affecting the third portion, 3 were on the anterior and superior walls and 1 on the posterior.

Duodenal ulcers may be acute or chronic, and either form may perforate. An acute duodenal ulcer resembles the ordinary acute peptic gastric ulcer, and, as in gastric cases, the perforation may take place acutely through a small or large opening before adhesions have formed, giving rise to flooding of the peritoneal cavity in one case or mere trickling of fluid into it in the other.

A chronic ulcer, which is the form usually encountered by the surgeon in dealing with non-perforated cases, resembles the ordinary chronic gastric ulcer, having thickened edges and a smooth, indurated base devoid of granulation tissue; this form less frequently causes acute perforation, as, on account of its progress being slower, time is given for adhesions to form, which adhesions limit extravasation.

If the perforation occurs through a large opening in some portion of the duodenum covered by peritoneum, such as the whole of the first portion and the anterior or outer wall of the second portion, and if there are no protective adhesions, the larger peritoneal cavity will be flooded with the duodenal contents, passing first into the right renal region, then flowing into the pelvic cavity, and later flooding the whole of the viscera, rapidly setting up general peritonitis.

If the perforation is, as may be the case, only a minute aperture, the extravasation occurs more gradually, and the effusion may at first be limited to the renal pouch, and only gradually extend to the rest of the peritoneal cavity.

The catastrophe of an acute perforation is one of the most serious accidents that the surgeon can be called on to deal with, and unless an early operation can be carried out death is almost inevitable. A diagnosis of the actual cause of the peritonitis has in the past seldom been made—I think because the diagnosis of duodenal ulcer has not until recently received sufficient attention, for the previous history ought in most cases to afford a clue to the condition. The fact, however, remains that out of 51 cases of perforated duodenal ulcer collected from various sources by Mr. Moynihan only 2 were correctly diagnosed, and no less than 18 had been operated on under the impression that the cause of the peritonitis was appendicitis.

Fortunately the gastric and duodenal contents are usually at the time of perforation only slightly septic, so that an operation undertaken within twelve or even twenty-four hours of rupture should offer a good chance of

success, if at the same time that the abdominal cavity is drained the ruptured intestine is closed.

The closure of the rupture at the time of operation is essential, for practically all the cases of perforated ulcer of the duodenum treated by simple drainage without repair of the ulcer have been fatal. In my first case, operated on some years ago, because of the extreme illness of the patient, I tried simple drainage with gauze packing, as, on account of extensive adhesions, a long time must have been spent had I attempted repair of the large perforation; the patient rallied, and lived for forty-eight hours. Had I been able to close the opening, I think he would have recovered, as did my second case, operated on under quite as unfavourable conditions, but in which I inverted the edges of the ulcer and covered the line of suture by an omental graft.

Any other treatment than operation is useless and not worth discussing; moreover it has been distinctly proved that after repair of the rupture, simple drainage of the area of operation and, if needful, drainage of the pelvis by a long tube inserted through an incision over the pubes, the drainage being assisted by the semi-recumbent posture, is all that should be done, for the extensive operation of evisceration with thorough cleansing does more than is necessary, and leads to death from shock and from toxæmia in a large proportion of cases.

The mortality is still far too high, and, like operations for perforated gastric ulcer, varies with the time of operation after rupture. It will be brought down, I feel sure, to from 5 to 10 per cent. in cases operated on judiciously within twelve hours of rupture, as ought to be the case in all civilized centres where skilled surgery is available.

Perforation of the duodenum, when adhesions have already formed, so that extravasation is prevented, gives an entirely different history, and has altogether a different course, the condition being one of localized peritonitis, usually ending in abscess that may gradually increase in size and reach the surface beneath the right costal margin, or at the umbilicus, or over the caecal region, thus simulating gall bladder or appendix inflammations. In cases where adhesions to neighbouring organs are very firm an ulcer may slowly advance and produce an excavated visceral ulcer. I have in such conditions seen a smooth ulcerated cavity formed in the liver, in the pancreas, and even on the anterior abdominal wall.

After an abscess has fully formed, if neglected or not diagnosed and treated, it may by secondary rupture into the peritoneal cavity lead to a virulent general peritonitis, or by rupture into the colon, duodenum, stomach, kidney, or gall bladder, it may lead to an intervisceral fistula and to death from septicaemia, or rarely to recovery after a long and tedious illness.

Perforation of an ulcer through a part of the duodenum uncovered by peritoneum, as, for instance, the back or inner parts of the second portion of the duodenum or the back of the third portion, leads again to a widely different train of symptoms, for the pus may burrow upwards, leading to subphrenic abscess that may pass still further, and burst into the pleura or lung, or it may pass backward and produce a perirenal abscess, or downwards and simulate a perityphlitis. I have even seen it to simulate an iliac abscess, as if from spinal disease, and have also seen it to form a pelvic abscess simulating disease of the pelvic organs. I will relate a case to show the difficulty of diagnosis in this condition:

I was asked early last year by a medical friend to see a gentleman, aged 53, who was supposed to be dying from a malignant tumour in the region of the liver, with secondary effusion into the right pleura, and it was only after a hopeless prognosis had been given that I was asked to see him. I elicited the history that twenty years previously he had had a severe attack of indigestion with pain some hours after food, and at that time he remembered that the illness was accompanied by dark motions, which his medical attendant told him were due to altered blood. From that time onwards he had been subject to what he termed weak digestion, characterized by pain three to four hours after a meal, usually relieved by taking food. He was not, however, prevented attending to his work until December, 1905, though in August he consulted a medical man because of the pain after meals and of a pain which awakened him every night from 1 to 3 a.m. In December he became worse, and in January a swelling was first noticed beneath the right costal margin, which was supposed to be an inflamed gall bladder, though in January the diagnosis was again altered, as the urine was noticed to be red and to contain blood, when kidney trouble was diagnosed.

In February the right side of the chest was found to be dull, evidently due to some effusion in the pleura, and at that time the chest was aspirated by a surgeon and 2 pints of clear fluid withdrawn. The diagnosis was then changed to malignant tumour with secondary pleuritic effusion. The patient was then coughing up a quantity of muco-purulent sputum and was rapidly becoming weaker.

When I saw him on February 22nd, 1906, he was very ill and emaciated to an extreme degree. He was suffering from irregular fever with profuse sweats, and his pulse was rapid and feeble. I found well-marked dullness in front as high as the nipple line and rather higher behind, and there was a hard, tender mass below the right costal margin, which did not move during respiration. The right side of the abdomen was absolutely still and rigid during respiration, though the left side moved moderately. The outline of the stomach could be seen down to the level of the umbilicus, and while I was examining the abdomen there was visible gastric contraction, followed by a gurgle as if air and fluid were passing through some stricture. On auscultating the dull area on the right side of the thorax, the gurgle I felt on palpating the stomach could be distinctly heard in the chest, and on percussing with two coins in the epigastrium and over the first part of the duodenum the marked percussion note was distinctly conveyed through the stethoscope applied over the area of dullness. With the history that I had just elicited to guide me and with the well-marked physical signs I have mentioned, I had no hesitation in diagnosing subphrenic abscess due to perforation of a duodenal ulcer, and it became clear that the abscess had burst into the lung and was giving rise to the purulent expectoration, while the pleurisy was a secondary and superadded condition.

The patient was moved to a nursing home, and on March 3rd I made an incision between the seventh and eighth ribs in the axillary line over the centre of the area of amphoric resonance. An exploring syringe was passed, and offensive pus was at once obtained. The incision was then extended into the abscess cavity, and over a pint of very fetid pus was evacuated and a large tube inserted. So far as could be made out, the pus was situated between the liver and diaphragm. He forthwith began to improve and the temperature at once became normal.

After the discharge had lessened to a certain extent, it did not tend to diminish further; and, as he began to take more food, the discharge increased, and with the increase of food the digestive symptoms reappeared. It was therefore decided to attack the abdominal disease, and on April 7th, about a month after the first operation, I opened the abdomen a little to the right of the mid-line, and found a large ulcer of the pyloric end of the stomach extending through the pylorus into the duodenum. The pylorus and duodenum were firmly fixed to the under surface of the liver and to the front of the kidney by such firm adhesions that it was felt advisable not to disturb them as they were doubtless bounding the abscess cavity. The cardiac end of the stomach, though dilated, seemed to be healthy, and there was no great difficulty in performing a posterior gastro-enterostomy, from which he made an uninterrupted recovery. He was able to take food by the mouth on the day of operation, and by the end of the week he was taking a large quantity of pounded fish, meats, and other foods without discomfort. The discharge from the chest immediately began to lessen, and within a week the drainage tube was removed. Within a month from the time of the gastro-enterostomy he was able to leave the nursing home with both wounds soundly healed, and the tumour that had been felt below the right costal margin had entirely disappeared. When I saw him on May 31st, 1906, he had gained 12 lb. in the month, and I have since heard that he is in perfect health.

It will be seen that in this case the difficulties in diagnosis were very great, but that they were at once simplified by obtaining a clear antecedent history.

Cicatricial Contraction.

The method of cure of duodenal as of any other peptic ulcer is by cicatricial contraction, and on the site of the ulcer will depend any complications that may follow. For instance, if the ulcer is just beyond the pylorus it may lead to stenosis, resulting in gastric dilatation with its well-known symptoms. If the ulcer be lower down it may cause obstruction to the bile and pancreatic ducts, leading to persistent jaundice and to cystic or other disease of the pancreas. If situated lower, where the gastric and intestinal portions of the duodenum join, it may lead to enormous dilatation of the first portion of the duodenum. In one case of this kind that I saw, in which the obstruction was in the second portion of the duodenum, an hour-glass stomach had been suspected, the two cavities being actually formed by a dilated stomach and dilated first portion of the duodenum connected by the pyloric ring, which was widely dilated; the condition was immediately relieved by a gastro-enterostomy.

In obstruction of the bile passages by cicatricial contraction a cholecystenterostomy will give relief to the

jaundice, but the obstruction of the pancreatic duct may lead to atrophy of the pancreas and to secondary glycosuria. This sequence of events I experienced in an analogous case in which both ducts were obstructed, and, although the obstructive jaundice was relieved by operation, and the patient lived for nearly a year in comfort, death ultimately occurred from glycosuria and acetonaemia.

Adhesions.

If the ulcer advances slowly towards the surface, a local peritonitis will occur, leading to adhesions to adjacent organs or to parietal peritoneum. Thus embarrassing adhesions may be found between the duodenum, gall bladder, liver, stomach, or colon, giving rise to various symptoms according to the part affected, and leading readily to errors in diagnosis. Thus I have seen intestinal obstruction due to adhesions around the colon set up by a local peritonitis from duodenal ulcer; adhesions around the bile ducts setting up jaundice or producing attacks of pain simulating gall stones in the cystic or common ducts; kinking of the pylorus from adhesions to the liver or to the abdominal wall, as well as other conditions leading to a suspicion of recurrent appendicitis, renal calculus, ovarian disease, etc.

Cancer.

Though it is difficult to prove, it seems possible that duodenal cancer may supervene as the result of the irritation of duodenal ulcer, just as the sequence has apparently been so directly proved between gastric ulcer and cancer. Duodenal cancer is, however, rare, whereas duodenal ulcer is common, and as yet the observations pointing to a direct connexion between the two diseases are too few to generalize on. Dr. Mayo has stated that he has only twice seen primary cancer of the duodenum, once developing on an ulcer base.

I have operated on three occasions for primary cancer of the duodenum producing intestinal obstruction, the symptoms resembling those of obstruction at the pylorus. In all, gastro-enterostomy gave relief for a time, in one for a year. In none of the cases could I trace any connexion between ulcer and cancer.

Chronic Pancreatitis.

When subacute or chronic pancreatitis is associated with duodenal ulcer—a condition which it is possible to diagnose by the rapid loss of weight and jaundice, associated with the presence of large quantities of neutral fat in the motions and of the characteristic reaction in the urine—the need for operative treatment becomes additionally urgent, otherwise the pancreatic disease will progress and lead to glycosuria, if the patient survives a sufficient length of time. Another and more acute danger would also be the advent of infective cholangitis, leading to septicæmia.

A gastro-enterostomy is the first indication; but if the jaundice is well marked it may have to be supplemented by a cholecystenterostomy in order to relieve the jaundice and to take pressure off the pancreas. I have performed this double operation with complete success, both as regards the duodenal ulcer, the interstitial pancreatitis, and the jaundice.

TREATMENT OF DUODENAL ULCER.

If duodenal ulcer could be diagnosed early and with certainty, the importance of a thorough course of treatment by diet and rest might be the means of bringing about a cure of the condition. But the facts that the symptoms are often comparatively slight or even absent in a certain proportion of cases at the inception of the disease, and that it is frequently difficult to say at first that the case is not one of simple gastro-duodenal catarrh, result in the trouble being seldom treated seriously until the symptoms have persisted off and on for a long time, sometimes for many years, or until some more severe attack or one of the serious complications leads to a diagnosis being made. Then, perhaps, the patient will submit to restraint in diet and to a course of medical treatment, which is as a rule left off as soon as he is relieved, to be resumed again in a half-hearted manner at each recurrence of symptoms until the time comes that the disease can no longer be dallied with, and if complications do not prove it, the patient grasps the fact that he is seriously ill and must have true remedial treatment. I have seen so many cases that have been treated medi-

cally off and on for years and which ultimately had to submit to surgical treatment, either for the disease or for complications resulting from it, before obtaining real relief, that I sometimes wonder whether a patient with chronic duodenal ulcer is ever cured by medical treatment alone.

Lapeyre says that very few completely cicatrized ulcers have been observed, but Perry and Shaw found evidence of repair, more or less complete, in 50 per cent. of cases coming to autopsy, and in several the cicatrix had produced stricture of the duodenum.

Fortunately surgical treatment offers not only a means of relief but of cure in this otherwise troublesome and dangerous disease.

Surgical treatment may be either direct or indirect. By direct treatment I mean excision of the ulcer or an infolding of the duodenal wall at the site of the disease. By indirect treatment I mean a gastro-enterostomy with or without occlusion of the pylorus.

Except in some of my very early cases in which a duodenal ulcer was associated with ulceration and thickening of the pylorus and in which I excised the ulcerated area, or while performing pyloroplasty took the opportunity of excising the ulcer, I have not attempted the direct treatment of duodenal ulcer; moreover, in these cases, though temporary relief was given, subsequent operative treatment was required, so that my experience does not lead me to favour in any way the direct treatment of this condition.

My results after the indirect method have been so satisfactory, whether looked at from the immediate or ultimate results, that I can see no need to consider the direct operation further, especially as there seems to be no evidence to prove that carcinoma develops in the healed scars of duodenal ulcers, since cancer of the duodenum is so very uncommon, while ulcer is by no means rare.

Operation.

My experience leads me to express a very decided opinion that the operation of posterior gastro-enterostomy is the treatment for duodenal ulcer. It acts by diverting the food from the ulcerated region and so relieving the ulcer from the irritating effects of the acid stomach contents, thus enabling it to heal smoothly, but it also at the same time relieves the associated conditions, hyperchlorhydria, spasm of the pylorus and dilatation of the stomach.

The relief is immediate, and within a very short time the patient can, as a rule, take his food without pain or discomfort, and without the subsequent flatulency and other distressing symptoms usually associated with duodenal ulcer.

Apart from the complication of perforation, I have operated on 66 cases of duodenal ulcer by the operation of posterior gastro-enterostomy, and, I am happy to say, without having lost a single case as the result of operation.

Not only are the immediate results good, but the ultimate issue is very satisfactory, as I know by the communications I have had subsequently from my patients or from the medical men with whom I have been associated in their cases. But my information of the after-progress of some of these cases has been even more direct, for in quite a number of cases the operations have been on medical or other professional men, whom I have had the opportunity of seeing subsequently and knowing in their ordinary social life.

The method I always adopt in performing gastro-jejunostomy is the posterior operation, in which the lower border of the stomach is united to the jejunum as near to the duodeno-jejunal flexure as can be conveniently managed; clamps are always used; the opening is made sufficiently large, about 2 in.; the margins of the opening are united by two continuous sutures, an outer of Pagenstecher's thread taking up the serous coats a little way from the margin, an inner of chromic catgut taking up the whole thickness of the cut walls of the stomach and intestine. Mucous membrane is, as a rule, not excised, neither is the pylorus occluded nor the ulcer infolded, unless the duodenal wall is showing signs of being thinned. Subsequent to operation the patient is always placed in bed well propped up, in fact, almost in the sitting posture, a position which I have found by long experience is not only the most comfortable to the patient,

but is one that avoids chest complications. It assists thoracic breathing, takes off pressure from the heart, assists drainage from the stomach into the jejunum, as a rule prevents vomiting subsequent to operation, and by giving the patient a sense of well-being, it hastens convalescence, and enables him to be moved on to the sofa within a fortnight of operation.

In peritonitis from ruptured duodenal ulcer this position serves another purpose, that of draining septic fluids from the diaphragmatic area, where absorption is more dangerous, to the pelvic area, where septic fluids can be more easily drained away, or if not removed, can be more safely disposed of by the efforts of nature.

During operation the patient is enveloped in a cotton-wool suit made by the nurse of gamgee tissue, thus preventing chilling of the extremities, and avoiding shock; this suit is of use subsequently by keeping the patient warm when propped up in a position in which it is difficult to keep him covered by the bedclothes.

I think the value of this care to avoid chill during operation is shown by the almost total absence of chest complications in my cases as compared with their frequency in many of the Continental clinics, in some of which, to my knowledge, the patient suffers much exposure before and even during operation.

The administration of saline fluid per rectum subsequent to operation in large quantities is of great service in relieving thirst, and in supplying fluid to keep the blood vessels full until the patient can take sufficient fluid and food by the mouth. Feeding by the mouth is begun as soon as the nauseating effect of the anaesthetic has passed off, so that by the evening of the day of operation the patient is taking 1 oz. of albumen water or other bland fluid every hour, and on the day following 2 oz. at hourly intervals.

The administration of food at frequent intervals is advisable for some time after operation in order to absorb and neutralize the irritating acid of the gastric juice.

For some time only soft food is allowed, such as fish, mashed potatoes and gravy, jellies, pounded meats, etc., and between each meal I usually advise that some milk and lime water should be given to take up the excess of acid; this saves discomfort, and prevents harm should any of the stomach contents pass through the pylorus. If the pulse is feeble during or after operation, injections of liq. strychninae in 5-minim doses are useful, and, if needful, they are repeated every four or six hours for a time.

I have thus far spoken of gastro-enterostomy as an operation for the relief and cure of uncomplicated duodenal ulcer, but the same operation is the one indicated in many of its complications, such as haemorrhage, obstruction from adhesions, or from contraction of the lumen due to cicatrization of the ulcer, and for dilatation of the stomach secondary to ulcer; it may also be called for as a primary or secondary procedure in perforation of duodenal ulcer and as a secondary measure in abscess or in extensive adhesions following on perforation.

Treatment of Haematemesis or Melaena.

Bleeding from duodenal ulcer may be so profuse as to terminate fatally within a few minutes, and yet there may be no external sign of haemorrhage, though usually, even in fulminating haemorrhage, the end is longer delayed and the cause rendered evident by haematemesis or melaena; or the first bleeding may be severe for a time and cease, to recur at longer or shorter intervals; or, again, it may be slight but persistent, leading to profound anaemia.

I think it may be taken for granted that when once a duodenal ulcer has given rise to haemorrhage, whether that be shown as haematemesis or as melaena, the bleeding will be repeated and the recurrence of the bleeding may be severe or even fatal.

The conditions in duodenal haemorrhage are quite different from those attending the bleeding from gastric erosions or even from acute gastric ulcer, but they resemble in severity and in importance those occurring from chronic ulcer of the stomach when a large vessel is eroded.

My conviction is that a second haemorrhage ought not to be waited for, but that operation ought to be undertaken as soon as the first bleeding has ceased and before the second attack comes on.

In the quiescent interval a gastro-enterostomy is a very successful operation, which may be relied on in a very large percentage of cases to prevent any recurrence of the bleeding, and at the same time to lead to a cure of the ulcer. I have operated on a considerable number of cases and know the statement to be correct.

The direct treatment of the bleeding area can only rarely be necessary or desirable, but I know of a case in which a colleague felt it desirable to operate during the course of violent haemorrhage, in which the life of the patient was threatened, and finding the small intestines filled with blood he saw that the only chance was to open the duodenum and find the bleeding-point, which he was fortunately able to do, and to ligature the vessel, after which the patient made a complete recovery.

In two cases of severe haematemesis and melaena arising from duodenal ulcers, I have had to operate during the haemorrhage, which in each case recurred shortly before the patient was to be operated on, in one case just before and in the other two or three hours before. In both a posterior gastro-jejunostomy was performed; in neither was there any repetition of the bleeding, and in both a complete recovery followed. In neither of these cases would it have been practicable to explore the duodenum, either on account of the critical condition of the patients or from the presence of an inflammatory tumour surrounded by numerous adhesions.

In cases operated on in the quiescent interval between the bleeding attacks, the direct operation is, I think, undesirable, as it involves a dangerous operation when a safe one would answer equally well or better. Moreover, after the local operation a gastro-enterostomy would also be required for the cure of the ulcer, hence for both these reasons I would emphatically advise the indirect operation as the one to be performed with very few exceptions in case of haemorrhage from duodenal ulcer.

The Treatment of Perforation.

It is universally accepted that early operation is as desirable in case of perforation of a duodenal as of a gastric ulcer, and that time has more to do with success or failure than has any other element, if ordinary skill is used. If the extravasation occurs through a small leak, the peritoneal soiling will be localized to the right side of the abdomen, and as at first the effusion is only slightly septic, a vertical incision through the right rectus about 1 in. to the right of the mid-line, which will enable the right kidney pouch to be cleansed and the opening in the duodenum to be sutured, is only necessary. Drainage in such a favourable case is not absolutely necessary, though personally I think it is safer to drain; irrigation of the peritoneal cavity under these circumstances is undesirable, and excision of the ulcer is not called for. The edges of the perforation should be turned inwards and a Lembert continuous suture, or several interrupted peritoneal sutures, or a purse-string suture, according to the size of the opening, must be applied, and if possible an adjoining piece of omentum should be stitched lightly over the line of suture.

If the perforation is a large one and the abdomen has been flooded with the stomach and duodenal contents, the incision over the right rectus will still be called for to remedy the rupture; but, in addition, a small incision should be made over the pubes just large enough to admit a tube that will reach to the bottom of Douglas's pouch in the female and to the bottom of the pouch between the rectum and bladder in the male.

Now comes the question of irrigation with hot saline fluid. Many surgeons do not advise it, and say that they get better results without it; Murphy is very emphatic on this point. I must confess that I have only seen good result from saline irrigation if applied judiciously in such cases, for, with the patient in the half-sitting posture, all the fluid gravitates to the pelvis and escapes through the tube, bringing with it any foreign matter that has entered the peritoneum. The viscera should not be handled, and any rough swabbing or wiping out of the abdomen should on no account be done.

If the patient is in fair condition at the time of operation, and the peritoneum has not lost its polish, the prognosis is good.

If the endothelium of the peritoneal sac has been damaged and the intestines are distended from paralysis of the muscular coat, the duodenal opening should be

rapidly repaired, irrigation with hot normal saline solution be thoroughly but quickly performed, and free pelvic drainage adopted.

In exceptional cases seen late, after distension has supervened, it may be advisable to bring out a loop of distended small gut and incise it transversely so as to get rid of flatus and fluid faeces in order to relieve the distension, afterwards suturing and returning it; and while the patient is under the anaesthetic the stomach tube should be passed and gastric lavage effected.

The patient must afterwards be well propped up in bed so as to favour drainage, and must have saline fluid administered by the rectum in large quantity after the manner recommended by Murphy, and he will be benefited by strychnine given subcutaneously.

Although the prognosis in such a late case is not good, it is not hopeless; the danger will have been due to the delay and to the absorption of toxins, and if the patient can be kept going for a time until the poison is washed out of the blood he may recover.

In case of perforation leading to localized suppuration, it is important not to delay operation lest the abscess burst secondarily into the peritoneum, or if extending upwards burst into the pleura or pericardium.

In such cases the abscess must be opened and drained, but it is neither necessary nor wise to look for the perforation, which is often very small, and may give no further trouble; moreover, to search for a perforation under such conditions would involve danger of separating adhesions and spreading infection.

The question of performing gastro-enterostomy in perforated duodenal ulcer is important, and not always easy to decide. In some cases, when the patient is seen shortly after perforation and is in good condition, a gastro-enterostomy will lead to a more rapid repair of the ulcer, and may not seriously add to the shock; but, as a rule, the added shock of an extended operation is not advisable, and I prefer to do the gastro-enterostomy as a subsequent operation if necessary. In abscess following on perforation I think this course ought always to be followed, and, in my experience, this has proved satisfactory.

Dr. W. J. Mayo, in speaking of the subject, says: "In 3 out of 10 cases of acute perforation we made a gastro-jejunostomy at the same time, but, generally speaking, it is safer to do this as a second operation if necessary." Out of the 10 cases 4 died.

During the past two or three years a considerable number of cases of operation for perforated duodenal ulcers have been recorded by individual surgeons, but the limited number of cases coming under the notice of any one surgeon renders a statistical estimate in most cases almost useless unless a considerable number of cases from various sources can be collected and analysed together.

I have collected all the cases of operations for acute perforating duodenal ulcer that I could find recorded, and find that of 155 cases—of which 52 recovered and 103 died, a mortality of 66 per cent.—61 were operated on within twenty-four hours of rupture, with 38 recoveries and 23 deaths—a mortality of 37.7 per cent.—whereas of 63 cases operated on later than twenty-four hours after rupture there were 11 recoveries and 52 deaths, a mortality of 82.5 per cent. Of the remaining 31 cases, in which the time of operation was not stated, but in which the time was probably over twenty-four hours after rupture, 3 recovered and 28 died—a mortality of 90.3 per cent.

One point is clearly brought out on analysis, and that is, the earlier operation is performed after rupture the better the result.

DR. F. C. DE MAHY, who died recently in Paris at the age of 76, gave up the practice of his profession when he was elected a member of the Chamber of Deputies in 1871. He was Minister of Agriculture in the Freycinet Cabinet (1882) and afterwards in the Duclerc and Fallières Ministries. In the latter administration he exchanged the portfolio of Agriculture for that of Minister of Marine, an office which he also held in the Tirard Cabinet (1887). During one session he was Vice-President of the Chamber of Deputies.

THE late Mrs. Elizabeth Cardwell of Harrogate, who died on October 11th, left £5,000 to the Dewsbury and District General Infirmary, £3,000 to the Harrogate Infirmary, £3,000 to the Yorkshire Home and Hospital for Chronic and Incurable Diseases at Harrogate, and £2,000 to the Leeds General Infirmary.