POST-MORTEM EXAMINATION.

The heart was small, measuring 3 in. vertically and 4 in. transversely. There was a moderate amount of epicardial fat present.

Condition of Arteries.

Aorta.—The ascending part was soft, pliable, and comparatively free of atheromatous patches, except at its lower part, where one or two were present. The cusps of the aortic valve, especially the right and posterior, were stiffened at their bases with patches of calcification.

Right Coronary Artery.—The orifice of this artery, while reduced in size, was not so small as the orifice of the left coronary. On cutting the vessel transversely a quarter of an

A drawing of the posterior surface of the heart. Before the heart was dissected the perforation appeared as a slit. It became enlarged as the result of manipulation. The right coronary artery and its two main branches are seen. They supply a larger area than usual on the posterior surface of the heart. The posterior branch of the left coronary artery is seen in the drawing.

inch from its origin, its lumen was found to be reduced to a mere slit by the presence in its wall of annular atheromatous thickening. The main stem of the right coronary artery was tortuous and presented patches of calcification along its whole course. Its two branches were also markedly atheromatous. It did not give off a right marginal branch, but divided into (a) an inferior interventricular branch, (b) a terminal branch which passed down on the posterior surface of the left ventricle; this branch was in close proximity to the branch of the left coronary (see drawing). On cutting across the inferior interventricular branch near

its termination it was found that its lumen would scarcely admit a pin. The other branch was similarly reduced in calibre.

Left Coronary Artery.—At its origin from the sinus of Valsalva its lumen was exceedingly small, but immediately distal to its origin the lumen became perfectly patulous, 6 mm. in diameter. Distally there were patches of atheroma involving rather more than half the circumference of the vessel wall, but the lumen was not greatly reduced. Its anterior branch had numerous patches of atheroma, with the result that at many points its lumen was almost obliterated. Its posterior branch, somewhat smaller than usual, pursued a normal course, but it was also markedly atheromatous, and its lumen extremely narrowed.

Auricular Part of the Heart.—Both auricles were normal in appearance. The muscle coats were rather pale, and the walls exceedingly thin.

Ventricular Part of the Heart.—The tricuspid valve was normal. The bases of the cusps of the mitral valve were slightly calcified. There was no narrowing of the tricuspid or mitral orifices.

Left Ventricle.—For the greater part the muscle wall was thinner than usual. It was six-eighths of an inch at its thickest part and was five-eighths of an inch in the region of the site of the perforation. On the posterior wall about 1½ in. from its apex, and between the two branches of the right coronary artery (see drawing), there was a perforation 1 cm. in length. It passed through the entire thickness of the wall of the ventricle. On examining the interior of the chamber after reflection of the posterior cusp of the mitral valve, it was found that the heart muscle around the region of the perforation was somewhat necrotic in appearance, and the fibres of the heart in this area had ceased to manifest their normal colour and appearance. On microscopic examination of a piece of tissue taken from the posterior wall of the left ventricle adjacent to the site of the rupture the following appearances were found: The muscle fibres were not closely packed together; they had lost their striation and some had no nuclei. Fibrous tissue cells were abundant with large nuclei; they appeared to replace the muscle cells to a large extent.

REMARKS.

The salient features observed *post mortem* were:

1. Narrowing of the lumen of the right coronary artery, causing almost complete obstruction of the circulation through that channel.

2. Secondary fibrotic and degenerative changes in the cardiac muscle in part of the region supplied by the right coronary artery.

3. The rupture was situated in this region.

4. Degenerative changes were more prone to occur in the specimen described, as the area affected was entirely dependent for its blood supply on the right coronary artery.

It would be of interest to know if the coronary vessels were affected with arterio-sclerosis in the five cases recently reported. In four of them reference was made to degenerative changes in the aorta. Were the orifices of the coronary vessels narrowed in these cases? In some instances they may be quite patulous, while the lumen of the main stems is narrowed as the vessels run in the substance of the heart muscle. In one of the cases reported the aorta showed no sign of disease. It did not follow that the coronary vessels were in a similar condition. The weight of the heart in these cases was worthy of note. In each of the five reported it was found "enlarged." In the case which we have described it was smaller and under average in weight.

Various suggestions have been advanced to account for spontaneous rupture of the heart. It is, without doubt, the result of a diminished blood supply with consequent secondary degenerative changes in the heart muscle, caused by arterio-sclerosis in one or both of the coronary arteries.

A SIMPLE METHOD OF BLOOD TRANSFUSION IN INFANCY.

BY

GEORGE H. ALABASTER, M.D., F.R.C.S.ED.,
QUEENSTOWN, SOUTH AFRICA.

THE value of blood transfusion in severe degrees of shock is now generally admitted. I recently had occasion to apply it in a male infant 4 months old, in an extremely collapsed state, when lesser methods of treatment had failed.

After three weeks' enteritis, with associated pyelitis due to *B. coli*, the child lay with drooping eyelids, half-closed sunken eyes, waxen face, depressed fontanelle, utterly listless, and apparently moribund. Half a pint of subcutaneous saline given earlier in the day had failed to produce any improvement. Death within the hour was expected by all in attendance. It was decided to attempt blood transfusion, and the method employed seems worth recording in detail, as it proved effective, and gives promise of help in certain wellnigh hopeless cases. The operation was carried out in an operating theatre, but could be performed with little more difficulty in a private house.

A bowl of normal saline, so that the syringe and needle might be washed if necessary, a solution of sodium citrate (6 grains to 1 c.cm. distilled water), and a solution of 1 per cent. novocain with adrenaline, were prepared. Two 10 c.cm. syringes (one as a reserve) with two fine needles, sterilized by boiling, were available. The needles were of medium length, not so fine as hypodermic needles, but finer than the usual exploring needle.

The mother sat with her arm resting on a table in convenient proximity to the child. Venous congestion was produced in the mother's arm with a turn of the bandage applied to the upper arm in the usual manner. She was warned to ignore any loss of blood as quite insignificant and unimportant to herself. Her median basilic vein was then exposed under local anaesthesia with 1 per cent. novocain. A ligature was passed beneath the vein, but left untied and gripped with a Spencer Wells forceps for lifting and steadying.

Under novocain anaesthesia an incision was made across the upper part of the child's thigh, about an inch below and parallel to Poupart's ligament. The subsequent steps of the operation are made easier if this incision is long rather than short. The subcutaneous fat was divided, and the vein which lies in the deeper part of the fascia, well to the inner side of the femoral artery, was found. It is important not to prick the vein, and the deeper part of the incision in the fascia was made in the direction of the long axis of the vein, after retraction of the margin of the wound. An aneurysm needle was then passed under the vein, and moved up and down, thus clearing 1 to 1½ inches; the handle of the aneurysm needle falling at the peripheral end of the wound cocked the vein up, putting it on the stretch and steadying it.

Into the syringe and needle 1½ c.cm. of the citrate solution was introduced, and it was then filled with blood from the mother's vein. No attempt was made to stop the bleeding from the mother's vein at the moment, but the syringe was quickly shaken to mix the blood and citrate solutions, and such air bubbles as were present were expelled. The child's vein was now lifted and stretched with the aneurysm needle in position and the needle of the syringe introduced into the vein with its point lying superficially and its bevelled surface deeper; in this manner the point is more easily seen and controlled and less easily driven through the vein wall. With the needle pushed well along the vein the 10 c.cm. of blood were easily and rapidly introduced and the vein tied to prevent any possible haemorrhage; the wound was closed and dressed with gauze and collodion to prevent any unnecessary exposure of the child. There was no shock to the child, who scarcely moved throughout the operation.

The effect was remarkable. I was called away, but returned in three hours to find the child's appearance wonderfully improved. A feed had been taken, and the depression of the fontanelle, which had been very marked, had vanished, and the patient's appearance was no longer that of a dying child.

A second transfusion was performed a few hours later in the hope of intensifying this evidently beneficial effect; 25 c.cm. of citrated blood were easily introduced, using the same syringe and needle all the time, and necessitating three introductions of the needle into the mother's vein and three into the child's vein.

Unfortunately twenty-four hours later the child went into convulsions and died, but I do not associate this with the transfusion in any way, for there were many pus cells in the urine, and there was probably a general blood infection. There was no difficulty in passing the needle into the same wound in each vein each time, and there was not the slightest reflux of blood alongside the needle from the baby's vein; nor, when the needle was removed, was there any escape of blood so long as the peripheral end of the vein was kept raised by the aneurysm needle. Giving antimony intravenously in a stout subject with small veins when dissection was necessary I have found such reflux alongside the needle troublesome, but blood is a more viscid fluid.

Assuming the total blood weight to be one-thirteenth the body weight, it seemed inadvisable to introduce more than 25 c.cm. of blood, and this could easily have been done had it been desirable.

Certain points of detail perhaps call for comment. The child should be kept warm, and as far as possible covered up during the proceeding, about which there need be no great hurry.

The upper end of the saphenous vein was selected because it was one of the largest superficial veins, and was in immediate continuity with the much larger femoral vein, so that the blood would be easily and quickly removed, preventing any tendency to reflux; also there was not the same danger of air embolism which the larger neck veins might offer. It might be urged that the exposure of the mother's vein by incision is unnecessary, but it prevents any possible bungling in the withdrawal of the blood, and the only real need for speed is during the process of transfer.

The very speedy recovery of the child from its collapsed state makes me doubtful whether the depression in the fontanelle and the collapse of an infant in severe gastro-enteritis is as much due to dehydration as to toxæmia, though it is probably caused partly by both. As a practical point arising out of this reflection, the question may be asked whether salines can ever approach whole blood in value, even in early childhood, for the child is suffering from something more than loss of fluid, something salines cannot influence perhaps.

With insufficient experience to express a definite opinion, I would suggest that blood transfusion might prove of very real service in severe degrees of collapse in infancy, whether from gastro-enteritis or from other cause.

THE TYPE OF CASE THE BONESETTER GETS.

BY

F. WILSON STUART, M.Ch.,

SURGEON, BIRMINGHAM CRIPPLES' UNION; ASSISTANT SURGEON, ROYAL ORTHOPAEDIC AND SPINAL HOSPITAL, BIRMINGHAM AND SHROPSHIRE ORTHOPAEDIC HOSPITAL, ETC.

DURING the past year it has fallen to my lot to manipulate a considerable number of cases of knee-joint trouble, in some the result of adhesions, in others of displaced semilunar cartilages.

The following two cases are, I think, worthy of record as illustrating, first, the type of case the bonesetter often cures and acquires fame in so doing, and, secondly, that which he cannot hope to cure and which sooner or later must come to the surgeon for operative treatment. The youth of one of the cases is rather exceptional. Cases have actually been operated upon at the thirteenth year,¹ and recently a case of reduction of displaced semilunar cartilage at 4½ years of age has been reported.²

CASE I.

A. B., aged 10 years, seen on March 12th, 1924, said he had fallen from the top of a wall nine weeks previously and hurt his right knee so that it was swollen and could not be straightened. At the end of four weeks he was able to get about on it, but the joint was unstable, and he fell frequently. He was taken to a consulting surgeon, who diagnosed a displaced internal semilunar cartilage and advised that a knee-cap be worn. The knee, however, still continued to give way, and two weeks previous to being

seen by me he fell down some steps and had been unable to straighten the knee since.

Condition on Examination.—The knee was normal in appearance and all movements were complete except extension, which was not quite complete, there being a sensation of some resilient structure blocking it. This was so slight that it was difficult to realize that there was really anything wrong with the joint. There was no pain on movement nor tenderness on pressure, and the only reply the boy gave to questions was "It's here," accompanying the remark by rubbing the inner side of the joint with his hand. He was then asked to walk, and the disability at once became apparent—he could not get the heel to the ground by quite two and a half inches, and limped across the floor on his toes. The quadriceps was very weak and flabby.

Treatment.—The displaced semilunar cartilage was reduced by full flexion, internal rotation, and extension. The boy was able to walk across the room immediately. A back splint was then applied and massage and electrical stimulation of the quadriceps carried out thrice weekly. No movements of any kind were permitted for a fortnight in order that healing of the torn parts should take place undisturbed. At the end of a fortnight the back splint was discarded and a bandage substituted. In spite of some tenderness over the inner side of the knee movements were begun. At the end of another fortnight the bandage was left off and treatment continued in the gymnasium for another week, when the boy was discharged.

During treatment in the gymnasium the joint was subjected to all sorts of twisting movements, but it stood the test, and the subsequent history proves the completeness of the cure—there has been no further trouble. This is rather remarkable in view of the length of time which elapsed between the first accident and the manipulation.

CASE II.

Miss C., having hurt her right knee two days previously, was brought to me on the evening of Easter Monday. She gave a history of its having been "out" many times before, but she had always been able to get it "back" herself; on this occasion she could not.

Condition on Examination.—The knee was flexed, much swollen, and very tender; all attempts to move it were strongly resisted by powerfully contracted muscles and produced so much pain that they had to be abandoned.

Treatment.—Next morning she was given an anaesthetic and the knee fully straightened quite easily by manipulation. Extension was accompanied by a sound as of something tearing inside the joint. After-treatment as in Case I was carried out, but, owing to the history of frequent displacement, operation was advised. Before this was done the cartilage again became displaced and again was reduced by manipulation—this time without an anaesthetic.

After this there was always a feeling of something moving inside the joint, and at operation the cartilage was found to be detached along the periphery in its posterior two-thirds—a condition to which I give the name "sickle-shape." In this position the detached portion of the cartilage is bent diagonally across the front of the internal condyle of the femur, so that any reduction which could take place by manipulation would result in tearing away more of it from the coronary ligament. Removal of the whole cartilage resulted in a complete cure.

REFERENCES.

¹ Jones and Lovett: *Orthopaedic Surgery*, p. 31. ² Christopher: *Journal of Bone and Joint Surgery*, vol. vi, No. 4, October, 1924, p. 918.

THROMBO-ANGIITIS OBLITERANS.

BY

CHARLES DICKSON, M.C., M.D., F.R.C.P.I.,

DUBLIN.

THE interesting paper by Professors Telford and Stopford of Manchester on thrombo-angiitis obliterans, published in the *BRITISH MEDICAL JOURNAL* of December 6th, 1924, provides a reasonable diagnosis in a somewhat obscure case recently under my care. The parallel as regards signs and symptoms is close, but as there is a striking contrast in the matter of age and course to date it is thought worthy of record.

The patient is about to complete his 86th year, and, although a lifelong fisherman, I am sceptical of any ground for connecting this fact with the present condition, as is done in one recorded case. The family history and personal history are both exceptionally good.

Some months previous to the first attack there had been acute suppurative of a corn situated over the metatarso-phalangeal joint of the great toe of the right foot. In the beginning of March, 1924, after a slight attack of bronchial catarrh and flatulence, sudden pain was felt in the upper third of the right calf. When I examined the leg several hours later the foot was swollen and oedematous to the ankle, especially over the dorsum of the foot, and of a reddish colour. The limb was stone cold as high as the junction of the middle and lower thirds of the leg. Walking was impossible on account of the pain, which was described as "cramp-