

interval. Control experiments with normal sera were negative in each case.

The actual microscopic appearances of blood undergoing this hæmolysis are the following: There is apparent a great variation in the size and colouring of the red cells, as has been stated; in addition there may be seen in numerous cells globules of dissolved hæmoglobin. Occasionally such globules may be seen lying free in the serum, apparently so recently extruded from a cell that sufficient time has not yet elapsed for their solution in the serum. Dr. Eason was also able to corroborate the observation of Levaditi that phagocytic leucocytes will attack with extraordinary avidity, and subsequently ingest, red blood cells which are held to contain the intermediary bodies by the aid of which union is achieved between hæmolytic toxins and the cells to be affected. Ruziczka has found that in the case of a guinea-pig immunised against fowl's blood, the phagocytic leucocytes of the guinea-pig are able to destroy the red corpuscles of the fowl without previously absorbing them; in such a case the leucocytes attach themselves to the red cells, and digest the latter little by little, as though actually gnawing or nibbling them.

A series of experiments was subsequently carried out with a view to determining the effect of temperature upon the process of hæmolysis by the serum of paroxysmal hæmoglobinurics. The result of these experiments was to show that all preparations which were kept at the blood temperature showed no signs of hæmolysis, though the latter phenomenon was well marked after exposure of the preparation for some time to the temperature of the room.

The general conclusions drawn by the author are as follows:—

1. A pathological substance is present in the blood, serum, and lymph of individuals affected with paroxysmal hæmoglobinuria.

2. This substance can dissolve (in vitro) the corpuscles of the affected individual (autolysis), and those of normal individuals (isolysis) provided that the conditions of temperature be suitable.

3. Temperature conditions in relation to hæmolysis require further study: it is, however, apparent that a temperature much below that of the blood favours the action of the hæmolytic substance, while the normal body temperature retards or prevents it.

4. The observations above considered corroborate those of Levaditi, Gruber, Ruziczka and others, regarding the activity of phagocytic leucocytes during hæmolysis in vitro.

5. These authors consider that the excessive phagocytic action observed is significant of an antecedent union of an intermediary body with the red corpuscles.

6. The intermediary body of paroxysmal hæmoglobinuria cannot, however, of itself produce solution of red corpuscles: for this it is necessary that there should also be present a thermo-labile toxic element, the complement. (This latter is destroyed by exposure to a temperature of 56° C. for one hour, while the intermediary body is thermo-stabile and survives such an exposure).

7. The changes observed in the red cells in course of solution correspond with those produced during hæmolysis by an immune serum.

8. The serum of normal individuals does not cause hæmolysis. The serum of various individuals suffering from disease produces either little hæmolysis, or (more often) none at all.

<sup>1</sup> Edin. Med. Jour., Jan., 1906.

### SOME PHYSICAL ASPECTS OF CARDIAC FAILURE.

IN a lecture upon this subject Dr. David Forsyth<sup>1</sup> observes that no treatment can be regarded as efficient which does not rest upon the triple foundation supplied by rest, the use of cardiac stimulants, and depletion, for the obvious indications are to diminish the calls upon the labouring heart, and to increase its capacity for dealing with the inevitable residue. The author urges the high importance of attention to means for alleviating the distresses attending the failing heart, for although the underlying affection is commonly a mortal one, the physician will have good cause to congratulate himself if he can rob the remaining days of the invalid's life of much of their pain and suffering.

Reduced to its simplest terms, the circulation consists of a force-pump, the heart, propelling liquid through a closed system of tubes. This force-pump is immensely assisted in the efficient performance of its duties by the suction of the negative pressure produced in the great veins by the act of inspiration. A third factor of immense importance in all problems connected with the circulation is the influence of gravity, and a fourth is the integrity of the splanchnic sympathetic nervous system, for the splanchnic veins are capable of accommodating all the blood in the body if their normal tension is deranged by failure of their sympathetic innervation.

A good example of the importance of physical considerations in the matter of heart affections is supplied by acute pericardial effusion, and it is with this disorder that the author is chiefly concerned. A case in point was that of a boy with a history of subacute rheumatic manifestations who came under observation for shortness of breath. He presented a slight extension of cardiac dullness, and the murmurs of double mitral disease. A week after his admission to hospital his cough became very troublesome, and resulted in the expectoration of much thin sputum coloured with bright blood. The note over the right apex in front became impaired, and auscultation over this area revealed many moist rales. From this date he went rapidly down-hill. The lungs were everywhere full of moist sounds, the area of the cardiac dullness still further encroached upon the lung, and the pulse became very rapid and feeble. The respirations rose to sixty, while the cough was constant and associated with attacks of hæmoptysis and cyanosis. Before death a pericardial friction sound became audible over the right ventricle. Post-mortem it was discovered that the pericardium was distended by six ounces of fluid, and the dilated heart showed evidence of old endocarditis. The right lung was solid, but not apparently from pneumonic consolidation; the appear-

ance was that of an intense œdema. The left lung was similarly affected, but to a less degree.

This case points the moral of the physical considerations enunciated above. There is no doubt that the cause of death was the pericardial effusion, which, enclosed in the rigid pericardial sac, exercised a fatal mechanical influence upon the heart. The positive pressure thus appearing within the pericardial cavity led to compression of the thin-walled venæ cavæ, and obstructed the return of blood to the auricles. This obstruction was reflected in the pulmonary circuit by the œdema of the lungs, which again extended the vicious circle by inducing a persistent cough.

In the treatment of such a case two things are essential to success—namely, to relieve the mechanical embarrassment of the heart which is directly due to the bulk of the effusion, and to reduce the labours of the overburdened myocardium. In the early stages the former can be met by alterations in posture. In the first instance, a semi-recumbent posture will throw the weight of the pericardial contents upon the diaphragm, and thus increase the capacity of the chest at the expense of the abdomen. At a later stage, to turn the patient well over upon his left side will give considerable relief by throwing the intra-pericardial weight against the bony thorax. But when pressure symptoms become really obtrusive there is only one thing to be done—namely, paracentesis of the pericardium. Dr. Forsyth urges that this proceeding is in general too long postponed. The indications for the operation are, in his opinion: (1) Spreading cardiac dulness; (2) progressive enfeeblement of the pulse; (3) increasing dyspnœa, especially of the air-hunger variety; (4) distended veins; (5) cyanosis. But it is recommended that the presence of the first three of these indications is ample justification for paracentesis.

The most favourable spot for paracentesis of the pericardium is considered to be the left costoxiphoid angle. The needle should be inserted here, and passed upward, backward, and slightly inward behind the sternum. The needle will then enter the pericardium at its lowest part after passing in for two or two and a half inches. In paracentesis of the pericardium it is necessary to regulate the speed with which the fluid is removed, for effusions in this situation often exist under a considerable degree of pressure, and rapid variations in the tension upon the heart are likely to affect the circulation profoundly.

<sup>1</sup> Clin. Jour., Jan. 17, 1906.

## STOVAINE AS A SPINAL AND LOCAL ANÆSTHETIC.

MR. G. L. CHIENE described to the Edinburgh Medico-Chirurgical Society his experience in the use of stovaine as a spinal anæsthetic. This preparation was introduced by Fourneau in 1904 and presents the advantages over cocaine that a solution containing it may be boiled without decomposition, while it is much less toxic and only slightly inferior as a spinal anæsthetic. After referring to the results of others, Mr. Chiene stated that in all his cases he had employed the method recommended by Tuffier. The stovaine alone or with adrenalin was obtained in 10 per cent. solution in sterilised bulbs. The syringe and needle having been boiled, avoiding any contact with soda, the required quantity of solution was drawn up through the needle which was then removed from the syringe and mounted on a special metal handle devised by the writer which greatly simplified its introduction into the spinal canal. After the insertion of the needle as in lumbar puncture for diagnostic purposes, the handle was removed and the syringe replaced. The piston was then withdrawn so as to allow some of the cerebro-spinal fluid to mix with the solution in the syringe, the injection being then made, the needle withdrawn and the puncture sealed with collodion. The quantity injected varied from 2 centigrammes in a child to 8 to 10 in adults. The patient experienced a numbness in the legs and in about seven minutes there was complete anæsthesia of the perineum and lower limbs generally extending as high as the umbilicus. Mr. Chiene had performed a considerable number of operations by this method, including those for hernia, transplantation of tendons, and arthrectomy of the knee and ankle. In some of his earlier cases anæsthesia was incomplete or of too short duration, probably due to an insufficient dose, but in no case did any ill-effects result, though a few patients suffered from headache. The patients do not require to be propped up during operation as with cocaine, and it was observed that they did not present the alarming appearance often associated with the latter drug, and were generally able to enjoy a meal soon after the operation. As a local anæsthetic stovaine was inferior to cocaine though it had the advantage of greater safety. It was not a vaso-constrictor and acted better when combined with hemisine, and Mr. Chiene had not found this combination liable to produce gangrene as stated by some authors.

## PROGRESS IN MEDICINE AND SURGERY.

### DISEASES OF THE KIDNEY.

(Continued from page 273.)

**Tests for Albumen.**—Two methods which are certainly convenient for clinical use have recently been described, and appear to be capable of giving delicate and accurate results. Wish<sup>5</sup> uses a solution of one part pure nitric acid and five parts cold saturated solution of magnesium sulphate. It may

be noted that a similar solution has been for many years strongly recommended in the Guy's Hospital Pharmacœpia for ordinary use. Wish uses a small pipette which is lowered into the urine and filled for about one-third of its length. The outside having been wiped, it is dipped for two-thirds its length into the reagent, which is then drawn into it, and the point of contact of the two fluids observed. A white ring indicates the presence of albumen. Payn<sup>6</sup>