But in endeavoring to account for these differences the analogy between the two sets of phenomena to a great extent ceases to hold. As regards the behavior of the disease, as a whole, the greatest difficulty is met with in endeavoring to account for the very varying characters of different epidemics. To quote a single example, the recent severe recrudescence of the disease in Poona, in the middle of the monsoon, is entirely contrary to the behavior of the disease in previous years, whether in Poona or any other part of India. As regards the clinical phenomena of plague, on the other hand, a proximate explanation can, at least in many instances, be found for the varying features which the disease presents. The disease is unquestionably intimately connected with, if not solely caused by, the entrance into the body of a specific bacillus, and the subsequent production of specific toxins, which, circulating through the tissues, produce the varied general and local symptoms. The toxins appear to have an early and special action upon the brain and nervous structures through the body. There is also reason to suppose that muscle, glandular structures, and, perhaps, all other tissues in the organism, are to some extent affected directly by the action of the toxins circulating through them.

It is not always easy to determine to what extent each of these two modes of action of the toxins—indirectly through the nervous system or directly on the structures and tissues themselves—is to be credited in producing the effect. But there would appear to me to be little doubt that the toxins of plague are primarily nerve poisons, and that the affections of other organs or tissues met with in plague are to a very great extent, and, perhaps, to a greater extent than is usually thought, due to the profound disturbance of the nervous mechanism which controls their action or nutrition, or both.

A CRITICAL SUMMARY OF THE LITERATURE

ON THE

SURGERY OF THE STOMACH.

BY CHARLES H. FRAZIER, M.D.,
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SUCH has been the activity of surgeons in this field that the reviewer can restrict his observations to the literature of the past year and yet find much that is worthy of attention. Of the many interesting features of the surgery of the stomach in this period especially noteworthy is the rapidly increasing popularity of operations, the object of which is to establish communication between the stomach and intestine, over those

which deal directly with the lesion of the pylorus. Discouraged perhaps with the results obtained from operative intervention upon the pylorus itself, or encouraged probably by the pleasing results following the anastomotic operation, where an attack upon the pylorus itself has been clearly contraindicated, whatever be the motive, surgeons are at all events discarding such operations as pyloroplasty, pylorotomy, or Loreta's operation in favor of gastro-enterostomy.

The explanation for this choice is not hard to find; the operation is not a difficult one; it meets all the indications for operative interference that arise from obstruction of the pylorus, except, perhaps, in those cases of pyloric carcinoma in which pylorotomy is possible; more than this, it has a salutary effect upon such lesions as are found in the stomach-wall secondary to obstructive disease of the pylorus; it precludes the possibility of a second operation, which may be necessary after a pyloroplasty or after pyloric dilatation; the technique has been so perfected that all the unpleasant effects, such as regurgitation of the bile, are now avoidable; the mortality has been so reduced that it may be regarded a safe procedure as compared with operations upon other portions of the digestive tract.

As to the method of its performance one must choose between a gastro-enterostomy alone or in connection with an entero-anastomosis or a gastrotomy. The added experience of the past year gives further assurance that the posterior operation is the operation of choice in every case. Among those who have contributed to the literature of the subject, practically all are united on this point, and favorable reports of cases operated upon by this method are constantly appearing. As regards the site at which the anastomosis should be established, there have been no new suggestions; the point selected should be the most dependent part of the stomach in order to insure thorough drainage. As regards the method by which the anastomosis is effected, the choice lies between the use of the Murphy button or some similar contrivance and simple suture.

In this connection we might refer to the discussion which has arisen as to the efficiency of the Podrez method. This method effects an anastomosis by the insertion of two sutures at right angles one to the other, through the entire thickness of both the stomach and intestinal wall; the necrosis of the constricted areas establishes the necessary communication between the stomach and jejunum. Warneck and Kisselew, in their experiments with this method upon dogs, failed in many instances to get the desired anastomosis. Podrez had already operated upon four cases, and was able in two to verify the efficiency of his method, while Sokaloff had, on the other hand, operated upon four cases, in two of which no anastomosis resulted, although the necessary conditions were observed. These results confirmed those in the experi-

ments of Warneck and Kisselew. Sokaloff stamps the method as unreliable, inasmuch as it is founded upon the supposition that all the layers of the stomach or intestine necrose simultaneously. Reichel proved the fallacy of this theory by showing that the serosa and muscularis resist pressure much longer than the mucosa, the latter undergoing necrosis sooner and thereby so loosening the ligature that it has no constricting effect upon the remaining coats. As pointed out by Sokaloff, this explanation accounts for those cases in which the ligature was found lying loose *in situ* in a cicatrix in the overlying mucosa. The observation of Sokaloff is a reasonable one, and, taken together with the failures attending the experiments upon dogs, furnishes sufficient grounds for a permanent objection to the method as originally described by Podrez. Trezbecky indorsed the Podrez method on account of its simplicity and on account of the time saved thereby in its performance; he advocated the modification of the technique, as recommended by Modlinski, of employing an elastic ligature, which would continue to constrict the layers until the entire thickness of the wall of the stomach or intestine was necrotic. Before adopting this modification he had operated upon a case of carcinoma of the pylorus with pronounced obstructive symptoms; fourteen days after the operation the patient died, and at the autopsy it was found that the ligature had only cut through the mucous membrane, the serosa and muscularis being intact.

While most of the mechanical devices for effecting anastomosis in the gastro-intestinal tract have been of American origin (Senn's plates and Murphy's button), yet these devices are more tenaciously clung to by the surgeons of Europe than by those of the United States. Working along this line, Baracz performed two gastro-euterostomies in which an anastomosis was carried out with aid of plates made of turnips; the plates were seven and a half centimetres long, two and a half broad, and two and a half millimetres thick, with an oval opening in the middle three centimetres long and three-quarters of a centimetre broad. These advantages were claimed by Baracz for his plates: less time is consumed in their introduction, and a broader serous surface is obtained than by other methods, thus insuring against perforative peritonitis. Baracz admits that the employment of these plates is better adapted to an anterior than a posterior gastro-enterostomy; and this of itself is a confession of its imperfection, since posterior gastro-enterostomy is the operation of choice.

Still looking for an improvement on the Senn plate or Murphy button, Martini conducted a series of experiments upon dogs in order to prove the efficiency of a cartilage plate. His operation was conducted in the following way: the plate, constructed of cartilage, was about one or two centimetres long, one-half to one centimetre broad,

and three to five millimetres thick. In the posterior wall of the stomach an oval incision two and a half to three centimetres at its widest point was made only through the serosa and muscularis, the mucosa being left intact. The plate was then secured in place by means of a number of sutures, running through the mucosa, the plate being perforated around the periphery for this purpose. After securing one such plate in place in the gastric and intestinal walls, the plates were brought into apposition and secured by silk sutures introduced through the muscularis and serosa. According to the results obtained it was noticed that in from thirty-six to forty-eight hours the mucous membrane was necrotic and the plates were free. On the third day communication between the stomach and intestines was established.

Apart from these suggestions as to the technique of effecting an anastomosis, certain modifications of this procedure have been recommended by various authors during the period under discussion. Ruthowski considers it of especial advantage to be able to resort to forced feeding immediately after the operation, and to this end he adopts the plan of combining gastro-enterostomy with gastrostomy, the tube being passed into the stomach and through the gastro-intestinal fistula into the jejunum. In support of this additional step it is claimed that it prolongs the operation but five minutes, places the stomach at rest, and allows of the immediate administration of food. The tube which prevents kinking of the gut or the formation of the spur is removed on the tenth day. Weitzel indorses this idea, and follows it up with a suggestion that the gastrostomy should precede rather than follow the gastro-enterostomy, on the ground that there is danger in the reverse order of the tube slipping out on reposition of the stomach. This operation Weitzel has called gastro-enterostomosis-externa.

As to the manner of inserting the Murphy button, T. W. Murray does this through a linear incision closed with uninterrupted sutures rather than by the purse-string suture. This prevents puckering of the walls of the stomach, which may interfere with union at some point. Carle and Fantino had already adopted a similar procedure; instead of relying on the purse-string suture a linear incision is made two-thirds as long as the diameter of the button, and through this incision on the stretch the button is introduced. One suture on either side usually suffices to secure the button in place.

Regarding the indications for the performance of gastro-enterostomy, they would seem to include practically all affections of the stomach in which operative intervention is indicated. As one might suppose, malignant pyloric stenosis is the indication in the large majority of cases. Of a series of thirty-eight cases that have been collected from

the literature of the year 1899, in twenty-one the cause of the steatorrhea was carcinoma; in the remaining seventeen the indications for operation included gastric ulcer, benign stenosis, congenital stenosis, gastritis, hour-glass contraction, gastropexy, and motor insufficiency.

As regards the ultimate effect of gastro-enterostomy upon the stomach, Hartmann and Souppault made some interesting and valuable observations. They found that the stomach often regained its normal dimensions, in some cases quite rapidly, but more often in benign than in malignant cases. The restoration of the organ to its normal capacity seemed to depend upon the condition of the muscularis at the time of operation; thus if there was very pronounced atrophy, or if there was very extensive cancerous infiltration of the muscular layer, either of these conditions would retard or altogether arrest any tendency on the part of the stomach to regain its normal dimensions. Similar results might follow if a suitable coil of intestine had not been chosen, or if the anastomotic opening was not sufficiently large to insure of proper drainage.

It was noticed, too, that the motor disturbances subsided more or less rapidly, according to the duration of the stenosis or to the amount of atrophy, or, again, to the presence or absence of adhesions. The latter, if present, would frustrate any attempt at restoration.

Distinct changes in the character of the gastric secretion were noted. Thus the quantity might be very much diminished, once the obstruction be removed; this phenomenon is explained on the ground that the retention attending obstructive diseases of the pylorus stimulates the secretory function of the mucosa; once the obstruction is relieved the secretory glands of the mucosa become less active and at times undergo atrophy. Not only is the quantity of the gastric juice affected, but its reaction as well; the latter may be changed from a strongly acid to a neutral one, but, as a rule, it remains slightly acid. These changes were by no means constant, and in some cases no change at all was noted.

Not the least interesting were those observations upon the effect of regurgitation of bile. In not a few cases did this occur, and yet without any apparent disturbance of the digestive processes. Attention was called to the experiments of Masse, who established a fistula between the common duct and the stomach in order to determine the effect of bile upon digestion; after a series of observations he was unable to note any ill effects. We call attention to these results, because so much time and thought has been devoted to devising methods by which the regurgitation of bile could be prevented. This has resulted in the elaboration of more than one method that in this respect has given satisfaction. Among the functional results of these operations was noted the return

of the urine to normal, both as to quantity and quality, and the subsidence of the persistent constipation.

As a possible complication directly attributable to the operation, Brauu's case is alluded to here. Eleven months after a gastro-enterostomy had been performed the patient, aged twenty-five years, was suddenly seized with signs of perforative peritonitis and died. The autopsy revealed a perforative ulcer of the jejunum, and Braun was of the opinion that the ulcer was an *ulcus pepticum*.

The mortality of this operation is steadily decreasing. Among the larger series from individual clinics which have been published is that of Kappeler, who records his experience with the operation from 1887 to 1898. Of thirty-nine operations, thirty-one of which were for carcinoma and eight for gastric ulcer, the mortality was about 30 per cent.—that is to say, of thirty-nine cases twenty-seven died within the thirty-day limit. These statistics are of little value to-day, because some of these operations were conducted before the technique had been so perfected and at a period when operation was performed only as a last resort.

Hartmaan and Sopault have furnished us with the results in a series of twenty cases, including ten operations for carcinoma and five for gastric ulcer. Recovery ensued in every case upon the thirty-day limit.

The average duration of life was seven months. If to this series be added some eighteen isolated cases that have been collected during the past year, the mortality would be about 5.5 per cent.; for the malignant cases, 10.5 per cent., and for the non-malignant, *nil*. A comparison may be made between the mortality of the various procedures that were employed. Thus in malignant cases the simple gastro-enterostomy, anterior or posterior, was followed by a mortality of 12.5 per cent.; in non-malignant cases recovery ensued in every case. The Braun-Jaboulay modification was followed in each case by recovery, while the combination of gastro-enterostomy with a gastrectomy was equally successful. It is questionable whether sufficiently accurate statistics can be obtained from so small a number of cases to be of much value. They do, however, indicate a great decrease in the mortality of the operation, and compare very favorably with those of former years. In the sixty-six cases from Czerny's clinic during a period of thirty months preceding January, 1898, the mortality was 30.8 per cent.; in malignant disease, 38.3 per cent., and in other conditions 11 per cent. Compare these figures with those of a more modern series, such as that given above, and note the marked difference.

One could not review the literature of the past twelve months without being impressed with the abundance of material treating of the

advisability of surgical interference in gastric ulcer. The indications for this are not, however, as yet clearly defined; the whole subject is still subjudice, although the rapidly increasing experience of very recent times is bringing order out of chaos.

The situation seems to be this: In cases of acute perforation the necessity for immediate surgical intervention admits of no dispute. Great stress is to be laid upon the importance of an early operation, since the prognosis is good or bad in direct proportion to the time that has elapsed between the perforation and the operation. According to the most recent statistics, as furnished by Lund, the percentage of recoveries during the period 1897 and 1899, in cases operated upon during the first twelve hours, was 86 per cent., and within the first twenty-four hours 73 per cent. Comparing these statistics with those of earlier periods, a very pronounced improvement is noted. Thus, up to 1894 the percentage of recoveries was only 10 per cent., while up to 1897 it was 51 per cent. Richardson believes that the percentage of recoveries, as quoted above, is too high, because of the failure of operators to report their fatal cases.

The operation is not a difficult one in ordinary cases, but there may be occasions in which so many adhesions have formed as to make it difficult to expose or excise the ulcer. The incision should be in the median line in all cases in which there is any doubt as to the location of the ulcer; but where there is a reasonable certainty that it is situated at the cardiac end of the stomach, an incision may be made parallel to the costal cartilages. Once the abdominal cavity is opened, a systematic search should be carried out, according to the order of the frequency with which ulcers occupy one or the other of the regions of the stomach. Thus, 52 per cent. are on the anterior wall; 31 per cent. near the lesser curvature; 27 per cent. near the cardiac end; 13 per cent. near the pyloric end, and only 8 per cent. upon the posterior wall.

When the perforation is found it should be sewed with a single or double row of Lembert sutures, and, as a precaution against subsequent leakage, a small fragment of omentum may be engrafted over this line of sutures. While it is all important that the perforation should be closed, the operation is by no means completed until an attempt has been made in a thorough and systematic way to cleanse the peritoneum, which, in the majority of cases, will at the time of operation have been already infected. Fortunately, the presence of the adhesions will confine the area to a more or less limited space. Upon the extent of the area involved, and upon the virulence of the organism, will be based the prognosis.

The method of cleansing the peritoneal cavity here differs in no way from that employed in the presence of peritonitis of other origin, ex-

cepting, perhaps, in those cases in which the ulcer is situated upon the posterior wall of the stomach. Then it is necessary to open, drain thoroughly, and irrigate the lesser peritoneal cavity, paying especial attention to the region between the diaphragm and the liver—a region which is difficult of access, and yet one which is most apt to be contaminated, and, if neglected, to give rise to subphrenic abscess. In order to prevent such a complication, it has been suggested that the lesser peritoneal cavity be opened and inspected on all occasions.

Hemorrhage furnishes another indication for operation, not only repeated copious hemorrhages, but the frequent small hemorrhages associated with marked anæmia and dilatation of the stomach. The percentage of recoveries after operation in this class of cases is anything but satisfactory, more especially after copious hemorrhages. The mortality, according to different observers, varies from 60 to 70 per cent. As regards the propriety of operating to control hemorrhage, Mayo Robson, in his Hunterian Lectures, says: "I cannot help feeling that operative treatment in acute hemorrhage gives such a high rate of mortality (64.2 per cent. as compared with but 5 to 10 per cent. treated medically) that it is better in such cases to rely solely upon medical means. But in the repeated chronic hemorrhages that are responsible for quite half the total deaths from hæmatemesis, the operation of gastro-enterostomy affords a reliable method of treatment, since it at the same time gives rest to the stomach and removes the hyperacidity of the gastric juice, by an operation that can be done with rapidity and comparative safety. Moreover, when the ulceration is at the pylorus, where it so frequently leads to hypertrophy and stenosis, the operation not only relieves the symptoms for which it is undertaken, but proves curative to the disease." With these conclusions most surgeons will agree, while, at the same time, they recognize certain exceptions. Thus, in those cases where the hemorrhages are copious, frequent, and uncontrollable by medical means, the question of operative interference may be raised with perfect propriety. Once operation has been decided upon, the mode of procedure must be chosen from these methods: excision, ligation *en masse*, cauterization, ligation of the bleeding vessels, and, should the ulcer involve the pylorus, perhaps a pylorotomy. In the majority of cases excision of the ulcer or ligation will meet all the requirements; pylorotomy may be reserved for those cases in which the ulcer is situated on the pylorus; cauterization or ligation of the bleeding vessels is not radical enough to deserve consideration.

In cases of a more chronic type, where there is a history of small and repeated hemorrhages, inducing a grave anæmia, operative interference gives very great satisfaction; and the operation of choice is, for reasons already mentioned, gastro-enterostomy.

There remains to be considered those cases of gastric ulcer in which pain and vomiting persist in spite of medical treatment. Here operation is rather one of choice than of necessity, and it must be left to the judgment of the attending surgeon whether the symptoms are severe enough to demand the use of the knife. In this connection the surgeon may be guided by the results of Greenough and Joslyn's investigation as to the condition of a series of cases five years after their discharge from the hospital. Of one hundred and fourteen cases treated at the Massachusetts General Hospital, but 40 per cent. had remained well at the end of five years, whereas 80 per cent. had been previously discharged as cured or relieved. Thus the failure to effect a permanent cure was 60 per cent., while the mortality was 20 per cent. Comparing this with the low mortality of gastro-euenterostomy carried out in the absence of peritonitis, one sees at once the propriety at least of giving very serious consideration to operative interference.

Little if anything has been accomplished during the past year toward the perfection of the technique of gastrostomy. The operations which command the greatest confidence are those of Kader and Marwedel, both of which were described in 1896. The most recent work upon this subject is a monograph by J. Braquehay. It treats, first, of the indications for this operation, which are divided into three classes: those in which the obstruction is non-malignant; those in which it is malignant, and those in which neither of these factors play a part, the latter class including partial absence of the œsophagus, or congenital malformation, tracheo-œsophageal fistula, diverticula, and pressure of a tumor. As to the variety of operations they may be subdivided into four classes: 1. Those in which the operation is performed at two sittings. 2. Those in which the closure of the stomach is maintained by a sphincter-like action. 3. Those in which closure is maintained by a valvular action. 4. Those in which a combination of the valvular and sphincter-like action is employed.

Surgeons at large give the preference to those procedures which depend for their efficiency upon a valvular action, and of these the best are those of Marwedel and Kader. These operations are the ones which can be carried out the most rapidly—and time is always an important consideration in these cases, since the patients are at the time of operation more or less cachectic. Marwedel's operation differs from Kader's in that in the former the tube is passed through an oblique track into the stomach-wall, while in the latter it passes directly into the stomach through a funnel-like process. In its present stage of perfection there is practically no danger of leakage into the peritoneal cavity after gastrostomy. There is scarcely any chance of the stomach contents escaping through the external wound, and but little likelihood

of subsequent contraction of the newly-formed fistula. Keen says that the mortality of this operation in the most difficult cases would not be higher than 10 per cent., and, to quote Mayo Robson, "It would not be an exaggeration to say that if cases of incurable stricture of the œsophagus or of obstructive cancer of the cardiac end of the stomach were handed over to the surgeon at a sufficiently early stage the mortality would not exceed from 5 to 10 per cent."

As regards the time at which operation should be performed in malignant stenosis of the cardiac end of the stomach, it is all important that this should be done once the diagnosis is made—that is, without regard to the degree of dysphagia. The advantages of an early operation are these: it allows of the patient receiving sufficient nourishment, and by putting the œsophagus at rest it does away with the mechanical irritation, retards the progress of the growth, and thereby prolongs life. As to the duration of life after this operation, one case has been reported in which the patient survived for a period of four hundred and two days. In non-malignant cases the longest period for which the patient has survived the operation is sixteen years.

To sum the matter up it might be said that the operation of gastrostomy, as performed to-day, is almost ideal. In none but the more difficult cases—those in which carcinoma is of long standing and the cachexia profound—should there be any appreciable mortality. The immediate benefits derived from placing the patient upon a sufficient diet, and thereby improving the general nutrition, are most pronounced. The subjective annoyance to the patient of the presence of a gastric fistula is practically *nil*. From the stand-point of the surgeon the operation is equally satisfactory, not only on account of its safety, but also on account of its simplicity and ease of execution.

Three years ago Schlatter, of Zurich, startled the medical world with an announcement of his sensational operation. Conaor, of Ciaccianati, had already made an attempt to remove the entire stomach, but his patient died upon the table. From the time of Schlatter's operation up to the present but eight additional cases have been reported with such results as will be seen presently. The history of the entire series may be told in a few words. Schlatter's case was operated upon September 6, 1897, and died October 29, 1898, about fourteen months later. At the autopsy evidences of metastasis were found in the mesenteric, retroperitoneal, bronchial, and supraclavicular lymph-glands, and in the pleura. That the death of the patient was not due to impoverished nutrition but to carcinomatosis seemed to be borne out by the records of the case from the time of the operation until death. This would seem to teach the physiologist that human life cannot only be sustained but that the individual can gain in weight from the assimilation of food solely by the intestinal tract.

On February 24, 1898, Charles B. Brigham, of San Francisco, operated upon a patient sixty-six years of age, uniting the œsophagus to the duodenum by the Murphy button. The latest report of his patient's condition was published early in February of this year, practically two years since the operation was performed. She is able to do general housework, her diet requires no particular restriction, and she eats three hearty meals a day. Since the spring of 1899 she has gained in weight. The Murphy button has never been passed; and a skiagraph taken on January 12, 1900, demonstrated it lying a little to the left of the spine, at the level of the eleventh dorsal vertebra. At present there is no evidence of metastasis; the blood count shows no leucocytosis.

Delatour (May 2, 1898) removed the entire stomach from a woman, aged twenty-six years, the growth being adenocarcinoma. She reacted well, had gained thirty pounds at the end of six months, and seventeen months after the operation her condition was reported as being excellent.

On May 31, 1898, M. H. Richardson, of Boston, performed the fifth total gastrectomy. In November the wound reopened and began to discharge, and in February, 1899, the patient died of intestinal obstruction, due to extensive dissemination of carcinoma. The autopsy revealed most extensive cancerous infiltration, involving the abdominal wall and intestines alike, with evidence of general carcinomatosis. Richardson draws the following conclusions from this case: The patient's health would have been fully re-established had there been no recurrence; the subsequent sufferings of the patient were due rather to the mechanical effects than to the cancer itself; œsophago-duodenotomy is technically possible in a certain number of cases; the experience gained in this case encourages rather than forbids further attempts in the surgical treatment of gastric cancer. Comparing the history of other cases that have not been subjected to operation with those that did undergo that procedure, Richardson believes the suffering of the former class to be much more intense, while those patients have not had the satisfaction of knowing that they had accepted the one chance for recovery.

Four months later (September, 1898) G. C. MacDonald, of San Francisco, operated upon a male patient, and met with the same success as his fellow-townsmen. At the last report, some eighteen months later, his patient was in excellent condition, was doing the work of a farm laborer, eating all kinds of meats and vegetables, and suffering no inconvenience therefrom. MacDonald lays stress upon the importance of the proper selection of cases and upon the necessity of securing perfect coaptation at the point of anastomosis.

T. F. Chavasse reported, in the *Transactions of the Pathological Society of London*, vol. 1., the sixth case. This case and those of W. H. Cobb

(death on the table) and A. C. Bernays (death in thirty-six hours) comprise the three fatal cases in this series of eight.

John B. Harris, of Troy, reports the fourth successful case. In May, 1899, the operation was performed. The patient, a woman, aged forty-six years, was discharged from the hospital June 15, 1899, after a meal of roast beef and mashed potatoes, having in that short time gained about twenty pounds. The anastomosis was effected without difficulty by a double row of sutures.

Excluding the operation of Connor, which was carried out before the technique of abdominal surgery had begun to attain its present state of perfection, there have been reported nine cases of total or complete gastrectomy. Of these, four are still living; two died, fourteen and seven months after the operation, respectively, and the remaining three died upon the table or within thirty-six hours. The mortality of this series is 33 per cent. Certainly, it must be admitted that the operation has a field—to be sure, a limited one—in the surgery of the stomach. Face to face with these results, the operation cannot be branded as impracticable or as unjustifiable. The lesson to be learned from the experience which these few surgeons have had seems to be this: that, given a patient in fairly good health, with a carcinoma which has not grown beyond the confines of the stomach, it is perfectly feasible and practicable to extirpate this organ completely and to effect a perfect anastomosis between the esophagus and the duodenum, with or without the aid of the Murphy button; that, providing metastasis has not already occurred, the patient may entirely regain his or her health, and will then be able to ingest and assimilate food of the same quality and almost in the same quantity as before the operation; that the process of metabolism seems in no way disturbed so far as the patient's health is concerned. In both the patients that survived the shock of the operation, but died some months later, the records would seem to prove that death was not due to impoverished nutrition but to the results of metastasis. Indirectly, the lesson to be learned is the importance of an early diagnosis—one established, if necessary, by the aid of an exploratory operation—not delaying for its confirmation until the tumor can be felt through the abdominal wall, for the time for operation will then often have passed. Richardson says: "Cancer of the stomach, if extirpated in its earliest stages, offers as good a chance of recovery as cancer of the uterus."

It would not be amiss to refer at this juncture to a partial gastrectomy carried out by F. V. Cantwell upon a woman, aged fifty-two years. A sarcoma, arising from the posterior wall of the stomach, and weighing twelve pounds, was removed. The patient recovered from the operation, but there was evidence of very rapid recurrence within

six months. As to the technique, the divided portions of the stomach were united with two layers of sutures, one a continuous, the other a mattress suture, and these together rendered the wound absolutely water-tight. Mayo Robson has collected fourteen cases of partial gastrectomy in which at least three-fourths of the stomach had been removed for cancer. Of this series the mortality was 28.5 per cent.

When we have reviewed the literature pertaining to gastro-enterostomy, gastrostomy, gastrectomy, and the operative treatment of gastric ulcer we have covered the greater part of the field in which there has been any activity during the past year. As gastro-enterostomy is growing more and more in favor, so pyloroplasty and Loret's operation seem to be sinking into disfavor. As has been pointed out, the results following gastro-enterostomy are so much more apt to be permanent than are the results of pyloroplasty or Loret's operation, and the beneficial effects upon the pathological conditions existing in the stomach at the time of operation are so much more pronounced, we can readily understand why so little attention is paid to those operations which deal directly with the pylorus.

The method of treating dilatation of the stomach by gastroplication has received some attention during the past year. The operation consists in raising the lowered greater curvature of the anterior wall of the stomach, folding it upon itself, and fixing it in position by two rows of sutures.

In glancing over the various methods that have been adopted in the treatment of carcinoma of the pylorus, one is not once struck with the small number of pylorotomies that have been recorded of late. Not only have few such operations been performed, but also very little attention seems to have been paid to this subject in recent treatises upon the surgery of the stomach. This may be due to the fact that patients do not submit to operative interference until such adhesions have formed around the pyloric growth as to make its complete removal impossible.

A review of the literature of the surgery of the stomach would not be complete without referring to a work published in 1899 by Terrier and Hartmann (*Chirurgie de l'Estomac*). There is no other book that treats of this subject in such a comprehensive and modern way. The individual operations are well described and splendidly illustrated, so that as a work of reference, especially in regard to operative technique, it is invaluable. As an indication of the relative importance of the various operative procedures described, we find about three hundred pages devoted to gastrostomy, gastrectomy, and gastro-enterostomy, while the balance of the book, including some fifty pages, embraces all that has to be said of excision and dilatation of the pylorus, pyloroplasty, gastrorrhaphy, and gastropexy.