employing the electric cautery knife for complete resection. He pointed out that in operating on cancer it had to be kept in mind that it was a chemical condition which stimulated cell life, and was not necessarily a bacterial stimulation, and these derangements of cell growth were due to alterations in the chemistry of the life of the cell.

Sir HAMILTON BALLANCE (Norwich) was strongly of opinion that a local excision of the rectum could not be considered satisfactory without removal of the whole rectal apparatus. He always performed inguinal colostomy. Patients would have to submit to an artificial anus in the inguinal region; it was the price they had to pay for their disease and its successful removal. A person with inguinal colostomy was not necessarily one who suffered any very great discomfort.

REPLIES.

Mr. GREY TURNER, in replying to the discussion, said that he had never expressed a hope that any manipulations would enable them to save the sphincter, unless the cases were sent at an earlier stage than formerly. He had hopes that if surgeons got cases in the earliest stage they would be able to carry out operations which would preserve the sphincter. Complete local removal of cancer of the rectum was of extreme importance; he found that in following the guidance of Mr. Ernest Miles in doing the combined abdomino-perineal operation so much time was spent in the abdominal part of the operation that the perineal or sacral part of the operation was apt to be scamped. He regarded the local removal as that part of the operation which was of more importance than that which dealt with a probable cancerous invasion in the upper glandular zone.

Mr. ERNEST MILES said that there were still two schools—one claiming the abdomino-perineal method, and the other adhering to the lower route. There was no question about the great necessity for complete and thorough local removal. He would like to go a step further. For fourteen years he had practised thorough removal, leaving nothing but the bones and the bladder, and still recurrences happened, and these recurrences happened in a region absolutely out of reach by operation from the perineal route. The radical operation included the upward zone or spread, and, in his view, the clearing out of that area was just as important as clearing out the axilla in cancer of the breast. His original mortality was due to (1) sepsis, and (2) faulty anaesthesia; by sepsis he meant not only contamination of the peritoneum, but also sepsis taking place in the interior of the large intestine. Before the radical operation was performed, drainage of the bowel should be established for some weeks by means of a temporary caecostomy. By that procedure the bowel was drained, and there was not the same danger of septic absorption which was a fruitful cause of death. As regards anaesthesia, many cases succumbed to chloroform poisoning, and he had adopted spinal anaesthesia with gas and oxygen. He looked to the time when the mortality would be materially reduced—say, to the same level as that which prevailed in hysterectomy.

Closing Remarks by the President.

Sir GEORGE MAKINS, President of the Section, in bringing the business of the Section to a close, congratulated the members on a very excellent meeting. He could not recall any occasion in past meetings of this Section in which there were more excellent speeches or more excellent material produced, so that the interest and attention of the audiences were never allowed to flag for a moment. He thought that the Section could not have been better served than it had been by their colleagues. With regard to the policy of those responsible for the meeting, he thought they had to express very great satisfaction that the Section was not confined actually to the usual limits of general surgery, but was permitted to have the benefit of papers by Mr. Kidd, Mr. Tilley, and Lieut.-Colonel Elliot, whose papers, while in a manner belonging to limited sections of surgery, really belong to the whole science of surgery. He thought that great advantage would follow from this policy and from the

opportunity they had had of hearing men with special knowledge on these subjects. He thought that the introduction of these specialties was a good thing in another way, as it brought them before a larger audience. There was only one disadvantage in bringing those special subjects before the Section of General Surgery, and that was, that to the experts they appeared to be so very easy that the general surgeon might be tempted to think that they really were as easy as they appeared.

OXYGEN INFLATION OF THE PERITONEAL CAVITY FOR RADIOGRAPHIC PURPOSES.

(With Special Plate.)

BY

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THE method of distending the peritoneal cavity by oxygen gas, which was introduced by Weber in Germany, followed by Rautenberg and Goetze in Germany, Stewart and Stein in America, and Alessandrini in Italy, has proved to be of great value in exact clinical diagnosis.

By allowing the separation of the liver and spleen from the diaphragm, it has enabled the outlines of these organs to be seen clearly for the first time. By compressing and displacing the empty intestines it enables the other solid viscera and abdominal tumours to be examined.

Method.

The procedure I have adopted is as follows:

1. *Preparation.*—In order that the intestinal tract shall be empty the preparation of the patient is begun forty-eight hours before the examination. Castor oil is given on two successive evenings, followed on the first occasion by an enema next morning. On the day of the examination no solid food is taken and no enema given. An hour before $\frac{1}{2}$ to $\frac{1}{4}$ grain of morphine is injected.

2. *Inflation of Peritoneum.*—A point about 1 in. below and to the left of the umbilicus is chosen, and with a very fine needle a track down to the peritoneum is anaesthetized with 1 per cent. novocain. Along this track an ordinary lumbar puncture needle is inserted. It is quite easy to identify the anterior and posterior layers of the rectus sheath with the point of the needle, and when the posterior layer is felt the needle is slowly pushed on about $\frac{1}{2}$ in. and inflation is begun. Messrs. Coxeter and Co. have made for me an inflation set, which consists of an oxygen cylinder, a $1\frac{1}{2}$ gallon rubber bag enclosed in a net with vulcanite taps at each end, an apparatus for warming the gas by means of an electric lamp, a glass tube with a bulb for sterile cotton-wool to filter out bacteria, and a connexion which plugs into a lumbar puncture needle. The part from the glass tube to the needle can be boiled. The bag

is first filled with oxygen and the connexion is plugged into the needle, which has been introduced into the peritoneal cavity. Slight pressure on the bag now causes the gas to distend the peritoneum. The pressure is continued until the abdomen is markedly distended, when the needle is withdrawn. It is not necessary to measure the amount introduced, but an average adult does not require more than 3 to 4 litres—that is, about half a bagful. The amount varies with the laxity of the abdominal wall. The liver dullness, as determined by percussion, disappears when the first 300 to 500 c.cm. have entered.

3. *Deflation.*—After the x-ray examination is over the patient is rendered comfortable by again inserting the needle through the anaesthetic track and allowing the gas to escape. Slight pressure of the hands on the abdominal wall facilitates this. The gas cannot all be expressed, and the liver dullness does not return for twenty-four hours.

If the gas is not removed it is slowly absorbed, the process not being completed for five to six days as a rule.

Dangers and Discomfort.

Dangers.—The objections to the method are largely theoretical, and no ill consequences have occurred in the fifty cases I have inflated, nor in any of the many cases of which published records exist. The dangers which may be anticipated are:

1. *Puncture of the Intestine.*—In practice it is found that live gut always gets out of the way, though it is easy to puncture the intestine in a cadaver.
2. *Puncture of veins in the omentum or mesentery with consequent gas embolism or bleeding.* This has not occurred.
3. *Infection of Peritoneum.*—It is unlikely that mere puncture of gut by a fine needle would lead to infection and the carrying in of a punched-out piece of skin is avoided by the use of a sharp needle with an obturator.

Discomfort.—About half the patients complain of no discomfort. Pain in the right shoulder, due to the falling down of the liver and drag on the diaphragm, is often felt. It can be minimized by keeping the patient recumbent, and is at once relieved by lowering the head and raising the pelvis. In only two of my patients has it been at all severe. The removal of the gas at the end of the examination is important, as it at once relieves the pain in the shoulder and any discomfort from distension. Several private patients have returned home by train immediately after deflation, and have stated that they were quite comfortable.

The site of injection has been chosen with some care, though in cases with abdominal adhesions it may have to be varied. By puncturing through the rectus muscle one is enabled to determine the proximity of the peritoneum by feeling the posterior layer of the rectus sheath. By choosing a spot below and to the left of the umbilicus the omentum may be avoided.

Positions for Radiography.

For various organs different positions must be adopted. The ones which have given most information are as follows:

1. Patient supine: (a) Rays from below; (b) rays from the side.
2. Patient prone: Rays from below.
This is the most generally useful position for the solid organs and gives a wonderful view with the screen.
3. Patient upright: Rays from behind.
This position is rarely necessary and is very uncomfortable. It may be used to demonstrate visceroptosis.
4. Patient lying on side: (a) Rays from below; (b) rays from the side.
5. Trendelenburg position. Prone or supine. (For the pelvic organs.)
6. Occasionally other positions—for example, semi-lateral or knee-elbow—may be necessary.

Results.

The spleen is readily seen and its size and contour demonstrated. The liver is also easily examined in various profiles and its ligaments become visible. The gall bladder, if enlarged, is seen and calculi are readily shown if opaque. If translucent calculi are present, they are seen as translucent areas within the gall bladder shadow, as they are more translucent than the mucus or bile they displace. The kidneys are seen in their whole extent, though they appear a vertebra lower than normally. The situation of calculi within the organ is clearly made out. Intra-abdominal tumours can be clearly made out and their attachments defined. The female pelvic organs are visible, though at present it is difficult to distinguish between a solid ovarian tumour and a uterine fibroid. Abdominal adhesions are often clearly shown. Tumours of the stomach, colon, and urinary bladder may be demonstrated by combining this method with inflation of the cavity of the organ concerned. The lumbar vertebrae are more distinctly shown than by the ordinary methods and a psoas abscess shows very clearly.

It has been suggested that the diagnosis between sub-phrenic abscess and empyema could be readily cleared up by obtaining the separation of the liver from the diaphragm, and that possibly obscure hernias such as obturator hernia could be accurately diagnosed.

The technical details of the radiography will be dealt with by the radiographers. The accompanying plates were taken by Drs. N. S. Finzi, Dudley Stone, Martin Berry, and H. T. George. I am indebted to my colleagues

at St. Bartholomew's Hospital for the opportunity to inflate many interesting cases.

ABRIDGED BIBLIOGRAPHY.

- Weber, E.: *Fortschritte a. d. Gebiete der Röntgenstrahlen*, 1913, vol. xx, p. 453.
 Rautenberg, E.: *Deut. med. Woch.*, 1914, No. 24, p. 1205.
 Goetze, C.: *Muench. med. Woch.*, 1918, No. 46, p. 1275.
 Stein, A., and Stewart, W. H.: *Ann. of Surg.*, 1919, July, p. 55.
 Alessandrini, P.: *Il Policlinico*, 1919, p. 641.
 Faschunbauer, H., and Eisler, F.: *Wien. klin. Woch.*, 1920, No. 39, p. 853.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

A CASE OF ENCEPHALITIS LETHARGICA.

SINCE this disease is likely to become more prevalent, I think it is desirable that notes of cases should be carefully taken and recorded, with a view to analysis for diagnostic purposes. In my notes of the following case I regret the absence of the results of lumbar puncture, and of blood examination. In other recorded cases, however, these examinations have not disclosed much that is important. The urine showed nothing unusual.

A muscular man, aged 49, of good health and habits, saw double on May 11th. He consulted me on May 12th solely on account of this symptom. Otherwise he felt quite well. Examination showed binocular diplopia on looking downwards. Pupil reflexes, the extrinsic ocular muscles, and patellar reflexes, were normal. A report from an eye hospital on May 13th stated that there was "paresis of the superior oblique."

I was informed on May 14th that he was not so well, and was weak, very silent, and somewhat changed in manner and appearance. I visited him on May 15th and insisted on his going to bed. Temperature: Morning, 102.4°; evening, 101.4°. Pulse: Morning, 120; evening, 98. Respirations: Morning, 20; evening, 26. Binocular diplopia present; ptosis left eyelid; sweating very general; flexibilitas cerea; Kernig and Babinski signs positive. Ocular conjunctiva congested; pupillary reactions to light and accommodation positive but sluggish. Mask-like face.

May 16th: General condition as on preceding day. Drowsy, but easily aroused. The following day a high enema was found necessary; still drowsy. On May 18th he was perspiring freely; tache cérébrale present; disappearance of diplopia.

May 19th: Tache cérébrale. Intellect clear; can recall with unexpected accuracy, having regard to his stuporous appearance, the date and circumstances of his first feeling ill. He can close his eyelids, but cannot open them. If I initiate the act for him by gently lifting the lids, he can complete the opening; this I repeatedly confirmed.

May 20th: Enema given for constipation; general symptoms as on the previous day, but more lethargic. Sweating of face (especially over chin) and of hands. General wasting of whole body and also of face. Digital pressure over the intercostal spaces in mid-axillary line, both sides, elicits pain. Similarly there is tenderness to digital pressure over the lateral branches of the posterior rami of the thoracic nerves, at a short distance from the vertebral spines.

May 21st: Sweating general, especially profuse over beard area. The next day ptosis of left eyelid more noticeable; no nystagmus, rotatory muscles of eyes acting normally.

May 23rd: Sweating freely, great wasting. No longer ptosis of left lid. Tongue, which hitherto was very dry and not easy to see (owing to inability to open the mouth satisfactorily), moister and better projected. Sweating on the chin area greater than on any other part of the face.

May 24th: Sweating freely. Incontinence of urine. Slight ptosis of right lid; lagophthalmos.

The following day the bowels, hitherto much confined, moved naturally. Opening and closing of eyelids is under voluntary control. Since May 19th he has been unable to open his eyelids without my initiating the action for him.

May 26th: Bowels moved naturally. Slight ptosis of right eyelid, as yesterday; recession of right eye. Opening and closing of lids under voluntary control. Pulse very weak. For the first time since illness cough is present. On examination of the lungs, hitherto repeatedly negative, there is dullness and bronchophony at right vertebral border and left base. Patellar, epigastric, cremasteric reflexes, hitherto present, now abolished. Babinski's sign negative; Kernig's sign present, as hitherto. Notable epigastric distension; great prostration, wasting, and sweating. Tache cérébrale, present since the eighth day (May 18th), is now faint, and comes and goes slowly. Sweating over beard area not so marked. Buttocks very red. Complaints of pain in left wrist—no signs. First interosseal and thenar eminences much wasted on both sides. Voice very low and indistinct. Pupils "half-way"; light reflex abolished; slight twitching at angles of mouth. Intellect clear; he made all arrangements for his funeral. Had a "bad turn" at midnight, no convulsion. Death in state of coma on May 27th (the seventeenth day). Temperature before death 106°. The temperature from May 15th onwards had varied between 100° and 103°, and had been almost invariably higher in the morning than in the evening.

FIG. 1.—Same case as Fig. 2, taken without oxygen inflation. Lower parts of kidneys seen indistinctly. Gall bladder not seen.

FIG. 2.—Same case as Fig. 1, taken after oxygen inflation. Liver, spleen, both kidneys, descending colon, and large distended gall bladder visible.

FIG. 3 shows an enlarged spleen with a nodular outgrowth secondary to intrathoracic sarcoma. Another secondary growth is seen in the diaphragm above the spleen.

FIG. 4.—A tuberculous mesenteric cyst in a child of 3. Calcareous patches are present in the cyst wall. The anterior abdominal wall is well separated and no adhesions are visible.

FIG. 5 shows a prolapsed right kidney. The left kidney is normal in position. The stomach contains barium.

FIG. 6.—Pelvis showing the uterus pushed to the left by a solid tumour of the right ovary.