BRITISH MEDICAL JOURNAL

LONDON: SATURDAY, MARCH 9th, 1935

SOME POINTS IN THE OPERATION OF GASTRECTOMY

BY

W. H. OGILVIE, M.Ch., F.R.C.S.,
SURGEON TO GUY'S HOSPITAL

There is little doubt that the operation of partial gastrectomy is destined in the immediate future to occupy a much more important place in abdominal surgery than it has done, in this country at any rate, during the past decade. Cases of cancer of the stomach are being recognized at a much earlier stage; during the last two years 80 per cent. of those which I have seen have been operable. But apart from its application to cancer it seems clear that gastrectomy is rapidly becoming recognized as the only rational surgical treatment for those cases of peptic ulcer—admittedly quite a small proportion—which are not amenable to medical treatment, because it is the only means whereby the acid level can be reduced permanently below the danger point. The different short-circuiting operations, of which gastro-jejunostomy is the best, and the various limited resections in the pyloric region, are now in the dock, and the whole of Continental surgical opinion, and that of the younger group of surgeons in England and America, is trooping into the witness-box against them. They have played a part in surgical history; they have done good for a time because Nature can resist maltreatment of her normal processes for many years before resistance fails, but their sins are now visiting them. Gastro-jejunostomy must go. It will survive, like some of the amputations on the foot, a technical exercise in operative surgery classes and a useful expedient in the occasional case. But it cannot remain in the group of rational and successful operations. The failures of gastro-enterostomy meet us to-day wherever we go.

If gastrectomy is to replace gastro-jejunostomy in ulcer treatment it must be equally safe and far more satisfactory. It is the purpose of these remarks to inquire where the dangers of gastrectomy lie, and where its functional results may miscarry, and to attempt to suggest how these dangers may be eliminated and these unsatisfactory results overcome.

The deaths following gastrectomy are usually the result of shock, haemorrhage, peritonitis, or post-operative pulmonary complications. Surgical shock is due, in varying proportions, to prolonged handling, prolonged anaesthesia, and loss of blood. The length of the operation is one of its chief dangers, and is in great measure a consequence of the amount of work that has to be done; the number of planes that have to be dissected, the number of bleeding-points to be tied, the considerable length of cut surfaces that have to be sutured, and the difficulty of access to the upper part of the stomach and the first part of the duodenum. Anything that simplifies the operation will therefore reduce its risk. The functional failures of gastrectomy come under three main headings: recurrent ulceration, post-operative discomfort, and anaemia. Dangers, difficulties, and failures are so closely linked that to discuss each separately will lead to repetition. I

prefer, therefore, to examine various phases of the operation from each point of view, taking them roughly in the order in which they are encountered.

The Anaesthetic

All drugs used for general anaesthesia, with the exception of nitrous oxide, are tissue poisons in varying degrees. Administered alone in sufficient concentration or for sufficient periods they can cause shock; in combination with prolonged handling they are bound to do so. Any form of general anaesthesia, whether basal or by inhalation, is therefore prohibited to the surgeon who wishes to bring his mortality for gastrectomy below that of gastro-enterostomy. High spinal anaesthesia has its advocates, from whose number I would at present exclude myself. For work at the level of the diaphragm a spinal is too uncertain to be satisfactory, and has too profound an effect on blood pressure to be safe.

There remains, therefore, only local anaesthesia, alone or in combination with gas and oxygen. The suggestion of carrying out an operation of this magnitude on a conscious patient may sound brutal; I can only say watch, and then try it. Premedication is, of course, necessary, not to dull pain, but to relieve apprehension and restlessness. No patient, entirely undrugged, could lie still in one position on an operating table for the one and a half to two hours that a high gastrectomy takes in the hands of a surgeon of moderate ability. I give omnopon 1/3 grain one hour before operation, followed by morphine 1/4 grain and atropine 1/100 grain half an hour before; in most cases no more is required. This medication brings the average patient to the theatre calm, but not sleepy; able to lie still, but also able to answer questions or to feel any handling of tissues not anaesthetized. In five cases in the last 120—two in hospital and three in private—I have used gas and oxygen in addition. Gas may be necessary to allay nervousness during the early stages, but it is better avoided. The increased respiratory movements add to the surgeon's difficulties, and therefore prolong the operation; the slight cyanosis that often appears provokes oozing from small vessels that do not bleed under local anaesthesia.

Of the effectiveness of local anaesthesia—that is, abdominal field block followed by splanchnic infiltration—there can be no question. Pain is entirely abolished, relaxation of the abdominal walls is complete, respiratory movements, under the influence of morphine, are slow and shallow, the blood pressure is not raised, and the capillaries not dilated, so that the tissues present their normal appearance and there is no oozing apart from cut vessels. In these circumstances the technical part of the operation is simplified to a remarkable extent, and any surgeon can more than save the twenty minutes necessary for inject-

ing the anaesthetic. More important is the complete abolition of shock. The pulse may rise twenty beats per minute by the end of the operation, but its volume is usually unaltered; there are, however, many patients in whom no change in pulse rate whatever takes place, either during or after the operation, and in whose chart there is no variation to mark the date of the gastrectomy. Patients may die after local anaesthesia from various causes, but none die, or look like dying, in the first three days. Here, again, proof is better than assertion, and I should advise any sceptic to spend a week with Finsterer, or to watch a surgeon using the method in England. One who came to see me went away remarking that he could do the operation himself in half the time; but that was a criticism of my skill, not of the anaesthetic. I should have preferred him to avoid the theatre altogether and visit the patient in the ward six hours after the operation. He would have been convinced.

A further advantage of local anaesthesia is in the immediate post-operative stage. None of my patients have axillary salines or infusions; some have water and glucose by the rectum, but they can take all the fluids they require by mouth.

The Incision

The two parts of the operation of high gastrectomy where access is most difficult and accuracy most essential are those concerned with the left gastric artery and cardiac end of the lesser curvature on one side and with the duodenum on the other. A right or left paramedian incision will favour one region and put the other out of reach; neither is high enough, for the centre of the highest paramedian incision of adequate length lies well below the level of the coeliac axis. I prefer the median incision. This may have drawbacks below the umbilicus, but above it has none. It is bloodless, it allows free access to the highest part of the subdiaphragmatic space, and it gives a scar of great strength afterwards. There is never any necessity, in gastrectomy, to go below the umbilicus; upwards the incision may be prolonged to the left of the xiphisternum, when it extends a good two inches higher than the paramedian can do.

The Separation of the Great Omentum

Of the surgeons whom I have watched at work only one has kept in view the anatomical problems connected with the omentum. It must be remembered that the great omentum is a pouch developed from the posterior mesogastrium. It carries, and is supplied by, the arteries which bring blood to the greater curvature of the stomach (Fig. 1), and its association with the transverse colon and mesocolon is a matter of physiological adhesion, only established during the later months of foetal life. The omentum appears to spring from the transverse colon, but no anastomosis ever develops between its vessels and those of the large intestine. The common technique of gastrectomy, in which the vessels of the omentum are tied off about two inches from the greater curvature of the stomach is therefore anatomically wrong and technically a waste of time. It is wrong, because the division of these vessels cuts off the whole of the omental blood supply, and the fringe which remains is a bloodless fat graft—destined to become fibrous and promote adhesions. It is a waste of time, because this devascularization of the omentum adds some ten minutes to the operation, and does harm rather than good.

Consideration of the blood supply of the omentum suggests that it should either be detached from the colon and removed in one piece with the stomach or, if it is left behind, that its blood supply should also be left. Till the last few months I have adopted the first course in every gastrectomy. The first step in the operation is to hold the omentum and colon apart, and run a knife

along the bloodless plane between them, which is close to the wall of the colon. The old plane of physiological adhesion being opened up, it is a simple matter to separate it down to the posterior abdominal wall with a gauze swab, when the foetal condition is re-established—above the posterior mesogastrium with the omentum, below the transverse mesocolon and colon. If the correct watershed is opened, as it usually can be under local anaesthesia, there are no bleeding points. The only ligatures required are at the two ends of the gastro-epiploic arch, one at the origin of the right vessel from the gastro-duodenum, the other near the spleen (Fig. 4).

During the last two months I have developed a very much simplified form of gastrectomy for the treatment of ulcers, which, for want of a better term, I call "physiological gastrectomy." This operation, by avoiding the

FIG. 1.—The blood supply of the stomach and great omentum.

FIG. 2.—Construction of the stoma in the Finsterer non-return gastrectomy.

duodenum, saves at least twenty minutes. This saving of time, and the consideration that the operation is planned for acid reduction and not for malignancy, have prompted me to leave the omentum. In this case, then, the arteries and veins to the greater curvature of the stomach are tied between the stomach and the epiploic arch, so that the whole omentum and its blood supply are detached from the stomach (Fig. 6). The vessels requiring ligature are more numerous inside the arch than below it, but the operation nevertheless remains a shorter one.

The Duodenum

The duodenum is one of the chief hazards of abdominal surgery, and I believe that it should be avoided whenever this is compatible with surgical principles. It has many dangers peculiar to itself. It has a thick, friable, muscular wall, which holds stitches badly and infolds with difficulty. It has a very abundant supply of vessels coming from various sources. The most troublesome are the group entering it from the pancreas, which must be

FIG. 3.—The Friedrich-Petz sewing clamp.

FIG. 6.—The parts to be removed in gastrectomy for ulcer.

FIG. 4.—The parts to be removed in gastrectomy for cancer.

FIG. 7.—Gastrectomy for ulcer completed.

FIG. 5.—Gastrectomy for cancer completed.

FIG. 8.—Diagram of gastrectomy for ulcer, to show maximum alkali conservation, and protection of the afferent loop against regurgitation.

secured by a number of small ligatures before enough of the wall is mobilized to allow for safe occlusion or anastomosis: in these ligatures a certain amount of pancreatic tissue is inevitably included. It receives the most powerful proteolytic ferment in the body. For this reason, perhaps, the duodenum is very prone to perforate after quite minor trauma. Most duodenal perforations, in my experience, are of this nature—small holes with much surrounding oedema, but no real scar tissue, suggesting that they are acute traumatic rather than chronic peptic ulcers. Many of us must have encountered such perforations following a blow on the abdomen some days previously. A year ago I lost a patient a week after gastrectomy for cancer, from peritonitis following a duodenal leak. The hole was a very small one, nearly an inch beyond the closed end, where no stitches had been inserted or vessels tied, and it probably marked the site of some small instrumental injury during the operation. The duodenum cannot be controlled satisfactorily by clamp, and it cannot be sutured to the stomach without displacing it from its bed.

For these reasons I have always disliked and dreaded that group of operations which include remodelling or anastomoses of the duodenum—Finney's operation, the Mayo duodenal excision, gastro-duodenostomy, pyloro-duodenal excisions with end-to-end or end-to-side anastomoses, and the various descendants of the Billroth I gastrectomy, the Schoemaker and the neo-Billroth of Haberer. I am confirmed in this dislike by the course of the few I have done, by the observation of a larger number in the hands of my friends, and by the complete failure of these operations to establish a secure place in surgery, in spite of the brilliance and persistent eloquence of their supporters.

Duodenal occlusion is less dangerous than duodenal anastomosis, and in gastrectomy for cancer it is absolutely necessary. My only observation on this step—in addition to the point I have already made that the wall must be separated from the pancreas for a sufficient distance to allow section at least three-quarters of an inch beyond the pylorus and a double row of infolding sutures—is that a simple purse-string is quicker and safer than the row of infolding sutures usually advised. I crush the duodenum at the point selected for division, tie it firmly with a silk ligature in the crushed groove, and then put in a purse-string of the Lane type (passing from III to IX on the pancreatic side, and then from III to IX on the outer side). An Ochsner clamp is then put across the duodenum proximal to the silk ligature, the knife passed between clamp and ligature, and the closed end immediately tucked into the purse-string. A second purse-string, which takes up the cut edge of the peritoneum on the head of the pancreas, is tied over the first.

The method is as safe as duodenal occlusion can be, but there remain the two risks of leakage and pancreatitis. Neither has yet happened to me, but both are real. Two of my patients have died from subacute pancreatitis about a week after gastrectomy. In each case the operation was for a large posterior gastric ulcer invading the pancreas, but I am certain the same risk is inherent in the necessary separation of pancreas from duodenal wall which occlusion requires. Were duodenal closure a necessary part of gastrectomy for ulcer this risk would have to be faced. After a prolonged period of doubt, I have come to believe that it is neither necessary nor wise.

In gastrectomy for gastric ulcer, or the common type of duodenal ulcer close to the pylorus, closing the duodenum presents much the same problems as in cancer. It may be a little more difficult because of oedema. But when the duodenal wall is widely scarred from old ulceration, or there are many adhesions round it, the same step may be very difficult, and with a posterior duodenal

ulcer it may be extremely hazardous, or even impossible. Is it necessary at all? It is well known that a duodenal ulcer will nearly always heal after gastro-jejunostomy alone; it will also remain healed unless the stoma becomes narrowed from oedema or ulceration, and acid once more starts to flow over the site of former ulceration. If the access of acid gastric juice is entirely and permanently prevented by division of the pyloric end of the stomach a duodenal ulcer will heal and remain healed without any question. A healed ulcer is every bit as good as an excised ulcer; each is a harmless scar. Transverse division of the stomach two inches proximal to the pylorus is therefore quite as efficacious in gastrectomy for ulcer as the conventional duodenal occlusion; it has the advantage of saving from eight to twenty ligatures, a good deal of difficult dissection and a good deal of time, and of avoiding any risk of leakage or post-operative pancreatitis. (Fig. 6.) But section at this point is also more certain to obtain that objective whose pursuit is causing gastrectomy to replace gastro-jejunostomy—the elimination of any tendency to future ulceration. Recent research has shown that the secretion of Brunner's glands, which distinguish the submucous layer of the pyloric antrum and first part of the duodenum from other parts of the upper alimentary tract, has a potent action in neutralizing acid.^{1 2} In the standard type of gastrectomy this secretion is sacrificed; in prepyloric section it is retained.

The Amount of Stomach to be Removed

Whether the operation be for cancer or ulcer, the removal of stomach must be thorough, at least three-quarters being taken away. In the first case our aim is to remove tissues that may possibly have been invaded by the growth; in the second, to reduce the area of acid-producing mucous membrane sufficiently to ensure that the acid level is kept below that at which fresh ulceration can occur. Acid is produced in the fundus and body of the stomach, and from this point of view alone there is no advantage, and indeed a certain loss, in taking away the pyloric antrum. A three-quarter gastrectomy leaves all the oxyntic glands of the fundus, but it has been shown, by repeated fractional test meals done years after the operation, that the acid secretion remains permanently at a minimal level. The same cannot be said of a more limited partial gastrectomy, or the timid type of resection which is still occasionally performed under the name of "pylorectomy." After this operation, as after gastro-jejunostomy, the acid curve is often found to be higher than it was before, once the depressing effect of the operation has worn off, and recurrent ulceration is only too common.

If gastrectomy is done at all, it must be thorough. On these grounds, in addition to the dangers connected with duodenal anastomosis, the Billroth I type of gastrectomy stands condemned. Sufficiently radical removal of gastric tissue prohibits the junction of the stomach to the duodenum without an amount of tension which adds to the dangers already inherent in such an anastomosis.

In connexion with high division of the stomach we must touch upon the ligature of the left gastric or coronary artery. This artery is the principal, almost the sole, supply of the lesser curvature. The right gastric or pyloric artery of textbooks is apparently a mythical structure. When clearing the duodenum for section we encounter in its place a leash of small vessels, coming mostly from the hepatic artery, which spread fanwise in the lesser omentum to supply the duodenum and pylorus in this neighbourhood. The left gastric is not only the main source of supply of the lesser curve, but it anchors the upper part of the stomach to the posterior abdominal wall, and it is surrounded by the lymphatic glands, which drain this part. Ligature of this vessel near its origin is

essential in cancer surgery, because only after such ligature is it possible to clear the lymphatics right up to the oesophageal opening in one piece with the stomach. High ligature is necessary on grounds of function as well, because after a Polya gastrectomy the remainder of the stomach must be free to lie in a new plane and move in a fresh axis. The normal stomach is slung like a hammock between its two openings; the left gastric artery springs from the centre of this arc, and is never pulled upon. The resected stomach hangs like a pendulum, vertically from the oesophagus and the peritoneal ligaments round the oesophageal opening. If the left gastric artery retains any attachments with the lesser curve it becomes an anchor, limiting movements. A good many cases of post-operative discomfort are, I believe, referable to such fixation.

This point may seem elementary, but, judging from the practice of many surgeons and the illustrations of surgical textbooks, the stomach is often drawn directly downwards after division of the duodenum, and the vessels ligatured in the lesser curve. By such a manoeuvre, as may easily be shown in the post-mortem room, the branches of the artery are tied, but not its trunk. If, on the other hand, the stomach is thrown upwards towards the left shoulder of the patient, the main artery is put on the stretch: a ligature can be passed round it, slid down, and tied close to the coeliac axis. After such proximal ligature the glands and fatty tissue can be cut away, in operations for cancer, right up to the cardiac orifice, and stripped downwards, leaving the lesser curve bare to the point of intended section.

The Type of Anastomosis

I have given reasons for preferring the Polya type of anastomosis to operations of the Billroth I type.

The Polya gastrectomy, however, while safer and more satisfactory, has disadvantages of its own. These are bound up with the double intestinal loop, and with the length of this loop. That four varieties of the Polya gastrectomy are practised, two anterior and two posterior, suggests that there are disadvantages in all. The chief troubles met with are vomiting in the immediate post-operative stage, and distension after meals at a later date. Post-operative vomiting is not frequent, but it is clear from the precautions they take to avoid it that many surgeons are afraid of it. It is the practice in many Swedish and German clinics to perform entero-anastomosis, or even a temporary gastrostomy, to forestall this complication.

Early vomiting suggests obstruction to the efferent jejunal loop. In the anterior operation this may be due to pressure on the loop by a transverse colon loaded with gas, as it often is after any severe abdominal procedure; in the posterior operation it is more probably concerned with the length of the loop passing through the opening in the transverse mesocolon. It is indeed difficult to close the mesocolic opening in a safe manner in the posterior Polya gastrectomy of the usual type without causing some kinking at the anastomosis by approximation of the two loops.

Distension after meals usually appears much later, at a time when the patient has returned to full diet. Anchoring of the gastric pouch by an undivided coronary artery has already been mentioned as one cause of post-prandial discomfort. True distension is, however, a more obtrusive symptom. After a meal of moderate size the patient complains of a sense of fullness in the epigastrium amounting even to pain, and a lump can often be palpated to the right of the midline; the lump and the discomfort disappear only after several hours. This particular trouble appears to be due to food entering the closed duodenal loop. It is not often seen after the Polya-Moynihan operation, because food tends to follow the

lesser curvature and enter the efferent loop directly, but I have seen it do so on three occasions. An x-ray shows the presence of barium in the whole closed duodenal loop, which is distended to two or three times its normal diameter. Such a state of affairs can only be remedied by an entero-anastomosis, which naturally brings the risk, a small one after a radical gastrectomy, of fresh anastomotic ulceration.

Since I had the privilege of assisting Finsterer four years ago I have adopted his modification of the posterior Polya operation in all cases. In over one hundred I have never met with either post-operative vomiting or distension after meals even in a minor degree. The essentials of the Finsterer operation are that the right half of the cut surface of the stomach is closed by two or more rows of sutures, so that the infolded line reaches nearly to the cardia (Figs. 2 and 8); the jejunum is anastomosed to the remaining half, distal loop to greater curvature, and the proximal jejunum is then attached to the closed part of the stomach, reinforcing the suture line, and interposing a thick valve of gastric and jejunal wall between the outlet of the stomach and the proximal loop. The jejunum now lies almost vertically, and its efferent loop runs downwards in direct continuation of the mouth of the funnel-shaped stomach.

The Suture of Cut Surfaces

The considerable length of the cut surfaces of the stomach, and the laxity of the submucous coat which allows the mucous membrane to pout from them in redundant folds, make either closure or suture of these surfaces difficult and time-consuming. When the epigastric angle is narrow, and the line of section has been a high one, the closure of the right half of the gastric opening for a Finsterer operation may be very difficult indeed if done with hand and needle.

The Petz sewing clamp,³ which crushes the line of intended section and then inserts a double row of tiny metal clips across the crushed line, has made such suture a job of the greatest simplicity (Fig. 3). The original Petz clamp was a cumbersome instrument, and had to be reloaded between each application. The latest form, which has been made by Heinrich C. Ulrich of Ulm to the suggestions of Neuffer in Professor Friedrich's clinic,⁴ is much simpler, and carries the clips in separate magazines, so that it can be used for several suture lines in succession. In physiological gastrectomy the pyloric section is finished with one application of the clamp and a row of Lembert sutures. The Finsterer anastomosis is done by closing the whole cut surface with the clamp and reinforcing the right half of this line with a double row of Lembert sutures: the left half remains closed and clean while the first line of the anastomosis is being sewn, and is only opened up for the haemostatic suture. Further time is saved because the cut surfaces of that part of the stomach which is to be removed are securely closed against leakage.

Closure of the Supracolic Compartment

This can only be done in a really satisfactory manner by sewing the edges of the opening in the mesocolon to the stomach as in gastro-jejunostomy, leaving the whole anastomosis in the infracolic compartment. In Finsterer gastrectomy this means that the mesocolon has to be brought nearly to the oesophagus. A memory of textbook diagrams would suggest that this must involve tension, but in fact it does not do so: the left-hand side of the opening is sewn to the posterior surface of the stomach before the anastomosis is started, the right-hand leaf to its anterior wall after it is completed (Fig. 5). The mesenteric opening in gastrectomy lies well to the left of the middle colic vessels, and there is no danger of wounding them.

In physiological gastrectomy this barrier between the subdiaphragmatic space and the main abdominal cavity is further reinforced by attaching the epiploic loop, carrying the omentum, to the posterior abdominal wall above the anastomosis by three or four interrupted sutures (Fig. 7).

The Immediate Post-operative Period

Many details of post-operative treatment are a matter of individual preference, but the question of fluid administration is one of principle. The balance between fluid in the tissues and the circulation, and the adjustment of this balance in response to circumstance, is one of the fundamental mechanisms of biological economy. This mechanism has been developed, tried, and perfected by evolution through countless ages; our knowledge dates from Starling, and is even now fragmentary and, with some of us, rudimentary. Yet we are quite ready to go at it like a dog at a bone, without any real knowledge of what we are doing. We should, however, remember that shock is essentially a physiological process and only becomes pathological when it runs riot. A blood pressure decreased to a degree that will produce no clinical symptoms of shock is a natural reaction to any injury, and is thoroughly beneficent after a severe operation. While the pressure remains low cut surfaces will come together if not prevented by exuded fluids, and capillary bleeding will cease if not maintained by the pressure of a circulation artificially overfilled and dilated. I have been convinced for many years that the patient who has received axillary saline during the course of an operation may reach the ward with a good pulse, but he is far more shocked two hours later than if he had been left alone. The body can only receive fluids naturally from the alimentary canal; by any other route they are taken under protest rather than accepted willingly.

The patient after gastrectomy under local anaesthesia is never shocked or anything like it. His blood pressure may be at its pre-operative level. It is usually lower, but his pulse is good, his skin warm and dry, his colour normal, and he looks and feels well. To insult such a condition of well-being by forcible feeding, even with fluids, is wrong. Fluids are required, but they may be given by mouth: if a suture line is going to give way it is never less likely to do so than in the first twenty-four hours. Therefore my patients are given a cup of tea, sweetened with glucose, when they get back to the wards; it warms them, cheers and reassures them. Thereafter they may have sterile water by mouth every hour, as long as no more than four ounces are taken at a time. Many of them have tap-water and glucose by the rectum, but this is not given for six hours at least. If any of my gastrectomy cases in the last two years have been given an axillary or intravenous infusion, it has been without my knowledge or consent.

Unsatisfactory Results

The common causes of failure after gastrectomy, post-operative vomiting, post-prandial discomfort, and proximal loop distension have already been dealt with. They can be avoided by the Finsterer gastrectomy. Recurrent ulceration can only occur if the post-operative acid level remains high—that is, after too conservative resection, or if entero-anastomosis has been performed.

Anaemia alone remains to be discussed. Moynihan first drew attention to this complication as a sequel of total gastrectomy, and in the early days of gastric surgery several cases of this complication were reported. It is remarkable, taking into consideration the increased frequency with which the operation is now performed, how few examples of anaemia have since come to light. Hartfall's recent paper on the subject suggests that the onset

of anaemia bears no relation to the amount of stomach removed, and is dependent rather on the functional disturbance produced by the operation in the particular case; an equally severe anaemia may follow gastro-jejunostomy. Walters⁶ has reported two cases of total gastrectomy, followed for eight months and two years respectively, in which little change took place in the blood picture from that prior to operation. I have not investigated my own cases from this point of view, but in a follow-up of some 140 gastrectomy patients I have found none whose symptoms or appearance called for such investigation. In the absence of gastro-intestinal disturbance the anaemia associated with gastrectomy reacts readily to iron and ammonium citrate by mouth. When we remember that gastrectomy is only performed for cancer, which is otherwise incurable, and for the small proportion of ulcers which are incurable by medical means, we can face the remote chance of an anaemia which is curable without anxiety.

Conclusion

The points I have dealt with are largely technical ones, but taken together they suggest certain conclusions. The chief are: that gastrectomy, whether for cancer or ulcer, must be really high; that the left gastric artery must, in each case, be ligatured at its origin from the coeliac axis; and that the stoma should be a non-return posterior gastro-jejunal one of the Finsterer type. In certain respects, in the point of distal section and in the treatment of the omentum, the operation differs in the two conditions.

For cancer the whole omentum should be detached from the colon and removed with the stomach, the duodenum should be divided at least three-quarters of an inch beyond the pylorus, and the fatty and glandular tissue along the lesser curve should be removed with the stomach right up to the oesophageal opening (Figs. 4 and 5). For ulcer the omentum and the gastro-epiploic vessels which supply it should be left intact, the distal point of section should be two inches proximal to the pylorus, and the lesser curve need not be denuded higher than a point one and a half inches below the cardia (Figs. 6, 7, and 8).

REFERENCES

- ¹ Florey, H. W., and Harding, H. E.: *Journ. Path. and Bact.*, 1933, xxxviii, 431.
- ² Idem: *Ibid.*, 1934, xxxix, 274.
- ³ Von Petz: *Zentralbl. f. Chir.*, 1924, No. 5.
- ⁴ Friedrich, H.: *Ibid.*, 1934, No. 9.
- ⁵ Hartfall, S. J.: *Guy's Hospital Reports*, 1934, lxxxiv, 448.
- ⁶ Walters, W.: *Journ. Amer. Med. Assoc.*, 1933, c, 804.

The fiftieth annual report of the Royal Prince Alfred Hospital, Sydney, contains the good news of the reopening of 200 beds which were closed in April, 1931, owing to financial stringency. Furthermore, the normal bed capacity of the institution has been increased from 530 to 568, which includes twenty-five beds for patients who can contribute part of the cost of their treatment. During the twelve months ended June 30th, 1934, the weekly bed cost was reduced to £3 10s., a "record" low level for a teaching hospital. It is now proposed to construct a new block for paying patients, to contain 159 beds; a new out-patients' department; and a psychiatric block of thirty beds, which will house the department of neurosurgery. The project will cost about £200,000, but it is calculated that some of this expense will be met by the profits from paying patients. The department of pathology is in urgent need of extension; the present laboratories were built in 1880, and enlarged in 1905. The equipment of the x-ray department also requires augmenting, but this will be postponed until the erection of the new out-patients' block provides further accommodation. The out-patient attendances during the year reached 192,662, and this huge number has had to be dealt with under much the same conditions as existed thirty years ago.