may benefit them, but not to the same extent as it benefits ulcer. The chief reason why the operation benefits is apparently due to the fact that increased acidity, which is so often a feature, is diminished by the passage of alkaline intestinal contents through the stoma into the stomach. A good practical rule when one contemplates advising gastro-enterostomy in cases presenting the manifestations of ulcer is to pause longer if the patient is a woman and if she is under 30.

HAEMATEMESIS.

Stomach bleeding has already been dealt with in previous sections. It sometimes occurs, however, unexpectedly and profusely, unassociated with other manifestations, and has to be dealt with as an emergency. Should such haematemesis be operated upon with a view to ligaturing the bleeding points? In my judgement the answer is an emphatic negative, and for these reasons:

1. The operation must be a severe one, involving pulling on the stomach, and incision into its wall and a search of its interior, and all this at a time when the patient is exhausted by a loss of blood.

2. Haematemesis may have multiple points as distinct from a single point of origin, and, as has already been shown, we have no means of knowing beforehand which condition exists in any given case, nor even is there opportunity to inquire. To place sutures round numerous small bleeding points of the mucous membrane is almost a futile proceeding, for one point that is seen there are several that are unseen.

3. Medical treatment of haematemesis is successful, and the mortality is not appreciably more than 3 per cent., though it is only fair to state that Mansell Moullin puts it at 6 per cent. In first attacks of haematemesis the mortality would probably be even lower. It is surprising how near death a patient may be from haematemesis and yet recover. Fredk. Smith¹⁴ had the interesting experience of 13 cases admitted for haematemesis under his care in a little over three months. Of these 11 were women and 2 men. In 2 patients the haemorrhage was so severe that they were thought to be moribund, yet both recovered.

NON-OBSTRUCTIVE DILATATION AND GASTROPTOSIS.

Obstructive dilatation has already been dealt with. For the atonic or non-obstructive dilatation gastro-enterostomy, whether judged by the modifications in function it produces or by actual clinical results, is rarely a necessary or desirable treatment. Failure of motor power, which is its marked characteristic, not only makes the operation risky, but detracts from the chances of its success. Muscular efficiency is as essential for the stoma as it is for the pylorus; and it has been shown that, in virtue of the arrangement of the muscular fibres, the pylorus is the preferential route, and if it is not obstructed, the stomach contents having reached it will leave by it. If pyloric spasm were a feature of atonic dilatation there would be some justification for the stoma, but it seldom is. Again, atonic dilatation is more often associated with diminished rather than increased hydrochloric acid, and therefore no benefit can accrue from the passage of alkaline intestinal contents through the stoma.

In certain cases where dilatation is associated with marked gastroptosis, in which the contents have to be propelled, so to speak, uphill towards the pylorus, or there may even be something approaching to kinking at the exit, under these circumstances it is conceivable that the pyloric path may be so difficult that a stoma becomes of use. Further, medical treatment of dilated stomach, whether it is or is not associated with gastroptosis, is often satisfactory in its results. Mere enlargement or prolapse of stomach is not necessarily a bar to efficient motility. Such stomachs can be made to empty in spite of the mechanical disadvantages which they present, provided their motility is kept at top hole. This is done by careful dieting, which makes the work as easy as possible, by periodical massage, keeping the patient fit, drugs like strychnine, and insisting from time to time on periods of rest on a bed or couch the foot of which is raised. It is surprising how well these patients do with such treatment. I will instance two examples in my own practice:

1. A woman aged about 42. About four years ago her stomach was enlarged and prolapsed, the greater curvature was nearer the pubes than the umbilicus, and the lesser

curvature a little above the umbilicus; the pylorus was not much displaced from its natural position. She had the usual symptoms associated with this condition. They did not directly result from the stomach being too big or prolapsed, but because its motor power had failed. Under treatment the size and shape of the viscous only partially improved, but the motor power was restored in spite of the mechanical disadvantage; and the patient got well and remains well, provided she keeps fit, does not get over-tired, and is cautious with her food.

2. In this patient, a man aged 81, an even more striking case, the stomach in size and position was almost identical with the foregoing case, and the condition has been under observation for ten years. At intervals during these years, generally once or twice a year, there has to be a period of strictly suitable diet, much rest, regular massage, etc., and each night the stomach contents are rendered alkaline by a large dose of sodium bicarbonate in hot water. By these means this patient has been able to lead an active life. An operation—gastropepy (lifting and fixing) is sometimes performed. Frederick Eve has done it several times, and reported on 3 cases under his and my care. The success which follows this treatment is apt to be partial, and I doubt in the long run whether it will produce better results than the medical treatment to which I have referred above.

REFERENCES.

- ¹ Hutchinson, Essay by Balean. ² Willcox, *Lancet*, June 10th, 1906.
- ³ Cannon and Blake, *Annals of Surgery*, vol. xli, p. 686. ⁴ Leggett and Maury, *ibid.*, vol. xli, p. 549. ⁵ Barclay, *Lancet*, 1908, vol. i, p. 862.
- ⁶ Cameron, *BRITISH MEDICAL JOURNAL*, 1908, vol. i, p. 140. ⁷ Hale White, *Lancet*, June 29th, 1901. ⁸ Dawson, *BRITISH MEDICAL JOURNAL*, October 21st, 1905, p. 1032. ⁹ Dawson, Discussion on Haematemesis, *Med. Soc. Trans.*, vol. xxvi, 1902. ¹⁰ Hale White, *Lancet*, November 3rd, 1906.
- ¹¹ Herringham, *Clinical Journal*, March 14th, 1906. ¹² Mayo Robson, *Lancet*, 1902, p. 1625. ¹³ Lejars, *Chirurgie d'Urgence*, Paris, 1906.
- ¹⁴ Fred. Smith, *London Hospital Gazette*, March, 1908. ¹⁵ Allbutt and Rolleston, *System of Medicine*, vol. iii.

An Address

ON

GASTRO-ENTEROSTOMY AND AFTER

DELIVERED TO THE SUNDERLAND DIVISION OF THE
BRITISH MEDICAL ASSOCIATION.

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

HONORARY SURGEON, LEEDS GENERAL INFIRMARY.

ON September 27th, 1881, Wölfler, then assistant to Billroth, in Vienna, was engaged in operating upon a patient suffering from carcinoma of the pyloric portion of the stomach. Resection, which it was the intention of the operator to perform, was found to be impossible, and the abdomen was about to be closed when Nicoladoni, who was acting as assistant, suggested that a new outlet from the stomach, to replace that which the disease had obstructed, might be made by attaching the jejunum to the stomach. There are few surgeons who can afford to neglect the whispered hint of a well-trained and familiar assistant, and Wölfler immediately acted upon the suggestion thus quietly made to him. In this way there was introduced to surgery an operation which has been the means of saving unnumbered lives, and of restoring to many thousands that enjoyment of perfect health which would otherwise have been for ever denied them. In surgical work the perfect method is rarely, if ever, a matter of instant accomplishment, nor is it often the work of a single individual. The very great majority of the operations practised to-day are, so to speak, composite procedures made up of details suggested here by one authority, there by another.

In the constant endeavour to find the simple and the safe method of gastro-enterostomy mechanical aids, almost beyond computation in their infinite variety, have been exploited by one surgeon after another. Happily we have at last arrived with confidence at the conclusion that nothing more is necessary to ensure the firm union of the intestine to the stomach than the simple continuous suture. But though these bobbins, buttons, elastic ligature, and strings of all kinds are relegated for ever to the museum shelves, we owe it to their inventors, and, above all, to Dr. J. B. Murphy, to say that, without the knowledge and the confidence which these things generally have given us, the progress of intestinal surgery must have been long delayed.

In the original operation of Wölfler the jejunum was attached to the anterior surface of the stomach, and it was

placed in such manner that its proximal end lay to the right, its distal to the left. The jejunum, that is to say, was anti-peristaltic in relation to the stomach. Various disabilities, the chief of which was regurgitant vomiting, followed this operation, and in 1885 von Hacker attempted to overcome them by utilizing the posterior surface of the stomach rather than the anterior for the anastomosis. The results at first were little, if at all, better, and it was not until the year 1900 that the real causes of the distressing complications of the operation began to be understood. In that year Petersen, in reporting the results of Czerny's clinic at Heidelberg, called attention to the need for the attachment of the jejunum to the stomach at a point as close to the flexure as possible. He gave good reasons for the adoption of the "no-loop" method, and by degrees the opinion has become widespread, if not general, that the posterior no-loop operation gives results, both immediate and remote, which are decidedly more satisfactory than those attainable by any other method. In this operation, as I described it some years ago, the attachment of the jejunum to the stomach was made along a line which ran from above downwards and to the right, to end at the lowest point of the greater curvature. In my own hands this operation gave excellent results; but this experience was not repeated by all surgeons. Dr. W. J. Mayo, for example, found that in some instances, generally after a period of a few weeks or a few months, bilious vomiting became troublesome, and in certain cases necessitated a secondary operation. He considered that this symptom was due to a mechanical obstruction, a kinking of the jejunum either at the flexure or at the upper end of the attachment of the bowel to the stomach, due to a double displacement of the intestine from its normal position. The normal position he described thus:—

The jejunum from its origin drops at once into the left abdominal fossa. Not only does it pass to the left, but it gravitates backwards into the left kidney pouch underneath the splenic flexure of the colon, so that at a point 4 in. from its origin it lies on a plane to the left and posterior.

Accordingly he suggested that the attachment of the jejunum to the stomach should be made in such manner as not to alter this "normal position." The opening in the stomach was therefore made to run from above downwards and to the left.

There can be no doubt that the position Dr. Mayo describes is that in which the jejunum is often (by no means always) found when the abdomen is opened upon the operation or *post-mortem* tables. And it is so found for a very good reason—that is the position into which it falls by gravity when the patient lies on the back. The duodenum ends and the jejunum begins on the left side of the front of the body of the second lumbar vertebra, and from here, in the recumbent position of a patient, the gut, if free to move, will naturally drop backwards into the kidney pouch. But a moment's consideration will make it clear that this can be no fixed position. The jejunum is pendent from the flexure and alters its position from time to time; it can swing from one side to the other with ease, and without obstruction occurring at the flexure. The little meso-colic ligament prevents it sagging too tightly down towards the pelvis. I think it probable that this slender ligament exists purely for the purpose of suspending the flexure in order to prevent a kink occurring in any of the various movements of the gut. If a patient be made to lie on the right side before the abdomen is opened the jejunum will be found to fall to the right. If a patient dies while lying on the right side the jejunum will be found to pass almost horizontally to the right, as I have clearly demonstrated. There can be no "normal position," therefore, of the jejunum in the sense described by Dr. Mayo. The jejunal origin is so constructed that an easy play of the gut in all directions is possible. The best position, therefore, for an anastomosis of the jejunum with the stomach to take is determined by the most frequent or easiest position taken naturally by the jejunum. This is, in my opinion, the vertical position; and for some time now I have attached the bowel as nearly as possible in the exact median vertical plane, and have made the anastomosis as close to the flexure as possible. In a paper elsewhere I have discussed the causes of the "bilious vomiting" which occurs after the "no-loop" operation; here I need only say that it is probably due to a mechan-

ical obstruction, slight indeed and perhaps intermittent, caused by a partial rotation of the gut around its longitudinal axis at the time the attachment to the stomach is made. It is therefore necessary to see that the part of the jejunum selected for the suture lines can be approximated easily, and without a twist or kink, to the posterior surface of the stomach at the place where the attachment is to be made. This, then, is the method of gastro-enterostomy which I believe to be the best; it is that which I have practised for almost four years in all cases, except in some few instances, about 20 or 30 in all, in which I have performed the anastomosis along Mayo's line. The immediate mortality of the operation has varied according to the type of case for which it is done. If cases of perforation and acute haemorrhage are excluded the mortality is less than 1 per cent. In cases of chronic duodenal ulcer it has been in my hands a little over 2 per cent. I have had no deaths among the cases of chronic gastric ulcer. When the very enfeebled condition of many of the patients is remembered, I think it will be conceded that a smaller mortality than this is hardly to be expected in an operation of this character. The immediate results of gastro-enterostomy thus performed are, then, quite satisfactory. What are the ultimate results? Before endeavouring to give a satisfactory reply to this most important question I would ask you first to consider what manner of operation gastro-enterostomy is, and what is the precise purpose we should expect it to fulfil. I am an ardent and a sanguine advocate of this operation, than which I think there is none in all surgery more completely satisfactory; but I must confess to a feeling of amazement when I see the operation advocated, as it not seldom is, for conditions for which hardly anything could be more inappropriate.

Gastro-enterostomy is, of course, a "short-circuiting operation" so called. It affords an opportunity to the stomach contents to avoid the long passage by the pylorus and duodenum into the jejunum. Do the contents avail themselves of this chance? This question raises the further question as to the effect of short-circuiting operations in general in the alimentary canal. Supposing entero-anastomosis to be performed, does the opening encourage all or any of the contents to pass by the new route, or is the old route more easily followed? This question has been answered both by clinical and by experimental work. For example, in a case of acute general peritonitis due to gangrenous appendicitis upon which I operated twelve months ago, a faecal fistula followed and refused to heal. I therefore decided to operate, and, making an incision over the sigmoid flexure, I anastomosed the lowest piece of small intestine available above the fistulous opening to the sigmoid, the new opening being about 3 in. in length. After the operation the faecal fistula discharged for several weeks, exactly as it had done before, and continued to do so until I obliterated the part distal to the anastomosis by suture. This case exemplifies what I believe to be a fact—that artificial openings are not preferred to the natural channels, unless in the course of the latter some obstruction is present. A great deal of valuable experimental work has been done, by several observers, the first of whom was Kelling.² In a long series of investigations he performed gastro-enterostomy by all methods—anterior, posterior, Roux's; attaching the jejunum at a high point, at a low, and the ileum at any part. The results were always the same. Nothing passed by the new anastomosis; all food, solid or liquid, went through the pylorus. Cannon and Blake³ demonstrated the same facts. When the jejunum was joined to the stomach the new opening was not made use of, except in one case where it lay very close to the pylorus, and then only in a small measure. Delbet⁴ divided the intestines and attached the distal end to the stomach and the upper to the skin, so that all food passing by the gastro-enterostomy opening would be discharged by the rectum, all leaving by the pylorus would escape at the artificial anus. Nothing ever passed through the anastomosis; everything ingested, fluid or solid, left by the pylorus, and was discharged on the surface of the abdomen.

Tuffier⁵ showed the truth of these observations in similar experiments, when the working of the parts was demonstrated by feeding the animals with food containing bismuth. In all cases and in the hands of all observers the same fact was disclosed: with an

unobstructed pylorus nothing is ever transmitted through a gastro-enterostomy opening. Why is this? The explanation given by Cannon and Blake is probably correct; it is that the new orifice becomes stretched in the movements of the stomach, and so becomes, as it were, a part of the gastric wall, not the slightest aperture remaining.

Much of the literature dealing with the surgery of the stomach has been hitherto concerned with the details of technique, with the complications which follow immediately upon the operation, and with the mortality. Upon all these points there is now very little left to say, except with regard to a very formidable sequel, destined, I believe, to prove the most serious of all—namely, peptic ulcer of the jejunum. Almost nothing has been written as to the after-results of the operation, and, so far as my knowledge goes, there has been no close examination into the history of patients at some long period after operation, nor any considered opinion passed upon the information so discovered. Of the immediate success of gastro-enterostomy and of its small death-rate many surgeons can now speak with the authority of adequate experience. But there is great need for a close scrutiny of late results, in order that we may learn what disabilities may attach to the operation, what are the limits to be put to its performance, what exactly are its sustained effects upon the general nutrition, and, finally, whether there is a possibility of any recurrence in the stomach or in the duodenum of whatever disorders first made the operation imperative.

In order to be able to speak with some authority upon these points, I have collected the records of all cases operated upon by me up to the end of the year 1905. Owing to the kindness and courtesy of the many medical men who referred the patients to me in the first instance I have been enabled to obtain written answers to a series of printed questions as to the present condition (February, 1908) of most of them. The reports in the great majority of cases have been made by the medical men, but a few have been received direct from the patients themselves. In order to eliminate all prejudice these reports were then handed over to my colleague, Mr. H. Collinson, who very kindly undertook the heavy task of summary, analysis, and criticism. For convenience and to ensure greater accuracy the cases were divided into four groups, in accordance with the plan always followed by me:

	Number of Cases.	Number of Deaths.
1. Perforating ulcer	9	1
2. Cases of acute haemorrhage	26	3
3. Cases of chronic ulcer	205	2
4. Cases of hour-glass stomach	15	3
Totals	255	9

In all there were accordingly 255 cases with 9 deaths, a mortality of 3.5 per cent. But in order to assess the actual risk which a patient undergoes it is more accurate to compute the death-rate in each separate class; for in the cases where the operation was done because death was imminent from haemorrhage the risk must obviously be greater, and in the cases of hour glass stomach gastro-enterostomy may be only one-half the operation necessary; in no less than 6 of the 15 cases in my series has gastro-gastrostomy or gastroplasty to be performed at the same time. These complications add perhaps a greater increment of risk than does strangulation to the ordinary operation of radical cure of a hernia. In my series of cases from the first I have performed up to March, 1906, including every case and all complications, the mortality is under 2 per cent. But mere recovery from an operation is by no means all that is necessary. There is an unfortunate habit of describing an operation as "successful" almost at the moment of its completion. We are all accustomed to be asked by the relatives of patients who are interviewed when an operation is immediately over, whether the operation has been "successful." That is a question which may be answered satisfactorily only after the lapse

of many months. In an operation of the severity of gastro-enterostomy, an operation, moreover, by which certain physiological principles seem to be set at naught, the lapse of two years is certainly not too much to allow us to speak with confidence as to its success. I propose to consider the after-results of my cases in the following manner.

GROUP 1.—PERFORATION OF THE STOMACH OR DUODENUM.

During the period mentioned, that is, to the end of 1905, I operated upon 27 cases of perforating ulcer; 18 patients recovered. In 6 cases gastro-enterostomy was performed immediately after the closure of the ulcer because of the narrowing at or near the outlet of the stomach which this procedure had caused. In 2 other patients symptoms due to a cicatricial stenosis near the pylorus developed within a few months, and gastro-enterostomy was necessary to afford relief. In one patient I have recently had to operate four years after the closure of a perforating ulcer, which had caused a contraction in the centre of the stomach. Gastro-enterostomy was performed to the greatly hypertrophied cardiac pouch of an hour-glass stomach. In 9 cases, therefore, in a total of 18 who recovered the operation of gastro-enterostomy has been necessary. All these cases are reported to be now quite well. Of the remaining 9 cases, 8 are quite well and are free from stomach symptoms, one suffers from slight indigestion and occasional vomiting; the ulcer in this case was prepyloric. The freedom from suffering of those patients in whom the ulcer was on the lesser curvature and away from the pylorus is significant in connexion with the question as to the need for gastro-enterostomy in cases of chronic ulcer so placed. Infolding or the excision of such an ulcer, it is clear, suffices to effect a cure.

GROUP 2.—ACUTE HAEMORRHAGE.

In the series of haemorrhage cases there are 23 patients who recovered from the operation. All are alive now, and reports as to the present state of health have been received from 22. One patient, who was admitted to the hospital from prison, cannot now be traced; 18 are reported as being "perfectly well," "cured," "absolutely cured"; in each one a complete restoration to health, good digestion, and normal appetite has occurred. One case is improved in health, but is rather delicate. His medical man reports "the operation was for urgent and grave haematemesis, and undoubtedly saved the patient's life, but he is still as he was before—weak and frail. There are no symptoms of dyspepsia." Three patients have suffered from post-operative vomiting. Two of the cases, operated upon in January and March, 1903, had the posterior long-loop operation; in one vomiting of bile occurred infrequently for a year and then disappeared. The patient is now "quite well." In another it has continued at intervals of two or three weeks up to the present time; the patient, moreover, says that she is "far better" than before, and "able to work now." In the third case the no-loop operation was performed, the jejunal direction being downwards and to the right. This case is to me the most interesting of all, for it is the only case in which after the no-loop operation any bilious vomiting has occurred. The operation was in February, 1905, upon a patient seen with Dr. Nicholson Dobie and the late Dr. Dreschfeld. Bilious vomiting occurred every week or two up to three months ago, when it disappeared after repeated lavage. In this case, after the anastomosis was completed, it was noticed that the jejunum did not fit well; it seemed to be twisted above the point of union with the stomach; a remark to this effect is made in the notes written on the day of operation. In over 200 cases of the posterior no-loop operation in which the jejunum was applied to the stomach vertically or with a slight inclination to the right, this is the only one in which bilious vomiting has occurred, and it is of great interest to note the fact that the appearance of the parts at the completion of the operation did not seem to me to be as satisfactory as usual.

GROUP 3.—CHRONIC GASTRIC OR DUODENAL ULCER.
There are 205 patients upon whom 214 operations were performed.

The following table shows the classes classified:

	Cases.	Deaths.
A. Gastric ulcer, duodenal ulcer—singly or together	174	2
B. Cholelithiasis with ulcer	4	0
C. Cholelithiasis causing obstruction	6	0
D. Cases in which no ulcer was found	11	0
E. Pyloroplasty (secondary gastro-enterostomy) ...	3	0
F. Secondary operations, the primary being performed elsewhere	7	0
G. Secondary operations in cases classed under A. and F.	9	0
Total	214	2

Late Results.

In 14 cases no report was furnished in 1908, but in 11 of these the patients were seen by me or reports received over two years after operation, and I have notes to say that all were well; in 3 cases no report can be obtained.

In 12 cases the patients were reported to be "no better" or "about the same." In 6 of these cases, all women, no ulcer was found at the operation, nor any evidence of obstruction. One of the cases was a secondary operation by myself, the primary operation having been performed elsewhere. I found no lesion of the stomach, and closed the abdomen without doing anything further. There has been no relief from the symptoms, pain, and haematemesis. In another case the lesion was very slight, a small scar only being found on the posterior surface. One case is an example of Finney's operation. Three suffer from regurgitant vomiting, but are kept fairly comfortable and free from symptoms by lavage.

A close study of the unsatisfactory cases has seemed to me to be especially necessary, in order to discover the circumstances in which the operation of gastro-enterostomy does not give satisfactory results. All the patients had suffered much from "indigestion," pain of sufficient severity to make them consider hopefully the question of operation, and from vomiting, haematemesis in two cases, and loss of weight. Nine of the patients were women. Of the 3 cases in men, 2 were relieved entirely of their original symptoms, but suffer from regurgitant vomiting; both operations were performed in 1903, and a long jejunal loop was left; the third was a case of Finney's operation. Among the 9 women there were 6 in whom no ulcer could be demonstrated; and there was neither stasis nor evident obstruction in any of them. Three of the patients are pronounced to be "intensely neurotic," and the operation has "not made much difference." It is satisfactory to be able to report that only one case in this series was operated upon later than January, 1904. The lessons to be learnt from this series are: That the mimicry of the symptoms of ulcer in women may be very exact; that in the absence of a demonstrable lesion, or some evidence of stenosis, gastro-enterostomy must not be performed; that the long jejunal loop is the cause of regurgitant vomiting; and that relief to symptoms may be completely given by an operation which is mechanically imperfect, and which therefore entails that distressing sequel, bilious vomiting.

In 5 cases there has been complete relief from the symptoms for which the operation was done, but in all there is slight, very occasional vomiting of bile. The intervals of this vary from "two to three weeks" to "every few months." In all, the patients have returned to work, eat well, have gained weight, and attribute the onset of the vomiting to slight or grave indiscretions in the matter of diet. In 4 of the cases the patients are "well satisfied" with the result of the operation, though their surgeon does not share their feeling of content.

In 10 cases the improvement is doubtful or has been tardy; 3 of these were secondary operations, the original operation being done elsewhere. In one case of duodenal ulcer with the most intense hyperchlorhydria there was a recurrence of symptoms one year later, and at a second operation elsewhere some adhesions and a jejunal ulcer (?) were found. The patient recovered and improved subsequently. One patient, after improving

considerably, began to suffer, subsequent to pregnancy, from severe dragging pain in the abdomen. Ventrifixation of the uterus was performed, and she is now well and at work. The remaining patients have still some of their former symptoms, and usually have to make occasional calls upon their medical men. The chief symptom that remains is vomiting. In all, the ulcer found was small, and at some distance from the pylorus, in the body or on the lesser curvature of the stomach.

Eight patients have died since the operation; one six and a half years later of carcinoma of the pancreas; one six years later after operation by another surgeon for carcinoma of the caecum; one eight months later of acute pneumonia; one four years later of cardiac disease; one three months later of acute abscess of lung; one one year later of cardiac disease; one two years later of pernicious anaemia; in one case the cause of death three years later is not mentioned.

In 7 cases death occurred from malignant disease of the stomach developing at the site of the ulcer. The deaths occurred two years, four years, two and a half years, three and a quarter years, one year, one and a half years and two and a half years subsequently. The deaths in these cases are very significant. The interval in most of them between operation and death suggests that the condition present at the time of the operation was not then malignant, but rather that a carcinomatous invasion of the diseased part occurred at a later period. They were, perhaps, examples of *ulcus carcinomatosum*. There can be no doubt that in some of these cases Rodman's operation—excision of the ulcer-bearing area—would have been the better procedure.

Two patients died as a direct result of the operation; one from uraemia, one from acute obstruction due to hernia of all the small intestine into the lesser sac, and strangulation at the margin of the opening through the transverse mesocolon.

The final results in this group may be briefly stated thus:

Living.			
Cured	...	...	148
Relieved	...	...	5
Doubtful	...	...	9
No better	...	...	12
No recent report (11 of these may be considered certainly as cured)	...	...	14
Dead.			
As result of operation	...	...	2
Of carcinoma of stomach	...	...	7
Of other causes	...	...	8
			205

GROUP 4.—HOUR-GLASS STOMACH.

In 15 cases gastro-enterostomy was performed, being combined in 6 with other operations—gastroplasty or gastro-gastrostomy. There were three deaths. In one patient regurgitant vomiting occurred so severely as to need the secondary performance of entero-anastomosis. All the 12 patients are now perfectly well, and in the enjoyment of good appetite and sound digestion. They are all cured of their stomach disorders.

Such is the detailed analysis of the cases included in each separate group. In order that an accurate general statement as to the effects of gastro-enterostomy may be made the cases must be brought together.

A summary of the cases gives the following result:

Group 1.	8 patients living;	8 patients cured
Group 2.	23 " "	19 " "
Group 3.	188 " "	159 " "
Group 4.	12 " "	12 " "
231		198

The present condition of all the patients is as follows:

Patients cured	...	...	198
Improved	...	...	8
No better	...	...	12
Doubtful	...	...	9
Not recently reported	...	...	4
			231

Twenty-four patients are dead—9 as a result of the operation, 7 of carcinoma of the stomach, 8 from other causes unconnected with the disease of the stomach or the operation performed for its relief.

CONCLUSIONS.

Such is a brief abstract of the analysis of all the cases upon which I operated from the beginning of my experience to the end of the year 1905. The result of the inquiry into the after-history enables certain conclusions to be drawn which may guide us in our treatment of the chronic disorders of the stomach in the future. I would submit to you the following propositions:

1. Gastro-enterostomy is a short-circuiting operation, and, like all such procedures, acts best when a gross mechanical obstruction exists in the normal path of the intestinal contents.

2. Experimental work shows that when the pylorus is normal, and there is no impediment to the passage of food through it, the opening made in the operation of gastro-enterostomy does not allow of the escape of any of the gastric contents into the intestine.

3. The operation, therefore, gives the best results in cases where there is organic disease in the prepyloric or pyloric regions of the stomach or duodenum, or when performed on the cardiac side of a stenosis in the body of the stomach.

4. When an ulcer is found on the lesser curvature towards the cardia it should be excised if possible; gastro-enterostomy is not necessary, and if performed is either almost useless or entirely harmful.

5. When there is a suspicion of malignancy in an ulcer or ulcers in the pyloric region, Rodman's operation should be performed.

6. Under no circumstances, and in compliance with no persuasion however insistent, is gastro-enterostomy to be done in the absence of demonstrable organic disease.

7. Regurgitant vomiting, formerly the most troublesome of all complications, is dependent upon faults in the operation which result in some mechanical obstruction to the intestine. These faults are chiefly dependent upon the presence of a "loop" in the jejunum, but may also be caused by a twist in the intestine around its longitudinal axis at the time of its application to the stomach.

8. The posterior no-loop operation with the vertical application of the bowel to the stomach is the best procedure.

REFERENCES.

- ¹ *Annals of Surgery*, 1906, xliii, 539. ² *Arch. f. klin. Chir.*, 1900, lxx, 259.
³ *Annals of Surgery*, 1905, xli, 686. ⁴ *Bull. et Mém. de la Soc. de Chir.*, 1907, xxxiii, 1250. ⁵ *La Semaine Médicale*, 1907, ii, 513.

ERYTHROCYTHAEMIA AND CYANOSIS.

BY W. P. HERRINGHAM, M.D., F.R.C.P.,

PHYSICIAN TO ST. BARTHOLOMEW'S HOSPITAL.

A CERTAIN time ago a lady was sent to me for consultation whose case was unusual. She was 38 years of age, and had been a strong woman, fond of taking long walks. She had had no severe illness, but about six years before she had become very pale, and was told she was anaemic. This had given place to a colour higher than natural, and she had ever since been subject to attacks of shortness of breath, in which she became very blue. She had been seen by another physician, who had examined the blood, and had found it polycythaemic.

She was a rather thin person, but healthy looking, except that her complexion was too florid. Her fingers were rather purple, but not her face. She was breathing rather rapidly, and as if with some difficulty, but I could not clearly find out why. There was no sign of laryngeal or tracheal or bronchial obstruction; the chest moved fairly, and was resonant; there were no abnormal sounds in the lungs. The breath sounds were a little weak, but not weaker than they are in some healthy chests. The heart's apex was inside the nipple line, the sounds clear, the pulse regular, and the maximum systolic blood pressure was 120 mm. Hg. Neither liver nor spleen was palpable. The urine, though turbid with urates, contained neither albumen nor glucose.

The only complaint beside that of short breath was of extreme constipation, and I at first thought that it might be a case of enterogenous cyanosis. But I could find no indican, which is generally present in the urine when any poison of a putrefactive kind is being absorbed from the intestines.

The blood was examined for me by Dr. Pritchard in the

Clinical Research Department of St. Bartholomew's. He reported:

Count.—Haemoglobin = 120 per cent. (Haldane).

Red cells = 7,630,000 per c.mm. Shape and staining natural; no abnormal cells seen.

Colour index = 0.78.

White cells = 8,800 per c.mm., namely:

Polymorphonuclears	64 per cent.	= 5,632 per c.mm.
Lymphocytes	25	" = 2,200 "
Hyalines	8	" = 704 "
Eosinophiles	2	" = 176 "
Basophiles	1	" = 88 "

Culture.—Six tubes were inoculated, and all remained sterile.

Spectroscopic Examination.—Dr. Hurlley reported: No trace of either methaemoglobin or sulph-haemoglobin; not even on adding a reducing agent did the band of the latter appear.

In spite, therefore, of the extreme constipation the blood did not resemble that of enterogenous cyanosis, which shows one of these two abnormal forms of haemoglobin, each of which is probably due to reducing agents in the blood. Methaemoglobin is regularly thus produced *in vitro*, and Hurlley's conjectures from his experiments that the same is true of sulph-haemoglobin. Nor did it conform to the splenic form of cyanosis, for though there was a great increase in the red cells there was no enlargement of the spleen.

I was puzzled, and said so, and a little later the patient came up to a nursing home for further investigation. But two days after her arrival, when she was beginning to menstruate, she was seized, as was not infrequent at those times, with one of her attacks of dyspnoea. It was chiefly expiratory and was extreme in degree, so that she became very cyanosed. In fact it was like a very bad attack of asthma. But it differed from every asthmatic attack that I have ever seen in the entire absence of any signs that could be referred to the bronchi. I have never seen asthma without being able to hear sibilus or rhonchus or râle. In this case there was no such noise. The chest was moving with great efforts, it was highly resonant, and the breath sounds, especially on the right side, were exceedingly weak. The attacks recurred, and she died in about two days.

I was allowed to make an autopsy. The lungs were emphysematous, but small, and from the larynx to the finest divisions of the bronchi there was no sign of any disease of the air tubes. They were not thickened, and the mucous membrane was free from any secretion. There was a patch of congestion at the left base, where we had heard fine crepitation the day before death. The heart was rather small, neither hypertrophied nor dilated, and free from valvular disease. I was unable to weigh the viscera. The liver was congested, but was not enlarged. The *spleen was not enlarged*, and seemed natural on section. I regret that the marrow of the long bones was not examined.

I thought at the time that this case was one of atrophic emphysema in a youngish person, which had led to polycythaemia in compensation for deficient aëration. But the more I think of it the less am I satisfied with that explanation. I have seen the red cells much increased in emphysema, but only when there was much bronchitis and dilatation of the right side of the heart. In the emphysema of old age, which this case resembled, I have not counted the blood, because I have never seen any marked congestion or cyanosis, and I have not been able to find such records in literature.

The other alternative is that it was a case of polycythaemia or erythrocythaemia of the usual type, but without any splenic enlargement, that the emphysema was a more or less accidental addition, and that the fatal dyspnoea was chiefly due to the state of the blood.

There is a general agreement, I think, that enlargement of the spleen is of secondary consequence, and is not a cause, but in some way an effect, of the state of the blood. In several instances the spleen has not been recognized as large during life, and in one or two cases which have been dissected (Cabot, Osler) there appears to have been very little enlargement after death. There is no doubt that enlargement is the rule, but there are exceptions. I think it is allowable on the evidence to suppose that the disease may exist without any enlargement.

On the other hand, paroxysmal dyspnoea is a symptom that has been recorded in a good many cases. It is rather a surprising symptom under the circumstances. It may