that reactions may be obtained, giving rise to suspicion that an abnormal glycosuric state exists. In an extreme case of low specific gravity urine—viz., one in which it stood at 1002—the sugar indication stood at 0.34 per 1000.

I have stated that in the case of normal urine the cupric-oxide reducing power shown to exist before and after hydrolysis stands ordinarily in the relation of about 60 to 100. The symbol K is used to represent this relation, a body with a cupric-oxide reducing power of, say, 60 before hydrolysis which becomes raised to 100 by conversion into glucose, being spoken of as possessing a K value of 60. In the fasting animal it is noticeable that K stands at a lower point than in the fed animal. In one of my observations upon the rabbit, the one that has been referred to above as giving the lowest cupric-oxide reducing figures, it was noticed that K stood as low as 38, the cupric-oxide reducing power before hydrolysis being 0.68 per 1000 and 1.80 after. In another instance it stood at 42, the figures before and after hydrolysis being respectively 3.70 and 7.90 per 1000.

In mild glycosurics where the urine may give a traceable indication of sugar with Fehling's solution it may be mentioned as a noteworthy point that K stands higher than in the actually normal condition. The initial titration figures may not be higher than those that may possibly be met with in concentrated urine from the healthy person, but the figures after hydrolysis do not show the extent of rise that occurs in the case of normal urine. This means that there is a larger proportion of glucose in the carbohydrate that is present, and it is the elimination of carbohydrate in the glucose form that constitutes the particular feature appertaining to abnormal glycosuria.

I have given in my work, from which I have been drawing examples, a series of ten observations to illustrate the point in question. The mean of the K figures belonging to the series stands practically at 80, the lowest figure in the series being 67 and the highest 88. There are two examples with a K of 88. Taking one of these two, the figures before hydrolysis were 7.69 and after 8.72. I refer to this example to show the contrast with the condition in the normal rabbit's urine referred to above, where the figures before hydrolysis were 8.80 and after 16.54, giving a K of 53. As the abnormal variety of glycosuria attains greater intensity K becomes higher and higher until the glucose so overpowers everything else as to lead to the same figures being obtained before and after hydrolysis, as is found to be the case in pronounced diabetes.

Dr. Kellas and Dr. Wethered³ extol the safranin test and think that it "deserves to come into more general use." Being unaffected by creatinine and uric acid, they speak of it as a more scientific test than Fehling's solution. This is so far true, but it happens to be of sufficient delicacy to give, as stated by them, more or less reaction with ordinary urine. It is just this character which, in my opinion, renders it unsuited for clinical use and I feel that much danger of frequent error would be incurred if its employment in a general way were adopted. The great value, I consider, of Fehling's solution is that the sugar normally present in urine escapes being revealed except under the existence of special circumstances. In these circumstances, mainly consisting of undue concentration of the urine, whilst only a slight reaction may be given by Fehling's solution, a full reaction would be given by the safranin test with exclusion of the opportunity of seeing any gradational indication.

Assuming that a slight reaction is given by Fehling's solution the question naturally presents itself, does it constitute an exaggerated normal reaction or is it the result of an abnormal condition? To give full opportunity for a trace of reaction to show itself the contents of the test-tube should be briskly boiled for a short time and the tube looked at after being allowed to stand aside for a few minutes. Over and over again it is found, on adopting this procedure, that at the end of boiling there may be no sign of precipitate to be seen, whilst on standing a precipitate comes into view. The scientific way of ascertaining the true significance of a doubtful reaction is through the medium of a test-meal. If two or three hours after a plentiful allowance of starchy matter and sugar has been taken, there is no effect produced upon the urine, it may be concluded that nothing abnormal exists.

Grosvenor-street, W.

A METHOD OF AMPUTATION AT THE ANKLE-JOINT WHICH LEAVES THE HEEL INTACT.

WITH A REPORT OF TWO CASES OPERATED UPON AND SHOWN AT THE CLINICAL SOCIETY OF LONDON ON APRIL 24TH, 1907.

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THE method here given was made use of in the two cases described below for long-standing talipes equino-varus, with equinus predominating. In both cases the deformity had been untreated in the past and owing to the stretched and enfeebled condition of the extensors and the shortened and contracted condition of the flexors offered little chance of improvement without relapse, so long as an ankle-joint remained, which would allow the flexors again to overpower the extensors. The operation resembles in many respects le Fort's modification of Pirogoff's operation and may be termed "trans-calcaneal amputation of the foot."

Details of the operation.—For the anterior flap three points are taken as follows: half an inch below and half an inch behind the tip of the internal malleolus, a quarter of an inch below the tip of the external malleolus, and one and a half inches below the mid-point of a line joining the tips of the two malleoli across the dorsum. A semilunar flap is then cut joining these three points. The plantar flap is then cut by an incision dividing skin only, which extends from the inner extremity of the anterior flap downwards and forwards to half an inch in front of the prominence of the tubercle of the scaphoid, then transversely across the sole to half an inch in front of the prominence of the base of the fifth metatarsal, and then straight back to the outer extremity of the anterior flap. The anterior flap is then dissected up, the extensor tendons are divided, the anterior tibial and musculocutaneous nerves are cut short, and the dorsalis pedis artery is ligatured. The ankle-joint is then opened from the front and the foot is forcibly depressed (the equinus position greatly facilitates this stage of the operation), the internal lateral ligament is severed from its attachments to the astragalus, with the edge of the knife held close to the bone, and the anterior and middle fasciculi of the external lateral are similarly dealt with; then with the foot inverted the knife is passed from without between the os calcis and astragalus and the interosseous ligament is divided. The astragalo-scapoid joint is now opened and the head of the astragalus is freed from the scaphoid. The body of the astragalus is next seized with lion forceps and twisted round so as to detach it from the posterior fasciculus of the external lateral ligament and the posterior ligament and so removed.

The next step is tenotomy of the tendo Achillis and all contracted fibrous tissue around it, taking great care to avoid the posterior tibial vessels and nerve. It will then be seen that the os calcis can be brought up to the lower surface of the tibia, except for the projection of the sustentaculum tali which comes into contact with the internal malleolus. With a broad gouge the cartilage is then removed from the lower surface of the tibia, working from within outwards so that the gouge is checked against the internal surface of the external malleolus, and then the malleoli are cleared of cartilage and the posterior inferior tibio-fibular ligament is removed. Next, with the foot well depressed and pulled forwards, the upper articular surface of the os calcis is cleared of cartilage either by sawing off a thin slice with a fine saw or with a gouge. Owing to the slope of this surface it is necessary to take a little bone as well from the posterior part of this surface. The sinus pedis is then cleared of all fibres of the interosseous ligament and extensor brevis digitorum. Then so much of the sustentaculum tali is cut obliquely as will allow the os calcis to fit into the hollow between the malleoli.

Up to this point the front of the foot has been left articulated to the os calcis for purposes of manipulation. The os calcis is now disarticulated from the cuboid and the separation of the foot is completed by cutting obliquely through the soft tissues of the sole to the margin of the skin flap already marked out. Before fixing the os calcis to the tibia the plantar vessels are tied, the plantar nerves are cut short, the tourniquet is removed, and all bleeding points are

³ Loc. cit., p. 1141.

secured. About a quarter of an inch of the anterior extremity of the os calcis is then removed and the os calcis is brought into apposition with the tibia and fixed there with a six-inch excision pin driven through the sole with about two inches left projecting. A second pin may be used and passed through the tibia into the os calcis from the front and tension subsequently—i.e., after suture and dressing—kept up on the projecting ends by rubber tubing passed in figure-of-eight round them. After suture of the flaps the stump is put up preferably in plaster for a fortnight, when the stitches and pins may be removed. Plaster is then re-applied and the patient is allowed to get about with the leg flexed on a peg leg. Plaster should be continued until firm bony union has occurred and the patient should not be allowed to put the foot to the ground under three months but should continue to use the peg leg. At the end of three months an artificial foot can be fitted and gradually made use of.

to strong faradism and galvanism. The movements at the hip and knee were good. The left leg measured to the malleoli was one inch shorter than the right.

The operation performed on April 17th, 1906, was practically identical with the one described above except that the internal malleolus was removed and only the cartilaginous surface of the sustentaculum tali cut off. Two steel pins were used and cross tension was kept up on the projecting ends by means of rubber drainage tubing. The stump was put up on a splint for ten days and then the pins and stitches were removed. Plaster was then applied and the patient was allowed up on a peg leg. There was firm bony union at the end of four weeks. An artificial foot was fitted, and the patient began to walk on it on Sept. 8th—i.e., five months after the operation. Up to the time of the foot being fitted the patient walked about well on the peg leg. He can now walk well on the artificial foot without additional support. The stump is quite firm and has no tender spot.

FIG. 1.

The stump in Case 1 three months after operation.

FIG. 2.

The stump in Case 1 a year after operation. The ridges on the skin are due, of course, to impressions left by a coarse stocking.

CASE 1. *Infantile hemiplegia involving left arm and leg.*—The patient, a man, aged 30 years, was admitted to the Metropolitan Hospital on March 31st, 1906, with the following history. When one year old he had had infantile hemiplegia which left partial paralysis of the left hand and leg below the knee. He had had no treatment in the past. The deformity of the foot had gradually increased. He had worn a high boot for the previous six months (O'Connor extension) but it had constantly given away and had not afforded him much support. He was unable to work as a labourer owing to difficulty in standing. The left arm and leg were much wasted. The foot was in the position of marked equino-varus with the dorsum directed downwards. Electrical reactions.—The left thigh was normal. The superficial calf muscles reacted to strong galvanic and faradic currents. The tibialis posticus and flexor longus digitorum reacted to very strong faradism and slightly to very strong galvanism. There was no reaction in the extensors. The peronei reacted

CASE 2. *Infantile hemiplegia involving the right arm and leg and slightly also the left leg.*—The patient, a man, aged 44 years, was admitted to the Metropolitan Hospital on June 28th, 1906. The deformity in this case was almost identical with the first but the varus was rather less marked. An additional factor in this case was some paresis of the extensors of the opposite leg with rectangular talipes. The operation was identical except that rather more of the front of the os calcis was removed as the plantar flap had been cut a little too short. When the dressings were removed the central portion of the anterior flap was found to be gangrenous and was cut away. Some blood clot had collected underneath the flap. The tourniquet in this case was not removed until after the wound had been closed and firm pressure applied with dressing and bandage. As there is a certain amount of slack under the anterior flap this is probably an unwise proceeding in these cases. Subsequent skin-grafting produced a good scar but a little depressed in

the centre and not free as in the first case. The patient commenced to walk on a peg leg five weeks after the operation, when bony union was firm and the wound was soundly healed. He began to walk on an artificial foot seven months after the operation.

Remarks.—1. It will be found that with the incision given the margin of the plantar incision will be about from one to two inches longer than the margin of the dorsal, so that in suturing slight puckering of the plantar flap will be necessary. Any attempt at lengthening the anterior flap at the expense of the plantar offers two disadvantages—danger of sloughing in the dorsal flap, which consists only of skin and is not too well supplied with blood, especially in paralytic limbs, and also a risk of getting the ultimate scar too near the sole. 2. At the completion of the operation the plane of the sole remaining will not be horizontal but tilted forwards and upwards at an angle which corresponds to the position of the os calcis and sole in the normal foot. 3. The tendo Achillis having been divided there is no likelihood of the os calcis becoming displaced backward and lateral displacement is prevented by retaining the malleoli. It is important to remove all cartilage and to get accurate adaptation of the bony surfaces before fixing. 4. The results of the two cases reported offer encouragement to repeat the operation in similar cases. The resulting stump is certainly as good as, if not better than, that produced by any other known amputation at the ankle. The operation should be applicable also to some cases of disease and injury in which it is possible to leave the os calcis. The accompanying illustrations are from Case 1.

Welbeck-street, W.

A SUGGESTION FOR THE RADICAL CURE OF FEMORAL HERNIÆ.

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ONE hears on all sides of the unsatisfactory nature of the usual attempts at the radical treatment of femoral herniæ so that the suggestion here made, if it does not appeal to the profession, can receive no worse fate than many others. Briefly, it consists in twisting the isolated sac, transfixing and tying it with No. 4 silk, and leaving the two ends of the silk long. Both ends are then threaded with curved needles. One end, A, is passed twice through Poupart's ligament and then out through Gimbernat's ligament, whilst the other end, B, is buried deep in the pectineus and also brought out through Gimbernat's ligament. The ends are then tightly tied and the opening is found to be securely closed. The tied sac acts as a thick plug at what appears to be the weakest point in other radical cures.

FIG. 1.

Schema of operation. A, External oblique muscle. B, Obturator foramen. C, Symphysis pubis. D, Poupart's ligament. E, Gimbernat's ligament. F, Pectineus muscle. G, Common femoral vessels. H, Sac of hernia, cut and tied. I, I, Curved needles on long suture transfixing sac.

My opportunities as resident medical officer for performing this operation have naturally been few but through the kindness of Mr. A. E. Kennedy I have operated in the above

manner on two cases in females, aged 30 and 37 years, with femoral herniæ of three and five years' standing respectively. Six months in one case and four months in the other have elapsed since the operations and the wounds are quite sound

FIG. 2.

Schema of operation. A, Poupart's ligament. B, Pectineus muscle with lower suture passed. C, Stump of sac transfixed. D, Gimbernat's ligament with both sutures passed. E, Needles on ends of sutures which are ready for tying. The femoral vessels are omitted for the sake of clearness.

with no sign of recurrence. This, of course, is no commendation for the operation. I merely wish to throw out the suggestion in case it might appeal to other surgeons of greater opportunity and experience. I may mention that this method was very easy in my own cases; I do not know how it would be in cases of strangulation or in very old people with lax tissues.

Sydenham, S.E.

A CASE OF STREPTOCOCCIC SEPTICÆMIA:

TREATMENT BY WRIGHT'S METHOD WITH A VACCINE MADE
OF ORGANISMS OBTAINED FROM THE PATIENT'S BLOOD,
THE INOCULATIONS BEING CONTROLLED BY THE
OPSONIC INDEX; RECOVERY.

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(From the Bacteriological Department, St. George's Hospital.)

THE patient, a lad, aged 14 years, was first seen by one of us on Feb. 28th, 1907, when the following history was obtained. A year previously he had been operated on for a breaking-down tuberculous gland of the neck. This wound healed and gave no trouble till December, 1906, when some discharge was noticed from the scar and some thickening detected beneath it. On examination some deeply situated tuberculous glands were found on the left side of the neck and a sinus discharging thin pus. Otherwise the boy was apparently in good health. On March 2nd the old scar with the sinus was excised and the wall of the former cavity and the deep glands were dissected out. The latter were more than usually adherent and the internal jugular was in their removal wounded and ligatured above and below the injury. On the 3rd the temperature rose to 102.6° F. The stitches were at once removed and the wound cavity was flushed out with biniodide solution. A gradual improvement took place until the 8th, when for the first time since the operation the temperature fell to normal. On the 12th the temperature rose to 103.4° and considerable discomfort was caused by a violent spasmodic cough, probably due to irritation of the vagus by the ligature. The cough persisted for several days and stopped on the silk ligature coming away. On the 16th the boy complained of pain high up in the right thigh, and on the following night a definite rigor took place. The rigors continued daily and on the 19th the temperature reached 106.2°. The pain in the right thigh continued but no hardness or swelling could be detected.

The question of vaccine treatment was now considered and a Wright's capsule of blood from the finger together with