blood was transfused. Following this he showed improvement, and for the next week his progress was fair, but he seemed to have lost heart, and it was thought that a second transfusion would give him the desired stimulus. On December 28th (red blood cells 2,320,000, haemoglobin 60 per cent.) 450 c.cm. of whole blood was transfused with the two-way stopcock from a second donor. More than this quantity was not used, as towards the end of the procedure the patient complained of general discomfort, and within ten minutes after the operation the pulse became weak and rapid, respirations shallow and hurried, and he was only partly conscious. Stimulants were administered, and four hours later he was sitting up in bed smoking a cigarette. The following day intense jaundice was present, and he had passed a small quantity of very dark red urine. The pulse was weaker and there had been considerable bloody oozing from the stump. Twenty-four hours after this (the second) transfusion he became unconscious and died. At autopsy only a few petechiae were found beneath the serous coat of the small intestine, the liver was fatty, the kidneys and spleen dark red. No sign of pulmonary embolus or infarct could be found. Death was due, apparently, to acute haemolysis.

CASE IV.—Rfm. M., under the care of Major T. R. Elliott, R.A.M.C., who was kind enough to furnish me with progress notes, sustained multiple shrapnel wounds on December 14th, 1915. Three days later he was admitted to base hospital in very bad condition, with septic wounds of the left knee, right ankle, and left lung. On the twelfth day after the injury trismus appeared simultaneously with the expectoration of gangrenous pus from the lungs. Tetanus developed rapidly on the next day, causing rigid trismus and board-like abdomen, but no spasms nor difficulty of respiration. The condition of the patient was very pitiable, since he could not void from his mouth the fetid material that continued to come up from the lung abscess on the left side. Antitetanus serum was given until January 6th (a total of about 60,000 units). On the twenty-seventh day after the injury secondary haemorrhage occurred twice from the septic wound of the left knee. The vessel was ligatured. The blood lost was estimated as being rather less than a quart; the patient was much blanched. For the next week the general condition became worse, and there were signs of consolidation at the base of the left chest. No pus was found on exploration. On January 17th, before transfusion, the red blood cells were 2,832,000, and haemoglobin 45 per cent. By syringe-cannula method 860 c.cm. of blood was transfused; a rigor followed at once, and lasted fifteen minutes. On January 18th the red blood cells were 4,600,000, and haemoglobin 60 per cent. Following this the condition improved, and on February 1st a small localized empyema was opened, and the right ankle thoroughly cleaned and drained. By February 16th the patient was rapidly convalescing; the sputum ceased to be fetid soon after the abscess was drained. He was evacuated to England on this date.

REFERENCES.

- ¹ H. S. Satterlee and R. S. Hooker, *Surg., Gynec. and Obstet.*, 1914, xix, p. 235. ² Edward Lindeman, *Amer. Journ. Dis. Child.*, July, 1913, p. 28. ³ P. Rous and J. R. Turner, *Journ. Amer. Med. Assoc.*, June 12th, 1915, p. 1980. ⁴ H. S. Satterlee and R. S. Hooker, *Journ. Amer. Med. Assoc.*, February 26th, 1916, p. 618. ⁵ L. J. Unger, *Journ. Amer. Med. Assoc.*, February 13th, 1915, p. 582. ⁶ L. B. Robertson and A. Brown, *Blood Transfusion in Infants and Young Children*, *Canadian Med. Assoc. Journ.*, April, 1915.

A SIMPLE TECHNIQUE FOR INTRAVENOUS INJECTIONS IN INFANTS.

By ANN MARTIN, M.D. CORNELL UNIVERSITY.
(From the Sick Children's Hospital, Edinburgh.)

ON account of the small size and inaccessibility of the superficial veins in young infants, it is usually difficult, and often impossible, to give intravenous injections or even to obtain sufficient blood for the Wassermann reaction by the methods ordinarily employed. The difficulty is satisfactorily overcome by puncturing the superior longitudinal sinus through the anterior fontanelle, according to the procedure recently introduced by Helmholtz of Chicago.¹

I have made extensive use of Helmholtz's method in Dr. Fowler's ward in the Edinburgh Sick Children's Hospital during the past winter, and have found it simple and free from risk. The results of saline injections given in this way have been altogether better than those of the subcutaneous method hitherto employed. The following description of the technique of the Helmholtz method, based on a series of 50 cases, is offered as a guide.

The scalp over the anterior fontanelle is shaved and disinfected with iodine. No anaesthetic is required. The child lies in bed with its head raised to a convenient angle on two pillows. A nurse holds the head securely with a hand on either side; the operator stands in front and on the right side of the child. The needle (held at an angle of about 50 to 60 degrees with the plane of the fontanelle)

is inserted in the middle line, half way between the anterior angle and centre of the fontanelle. Some little force is required to push the needle through the firm pericranium, and, when the resistance is overcome, one can feel that the point of the needle is in a cavity. The point should not penetrate more than one-eighth of an inch below the surface of the skin since the sinus lies immediately under the pericranium. If the needle is in the sinus blood flows at once into the syringe; should this not happen the needle has gone too deep, and has passed completely through the sinus. This is the mistake usually made by a beginner; it does not, however, cause any damage. It is rectified by gently withdrawing the needle until the point re-enters the sinus, as is shown by a flow of blood into the syringe.

A specially ground needle is essential. The sinus is in many cases so shallow that an ordinary long-pointed needle pierces the inner wall before the entire opening in the end of the needle is through the pericranium. A needle of size No. 20 or thereabouts, with a bevel measuring 2 mm., should be chosen in place of one with an ordinary bevel, which measures about 4.5 mm.

When introducing fluid, such as eusol or saline solution, we have found a two-way stopcock and 10 or 20 c.cm. syringe, as described by Graham,² the most satisfactory instrument. The needle is inserted with the syringe only a quarter full of fluid, as it is easier to manipulate thus. Very little pressure is needed to inject the fluid, which, indeed, flows in almost of itself on account of the slightly negative pressure in the sinus. If pressure is needed one may be sure that the needle has escaped from the sinus; usually it has accidentally been pushed in too far. Each time the syringe is refilled it is well, immediately before injecting the fluid, to make sure that the needle is still in position by slightly withdrawing the plunger so as to ascertain whether there is a reflux of blood.

Autopsies on patients in whom, for diagnostic or therapeutic purposes, the sinus had been punctured at intervals of from a few hours to several weeks before death showed that in no case had any injury been done, nor in any case in which this method has been used have any untoward symptoms followed. The advantage of using the superior longitudinal sinus is evident. I have never found it necessary to give an anaesthetic. The puncture causes little disturbance, and infants even fall asleep while the fluid is running in. There is also the very material advantage that repeated injections, if such are necessary, are as easily performed as the first.

REFERENCES.

- ¹ *Amer. Journ. Dis. Child.*, vol. x, September, 1915, p. 194. ² *BRITISH MEDICAL JOURNAL*, May 6th, 1916.

ACUTE GENERAL HAEMORRHAGIC PERITONITIS.*

By ARTHUR J. NYULASY, M.R.C.S.ENG.,
GYNAECOLOGIST TO THE PERTH HOSPITAL, AUSTRALIA.

ACUTE general haemorrhagic peritonitis is an uncommon condition, but three cases have come within my experience in the Perth Hospital. Two of them resulted from criminal abortion and came to the *post-mortem* table; one of them presented a striking lividity of the skin, which persisted after death; it involved the whole body, and was so pronounced in the face as to be almost startling. The third case will be described in detail.

A multipara, aged 30 years, transferred from a medical ward, had been admitted with severe diarrhoea and some pain and tenderness in the lower abdomen, the pulse being 120, respirations 32, and temperature 101.9° F. The diagnosis suggested by the physician who sent her to hospital was "ruptured ectopic gestation." In a few days the diarrhoea ceased, and the temperature, after a fluctuating course, dropped to normal, the pulse to 108, and respirations to 28. On then examining the patient I found the tongue clean and moist, the colour of the face normal, and nothing in her appearance to suggest serious illness. The abdomen conveyed the idea of general "fullness," although there was no marked intestinal distension, while the pelvic area, especially in the left iliac fossa, was very tender on pressure. Bimanually a pelvic mass was made out, and later found to be the somewhat enlarged uterus and an enlarged left Fallopian tube and adherent intestines. The mass was extremely tender on pressure, so that a satisfactory examination

* Paper read before the Western Australian Branch of the British Medical Association.

was impossible without an anaesthetic. There was dullness on percussion over the flanks, and I detected free fluid in these regions by what I call the "staccato touch." To carry out this test the flank is struck lightly and sharply in a staccato fashion with the tip of the finger; if free fluid be present, the sound given out by percussed fluid is distinctly heard. There was no localized pallor of the external genitals, a physical sign which, when present, I have found of great value in the diagnosis of atypical cases of ruptured ectopic gestation.

Operation (September 9th, 1915).—There was a yellow discharge from the cervical canal, and on curettage I could detect no evidence of a decidua, only the "slimy" sensation of chronic endometritis being conveyed through the curette. I therefore ruled out ruptured ectopic gestation, but on opening the abdomen the cavity was found to be full of bright red fluid blood, and the case appeared to be clearly one of recently ruptured ectopic gestation. On freeing and drawing up the adherent left Fallopian tube (enlarged to the size of a finger), pus was seen to be issuing from its outer end. The involved tissues were so friable that the distal portion of the tube came away quite easily in my hand up to about an inch from the uterine cornu. The right tube was also much inflamed, so that double salpingectomy was carried out. Neither in the tubes nor in the ovaries was there the slightest evidence suggestive of ectopic gestation, nor could I discover any ruptured large vessel which might account for the flooding of the peritoneal cavity with blood.

When the blood had been mopped out from the abdomen very acute peritonitis was revealed, the intestines being intensely red, roughened, and marked with patches of yellowish lymph. The abdominal walls were unusually lax, so that by lifting them up we were enabled to bring the intestines into view right up to the costal margin. As far as we could see them, the intestines were involved in exactly the same manner as under the abdominal incision. The state of the patient now demanded prompt conclusion of the operation, so that the kidney pouches had to be left without special cleansing, but there was no more obvious free blood. No drainage was used.

After-Treatment.

The patient was placed in the Fowler position and saline freely administered. A few days later the wound suppurated and opened, and a quantity of blood poured out from the abdominal cavity through the lower end of the incision. It is to be noted that the parietal peritoneum had at the operation been found thickened, stiff, and friable, so that any blood which had not been mopped out from the abdomen, or which had poured out into it afterwards, would probably have a better chance of making its way out than if the parietal peritoneum had been normal. The patient made an excellent recovery.

The absence of serious symptoms in this case was very remarkable. It may be accounted for partly by the preliminary diarrhoea and partly by the large quantity of blood which escaped from the engorged peritoneal vessels in a case fittingly described as "acute general haemorrhagic peritonitis." The conditions found at the operation suggest that acute infective inflammation of the peritoneum is not *per se* nearly so serious as appears to be commonly supposed, and that, providing the focal factor and any free toxic fluid be removed from the abdomen, and that there is no paralytic ileus, the patient may recover with comparative ease from a most extensive acute infection of the peritoneum. In other words, in such a case, if the patient die after operation, she dies of the bowel rather than of the peritoneum. This being so, if the foregoing case had deteriorated subsequent to operation, I would have carried out caecostomy, taking care at the same time to swab out the bulk of the free blood which might have poured out into the abdomen.

To illustrate recovery from extensive acute infective inflammation of the peritoneum, another case of general peritonitis in my care in the Perth Hospital some years ago may be cited. The condition resulted from criminal abortion, and was part of a general septic poisoning. After about six weeks, during which marked diarrhoea was present, the patient, apparently on the way to recovery, grew drowsy and delirious, and died in a couple of days, after vomiting, ultimately faecal, had developed. At the autopsy universal peritoneal adhesions of rather recent date were found, while one of the peritonitic bands had strangulated and cut through into a loop of bowel, with resulting extravasation of faeces. But for this unfortunate complication the patient would undoubtedly have recovered from what had obviously been a universal infective inflammation of the peritoneum.

THE late Professor J. W. White, of Philadelphia, left estate of the value of £200,000. Among the bequests in his will is one of £30,000 to the University of Pennsylvania for the foundation of a professorship of surgical research, and another of £2,000 for prizes for resident physicians and nurses and for Christmas gifts to child patients.

A CASE OF PNEUMOCOCCIC CONJUNCTIVITIS.

BY

J. CROPPER, M.D., LIEUTENANT R.A.M.C.,
EYE SPECIALIST.

THE following case is of interest from the fact that the infection was pure—that is to say, no other organism appeared on culture—and for the short and satisfactory ending on treatment.

A. B., aged 45, a medical man who had previously suffered from a troublesome nasal and pharyngeal catarrh of the left side, was seized on March 18th with a well-marked conjunctivitis in the left eye. The eye was quite well the night before, but on the following morning there was not only pain and irritation, but a well-marked bead of pus collected at the inner canthus, and re-formed every fifteen or twenty minutes.

At 2 the same afternoon I was asked to see the patient; a swab was taken, and slides of the pus showed that almost every leucocyte contained one or more diplococcus. No other organism was seen, nor did any other grow in the culture.

As fresh eusol was not at hand, the eye was thoroughly irrigated with silver nitrate solution, grs. v to 3j (1 per cent.); the upper lid was well raised and the lower brushed with a swab of wool, the silver solution was *not* neutralized with salt.

The lids swelled up considerably, but next morning the pus had entirely ceased. Fresh eusol solution one-third the ordinary strength (that is, 0.16 per cent.) was dropped into the eye, and caused comparatively little pain. This was repeated the same afternoon, but caused considerably more inflammation and pain, the conjunctiva becoming somewhat injected and purple in colour.

At the patient's request and that of his friends I agreed—though with considerable misgiving—to discontinue the eusol and to use warm boracic douches four or five times daily. This produced excellent results, and a slide of the slightly purulent discharge next day—that is, on the fourth day—showed no organism whatever under the microscope.

I append a short report by the pathologist, Captain Rentoul, R.A.M.C., who very kindly examined the slides and made the necessary cultures.

Report by CAPTAIN RENTOUL.

On March 18th, 1916, I was asked to examine pus taken from a case of conjunctivitis. The smear on the slide showed pneumococcus in pure culture. Some were in the pus cells, but most were lying free. They all had marked capsules. The swab was used for planting out. Here, again, I obtained a pure growth of pneumococcus.

The interesting points to notice were:

1. So pure a growth of pneumococci in a direct smear.
2. So pure a growth on culture.
3. On the fourth day I again examined a smear and found no organisms.
4. The fact that severe cases of pneumococcic fever had occurred in the neighbourhood. In these cases the only symptoms were malaise, and a temperature of 102° to 104°, ending in a few days by crisis; in all these cases I grew a typical pure pneumococcus from the blood (5 c.cm.) and urine.

Having suffered for months from a similar attack of conjunctivitis I warned the patient not to be too sanguine about an early cure of his case.

I attribute our success to the early date at which suitable treatment was adopted. Had it been treated for a week with a weak boracic lotion it is extremely unlikely that either silver nitrate or eusol would have proved effectual, for as a friend remarked, the pneumococcus would have had time to burrow into the tissues, in fact, to "dig himself in."

The very thorough irrigation of the conjunctival sac was also of importance. It is too often thought that to evert the upper lid and paint it with a caustic is enough; the fornix is more important than the smooth upper lid.

To my mind the essential point is to be guided not only by the "clinical picture," but also by the pathological evidence at hand. Probably the eye was infected from the nasal duct.

My grateful thanks are due to Captain Rentoul for his ready help and advice.

SIR JAMES GOODHART left unsettled estate valued at £52,217.

THE Rockefeller Foundation has decided to establish a school of hygiene in Baltimore as an integral part of Johns Hopkins University. It is intended for the training of students in preventive medicine and public health work. Professor William H. Welch has been appointed director of the school, which, it is hoped, will be opened in October next.