The Surgical Treatment of Gastric Ulcus and its Complications - particularly Perforation.
Twenty years ago, the simple round ulcer of the stomach had no interest for the surgeon, as the treatment of this affection was held to be entirely within the province of the physician. However, recurring, violent haemorrhages from an ulcer of this organ with persistent vomiting brought many patients to the brink of the grave, death frequently taking place. One also perforation with escape of stomach contents into the peritoneal cavity was found post-mortem to be the cause of so many deaths that physicians began to think they might stop in and heal with the knife what physicians were unable to accomplish. About this time Marion Sims in speaking of gastric and typhoid
ulcers said "Rest assured the day will come of such not far distant-when an accurate diagnosis in cases of perforating gastric & intestinal ulcers, followed by prompt action, will save his life that must quickly ebb away."

Since his day the ulcer of the stomach has become the subject of keen surgical interest. Operations of every variety have been tried on the spur of the moment, or else previously planned for the simple ulcer, with complications.

Prior to 1875 the stomach had only been operated upon in isolated cases by a few other continental surgeons, but since that date one chiefly to the discerning of Lister, it has come more & more within the scope of surgery.
Rydgien in 1871 was the first surgeon who undertook to excise an ulcer upon the posterior wall of the stomach for troublesome haemorrhage. In that case there was a large ulcer close to the pylorus, adherent to the pancreas, with much thickening of the stomach wall. He resected it with great difficulty, the patient recovered. During that year he excised an ulcer in two cases with no death. Billroth also commenced much about the same time the resection of the pylorus. Where an ulcer was frequently a complication. They were quickly followed in 1882 by Czerny, who partially excised an ulcer for troublesome haemorrhage.
Also Corone & Dr. Kulicz.

Two

out of four of the latter's cases proved false.

The stomachoscope was now first employed to explore the interior of the stomach with an endeavor to locate the ulcer, but this instrument did not fulfill the hopes of its inventor, and was abandoned.

Kusler opened the stomach through the anterior wall of an ulcer.

In his case a cherry stone was found embedded in the floor of the ulcer. Two of his cases suffered from ulcer hematemesis delirium of the stomach, so he opened the anterior wall, cauterized the ulcer, and performed a gastro-enterotomy. Both patients recovered.

In 1883 Dr. Kelton C. Foster of Bristol related a case
Of gastric ulcers which end fatally with peritonitis, at the post mortem perforation was found with stomach contents in the peritoneal cavity. In discussing this case he was the first to suggest that a laparotomy should be performed. The ulcer ought for to stitch up.

Both in the Continent also in the same year suggests the anticipation & prevention of perforation with forcing of the peritoneum by a timely laparotomy. Excision of the ulcer fountain of the resulting wound.

During the next ten years success of cases as very hard to find.

In 1890 Prof. Pulkowski op. success upon a case of 18 in whom every kind of medical treatment had been tried.
to no purpose, excised a round ulcer by resection of the anterior wall of the stomach near the pylorus. Examination of the ulcer after removal showed that perforation was on the point of taking place. The patient - pop-up on the tenth day - no vomiting - recovery. The was - fairly - weight. In 1893 Rome of Lancanne at the French Empire of surgery reported a case of successful excision of an ulcer, which had eroded the coronary artery. During the next four years, ulcer of the stomach, prior to perforation were still left - almost entirely in the hands of physicians except in a few isolated cases of Dr. Buerger's team - persistent vomiting. But cases subsequent to
Preparation were being more readily diagnosed and promptly treated by immediate operation with the consequent gradual diminution of their high mortality.

A table published by lithotypholy is quoted by Bancroft, showing the very forcible advancement that has been made in the direction:

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Dr. Wolff of University College has recently collected all recorded cases in England and America up to the end of 1897. His table shows that one of 425 cases there were 63 recoveries, thus equally 50 per cent.
Without the real obstacle which has deterred many operators from undertaking the treatment of cases prior to perforation, has been the inability to locate the site of the ulcers within the stomach, for at present we are without any means of determining before operation the precise portion of a gastric ulcer, whether the seat of pain, or the time when vomiting occurs, nor the influence upon the pain of posture, none of these are sufficient to indicate exactly whether the ulcer is on the anterior or posterior wall of the stomach, at the pylorus or cardiac end. Yet, how is this all? In a number of cases of ulcers which end in perforation, notably those upon the anterior surface, there are either no symptoms
or they are so slight and indefinite as not to warrant the diagnosis of ulcer at all.
However as will be shown later on the actual site of the ulcer is not now considered to be of such great importance for during the last two years, numerous cases have upon recovery in which the stomach by means of the operation of gastroenterostomy has been given almost complete rest. The fluid food given passing on almost at once into the intestines. Thus the raw surface of the ulcer is placed under the most favorable conditions for healing. Although the actual ulcer itself in most cases remains untouched.
owing to perforation being the most obvious complication of gastric ulcer we shall proceed to discuss with more detail the features of that complication.

Pathology. There can be little doubt that ulcer of the stomach is a much more common ailment than it is generally considered to be, so that a large number of cases treated as gastritis or dyspepsia are in reality cases of gastric ulcer. It is a large percentage of these cases undergo complete cure under the care of the physician.

The young and the weak—girls in particular—are most likely to suffer. According to Leber.
it is three times more common in females, and then between the ages of 14 and 35. Among men, it is three times common at middle life, and then the stomach seems more usually the site of ulceration. According to Brinton, perforation occurs in 13 1/2 per cent of all cases of peptic ulcer, far more than in proportion to males.

In most cases a history of some gastric trouble can be obtained. In many even a direct medical history of a gastric ulcer. The great feature seems to be that here in the stomach an organ liable to great mechanical changes, we have a weak raw spot if a mass of indigestible food comes in contact with it, or there is sudden...
much increased peristalsis, or if
if he stretches too far by
the presence of much flatness
at any moment — it may
give way. The patient's life
is in danger.
Perforation occurs quite
suddenly. This fact is a ref-
monic in diagnostics as cotton
bunches has suddenly taken
place in a definite region of
the body which at once
arrests your attention.
As in other diseases it seems
to run in families. A case was reported of per-
oration recurring in two
patients, both father and son.
Died of typhoid complication.
Perforation has also been
known to occur after strong
doses of purgatives have
been taken.
Pathology.

Trichia ulcers may be malignant, tuberculous, or syphilitic, but the special form of ulcer which we are now discussing, which requires surgical treatment is the simple ulcer of Curwen-Richardson. The late repair Smith divides these ulcers into acute or chronic. The former, small, punched out, characterized by urgent clinical symptoms of terminating, proceeding with perforation. The latter, also producing much the same set of symptoms but more usually causing the stomach to become distended and adherent to other structures. The means of these adhesions producing still further symptoms. Usually of large size with shelving irregular margins, & with a greater tendency to heal.
that perforate.
Both set of ulcers are more often situated upon the posterior wall of the stomach, and are not usually single, but in some cases several may be present at one time.
The incidence of perforation does not in the least degree correspond with the incidence of locality, for although the simple ulcer belongs commonly situated upon the posterior wall it tends to perforate much more frequently upon the anterior wall.
According to Reclus, however, the half of all ulcers are upon the anterior wall of 80 per cent. of true perforate.
According to Brechfeld's ulcer perforates on the anterior wall 85 out of 100 cases, while on the
Posterior wall only 2. 1 at
the pylorus 10 out of 100.
Perforation after ulcers
have formed is more common
upon the posterior wall near
the lesser curvature. Fibrous
end. A good many examples
of this may also be seen on
the anterior wall when the
perforation is high up near
the lesser curvature. Thence
the left lobe of the liver.
When so situated they are
very often quite out of
reach, especially toward
the cardiac end. Especial:
ly as
will be seen later on. Canal
be entered.
As perforation most often
occurs after a full meal
it may mean that several
pints of stomach contents
are poured out anteriorly
into the gastro-hepatic
space. This flows over the
Germinations seem diffuse throughout the coils of small intestine to the cumbrous pelvic hollows, posteriorly through the frame of Winslow into the liver sac.

The limits of abscess formation are formed by the amount of extravasation that occurs. These extravasations posterior are the cause of the majority of subphrenic abscesses. However, subphrenic abscesses are not always due to ulcers penetrating on the posterior wall, but as in some cases published by Purse & Dickinson, may be due to ulcers upon the anterior wall.

So the ulcer of recent acute may burst of stomach contents be discharged into the free abdomen.
2. Adhesions may have formed between the ulcer and the nearby structures. Upon perforation, a localized abscess results.

3. In the case of an adjacent organ, such as the stomach, pancreas, liver, or spleen, it may become adherent to the stomach. A localized abscess may occur in them, or some vessel may be eroded, leading to eventual hemorrhage and death. As a case reported in which the pancreas was perforated by a duodenal ulcer, in the head of the pancreas, was thus speared and bled into, with fatal result.

A very remarkable case was recorded by Dr. Tingdell of Dublin, of an ulcer perforating the diaphragm. There were no symptoms for many years after the existence of an ulcer, until one night the patient was heard
Who happened to be in hospital convalescing from an attack of acute rheumatism, mostly passes a quantity of fluid stores per rectum, painted, was dead in half an hour. At the autopsy, it was found that the stomach was bound to the diaphragm by adhesions. The pericardial sac was almost completely obliterated. The heart muscle exposed. A large lappet of close to the cardiac end of the stomach had allowed the gastric juice to act directly upon the exposed heart muscle, which was very friable. Thus giving way, thus tappin the left ventricle directly. Professor Chiani also records a similar case. Of the simple ulcer is the one most usual to perforate
as the malignant is more indurated & adherent to the surrounding structures.
The two features of most importance are the position of the ulcer & the presence or absence of adhesions.
As seen above the acute form usually occurs in young and niev resting upon the anterior wall where it is most unlikely that adhesions will have been formed. Since here we have mortality when such cases perforate.
The size of the perforation varies from a split-of half an inch to a pin point - so small that it cannot easily be detected even post mortem, being sometimes hidden in a fold of the stomach, covered by a pellicle, lymph, or at the bottom.
If a depression, surrounded
by much induration.

Two cases are recorded by
Dr. Bennett in which the size
of the perforation was half
an inch. Both were successfully
entered, although in one
case the perforation has
enlarged for 72 hours
general peritonitis was
present.

Symptoms.

(a) Acute cases with
perforation into general peritonitis
Cavity.

The majority of cases the patient
has suffered from symptoms
which is not typical of those
pointed to the stomach as the
seat of some lesion. In some
the previous symptoms have
been most marked, chiefly
pain and vomiting after
the ingestion of food.
Hematemic or melena.

While in others as in cases reported by Mr. Conde and Mrs. Knowles, the ulcer may be reached by the ulcer may be reported as "latent," not even a symptom of indigestion having been complained of. Perforation only discovered at the post-mortem. The patient having suffered 4 days from pleurisy. Third "Malignant" cases where symptoms are so vague, are all the more serious as the ulcer is frequently upon the anterior wall.

When a gastric ulcer perforates, there is in many cases the feeling of something having pierce the abdomen quite suddenly, generally after some increase strain or sudden movement on the
part of the patient, such as lifting a heavy weight, jumping up quickly, or running upstairs, be even the act of sneezing. The patient is said to be usually in the erect posture but in one case reported by Mr. Mackenzie the patient was at the time lying in bed. Pain is usually produced at the instant of perforation & in most cases is agonising, the shock of this being so great as in a case under Dr. Hunter's care. When a domestic was running upstairs cried out with pain & fell, a perforated stomach being found at the autopsy. Associated with pain is tenderness on pressure. The site of the pain is localized at first in the
Epigastric or left hypochondriac region, or even in the lower part of the thorax. In some cases, however, it is more pronounced in the back, either in the mid-dorsal region between the scapulae or localized to the left of the spine at the base of the last two ribs.

When the pain has been more acute posteriorly, the ulcer has in a number of cases been found upon that aspect of the stomach. At first, localized almost to one definite spot, the pain & tenderness soon radiate to the region of the umbilicus & as peritonitis sets in, extends over the whole abdomen. The pain always becomes worse with a more marked feature of the occurrence of perforation. It has been
known to be very severe at the tip of the left shoulder more so here than anywhere else. One or two cases have been reported however in which no pain was present at first to indicate perforation but came on gradually over the whole abdomen. By the operation several hours afterwards perforation was found with general peritonitis. One such case was admitted under the author’s care in the Royal Infirmary where pain had thus come on gradually with all the symptoms of peritonitis. But present when the patient was first seen, a small perforation was found on the anterior surface upon elevating the left lobe of the liver. Considerable extravasation had taken place. The patient recovered.
Almost coincident with the onset of pain is the symptom of shock. Which in most cases is well marked, indicating severe lesion with its consequent impression upon the nervous system. There is often much unnecessary confusion in the use of the terms shock and collapse. Here the initial shock comes on immediately the ulcer bursts and may be so severe as to cause death, from the sudden rush of the outpouring of stomach contents over the peritoneum, or it may be absent altogether. All grades of severity are witnessed: but it must be most carefully distinguished from the ensuing collapse due to the sequel of peritonitis. So, shock precedes collapse. It is worse just after the rupture has occurred.
The shock following perforation is so severe & its effects so observed to increase with such great rapidity that it is apparent that the chances of success are diminishing in direct proportion to the length of time that is allowed to elapse between the occurrence of the injury & its repair by surgical means.

Injuries of the upper abdomen produce much greater shock owing to their close proximity to the solar plexus & inferior pancreas. Nausea & retching may be said to be present in every case, vomiting perhaps once or twice but seldom is it continued. This absence of continued vomiting is of great importance in distinguishing from other abdominal affections as hernia etc.
The frequent ineffective attempts at vomiting are most distressing to witness. At first the abdominal muscles are held rigid thoracically, all movements cease. The breathing becomes entirely thoracic, quick & shallow.

Gradually the abdomen becomes distended due to intestinal paralysis & the presence of free fluid & gas in the peritoneal cavity; still later it may become tympanitic on percussion all over, so much so that no liver dullness whatever can be made out. This loss of liver dullness is a very prominent & important feature as it is almost certainly due to free gas in the peritoneal cavity. Absence however is not negative of perforation.
The temperature at first Mildly begins to rise to 100° or 101° or even higher. The pulse becomes quicker and more thready, showing the progress of general perturbation.

The patient—lies without knees drawn up, the face wearing a anxious, drawn, printed expression. Tenuity may now occur once or twice until collapse becomes more marked. Intense restlessness may come on the patient—wandering his head from side to side, tossing the abdomen back and forth to the intense pain. The bowels may be empty all through. In some cases the urine has been known to be suppressed.

As the case continues the collapse increases. The patient—gradually succumbs usually within 24 to 72 hours.
Chronic cases with perforation into the general peritoneal cavity.

If the extravasation from the stomach does not spread so rapidly, but is more circumscribed and limited by adhesions, the symptoms are apt to be delayed and have a more chronic variety.

In these chronic cases the stomach has become adherent at the site of the rupture to adjacent structures. When the rupture occurs there may be localised pain and tenderness as in the acute form, gradually becoming more diffuse and followed by vomiting. Symptoms of general peritonitis do not ensue, but rather those of some localised colic.

After eating, an increase in the swelling...
In the first days, constitutional symptoms became more evident, indicating septicemia from the absorption of septic products. These readily diffuse through the lymphatics of the diaphragm to give rise to septic pneumonia.

Subphrenia abscesses are by far the commonest from the latency of their symptoms often present great difficulty in diagnosis, as will be seen from the following case reported by Dr. Bickham, 26th St. Thomas' Hospital. The patient, a young girl, had all the typical signs of gastric ulcer which was healed medially. When quite suddenly the symptoms of pneumonia became evident which seemed to develop into a pneumothorax. After a sudden death, it was discuss at the post-mortem that a
Partial ulcer had ruptured on the posterior wall to large abscess, had formed beneath the diaphragm between the posterior wall of the stomach and the liver, &c. &c. This containing for as well as pus has simulated a pneumonia thoracis. The most terrible cases of all are those in which ulcers may be so latent—so insidious that the patient makes no complaint. Whatever it is unaware of any departure from health. When residue perforation occurs abdominal peritonitis is well advanced before the surgeon has time to step in.

Diagnosis. The well-known clinical features of partial ulcer need not detain us, but we will
proceed to consider those of the more important complications of which perforation is the most important. The patient is in most cases a young woman, with some previous history of anemia or dyspepsia; in many cases also a direct history of gastric ulcer can be obtained. Men of the same age are by no means exempt, but it is more likely to occur in them between the age of 40 to 50.

The sudden onset of acute pain is very characteristic. The site of which is fairly constant in the upper abdomen, with especial reference to the epigastric region. It must be remembered that pain may not be so marked if the rupture occurs when the stomach is empty.
In rare cases it may not be
complained of at all, until
peritonitis has set in. So
one of the chief guides
in diagnosis is removed.
The general appearance of
the patient points to some
severe lesion. Shock is
usually pronounced from the
first. In many cases
the true Hippocratic facies
so often associated with
peritonitis is present at
an early stage.
The complete absence of
twin dullness is of great
importance, it was consid-
ed by Liebermeister a pathognomonic
sign but it must be taken
into consideration in conjunc-
tion with other symptoms
for in a number of cases
suffering from chronic atonic
dyspepsia this great diminu-
tion of liver dullness has been noted.
especially in front.
In acute cases, the retrac-
ted state of the abdomen quickly
gives way to distention due to
paralysis of the gut as well as
the presence of free gas in the
peritoneal cavity, peritonitis
ensuing very rapidly, usually
within five or six hours.
In more chronic cases after
therapeutic or lack of perforation
have passed off there may
be nothing definite until
the evidences of some local
collection of pus become
present. This may point
either anteriorly below the
Xiphisternum or more
usually posteriorly to the
left of the spine, indicating
a subphrenic abscess.
The fact that no trauma
has occurred puts rupture of
the liver or spleen out of the
question. A trauma...
a break, and may expedite the rupture as in one case the stomach was found at
the post mortem to be ruptured at the site of an old ulcer
soon after a heavy meal from a man being squeezed
together the buffers of a train.
the shock was so great he died in half an hour.
In all cases the duodenum
must be considered, as
the symptoms of a rupture
are often circumstantial ones
of a gastric ulcer, but this
is often in such cases the
absence of a digestive history
and may be indigestion without
any hemorrhagic or the
absence of pain after the injection
of food may be considered.
Iklage. Also ulcers are
known to occur here more
in middle aged men. However,
the treatment would be the
Some of the trouble should always be examined at the time of operation after the abdomen is opened. Senny and America recommends that in most cases free hydrochloric acid in the peritoneal cavity should be looked for, but this very soon disappears with the onset of peritonitis. This same surgeon has shown that the actual fact of perforation has occurred by passing hydrogen gas into the stomach, an aspirating needle is then passed through the linea alba to where gas begins to escape; a light is applied to the blue hydrogen flame observed. Needless to say this method need not be resorted to for the previous history of the case, the symptoms of the physical signs will in the real majority of cases.

be sufficient to indicate what has taken place.

With regard to the pain, the

vomiting and nausea might at first indicate

pelvic or renal colic, but

in such cases it would not

be so intimately associated

with the ingestion of food.

Also the character of the

vomiting, the ineffectual attempts

at which may almost be said
to be characteristic of

perforation having occurred.

According to De-Beer-Shields,
in

such cases vomiting is

generally absent. However,

most authorities will be

found to agree that vomiting

occurs once or twice at

first—at least—this is subsequently

followed by great nausea

and frequent retching.
Prognosis.

In the case of simple perforation when this may be considered fairly good with our present medical treatment. But when violent repeated hemorrhages of persistent vomiting are present the prognosis is bad. Much depends mainly upon the result of the operation employed.

If perforation has already occurred it is of course extremely grave hopeless. Very much how soon afterwards the case is first seen of the abdomen can be opened. The exact nature of the injury other than the prospect of recovery when not so dealt with is almost hopeless but not quite. If the rupture takes place when the stomach
The patient remains at perfect rest horizontally there may be very little leakage from the stomach, too the result may only remain a small localized peritonitis. Some cases have been known to struggle through a diffuse general peritonitis but they are very rare. Taylor records a case with all the symptoms of perforation which gradually improved, so no operation was performed and recovery ensued. Also S. Scale in the same year.

Even after a localized abscess has been formed it has itself burst either into the stomach or bowel too been evacuated. The patient has recovered. Otherwise 91 per cent of cases
Terminal fatally within 24 hours. A very few die of shock within a short time of the perforation, but the vast majority die within 4 or 5 days of general peritonitis. With regard to the cases of violent haemorrhage some authorities consider that the loss of blood per se is seldom enough to cause dangerous anaemia, so the medical treatment has been relied upon. On the other hand the persistent vomiting is a worse feature as the progressive dehydration is impossible to stop and quite justifies operation. A remarkable case specially this feature occurred under the writer's care at the Royal Infirmary, Edinburgh.
A girl aged 26 was admitted to the medical wards with persistent vomiting occasional melena and increasing emaciation. She vomited everything immediately it was taken. She complained of constant severe localized pain in the epigastric region, always increased by pressure. It also in the mid-epigastrium posteriorly. No tumour was to be made out.

The diagnosis of gastric ulcer was made, operation advised, at which the stomach was found perfectly healthy. No indication of ulcer could be found. She did not recover from the shock of the operation and the post mortem the stomach of duodenum were found.
Quite healthy, but an irregular rigidity of the cord of a shilling was found about 4 inches above the cardia, and of the stomach and the oesophagus.

Treatment:

The will now proceed to discuss the form of treatment requisite under the following heads:

1. Before Perforation.
2. After Perforation.
   a. Acute Cases.
   b. Chronic Cases.

1. Before Perforation.

The surgical treatment of the appendix being before perforation has occurred has so far had comparatively few adherents due mainly to the fact that
it is as yet with our present knowledge impossible to diagnose the situation within the stomach of an ulcer. Even when perforation has occurred, we are quite unable to state what we shall discover before opening the abdomen; but surgeons are everday beginning to realize more and more that the actual site of the ulcer is of no great importance.

During 1893 much more attention was given to the surgery of the stomach than in any previous year, both especially in America and on the Continent. How the surgical treatment of gastric ulcers prior to perforation is becoming more and more established.

Perforation on the Continent than whom there is no greater authority upon the
The danger to life from a gastric ulcer is at least not less probable than the danger of a complete modern operation. Keen in America who has recently contributed largely to this subject - argues that if there be any doubt of diagnosis as to an early perforation taking place, an exploratory laparotomy is urgently required. He considers that if after prolonged medical treatment the symptoms of an ulcer do not abate they are three surgical methods of dealing with it - open to the Pylorectomy or Gastric Antrectomy, the object in both cases being to put the ulcer as far as possible at rest. Also Excision as in Pyloroplasty, Partial.
Sacheatomy.

He considers along with others that the single ulcer if allowed to continue may undergo malignant degeneration for this reason alone should be operated upon.

Acute leucemia he goes on to consider occurs in two forms

1. Funicular, with death imminent.
2. Repeated small hemorrhagic attacks.

Delays further operation at once in the first case if there be a loss of half a liter repeated within 24 hours, but then it is in view to agree with Hartman that absolute rectal feeding, injective protein, bandaging the four extremities in the rectal bandage adopted in such cases.

Anemia in the more chronic cases
When the hemorrhages are
small repeated at intervals
he recommends operation
as the best time for the patient
can be chosen. If it will depend
upon what is actually found
at the time of operation whether
the vein should be excised
or a retroenterotomy per-
formed, whereby emptying the
stomach is expedited.

In hatching state, there are only
two cases on record in which
the bleeding vessels have actually
been tied. It is usually found
impossible to tie the bleeding
vessels as the mucous membrane
is too friable.

Kysturich 33 in summing up
cases requiring operation
considers that such a need
prior to perforation is case.
0 where symptoms have not
been lessened by prolonged
medical treatment.
(3) When there is obstruction of the pylorus by an ulcer.
(4) When violent pain is the result of adhesions.
(5) Where perforation is very severe.

He urges that gastro-enterostomy be performed today, that the death rate for all cases of gastric ulcer is 25 to 30 per cent, but for gastro-enterostomy only 16.2 per cent.

Up to the end of 1895 in Gerson's clinic at Kielberg, the results of operation in cases of fresh round ulcer with acute haematemesis were very good. The conclusion arrived at was that time should not be wasted looking for an ulcer but gastro-enterostomy at once performed as all symptoms are relieved immediately owing to the unobstructed escape of
Operation.

In cases where operation is being undertaken for persistent vomiting or profuse hemorrhage, the stomach should not be previously washed out for fear of causing a renewal of these symptoms, as the increase of shock in such procedures can ill be borne by the already lowered vitality of such cases. Previous rectal feeding, if necessary, a saline infusion, should be more relied upon. If hunger the stomach contains food at the time of operation. This may be emptied into the duodenum by clamping pressure frequently a precaution of this
surface of the stomach, or some
discoloration will indicate
the site of an ulcer, but if no
such indication present itself
a vertical incision should be
made in the anterior wall
of the stomach as although
there room is thus obtained
there is much less risk of
very troublesome hemorrhage
occurring than if the incision
has been made parallel
with the long axis.
The interior of the stomach
should now be systematically
explored. The posterior wall
being best brought into view
by imagining it, by means
of the hand passed through
a rent in the diaphragm.
If no ulcer can be detected
further exploration should
then in all cases be employed
as the specific remedy for
the relief of symptoms.
But if an ulcer is found an attempt should certainly be made to excise it, the edges being brought together by sutures or a small pad of gauze being stuck on outside. Sometimes, however, the necrotic membrane will be found very friable, so that stitches will not hold. In such cases it is much better not to attempt excision, but turn to a gastro-enterotomy.

Koch, as far back as 1884, employed the cautery, also potassium in 1887, but only in isolated cases. At the present day the cautery may be used with advantage where the ulcer is situated upon the posterior wall of the stomach, being done by adhering to the tissue, whereas, also when near the cardiac end, it is more difficult to perform manipulate.
with regard to the operation of gastro-enterostomy or the establishment of a permanent fistula between the stomach and duodenum or pylorus. The posterior method is now considered to be the best, as was first employed by von Hakef, having taken the transverse incision and suturing the intestine with the posterior aspect of the stomach. Von Hakef used the simple silk suture, with no button or bone plate, as he considers the use of these tend very considerably to increase the shock of the operation. Reaumur, after his operations of the stomach, speaking of his method employed in the operation points out that: after a fair trial
of the method he has had
better results after using his or
own bobbin.
About two years ago before
hast-o-lineation was so
much employed & turned
suggested a method of
hast-o-lineation upon the same
principle as a hast-o-lineation,
in order to completely re-
lined tomach. He cuts down
finds the third portion
of the duodenum, traces
the duodenum far about - a
fork opens into the gut -
at this point & passes in
a catheter towards the
rectal end of the gut. Carefully
polythe the full round the
catheter, to prevent any
organ getting too catheter.
Carefully & slowly the catheter
& tissue. Reptile's food is
then administered while the
patient is still upon the table.
This operation has not so far had many advocates as the stomach, is not given the same complete rest as when gastro-enterotomy is employed. Eisendrath has recently made some interesting experiments by which he shows that after a vertical incision of the anterior wall of the stomach, the region of an ulcer can be drawn up by means of forceps situated in the mass, but in order to prevent perforation occurring in such cases external sutures are required as well. He recommends a circumferential suturing in preference to division. Where the ulcerated portion of stomach wall can be attached from without. In cases where the ulcer is near the pylorus he recommends pyloroplasty.
(2). After perforation.

(a) Acute cases.

We must now turn our attention to the most serious complication of all, that of perforation. As the majority of cases of perforation occur in general practice it is of the utmost importance that a speedy diagnosis should be arrived at in order that the patient may be placed as soon as possible under the best circumstances for operation, for in these cases time is all important.

As soon as the case comes under observation the diagnosis of perforation has been made everything should at once be done to lessen the amount of shock present or prevent collapse ensuing. The patient should be anaesthe. 
placed between hot blankets
surrounded by hot bottles.
A hypodermic injection of morphia
should then be given, in all
cases, as this not only relieves
pain, but tends to boost the
whole nervous system. It is
one of the best means of dim-
ishing the amount of shock.
The horizontal position, as
early as possible, is of the
utmost importance to prevent
as far as possible, the
entrapment of materials
spreading widely from the
point of perforation, where
they may soon become localized
by adhesions.

Then here recommends that
if food has recently been
taken, the stomach pump
should be used at all costs.
Nothing should be given by
the mouth, but an enema
of coffee, brandy, per rectum.
as early as possible. This should all be done before anything else is attempted so that if the patient has to be removed one way or another the removal is accomplished with as little increase of shock as possible. If operation is declined the patient must be kept rigidly in a horizontal position and allowed to move under any consideration. Morphia should be injected occasionally half-way for the relief of pain, but also to lessen the amount of peristalsis of both stomach and intestine. See alone may be administered by the mouth. Treatment - enemas regularly at stated intervals. As soon as an operation is decided upon all the necessary preparation should be made.
so that it may be commenced as the symptoms of shock are passing off. This prevents the escape of more septic products, the ulcer is easier to find if the patient is stronger.

**operation.**

The skin having been carefully prepared, the abdomen should be opened in the midline as that gives the best means of viewing and manipulating the stomach. Good length of vision is very important. The fear of any subsequent ventral hernia must give way to the all-important question of time. As large after large is quickly divided by the peritoneum, reached this will often be found to bulge considerably from the presence of gas or fluid beneath. As often this will
not be observed.
all bleeding vessels should now be carefully secured. The wound should be made as dry as possible. The peritoneum is Cautiously opened when a rush of gas or liquid will frequently occur. It should then be divided to the full extent of the superficial wound. The edges secured with catgut, the perforation has now to be found.
A small portion of the anterior surface of the stomach of left I' in 14 of the liver has come into view and these cases in which the perforation has existed for some time there may be found coated with lymph which can often be felt off like layers by wet blotting paper. The perforation may at once come into view as a small
point from which bubbles of gas or particles of food are seen to be issuing. It may be a small depression in the midst of a mass of induration or at the bottom of an abscess, or it may be concealed entirely by adherent lymph.

If not at first seen to lie to be of the liver should be carefully raised, if possible; it has been known to rupture of cause tremendous hemorrhage. Upon separating the liver from the stomach, the perforation may be observed to be situated high up near the lesser curvature, or worse still far out beneath the cardiac end. The lower division of the left-lower muscle will give more room, but if this is much distended this procedure will cause much
inconvenience. Even then it has been too far out of reach for an attempt at entering the mass.

If no perforation can be detected the lesser pao should be opened by tearing through the gastro-colic omentum of the posterior wall. Bucy found perforation in 22 of his cases upon the anterior surface, most of these were near the cardia, and 520 were difficult to close. In 43 of Comte's cases it was upon the anterior surface in 28, posterior 5, lesser curvature 4, pylorus 3.

While of America recommend that if the perforation is not at first readily seen it may be easily demonstrated by inflating the stomach with hydrogen gas.
through an elastic aosophageal tube. This is quite unnecessary. It involves the waste of precious time, not to mention the increase of shock that the manipulation would cause. The perforation having been found, the next step is to close it.

All extravasated stomach contents must be carefully mopped up with dry sterile gauze. The rest of the abdominal cavity shut off by means of sterile gauze.

The liver should be held up by an assistant, where present; the thick layers of lymph should be peeled off. The stomach wall, or the thin entrees, will often be found to cut—there was one case out of five being at the most critical point when being thickened, as the true depth
Of their insertion cannot be accurately gauged.

Some surgeons have advocated washing all by stomach contents by introducing an inflexible tube through the perforation as completely empty the stomach, but no advantage can be gained by doing this. Jacquet recommends that the stomach should be brought boldly all of the abdomen filled up and sterilized fluids through the manipulation of every case, but this tends to add considerably to the shock of also in many cases cannot be effected only by adhesions.

Mr. Goodiger's other has recom.

mend that the edges of the perforation should be pared to the ulcer, excised, but this is too waste of materi
precious time. Meadowsight states that on no account should an attempt be made to pass his rulers as there may be a good deal of trouble from the harmony of the larger cap thus produced. It will require more cunning for it more easily break down.

Porting mucous membranes from the stomach may cause some trouble, but if pads are used as in Eustace cases this trouble may be more easily dealt with.

The perforation should be closed by means of Lambert's paste, which should begin thus well beyond the entrance of the perforation. Carried down as close to the mucous layer as possible, sufficient far from the margins of the
Perforation becomes good inversion when tightened. They should all be put in before any are tightened. As soon as one has been firmly tied the whole perforation will invaginate into the. Even a third may with great advantage be used as it renders the extravasation of the perforat much more efficient to secure.

Carefully prepared sterilized silk, not too fine should be used. Where possible it should always be the only of one person to have a number of these sutures already threaded, to hand to the surgeon as he requires them as this is the most tedious part of the whole operation. The one upon which success mainly depends.
a point which is too often
left out of all consideration
until the operation has well
commenced. Then all is
hurry and confusion.
Drum heard a case in which
he was unable to enter as the
tissues were so soft,Friable,
so he lifted up a fold of
peritoneum, covered it
over the perforation.

Scales in the country used the
same method as the stomach
wall in his case was so
involved.
When it is thus found opposite
a clot, a closely fitting dress
may be inserted through
the perforation and
firmed in situ, with
packing, with sufficient
sutures to promote adhesions.
The tube may be removed in
about a week or ten days.
Several cases have been recorded where it was found impossible to bring the peritoneum. Being near the cardiac end of the stomach it could not reach far. The stomach wall has been stitched to the margin of the external wound with a resulting gastric fistula. Turner considers that two lesser oesophageal sphincter in all cases he explored the posterior wall of the stomach carefully examined by opening through the omentum as a safeguard against perforation above. He also to assist drainage as he has found at several post-mortems that stomach contents had passed into the lesser sac which had subsequently become occluded at the orifice of Winslow's peritoneal fold.
localized abscess has been the result.
Careful search should always be made for the presence of any other ulcer, as secondary perforation has occurred within a few days with fatal result in one or two cases.
After the perforation has been carefully closed the next most important point to be considered is the irrigation of the peritoneal cavity which must be very efficient — to be of any good and upon the fact of this being properly performed will depend to a great or less extent the success of the operation.
It must not be converted into a means of diffusing but of removing from the abdominal cavity foreign
bodies which have been extravasated from the stomach.
If it is evident that there has been any little extravasation as in some cases the perforation has occurred within the stomach quite empty, the surfaces of the extravasated fluid remain smooth when the carefully opened over with sterilized gauze.

Bruneel strongly advocates avoiding the use of employing irrigation, he has reported 2 cases with 3 recurrences. If however a considerable quantity of gastric contents has been left, over the whole abdominal cavity must be systematically washed out. This process of irrigation must be employed at a low pressure, as it does not tend to increase the shock.
to recommend Boro-glyceride 3/7 to the point of distilled water—a large quantity of which may be left in, allowed to drain away, as particles of foreign material are much more likely to come away by that means, so it will do no harm to leave the intestines bathed in it. Many surgeons simply use sterilized water at the temperature of the body. Also weak solutions of Boracic acid are used by many, but whatever is used it should be as pure as possible. Neither acid a lonic bit bland.

Mr. Gould considers normal saline solution the best not only to cleanse the peritoneum but also to act as a stimulant to help remove the collapse of the part immediately surrounding
the site of rupture should be first washed over, then the lesser sac through the frame of the ribs, passing carefully over to the left of the stomach in the region of the spleen. Working down the descending colon to the pelvis, then down the right side from the region of the liver, especially between that region of the diaphragm, down the pelvis of the kidney, among the coils of small intestine.

Mr. Wallace and others of St. Thomas' Hospital have recommended sectioning to enable the coils of small intestines to be more easily cleansed. But this must obviously interfere with the structure's function, which is one of the main objects to be preserved against.

If a large glass tube is used as recommended by Dr. Maurice
Along with the delivery tube, the
lotion will drain back more
easily.
No pains should be spared to
make the cleansing of the
general peritoneal cavity as
systematic as possible, it
being one of the most-essential
parts in the whole operation.
Ranking seems only to the
efficient closure of the
rupture. Making
On probable results a case in
which no food has been
taken for 5 hours previous
to the occurrence of perforation;
no only was present in the
peritoneal cavity - two
peritonitis was evident at
the operation, so no irrigation
was employed, the patient
making a good recovery.
Kriege Thurnett also record
similar successful cases.
dent comes the question of drainage.
If there has been little leakage
consequently, little irrigation
a glass tube should only be left in over the site of the rupture, but if systematic
irrigation has been employed
it is then a good plan to open
the abdomen in the hypogastric
region as well to pass
a glass drainage tube well
down into the pouch of Douglas.
Barclay attributes his deaths
of one of his cases to the
want of this precaution.
When a large collection of
pus was found in the
pouch of Douglas at the
pelvic margin.
Gray Smith recommended
that a counter opening
should also be made in
either loin of any collection
was thought to exist then.
Each case however as it presents itself will have to be treated on its own merits. As much time as possible should be taken. These manipulations carefully employed when the patient has plenty of strength but while the shock has been great the evidence of collapse will be ensuing and marks the operation must be brought rapidly to a close.

The operator should be very careful to have everything ready and of systematical go over all the details of the operation beforehand especially with regard to the suturing of the rupture careful cleansing of the peritoneum.

Plenty of assistance is also essential as many cases have to be dealt with outside
hospitals; for various obvious reasons many cases terminate fatally which might have been saved but for the omission of one of these most simple details.

After treatment: As soon as the operation is complete a light dressing should be applied. The patient put back to bed. The pulse or temperature must be carefully watched for the first few days. Symptoms of collapse must be combated. The drainage tubes after fresh gauge being constantly renewed in the drainage tube which may in the majority of cases be entirely removed in 48 hours. Rectal feeding alone must be continued for about four days, rice only allowed by the mouth.
(13). Chronic Cases.

We have thus discussed the treatment of what may well be called the acute variety. We must now pass to that of the more chronic type. Cases which come under this head are those in which a perforation has occurred in the extravasation of stomach contents is limited, a localized abscess being the result. Such cases are usually very amenable to treatment, if allowed to operate upon as soon as such a diagnosis is arrived at; for until the abdomen is opened we are guilty in the dark as to the site of perforation or amount of extravasation that has occurred. When the abscess is a well-defined and readily present itself to the surface it must be opened and drained.
An attempt should be made to discover the perforation, as no good would result if it were
left open, for delicate adhesions might be broken down with the result of a fatal peritonitis.
The cavity, however, may be gently syringed or both much benefit. Care being taken never
not to use a pessary antiseptic
as the perforation in the stomach
will have to still patent. A weak solution of Bicarb. acid will
be found the best in such cases. As soon as this has
been done the cavity must
either be tightly packed
with gauze or a drainage
tube inserted with a light
packing around, if the
cavity is of any size. But this
method will be found to
be the best.

It is a notable fact however,
that the majority of these cases
is the result of a posterior perforation to more or less extensive subphrenic abscess developing at first with vague symptoms but finally those of septicaemia setting in before any operative interference can be undertaken. When the symptoms are more definite—pneumonia, impyemia, pneumothorax are the diseases most frequently involved. In each case the thorax should undoubtedly be opened usually on the left side as that is the side chiefly affected. A portion of the 8th rib removed the lung will retract out of the way of the diaphragm will then be exposed. This should be stitched to the internal wound adhesions allowed to form. The next day this should then be opened on the left subphrenic space explored as this is the most common
site for the collection of pus. This can then be drained in the normal manner.
It has been found to be almost impossible to properly drain these subphrenic abscesses from the front. Too the above parallelism will be found to be the rule; although some urge that the pleura will then become affected which is the one thing to avoid which appears to be the real cause of peptic peritoneal ascites. This has in most cases already occurred by the time the abscess is diagnosed or even an abscess in the base of the lung has been evacuated as well.

The remarkable case of Mr. Dickinson's 26 which has been quoted above shows how difficult it is to make an accurate diagnosis
The presence of free gas in the abscess cavity in his case mimulating a pulmonary lesion.

We have thus briefly discussed the means of dealing with the autotic ulcer both before and after perforation has taken place.

So far the chief causes of death in the cases which have perforated have been as follows:

1. Peritonitis which has set in before operation.
2. Shock of operation and prolonged anaesthesia.
3. Perforation of subphrenic abscess causing septicaemia and lung complications.
4. Second perforation which is rare. Mr. Pepper records a case of this. Where 3 days after the operation another ulcer appeared the patient...
ties of fatal peritonitis. At
this point, when the first was
found to be well entwined.

In conclusion, we would urge
that in all cases of gastric
ulcers after a fair time
has been given to medical
treatment, if this must be
continued for a considerable period,
if the symptoms do not abate
or if they recur within a
short time, some surgical
intervention should be
undertaken.

In those cases of urgent
haemorrhage or where
vomiting is persistent, the
abdomen should be opened
at a time most suitable
to the patient's condition,
if no evidence of an ulcer
can be seen upon the
external surface of the
stomach, little time should be lost in any further delay, but gastro-enterostomy should be performed preferably by the pyloroplasty method.

If, however, the condition of the patient at the time will allow the anterior wall of the stomach may be opened the ulcer sought for either canterized or excised. If the ulcer be found close to the pylorus there is considerable surrounding inflammation pyloroplasty may be attempted but so far statistics point to gastro-enterostomy as the operation for excellence.

On the other hand where a rupture has taken place it will be seen how great is the necessity for early diagnosis and prompt treatment. Concluding this point—
Barkley has collected some interesting statistics. In nine successful operations the average time which ended was 7½ hours, the longest being 18 hours & the shortest 3 hours. In 16 unsuccessful cases the average time intervening between performance of operation was 2½ hours, the shortest 4 & the longest 70 hours. Mr. Coffey lately collected the following statistics on this point — 7 English cases.

<table>
<thead>
<tr>
<th>Hours</th>
<th>Cases</th>
<th>Death</th>
<th>Incurable</th>
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<tbody>
<tr>
<td>Up to 72</td>
<td>42</td>
<td>10</td>
<td>24.0</td>
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<tr>
<td>12-24</td>
<td>16</td>
<td>12</td>
<td>75.0</td>
</tr>
<tr>
<td>Over 24</td>
<td>27</td>
<td>19</td>
<td>70.4</td>
</tr>
</tbody>
</table>

Thus it is evident that an important factor time is — unless the performer is able to keep in soon after the effect of the initial
shock are passing off, the mortality must remain high.

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J. Southwell Sandfor.

Wateringhurst,
Kent.
April 20th 1900.