urge the value of the "cardiac sign" in these cases, and of the necessity for the search for "occult blood," and for x-ray investigation.

Gastric or Duodenal Ulcer or their Sequels.—Apart from the uncommon cases in which cancer supervenes in ulcer, there is usually less difficulty here than with chronic gastritis; for cancer is rare at the earlier ages when ulcer is most common. The duration of ulcer is often much longer than that of cancer, and the symptoms tend to disappear and to recur. Pain in ulcer is usually more severe than in cancer, but less continuous, more aggravated by food, more relieved by vomiting. Appetite in ulcer generally remains good, although the patient may refrain from eating for fear of causing pain. Tenderness over the lesion is apt to be greater in ulcer, although it is a mistake to say (as has been said) that there is no tenderness over a cancer. Vomiting in ulcer is commoner and more regularly associated with meals; and haematemesis is more often profuse and occasional, with perhaps a history of similar haemorrhages some years before. The tumour of an old ulcer may increase the difficulty, and it is important to remember that, even at operation, the nature of the mass may only be determinable by microscopy of an excised portion. I remember a case of another inflammation (not irrelevant) of the pancreas where, at operation, an able surgeon thought we had made a mistake in diagnosis, so firm was the mass found and so extensive, but the microscope showed only chronic inflammation, and the recovery of the patient confirmed the microscopy. Except in late and long-lasting cases of ulcer the weakness and wasting are not comparable to those of cancer. Special difficulty arises in cases where cancer has supervened on ulcer, because then the test meal shows a normal or excessive proportion of free hydrochloric acid, as in ordinary ulcer. It should be borne in mind that duodenal cancer is very rare. In some of these cases the x rays render valuable service. Sometimes exploratory operation is indicated, even apart from the question of possible malignancy, as in hour-glass stomach, pyloric stenosis, etc.

Hepatic Cirrhosis.—It is sometimes difficult to distinguish the haematemesis of hepatic cirrhosis from that of gastric cancer, and where jaundice or ascites or both coexist the difficulty is increased. The history helps, when we can get it. The sallow facies of cirrhosis, with venous varicosities, are different from the anaemia and thinness of cancer. But there is often wasting in cirrhosis, and cirrhosis may exist without a characteristic facies. The spleen is often enlarged and can be felt in cirrhosis, whereas in cancer the spleen, unless it is involved in the growth (which is rare), cannot be felt. Haematemesis in cirrhosis is apt to be profuse and "coffee-ground," and to occur when there is no loss of flesh. The appearance of toxæmia, such as occurs in hepatic cirrhosis, may decide in favour of cirrhosis. "Hepatic deficiency tests" do not seem to be of much service at present.

Gastralgia.—This should only be diagnosed when organic disease has been most carefully excluded. I cannot recall a case in which it has caused difficulty, but it is mentioned by others, so I refer to it.

Some Other Tumours.

Cancer of the Colon.—History, symptoms, and x-ray examination should make the diagnosis plain. Also the direction of visible peristalsis, when present, should distinguish. I remember a case, seen many years ago, before the advent of the x rays, in which visible peristalsis from left to right led me to diagnose gastric cancer, but where the surgeon, summoned from a distance, operated for a colonic growth and found himself wrong.

Cancer of the Head of the Pancreas.—Here we have to guide us a fixed tumour (if it be palpable), rapid wasting, white stools without jaundice, or jaundice with enlargement of the gall-bladder, together with the diastase reaction, results of estimation of faecal fat and its character, the copious stools, and the microscopical finding in the motions of still striated muscle fibres. It would be also worth looking for possible sugar in the urine (unusual), and to use Cammidge's test and Loewi's test (adrenaline dropped into the eye).

Tumour of the Omentum.—A pyloric cancer may simulate this. As I have pointed out in another paper,⁵ the commonness of pyloric cancer as compared with the rarity of omental cancer will help us. But the x rays should be our best guide to a certain diagnosis. The same means of examination should distinguish pyloric cancer from the rather large list of tumours of other organs, which it may simulate in its surprising variety of location in the abdomen.

Simple Gastric Tumour.—When such is clinically discoverable exploratory incision will be necessary and will decide.

Hair-ball in the Stomach.—This is a possibility not to be forgotten in a hysterical person, and we should ask for a history of hair-swallowing.

Faeces in the Colon.—Faeces in the colon may closely simulate a gastric tumour. If the mass can be unmistakably indented with the finger (very rare) then the presence of faeces cannot be doubted, but it is well to remember in such a case that there may also be a growth in the colon causing the faecal obstruction. Generally we must rely on the use of aperients and enemata, together with the x rays, to arrive at our diagnosis.

Aneurysm.—Error is easier to make than one might imagine. Expansile pulsation, if found, is distinctive. The x rays may decide.

Gumma.—The main thing is to remember it. I have diagnosed such a tumour and watched it disappear under iodide and mercury.

IN CONCLUSION.

Four points must never be forgotten in dealing with a case of possible gastric cancer—namely:

1. "It is never justifiable to open the abdomen as the sole means of making a diagnosis" (Walton).⁶
2. It is never justifiable to refrain from advising laparotomy when there is reasonable hope of successful radical removal if the general health permits.
3. The diagnosis must be arrived at by a joint use of clinical, radiological, pathological, and, if necessary, surgical means. And the greatest of these are the clinical, because they are the earliest to suggest.
4. "Dyspepsia" is not a diagnosis.

REFERENCES.

- ¹ Notes on Cancer of the Stomach. *Lancet*, November 3rd, 1928, p. 917.
- ² The Factor of Fever in the Diagnosis of Cancer. *Lancet*, 1920, i, p. 1309.
- ³ Twenty-second Annual General Meeting of the Association of Physicians, *Quart. Journ. Med.*, October, 1928.
- ⁴ The Early Recognition and Treatment of Cancer of the Stomach. *British Medical Journal*, November 10th, 1928, p. 838.
- ⁵ The Factor of Commonness in the Diagnosis of Cancer. *British Medical Journal*, November 11th, 1911, p. 1284.
- ⁶ *The Surgical Dyspepsias*. London, 1923, p. 274.

THE SCOPE OF CAESAREAN SECTION.

AN ANALYSIS OF 295 CASES OF THE CLASSICAL OPERATION.*

BY

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The scope of Caesarean section is a subject of considerable importance; it is one which it might be probable to discuss, and about which there is some diversity of opinion.

We know that in a certain percentage of cases natural delivery resulting in the birth of a living child is an impossibility, and numerous expedients have been introduced to deal with such cases, none of them absolutely satisfactory or entirely free from danger. The induction of premature labour, prophylactic version, symphysiotomy and pubiotomy, high forceps delivery, all have or have had a vogue, and have been, in skilled hands, more or less successful. Each method, however, presents certain disadvantages. The induction of premature labour, if em-

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barked upon sufficiently early for a living child to come through a high degree of contracted pelvis, will probably result in the birth of an infant which is weakly and unlikely to survive. Prophylactic version is by no means universally successful, and symphysiotomy and pubiotomy are often maiming and dangerous to the mother from sepsis and from lack of union. A high forceps operation, except in very skilled hands, is an extremely dangerous operation for the mother and is often fatal to the infant. This leaves us with the alternative of craniotomy or Caesarean section. In craniotomy the sacrifice of the child is obligatory, and this is not only repugnant to most obstetricians, but is also an operation by no means devoid of danger to the mother when she is in a state of shock and collapse. It is often difficult and requires prolonged anaesthesia. Caesarean section is the alternative left to us, and we have to consider under what conditions it is a safe operation, and whether, in cases where it has hitherto been regarded as unjustifiable, any technique can be introduced which will give better results.

The first authentic Caesarean section was probably performed in 1610 by Trautmann of Wittenberg, but for nearly two hundred years the mortality was over 50 per cent., as no sutures were used in the uterus and the patients died from haemorrhage and sepsis. In 1876 Porro introduced the modification of amputating the body of the uterus and bringing the cervix into the lower angle of the abdominal wound. This operation was fairly successful, but was necessarily a destructive manoeuvre and necessitated a prolonged convalescence. It remained for Sanger in 1882 to introduce the employment of sutures for the uterine incision, which made a conservative operation possible. Sanger's operation—known as the classical one, and of which the technique has been very slightly modified since he introduced it—presented certain disadvantages in cases which had been exposed to infection, which had been long in labour, and where other methods of attempted delivery had been tried. Deaths from septicaemia were only too common.

As an improvement, in 1907 Frank introduced a new method—namely, the lower segment operation. A transverse incision was made through the lower abdominal wall and the peritoneum was separated from the bladder and from the lower uterine segment, which was then incised, the child delivered by forceps, the placenta removed, and the incision closed—the whole operation being extraperitoneal. Though the operation was enthusiastically received it was found that the peritoneum was often torn, and Krönig proposed a modification—namely, the transperitoneal. He opened the abdomen by a median incision and separated the peritoneum from the lower uterine segment, which was then opened by a median vertical incision. These operations have been done scarcely long enough to show whether they are really satisfactory. The proximity of the wound to the vagina is disadvantageous since infection is more likely to occur. The spread of infection in cellular tissues is difficult to control, and it remains to be seen whether the scar in the lower uterine segment will stand the strain of pregnancy or a possible subsequent labour better than one through the muscular tissue of the upper uterine segment.

Vogt has recorded a series of 76 cases of lower segment operation with only 2 maternal deaths, and Kustner 55 suspect cases with no maternal death. It must be borne in mind, however, that this operation is more difficult, and it is not yet clear whether there is more or less risk of rupture of the scar in a subsequent pregnancy.

There is no doubt that the classical operation is an easier one, and if it can be performed safely is the one which commends itself to the majority of operators. The advantages are its simplicity, the easy delivery of the child, and the lessened haemorrhage due to the retraction of the muscular wall of the upper segment.

Indications.

In the time of Sanger the only indications were a contracted pelvis of high degree or a tumour which made natural delivery an impossibility. In 1898 Lawson Tait suggested Caesarean section for the treatment of placenta

prævia—an innovation which was regarded almost with horror by the conservative obstetric physicians of his day. Since then the indications for Caesarean section have been gradually widening, until at the present time the borderline in contracted pelvis between vaginal delivery and abdominal section lies about a true conjugate of $3\frac{1}{4}$ inches.

Severe eclampsia, accidental haemorrhage, and other toxæmias, an impacted oblique lie, ventrofixation, a rigid or atresic cervix, a narrow vagina in an elderly primigravida, a breech presentation with extended legs in a primigravida, a large child, a brow presentation, a tight contraction ring, serious cardiac disease, pulmonary tuberculosis, or severe bronchitis in the mother—all these have become indications in varying degrees, together with other rarer and more unusual conditions. It became obvious that this extension of the scope of the operation presented grave dangers. The classical operation is an easy one and presents no surgical difficulties, and there is no doubt that it began to be employed occasionally in unsuitable cases. Not only is the operation dangerous unless performed with extreme care under proper conditions—for there is the immediate risk of sepsis in a suspect or potentially infected case—but also there is the ultimate risk of a weak uterine scar which may rupture in a subsequent pregnancy.

In 1911 Routh made an inquiry into the results of Caesarean section for contracted pelvis in patients operated on between the years 1891 and 1910. He found that although the mortality in clean cases was between 2 and 4 per cent., in the potentially infected it rose to between 10 and 35 per cent.—not much better than in 1882, when it was over 50 per cent. In 1921 a further series of 4,000 Caesarean sections was investigated by Munro Kerr and Eardley Holland, from hospital statistics in Great Britain and Ireland. Among 3,374 operations for contracted pelvis the mortality in early cases was found to be about 1.8 per cent.; but late in labour and after induction of labour and attempts at delivery it was between 10 and 26 per cent. It was clear that in the suspect case Caesarean section was unjustifiable unless the technique could be improved.

Certain obstetric surgeons have been able individually to present lists of consecutive clean cases with no death—namely, Bar 95 and Schauta 125; but Bar specifically stated that he had most carefully rejected any potentially infected cases, which were dealt with by craniotomy. In Schauta's list of 76 cases of craniotomy on living children the maternal mortality was 1.3 per cent.; in craniotomy on dead children there was a maternal mortality of 6 per cent.

The problem before us, therefore, is so to improve our technique that we can operate on the potentially infected case with a risk as low as, or lower than, with craniotomy. The chief danger to be avoided is the spread of sepsis, with death from general peritonitis, septicaemia, pulmonary embolism, or septic pneumonia; and it is necessary to think out measures by which we can increase the resisting power of the patient, limit the infection, and aid elimination of toxic products, while at the same time it is essential to obtain a firm uterine scar.

My own technique for suspect cases is one which I adopted after a large experience of the treatment of infected war wounds, where the infecting agents were similar to those attacking the placental site—namely, the haemolytic streptococcus, the *Bacillus coli*, the *Staphylococcus pyogenes aureus*, and, in rare instances, anaerobic organisms such as the *Bacillus aerogenes capsulatus*. I have found this technique successful, and believe that its adoption may help to improve matters very materially.

I propose to give, therefore, a brief account of 295 cases of Caesarean section which have been under my care in hospital and in private during the last nine years, and which have been operated upon either by me or by my assistant surgeon Miss Ruth Nicholson, to whom I am much indebted for her able co-operation and assistance. During this period no craniotomy has been performed when the foetal heart has been heard, and no selection of the cases has been made. A classical Caesarean section has been done in all cases, clean or suspect, even if the patient had been long in labour with ruptured membranes, or if repeated examinations had been made, induction of premature labour performed, or forceps delivery attempted.

Technique for Suspect Cases.

The patient is prepared for operation in the usual manner, but no attempt is made to sterilize the vagina. Open ether is employed as an anaesthetic. As rapidity of operation is imperative the classical operation has been invariably performed. The incision is made slightly to the right of the mid-line, and the right rectus muscle drawn outwards, so that it will overlap the peritoneal incision. When the abdomen is opened a large gauze dab is placed in the upper angle to protect the intestines. The obliquity of the uterus is corrected and the abdominal wall is pressed firmly against the uterus by the hands of an extra assistant, who helps to push out the uterus as the child is extracted, so that no contaminated liquor amnii enters the peritoneal cavity when the uterus is opened. Large gauze swabs are placed behind and round the uterus, and the placenta is delivered through the uterine wound, all adherent membrane in the lower uterine segment being removed by a swab wrung out of warm saline. The uterus is stimulated to contract and retract by the injection of 5 units of pituitrin and 1/100 grain of ergotin, administered when the uterine incision is made. If given too early the uterus contracts so firmly that accurate coaptation of the cut muscular surfaces is difficult. If there is excessive bleeding the uterus is massaged and compressed manually with swabs wrung out of hot saline. In making the incision care is taken to keep above the lower uterine segment, where the bleeding is difficult to control. The uterine incision is then closed by interrupted sutures, an ample bite of muscle being taken with a large curved needle, but the decidua is avoided, so that there is no obvious channel of communication between the infected uterine surface and the peritoneum. No. 3 Van Horn twenty-day chromicized catgut is employed for the interrupted sutures, and No. 2 for a continuous suture which brings into apposition the peritoneal and superficial muscular layer on each side of the incision, so that the knots of the interrupted sutures are completely buried and a smooth surface is left. The continuous suture is made firm by taking a back stitch at intervals so that no gaping openings are left. With repeated Caesarean sections this method entails the narrowing of the anterior uterine wall quite considerably. I have never done more than four on the same patient. The lower abdomen and uterus are swabbed over with warm saline and the omentum is drawn over the uterine incision. A large rubber drainage tube is placed in the cave of Retzius and fixed in the lower angle of the incision. The abdominal wound is closed by a peritoneal catgut suture and interrupted silkworm-gut to include skin and rectus sheath; 20 ounces of rectal saline are administered with the table in the Trendelenburg position, while 10 or 20 c.cm. of a reliable antistreptococcal serum are injected subcutaneously. Care is taken by compressing the uterus to expel clots per vaginam. The lower abdomen is very firmly bandaged. Specimens of urine, liquor amnii, and placenta or membranes are secured for immediate bacteriological investigation. The Fowler position is adopted. Ten ounces of rectal saline are given every four hours, and the early evacuation of flatus is secured by a turpentine enema on the following morning, and a daily injection of 5 units of pituitrin, which also promotes uterine contractions. Pain and sleeplessness are combated by morphine, and calomel and salts or castor oil are given early and freely, even to the production of diarrhoea and incontinence of faeces in very septic cases.

Where lacerations of the vagina, cervix, or perineum exist from ineffectual attempts at delivery exudation is promoted by a dressing of 10 per cent. hypertonic salt solution, to which is added an equal part of 1 in 80 carbolic acid. Should the case progress favourably, with normal pulse and temperature, absence of vomiting and distension, the drainage tube is removed in forty-eight hours, by which time a large amount of exudate will have drained away. As soon as bacteriological reports are received the appropriate serum, if available, is given or repeated.

The technique for clean cases is very similar, but the drainage tube and serum administration are omitted.

For purposes of analysis I have placed my cases in groups, as shown in the accompanying table:

GROUP.	Total.	Puerperium.		Maternal Mortality.	Fœtal Mortality.
		Afebrile.	Febrile.		
I. Contracted pelvis	228				
A. Before or early in labour	133	113	25	0	3 Syphilis 1. Spina bifida 1. Prematurity 1.
B. Late in labour—after 12 hours and including cases of obstructed labour	59	29	30	0	6 Spina bifida 2. Asphyxia 1. Jaundice 1. Pempbigus 1. Septicaemia 1.
C. After instrumental induction of premature labour by bougies, balloon, or stomach tube	24	16	8	0	0
D. After attempts at forceps delivery	7	3	4	1	2
II. (a) Eclampsia and other toxæmias*	11	7	3	1	5
(b) Accidental hæmorrhage (concealed)	4	0	3	1	4
III. Placenta prævia	22	16	6	0	2
IV. Other conditions causing obstructed labour:					
(a) Fibroid tumours	3	3	0	0	1
(b) Ovarian cysts	2	2	0	0	0
(c) Ventral fixation	1	1	0	0	0
(d) Rigid os, atresia of the cervix	8	7	1	0	0
(e) Excessive size of foetus ...	4	2	2	0	0
(f) Malpresentation	4	2	2	0	0
V. Grave diseases affecting the mother:					
(a) Cardiac... ..	7	5	2	1	2
(b) Pulmonary (chronic bronchitis)	1	1	0	0	0

* These included pre-eclamptic conditions, pernicious vomiting, severe albuminuria, and uræmia.

I. Contracted Pelvis.

There were 228 cases in this group; they were divided into four subgroups as shown in the table. A typical infected case is the following.

A primigravida, aged 41, with flat pelvis and diagonal conjugate of 4 inches, was admitted with membranes ruptured seventy-two hours, and meconium-stained offensive liquor. The cervix admitted three fingers. The greater part of the head was still above the brim. Fœtal heart 160. The patient was yellow; pulse 104, temperature 100° F. By Caesarean section a white and limp infant of 6 lb. 4 oz. was extracted with a pressure sore over the left parietal bone. It responded to measures of resuscitation. The wound was drained, 20 c.cm. of antistreptococcal serum were given in a continuous saline subcutaneously, a pack soaked in hypertonic salt and 1 in 80 carbolic was placed in the vagina, and ergotin and pituitrin were administered. The patient vomited a brownish material almost continuously. Her pulse was rapid and temperature subnormal. She was freely purged with calomel and salts, the stomach was washed out and a high rectal wash-out given. In spite of some temporary incontinence of faeces the patient made a good recovery. From wound and vagina streptococci were grown freely.

In only one case of obstructed labour did a fatal result occur. The patient was in an exhausted condition after two separate attempts at forceps delivery, and death was due to septicaemia on the eighth day from a *Staphylococcus aureus* infection. The organism was recovered from the blood. The patient had refused a pelvic examination at an ante-natal clinic.

II. (a) Eclampsia and Other Toxæmias.

Caesarean section was only performed in special cases where other measures had failed.

Case of Eclampsia.—A 2-gravida, aged 27, was admitted with a history of scarlet fever when a child, influenza during pregnancy, and of recent headaches, oedema, and blurring of vision.

She was twenty-eight weeks pregnant and had had three fits before admission. Blood pressure 160/110. The urine was solid with albumin. In spite of morphine 1/4 grain and high colonic lavage, ten further fits took place in rapid succession. Pulse and temperature began to rise, and as there was no dilatation Caesarean section was performed. The child was stillborn. The placenta was small and full of infarcts, both kidneys were enlarged, and the intestines were collapsed. While in the Trendelenburg position 30 oz. of rectal saline were given, and the stomach was washed out on the table. After operation ten further fits occurred; temperature 104° F., pulse 130. There was some right-sided clonic spasm. The urine contained casts, red blood cells, but no pus, and the eyes showed albuminuric retinitis and flame-shaped haemorrhages. The last fit took place on the following morning, and the patient gradually improved and was discharged in good condition.

The one maternal death in this group occurred in a patient who had had no ante-natal care and was sent in comatose after ten eclamptic fits. She did not recover consciousness. No *post-mortem* examination was allowed, but a cerebral haemorrhage was suspected. The child was alive when the operation was started.

Case of Pernicious Vomiting.—Mrs. S. had vomited during the whole course of her first pregnancy. She was jaundiced and began to vomit coffee-ground material. Labour was induced and a living child was delivered with difficulty, as the pelvis was extremely small. Her urine contained coliform organisms, and the child died on the fourth day from meningitis. *Post mortem* there was no sign of injury to the head.

This patient again became pregnant in 1925, and was quite well for the first three months. She then began to vomit almost continuously, was very constipated, and was admitted to hospital. In spite of the usual treatment the vomiting continued. Her temperature was 99.8°, and pulse rate 110. The vomiting became haemorrhagic, the patient was comatose, the pulse poor, and the urine contained acetone and diacetic acid, a trace of albumin, and coliform organisms. Her condition was so serious that I performed Caesarean section, although the patient was only about twenty-six weeks pregnant. On opening the abdomen the intestines were found to be collapsed and sticky. A foetus of 3 lb. was removed from the uterus, which was dark in colour. The uterus contracted up, but did not bleed. Saline 20 oz. was given subcutaneously during the operation, and a large rectal saline while the patient was in the Trendelenburg position. The pulse improved and vomiting ceased very soon. The patient did well.

II. (b) *Accidental Haemorrhage (concealed).*

Caesarean section was only chosen in these cases when eliminative measures had failed and there was no dilatation of the cervix. Pituitrin was administered freely to aid uterine contractions and no hysterectomy was done. The following was the only fatal case.

A 7-gravida was quite well until 3 a.m. on March 31st, 1927, when she woke up complaining of abdominal pain. Nurse and doctor were called and morphine was administered. She complained of severe pain and nausea, but did not vomit. Varicose ulcers were present on the right leg. On admission at 5 p.m. the same day the patient presented a toxic appearance and was quite unconscious; the pulse rate was 140, the temperature 96°, and the breathing stertorous. The uterus was hard; no foetal heart could be heard. The urine was solid with albumin. There was dilatation of the os admitting three fingers.

A subcutaneous saline was given and Caesarean section performed at 6 p.m. The uterus was discoloured a mauve-green. Blood-stained fluid was found in the peritoneal cavity and subperitoneal haemorrhages were present. A stillborn male child weighing 6 lb. 10 oz. was delivered. Three pounds of retro-placental clot had separated the placenta. The uterus contracted feebly and death took place almost immediately after the close of the operation. The liver, kidneys, and uterine muscle showed thrombi, coagulation necrosis, and haemorrhages. A right iliac gland corresponding to the ulcerated leg was double the normal size and showed an increased number of lymphocytes. Bacteriologically the urine contained a mixed growth of *Staphylococcus albus* and streptococci, the varicose ulcer *Staphylococcus albus*, and the placenta non-haemolytic streptococci and *Staphylococcus albus*.

III. *Placenta Praevia.*

Caesarean section for placenta praevia has only been undertaken in cases where the placenta was central or overlapping, and where the soft parts were rigid. In practically every case vaginal examinations had been made before admission, and one or more severe haemorrhages had taken place. The same technique was adopted as in suspect cases of contracted pelvis. Special care was taken to secure good uterine retraction, as there is always a risk of post-partum haemorrhage, especially a trickling from the cervix. This was not noticeable in any of my cases. Of the two foetal deaths in this group, one was due to prematurity and the other to repeated haemorrhages.

IV. *Other Conditions Causing Obstructed Labour.*

(a) *Fibroids.*—There were three cases in this subgroup. Panhysterectomy was performed in all cases, but in one, as the conditions were unfavourable, hysterectomy was deferred for three weeks; the puerperium was, however, afebrile. The tumours were large in all cases and had undergone necrobiotic changes. In one case where the infant was stillborn, the placenta was situated over a tumour, and the child was obviously very badly nourished. In two of the cases the patients were elderly primigravidae, in the third no child had been borne for nineteen years.

(b) *Ovarian Cysts.*—In both of the cases in this subgroup the tumours were non-malignant, and one completely blocked and filled the pelvis.

(c) *Ventral Fixation.*—In only one case was Caesarean section necessary for a ventral fixation. It was associated with a slightly contracted pelvis, and a craniotomy had been done previously on a dead child for obstructed labour. The uterus was very firmly fixed anteriorly, the posterior wall was sacculated, and the uterus moved up very considerably when the band was divided.

(d) *Rigid Os, Atresia of the Cervix (8 cases).*—Into this group fall two interesting cases. In one there was almost complete atresia, with a pinhole aperture in scar tissue from which liquor amnii trickled. There was a history of a previous prolonged difficult labour associated with acute gonorrhoeal sepsis. In the other the atresia was complete. There had been one forceps delivery, and the patient was admitted after sixty hours of unavailing pains in an extremely exhausted condition. She was cyanosed, and the pulse was weak and irregular. No aperture could be found, and the liquor was plentiful and clear.

In another case there was uterine inertia from great distension by twins. The cervix was not dilated, and foul liquor came away. Two living children, who survived, were delivered by section, and the patient did well after a febrile puerperium due to a *B. coli* infection, which was treated by some potent anti-coliform serum from the laboratory of Dr. Weinberg at the Pasteur Institute.

In four cases of elderly primigravidae the operation was performed for a rigid os, associated in one with a breech presentation, in another for uterine inertia from small fibroids, and in two for occipito-posterior positions.

(e) *Excessive Size of Foetus.*—In three of the four cases in this subgroup the operation was performed for obstructed labour. One case was of special interest. The mother had been previously admitted to hospital for obstructed labour due to a double-headed monster—a case of dicephalus dibrachius dipus—which presented as a breech. The second child, though excessively large (11 lb. 8 oz.), was apparently normal.

(f) *Malpresentation.*—There were four cases in this subgroup: two brow presentations, one face mento-posterior, and one impacted shoulder. The case of impacted shoulder presentation occurred in a multigravida who had had several normal and forceps deliveries. It was a case of flat pelvis. She had not attended an ante-natal clinic for a month, and was admitted fully dilated, having strong uterine contractions. Foul liquor amnii was coming away, and there was a marked Bandl's ring. A child weighing 5 lb. 10 oz. was delivered alive, and though it was in a condition of blue asphyxia, revived; 20 c.cm. of anti-streptococcal serum and drainage were employed, and the puerperium was afebrile. The patient admitted later that she had examined herself, felt the hand, and thought something was wrong. She made an excellent recovery, and the child survived.

V. *Grave Diseases Affecting the Mother.*

(a) *Cardiac.*—In these seven severe cases of morbus cordis Caesarean section was undertaken as being the easiest method of delivery. All the patients did well but one, where death from a streptococcal pelvic abscess and broncho-pneumonia took place a month later. Sterilization had been attempted by ligature and section of the tubes, and it was probable that infection started from the cut tube. Unfortunately no drainage and no antistreptococcal serum had been given, as the case was regarded as a clean one, although she had had several previous forceps deliveries.

(b) *Pulmonary (Chronic Bronchitis).*—The patient was suffering from very severe bronchitis and dilated heart. She could not move in bed without distress, and was extremely cyanosed. She was given open ether as an anaesthetic, and did well.

RESULTS.

(a) *Immediate.*—The maternal mortality, taking all 295 cases together, is 1.3 per cent., a mortality exactly the same as in Schauta's series of craniotomy on 76 living children; and slightly lower than the 1921 report (Eardley Holland) operation death rate for clean Caesarean section—namely, 1.6 per cent. The foetal and neo-natal mortality is 8.5 per cent., which includes all cases of toxæmia, accidental haemorrhage, and placenta prævia. The longest series of consecutive cases without a death is 157—namely, from Case 14 to Case 171, during a period of rather more than four years. It is noteworthy that many of the operations were performed in an extremely out-of-date and ill-equipped maternity hospital, and that no patient who had received a prophylactic dose of antistreptococcal serum died of streptococcal septicaemia. I think the serum helps to tide the patient over the first few days of the puerperium, when her resisting power is at a low ebb and her immunity in a negative phase. To be really useful it must be given at the earliest possible moment, and I usually give it during the operation. The one fatal case in a contracted pelvis after attempted forceps delivery was due to infection with *Staphylococcus pyogenes aureus*, a very dangerous organism extremely difficult to combat.

(b) *Ultimate.*—I have made many inquiries with regard to the after-history of these cases, and have investigated the uterine scar in about 66 repeat cases. In none which have been treated after the method I have indicated have I found any weakness. Often the scar is imperceptible. I see no reason to discard catgut, which I have found quite reliable. In one case, where the operation had been performed for uraemic convulsions, the patient died subsequently with a ruptured uterus; but in this case, owing to a mistake, a bougie induction had unfortunately been performed. A certain number of cases have since passed through a normal labour or forceps delivery safely. Intestinal adhesions do not appear to have given rise to much trouble, but I have myself operated on one case of intestinal obstruction following a suspect Caesarean section after attempted forceps delivery. If the drainage tube is removed early there does not appear to be an excessive risk of hernia.

In conclusion, I think that these statistics show that craniotomy on the living child is an indefensible operation, as a Caesarean section on the above lines involves no extra risk to the mother and gives the expectation of a living child. For central placenta prævia the results for mother and child are so good that it would be well if cases of antepartum haemorrhage were sent into institutions where surgical measures could be undertaken satisfactorily at the earliest possible moment.

My best thanks are due to my house-surgeons and ward-sisters, whose help in the care of these patients has been invaluable, and to Dr. Hilda Cantrell, who has investigated the records.

SARCOMA OF THE SMALL INTESTINE.

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SARCOMA of the small intestine is, of course, a rarity and a clinical curiosity. The object of this paper is to give a brief outline of the subject and to place three cases on record. The literature is very extensive; it is also very dull, being made up of about 200 cases in all. These mostly appear as one-case records, and the notes have a monotonous similarity without broad generalizations. There is a very large transatlantic literature.

Among the very scanty facts which emerge as to the etiology we note a single recorded case in which trauma appeared to be the actual excitant. In another case the disease was found at the site of a tuberculous lesion. In a third case the immediate antecedent to the disease was typhoid fever. Males are affected twice as frequently as females, and the heaviest incidence of the disease falls in early adult life. There are, however, cases on record in every decade of life up to the ninth. The sarcomatous tumour is found most frequently about midway along the small intestine. Either way from this point its incidence lessens. Histologically round-celled sarcoma, lympho-sarcoma, and spindle-celled sarcoma occur with about equal frequency, but there is an example of almost every sort of sarcoma on record. The tendency to glandular invasion and metastatic dissemination is slight. The prognosis does not seem to vary much with either the site or the histology, but it does vary according to the gross morbid anatomy. The morbid anatomy admits of clear classification, thus:

1. The tumour may be a small polypoid mass projecting into the lumen of the gut.
2. There may be an extensive tubular or cuff-like infiltration of the bowel wall.
3. A growth may dangle as a pedunculated mass from the peritoneal surface of the gut.

The symptomatology likewise varies according to the morbid anatomy, but before proceeding to a description

of this certain symptoms common to all three types must be enumerated. These common symptoms are:

- (a) Precocious cachexia.
- (b) Heavy toxic and septic absorption with associated anaemia and fever. The fever would seem to be especially noteworthy in children, and the diagnostic difficulties are increased thereby.
- (c) Alternating constipation and diarrhoea, with malaena often. Vague abdominal discomfort and colic.

THE THREE CLINICAL TYPES OF THE DISEASE.

1. *The Sarcoma may Project into the Lumen of the Gut as a Small Polypoid Mass.*

This type would seem to be the most common, and also the one in which the prognosis is least grave. A minute account of such a case was given by Maxwell Telling in which a child of 3½ years complained of symptoms progressively increasing in severity and incidence over several months. The signs and symptoms closely resembled chronic intussusception, but not entirely. At operation a knuckle of small intestine containing an oval button-like mass encroaching into the lumen of the gut was removed. The little mass was found to be a spindle-celled sarcoma. Eight years later the patient was alive and well.

Almost invariably, however, in this type the illness passes through a phase lasting several months in which the general symptoms of cachexia, colic, and fever persist and progress, with a culmination in acute intestinal obstruction due to the polypoid mass precipitating an intussusception.

2. *The Growth may take the Form of a Tubular or Cuff-like Infiltration of the Bowel Wall.*

Here again the general symptoms persist and progress for weeks or months. An acute stage may be reached in several ways. Most commonly an abdominal tumour is discovered; this is taken to be an appendix abscess, or a twisted ovarian cyst, or a hydronephrosis, or a gastric carcinoma. Less commonly subacute intestinal obstruction, erroneously ascribed to a colon growth, takes place. Least commonly a general peritonitis is caused either by necrotic changes in the cuff-like mass or by actual perforation.

3. *The Growth may dangle as a Pedunculated Mass from the Peritoneal Surface of the Gut.*

This is the rarest type and the most grave. As in Type 2, the general symptoms progress till an acute illness