Reports ON MEDICAL AND SURGICAL PRACTICE IN THE HOSPITALS AND ASYLUMS OF THE BRITISH EMPIRE.

KING EDWARD VII HOSPITAL, WINDSOR.

CASE OF HERNIA OF VERMIFORM APPENDIX.

(By E. T. NORRIS, M.A., M.B.Cantab., Senior Surgeon.)

THE patient in the following case, a married woman, aged 36, was seized with sharp pain in the right groin at 11 a.m. on June 8th, 1909. At about 1 p.m. the bowels acted naturally. The pain, though severe, was not bad enough to prevent her walking to a neighbouring town three miles distant the same afternoon, and she also accomplished the journey home on foot, though apparently suffering a good deal. She felt a lump in the right groin when she undressed for bed, and, the pain being no better, she sent for her medical man, and was seen at 11 p.m. There was a painful fluctuating swelling, irreducible, about the size of a small hen's egg, in the right groin. There had been no vomiting, and she did not look ill. She said that she was sure that no swelling existed there before.

Operation.—The following day she was moved to hospital, and I operated upon her at 2 p.m. The femoral sac was a fluctuating swelling, and contained dark blood-stained fluid. The sole remaining content of the sac consisted of the tip of the appendix, about the size of a finger-nail, which being tightly strangulated at the femoral ring was black and to all appearances gangrenous, but proved not to be. The femoral ring was incised, and the appendix drawn out and an inch removed; the stump was returned into the abdomen.

Result.—The after-history was uneventful, recovery being rapid and complete.

In a paper by Mr. McAdam Eccles, in vol. xxxii of *St. Bartholomew's Hospital Reports*, I find some similar cases published.

The notes of the case were kindly taken by Dr. Elgood, Windsor.

Reviews.

HAEMODYNAMICS.

DR. JOHANN PLESCH has worked out in the laboratory of Professor v. Zuntz of Berlin measurements of the amount of blood and haemoglobin in the body, the volume of the output of the heart per minute and per beat, the circulation time, the velocity of blood flow, and the work of the heart.[1] These measurements, applied as they are to normal men and to cases of anaemia, heart disease, kidney disease, and exophthalmic goître have yielded results of very great interest, and may be accepted with considerable confidence, as they have been arrived at by exact physiological methods and under the guidance of Professor Zuntz, who is one of the first authorities—if not, indeed, the first—in Europe on respiratory problems. The determinations of blood volume, haemoglobin content, and oxygen capacity of the blood have been carried out by Haldane's method, which depends on the inhalation of a small and non-toxic quantity of carbon monoxide of known volume, and the determination of the percentage of CO haemoglobin in a blood sample taken from the finger of the subject. From the total amount of CO absorbed and the amount found by a calorimetric method in the measured sample of blood the total amount of blood in the body is arrived at. By means of a haemoglobinometer containing a standard solution of CO haemoglobin (the oxygen capacity of which was determined by Haldane's method of displacing the oxygen by ferricyanide) the oxygen capacity and percentage of haemoglobin are measured. Dr. Plesch uses a modification of Barcroft's blood gas analysis apparatus, and determines the CO in the blood not only calorimetrically, but by displacing it with with ferricyanide, burning it into CO_2 by means of an incandescent spiral, and measuring the volume of CO_2 so produced. The saturation of the haemoglobin to one-third of its capacity with CO is said to be quite harmless. The absorption of 150 to 170 c.cm. CO by a man of 70 kg. weight produces, according to Dr. Plesch, no symptoms. Some unpleasant results, however, were met with, we believe, by Professor Lorrain Smith during the course of an inquiry into the blood volume of various cases of anaemia.

The presence or absence of salts (Barcroft), just as the presence of more or less CO_2 (Behr), modifies the dissociation curve of an oxyhaemoglobin solution in a marked manner. It is almost certain, therefore, that the presence of CO also modifies the dissociation curve. The taking up of CO in the lungs by the undiluted blood may be, and probably is, different to the taking up of CO by blood diluted *in vitro* with water to 1 in 100. The determination of oxygen tension in the blood made by Haldane's method will probably require considerable modifications in the light of the recent results which Barcroft communicated to the Oxford meeting of the Physiological Society. The exchange of oxygen between blood and lungs, which, according to Haldane and Lorrain Smith, does not follow the physical laws of diffusion, may yet be found to do so by the CO method when its effect on the dissociation curve has been allowed for. All other evidence is in favour of the exchange in the lungs being a simple physical process, and Haldane and Behr, alone among eminent physiologists, assert that oxygen is forced in and carbonic acid out by a vital secretory process of the pulmonary epithelium. We do not see, however, that Barcroft's results can modify the determinations of blood volume by the CO method, and no error comes to light in Dr. Plesch's careful analysis of this method. He has employed another method as a control—namely, that of injecting a measured quantity of isotonic salt solution into a vein, and determining the variation in the haemoglobin percentage so produced. The accuracy of this method, he says, depends on the exact isotony of the solution used, for this, he says, prevents the salt solution leaving the blood. Dr. Plesch does not give any convincing proof that the isotonic salt solution does not leave the blood in the interval between its injection and the collection of the blood sample, but his results show a surprising agreement with those obtained by the CO method.

He agrees with Haldane in estimating the blood volume as 5.3 per cent. or one-nineteenth of the body weight—less in fat people. The haemoglobin he estimates at 0.70 per cent. of the body weight, the total oxygen capacity of the blood as 10 c.cm. per kg. of body weight. The blood volume is diminished after repeated and severe haemorrhages, is increased up to twice its normal value in chlorosis (confirming Lorrain Smith) and in nephritis without oedema. Dr. Plesch determined the minute volume of the heart by the method of Zuntz, that is, by arriving at the following factors: the oxygen content of the arterial blood, the oxygen content of the venous blood, and the oxygen use of the body per minute. The first factor is obtained from the alveolar tension of oxygen of the subject and the dissociation curve of haemoglobin. The alveolar oxygen tension can be measured easily by Haldane and Priestley's method, or calculated from the composition of the expired air and the known average volume of the dead space in the air tubes. The oxygen in the venous blood is got at in a very ingenious way. The subject breathes in and out of a 10 l. bag of pure nitrogen for two breaths. This is to wash most of the oxygen out of the lungs. He then breathes in and out of a small bag (3 l.) for ten to fifteen seconds. The contents of the small bag then represent the composition of the alveolar air, and the oxygen tension of this air will be in equilibrium with that in the venous blood. From the tension the volume of oxygen in the venous blood can be calculated. The whole experiment, lasting fifteen to twenty-five seconds, is quite harmless, and can easily be carried out with a subject of some intelligence. Dr. Plesch finds on the average (few cases have been done) the following figures:

Oxygen in Arterial Blood.	Oxygen in Venous Blood.	
18.76	12.9	Normal.
6.99	4.95	Pernicious anaemia.
15.71	8.78	Nephritis.

[1] *Hämodynamische Studien.* By Dr. Johann Plesch. Berlin: August Hirschwald. 1909. (Sup. roy. 8vo, pp. 245, illustrations 16. M. 7.)