A period finished on April 26th, 1928, and on May 26th she had a sudden attack of pain, simulating labour pains, in the hypogastrium and passing through to the back, and which lasted thirty minutes. Eleven days later, on June 6th, she experienced a second attack, which continued on and off for two days, gradually lessening in intensity till she came to Guy's Hospital and was admitted on June 8th.

On admission the temperature was 98.4° F., respirations 20, and pulse 105 per minute. The general condition of the patient was poor; the haemoglobin was 46 per cent. She complained of occasional slight pain below and to the left of the umbilicus. On

Fig. 2.

palpation there was guarding of the abdominal muscles over the right, and tenderness in both iliac fossae. On vaginal examination the external os was found closed, the uterus was anteverted and normal in size and consistency. Through the right lateral fornix a smooth lump the size of a tangerine orange was felt in the position of the right ovary. A scanty clear watery discharge was present, but there was no evidence of any uterine haemorrhage whatsoever. A diagnosis of ectopic gestation was made.

On June 15th the patient began to lose blood per vaginam; by the 18th, however, her general condition had greatly improved, and the haemoglobin had risen to 64 per cent.

A laparotomy was performed on June 18th. On opening the abdomen through a right lower paramedian incision the peritoneum was found to contain blood clot which filled the uterovesical pouch. The uterus, left ovary, and tubes were perfectly normal. Attached to the lateral half of the right ovary was a firm blood clot the size of a small tangerine orange. The ovary was cut across, and the right half, with the attached blood clot, removed. The remaining clots were cleared out from the peritoneal cavity, and the abdomen closed without drainage. The patient made an uninterrupted recovery, and was discharged on July 9th.

Fig. 3.

Description of Specimen.

The specimen consists of a spherical mass 5 cm. in diameter, and having half the ovary attached to its outer surface. This outer surface is for the most part smooth, and formed by a membrane in which ramify several small blood vessels. Showing through this covering is dark blood clot, and in one place (opposite to the ovarian tissue) there has occurred a rupture of the sac with haemorrhage on the exterior.

Examination of the cut surface (Fig. 1) shows quite definite ovarian tissue, containing at its lower edge a recent corpus luteum. The luteal cells are thinned out over the mass of blood clot, which can, in fact, be aptly described as haemorrhage

occurring into a corpus luteum cyst. In the centre of the clot is a somewhat irregularly shaped amniotic cavity filled with a homogeneous transparent substance, but unfortunately revealing no trace of any embryo. Dotted about in the blood clot between the wall of the sac and the amniotic cavity are several small white areas, and these, on microscopical examination, are seen to consist of typical chorionic villi (Fig. 2). Fig. 3 shows the characteristic arrangement of luteal cells and the wall of the corpus luteum in direct continuation with the wall of the cyst.

There seems to be no doubt from the specimen that this is a case of pregnancy following impregnation of a Graafian follicle, and that the developing corpus luteum was thinned out by the growing sac. The two attacks of severe pain can be explained by a consideration of the specimen. The first doubtless occurred when the haemorrhage took place into the cyst and the gestation sac; the second when the distended cyst ruptured into the peritoneum.

I have to thank Dr. J. J. Conybeare and Mr. A. J. McNair for permission to publish this case, Dr. J. W. Shackle for preparation of the photomicrographs, and Mr. R. C. Brock for assistance in compiling the description of the specimen.

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THE ADVANTAGES OF A PORTABLE THERMOSTAT FOR BLOOD TRANSFUSION.

BY

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REACTIONS after blood transfusion can be negligible, mild, moderate, or severe; they are generally regarded as unpleasant for the patient, but otherwise harmless unless due to some form of incompatibility, a contingency not, however, under discussion in this article. Whether a reaction after transfusion has any beneficial effect is a moot point. Protein shock, as we know from Vines's work,¹ does in fact shorten the coagulation time, and a brisk reaction after blood transfusion may act similarly. I know from experience that a single transfusion had a continued and most beneficial action in a case of purpura haemorrhagica in shortening the coagulation time and bleeding time and increasing the platelets, but this particular transfusion was unaccompanied by any appreciable reaction beyond a very short rigor lasting seven minutes and a rise of only 1° F. On the other hand, I have seen reactions so serious as to endanger life from the point of view of myocardial disturbance in splenic anaemia with haematemesis, in secondary anaemia, and in pernicious anaemia. After performing a number of transfusions I have come to the conclusion that these severe reactions, which are characterized by (1) pyrexia over 103° F., (2) a severe rigor lasting twenty minutes or longer, (3) myocardial disturbance, with arrhythmia and feeble pulse, requiring stimulants, and (4) prolonged after-sweating, were closely associated with failure to warm the blood sufficiently beforehand, and to keep it sufficiently warm during the transfusion. One case in particular impressed me in this way.

A man with very severe, sudden, and repeated haematemesis from duodenal ulcer required two transfusions on successive days. At the first, owing to the urgency of the situation and to help from assistants none of whom had ever seen a transfusion, the blood was kept far from warm; the result was a severe reaction, which was probably rather dangerous to the heart. On the next day, when a second transfusion was given, the blood was kept warm throughout the operation in warm water periodically and persistently renewed. The result was a reactionless transfusion with excellent results.

Reviewing my first fifty transfusions, I find a record of severe reactions mostly among the earlier ones, but no less than 20 per cent. showed severe rigors lasting twenty minutes or longer. In 4 per cent. there were severe and really dangerous cardiac disturbances after transfusion, associated with the rigors and prolonged for some hours afterwards. The onset of these reactions was thirty to forty-five minutes after the transfusion. Pyrexia over 103° F. occurred in 14 per cent., and prolonged after-sweating also in 14 per cent.

In practice, I found that to keep the blood at a proper temperature by adding warm water to the basin in which the flask was immersed and stirring continually was tiring to the nurses and time-wasting, necessitating the services of two people at least, sometimes more, since one became tired of holding the basin. Keynes² in his excellent monograph gives no very specific directions on this point, except that "the flask may be stood in a basin of warm water to keep it at body temperature." Inasmuch as, later on, he says that in certain cases—for example, of secondary anaemia, where there is a plethora of fluids—"a half to three-quarters of an hour must be occupied in giving 500 c.cm. of blood" (with which I entirely agree)—that is, forty-eight to seventy-two minutes for 800 c.cm. in a bad case—anyone who has had experience of blood warming in this way will realize the extreme irksomeness of keeping the basin at the right temperature for over an hour, not to mention the shifting of the flask, with the risk of bumping it against the basin—difficulties increased enormously in a private house.

Oswald Robertson,³ in the classical report on "Wound Shock and Haemorrhage," commenting on this point, remarks, "the bottle is restoppered and placed in a glass jar containing water at a temperature of 106°-107° F. (41° C.). If the water is maintained at this temperature, and the bottle is occasionally agitated, the blood becomes warm in a few minutes." True enough, but keeping it at an even temperature is almost impossible by manual means with any degree of accuracy. It seemed to me, therefore, high time that a thermostat should be used—that is, an automatically regulated water-bath, such as is used in the laboratory for Wassermann tests, but adapted for this type of work.

The Thermostat.

With the collaboration of Messrs. Charles Hearson and Co. I have evolved a convenient thermostat or water-bath, which is easily portable: it is supported on a stand of the necessary rigidity and height. A collapsible stand has

been, for the moment, ruled out, on account of the essential rigidity required. The stand can be introduced into the average car for transport quite easily, and the trouble of taking it to the bedside is well repaid by the convenience of having an anchor and support of just the right height.

My mode of operation is as follows. The blood is drawn into one flask and filtered into another through several thicknesses of gauze. This filtration eliminates any minute clots, which rarely, but dangerously, occur during even the best conducted bleedings. Meanwhile the thermostat has

been either lighted, or the current has been turned on and the water warmed: it is a help to start with the apparatus half full of water at about the right temperature (42° C. or 107° F.). The bath has a transparent window, which is turned towards the operator, so that he can see the level of the blood. The flask is lightly clamped in, since otherwise it would rise up owing to buoyancy; the transfusion is not begun until the temperature remains constant at 42° C., which takes a few minutes. This temperature allows two degrees drop during the transit of the blood down the tube to the patient, and sufficient length of tubing is essential to comfort in working. The bath is remarkably constant, the operation of the thermostat being excellent, whether for oil or electricity. Oil is essential for general purposes and for random transport, but for installation in one building electricity is preferable. If the whole apparatus is in use when anaesthetics are being administered (a very rare occurrence, inasmuch as

transfusions are usually given either before or after operations) care must be taken to stand the apparatus well away from the head of the patient.

Advantages of having a Thermostat.

1. One, if not two, assistants are dispensed with. The whole transfusion can be carried out unaided if necessary.
2. The blood is guarded from disturbance.
3. It arrives at the patient at the right temperature constantly throughout the transfusion, however long.
4. Reactions become negligible, assuming that the cross-test has been carried out properly; cardiac reactions are abolished, pyrexia is reduced to practically nil, while rigors are rare or absent, and are very mild if present.

In my experience, the case for the transfusion thermostat is so obvious as to be incontrovertible.

The apparatus is supplied by Messrs. Charles Hearson and Co., of 27, Mortimer Street, W.1, to whom I am indebted for much help; and also by Messrs. Down Bros., St. Thomas's Street, S.E.1.

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SEPTICAEMIA OF UNCOMMON ORIGIN.

BY

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SEPTICAEMIA due to *Bacillus pyocyaneus* is of somewhat uncommon occurrence. Stitt¹ states that this organism has until recently been considered rather harmless, but that this view can no longer be maintained, as it is frequently the sole cause of middle-ear inflammations, intestinal disorders, cystitis, and possibly at times of septicaemia. Park and Williams² conclude that, although ordinarily but slightly pathogenic for man, it may, under certain conditions, as in general debility, become a dangerous source of infection.

B. faecalis alkaligenes is a normal inhabitant of the intestinal tract, and haematogenous infection due to this organism is rare. Stitt³ mentions that it has been isolated from a few cases which resembled typhoid fever. Castellani and Chalmers⁴ state that it may produce a fever resembling enteric, and that vaccines have been tried in a few cases, but no definite results have been obtained so far. Hiss-Zimser and Russell⁵ quote a case of severe gastro-enteritis due to it, but add that it cannot be considered pathogenic as a rule.

The following three cases, admitted to the Penang General Hospital, present some points of unusual interest.

CASE I.

A male Anglo-Indian, aged 25, was admitted on September 18th, 1929, with a history of irregular fever for six weeks; he had been treated in another hospital for one month, but had left before he was well, and his condition had relapsed. His blood was there stated to be negative for malaria. On admission the temperature was 99.4° F., and the pulse 90. The heart and lungs were normal. The abdomen was flaccid, but showed no distension, and the spleen was not palpable. A blood film was negative for malaria. The urine contained a faint trace of albumin and a few pus and epithelial cells. *B. pyocyaneus* was grown in pure culture from the blood in forty-eight hours, but cultures of the stools, urine, and sputum were found negative five days later. The Widal reaction was negative.

Cough and profuse expectoration of greenish material occurred two days after admission, accompanied by impairment of resonance and crepitations over the right lower lobe of the lung. There were no rigors, but the patient complained of feeling cold and shivery. Distension of the abdomen and enlargement of the spleen two fingerbreadths below the costal margin appeared on the fifth day, with severe epigastric pain. The pyrexia continued for thirty-two days before the temperature finally reached normal, the highest point being 104° F. Constipation was a troublesome feature. Intestinal antiseptics, such as salol and dimol, and colonic irrigations with sodium bicarbonate or yaten, at different periods, seemed to have no influence on the course of the disease; quinine also had no effect. Easton's syrup, given as a simple tonic when the temperature showed signs of abating, appeared to do some good. The patient was discharged fit on November 7th.

CASE II.

A married Tamil woman, aged 26, was admitted on July 6th, 1929, with a history of fever and vomiting for three days, and pain in the lower part of the left side of the chest; she had had