animal generally appears to be in better health after infusion of salines than after transfusion of blood.

Even in traumatic anæmia resulting from long-continued losses of blood, transfusion of blood has in all probability no value not possessed by simple saline solution. The former may actually retard blood formation; the latter is at least always harmless, and might be beneficial if it were required.

In the other forms of idiopathic anæmia, pernicious anæmia, and leucocythæmia, transfusion of blood can, in my opinion, never be indicated. In both, the condition of the blood is the result of changes in the blood-forming or blood-destroying processes, or in both.

In leucocythæmia the disturbance is one of blood formation in the first instance, evidenced by the increase in the leucocytes of the blood, while the diminution in the number of the red I find to be due in great part to excessive blood destruction, probably induced by the activity of the leucocytes. In pernicious anæmia, the condition of the blood is mainly the result of excessive destruction. Transfusion of blood under such circumstances is not unattended by dangers as we have seen, but is followed in most cases by rapid destruction of the injected red corpuscles as evidenced by fever, sometimes by hæmoglobinuria, occasionally also by increase in the slight icterus which so frequently marks the progress of the disease.

It is important therefore to be able to distinguish between profound anæmia of traumatic origin and pernicious anæmia; and this I find it is possible most easily to do, by having regard to the character of the urine in the two cases. I find that the urine of pernicious anæmia contains large quantities of pathological urobilin, recognisable both chemically and on spectroscopic examination, and that its colour is correspondingly high. In marked cases, or during periodic exacerbation of the destructive process within the blood, this character of the urine is a very striking one; more especially as it is unaccompanied by any diminution in the quantity, is frequently quite independent of the occurrence of fever, and the specific gravity is usually very low (1010 to 1015).

The urine of traumatic anæmia, on the contrary, is exceedingly pale in colour, and is free from pathological urobilin. If in addition we note the condition of the blood in the two forms of anæmia, with special reference to the relation between the richness in hæmoglobin and the corpuscular richness—in traumatic anæmia the percentage diminution in hæmoglobin being usually considerably in excess of the diminution in the number of corpuscles; whereas in pernicious anæmia the hæmoglobin percentage is always relatively high, I believe we shall be able in future to draw a sharper line of distinction between these two forms of anæmia than has hitherto been possible.

(4) Lastly, if the condition to be met in transfusing blood is a threatened failure of circulation as the result of sudden loss of blood, then it is unnecessary to have recourse to blood transfusion, as infusion of any neutral saline meets equally well, if not better, all the indications. The value possessed by transfused blood in such cases is almost solely in virtue of its physical properties. The chief physical property of blood for purposes of transfusion is undoubtedly its volume. The immediate source of danger from sudden loss of blood is the fall in the blood pressure to a point where the circulation is unable to be maintained. The obvious indication, therefore, is to raise the pressure within the vessels. In health the blood pressure is dependent mainly upon peripheral resistance. The effect of a loss of blood on the blood pressure is, up to a certain point, completely neutralised by an increase in the peripheral resistance due to stimulation of the vasomotor centre. It is only after very severe hæmorrhage that this relation between the vessels and the amount of fluid they contain necessary for the carrying on of the circulation is disturbed. The pressure falls rapidly and suddenly, and death will ensue unless means be taken to meet the threatened failure of the circulation. The readiest way in which this can be done is to replace the lost blood with a certain bulk of fluid. To meet the danger thus arising, the quantity of blood is of more importance than its quality. In an emergency the infusion of ordinary water (Coates) has been followed by results as successful as any ever obtained after transfusion of blood. Bulk for bulk, pure or defibrinated blood, however, must possess certain advantages over neutral saline solutions free from organic constituents. They doubtless possess a certain physiological value as well as a physical value, inasmuch as blood must have a greater and more immediate effect in restoring the tone of the vasomotor centres

than saline solutions. These advantages, however, are more than neutralised by the other and still greater disadvantages—namely, (1) the difficulty of obtaining blood in sufficient quantity or with sufficient rapidity as compared with the ease with which simple saline solution can be prepared; (2) the dangers attending the transfusion of blood, compared with the absolute freedom from danger possessed by solution; and (3) the doubtful value of the transfusion, whether hæmogenic or physical, when compared with saline solution.

Transfusion of blood will long continue to be practised, and its action studied on account of the many interesting problems connected with the physiology and pathology of the blood on which it is well fitted to throw light. For practical purposes, however, all the advantages to be gained by transfusion may, I believe, be equally well and more readily obtained by infusion of a neutral saline, such as $\frac{1}{2}$ per cent. solution of common salt (about one drachm to the pint). The only pressing indication for the performance of transfusion is the collapse from sudden and severe loss of blood.

With regard to its performance, two points may be noted: (1) that the simpler the instruments used—a simple glass cannula, with a piece of india-rubber attached, and a clean syringe—the more easily will this infusion be effected, and the less likelihood will there be of the injection of air—a source of danger to which far too much importance has long been attached, as it is also one which can readily, with a little care, be altogether avoided; (2) that the temperature of the solution should never rise above that of the body.

Under no circumstances is transfusion of milk or of other mixtures possessing what are supposed to be nutritive properties, ever indicated. They possess no value not possessed by an equal bulk of saline solution.

CASE OF PROGRESSIVE PARALYSIS OF MUSCULO-SPIRAL NERVE CONSEQUENT UPON INJURY; OPERATION; SUCCESSFUL RESULT.

By CHAUNCEY PUZEY,

Surgeon to the Liverpool Northern Hospital.

In the JOURNAL of May 16th, 1885, I recorded very fully a case of paralysis of the ulnar nerve, due to a fracture of the ulna, in which I operated with a completely successful result; and I concluded by saying that, with the knowledge thus gained, I should feel justified in operating earlier in a similar case.

On March 21st of last year, a Custom-house officer, aged 50, was admitted into the Northern Hospital, under my care, suffering from complete loss of power of extension of the right hand and fingers, the wrist being dropped; and the sensation throughout the parts supplied by the cutaneous branches of the radial nerve being defective. The muscles of the dorsum of the forearm were flabby and wasted, and supination of the forearm was effected with difficulty.

The history given was, that three months before he had fallen down and fractured the humerus rather below its middle. Nothing special was observed about the fracture, which was treated in the ordinary way. On removal of the splints, there was found to be great impairment of motor-power in the forearm; wrist-drop and loss of power in the extensors of the fingers. The flexors acted well.

He was treated by galvanism and massage for some weeks, but instead of improving, his condition became worse, the muscles wasting rapidly. Then it was observed that the signs of "reaction of degeneration" were appearing in those parts supplied by the branches of the musculo-spiral nerve.

The site of fracture presented no noteworthy features, except that there was rather an excessive amount of "callus." Pressure over the course of the nerve elicited the ordinary sensations, until that part over the callus was reached, when they ceased. It was therefore thought that probably the nerve was involved in the callus; at all events, that it must be pressed upon in some way.

He was recommended to come into hospital for operation. To this he agreed; and on March 22nd I operated, making an incision 3 or 4 inches long over the course of the musculo-spiral groove, between the outer and inner heads of the triceps. The nerve was

soon found, and exposed throughout its extent, where it lay on the callus. It was thick, pink, and fleshy-looking higher up than the commencement of the callus, but over the thickened bone it was smaller, paler, and hard. On making a small longitudinal incision through the neurilemma, which appeared thickened, the nerve substance bulged out excessively, showing that it was much compressed. The nerve was, therefore, dissected out from the groove for 3 or 4 inches (the wound being lengthened for the purpose) until it could be felt free above and below the extent of the callus. A large arterial branch (no doubt the superior profunda artery) and its accompanying veins were tied. The wound was then closed, free drainage being provided for. The usual Listerian precautions were adopted.

The first result of the operation was eminently unsatisfactory; but this was due to a circumstance which I mention as a warning as well as an explanation. I had given directions that an Esmarch's tube was to be applied to the upper part of the arm for the purpose of rendering the operation bloodless. I afterwards found that a solid cord of india-rubber had been used. The effect of this must have been so to compress and bruise all the nerve trunks that for some days there was partial paralysis of all the muscles of the hand and forearm.

Happily these effects passed off before long; but it was not until nearly a week had elapsed that the first sign of something like a change in the musculo-spiral supply began to appear. This sign was a slight "tingling" along the parts supplied by the terminal branches of the radial nerve. Then very slowly, almost imperceptibly, there came slight power of extension of the fingers; then very slight extension movements of the wrist.

All this time the continuous current was being used daily; the circulation was also stimulated by hot mustard-and-water arm baths, and by massage, in which treatment every assistance was rendered by the patient himself.

This treatment was persevered with for weeks, the patient attending daily for the purpose, and making steady but slow progress. About the end of June I went away for two or three weeks, and the man ceased attending; and it was not until the first week of this year that I saw him again, when I was delighted to find that his damaged limb has completely recovered.

He is a very intelligent man; and he says that, feeling satisfied that his arm was steadily improving, and finding it inconvenient and he thought unnecessary to continue the galvanism, he carried out the rest of the treatment as well as he could himself and with a satisfactory result. There is now nothing to be seen amiss with the limb, except that it is nowhere quite as plump and firm as the other arm; but he has full and perfect use of every muscle and of every finger, and writes a beautiful "hand."

It may possibly be objected that the operation had less to do with the result than had the long-continued galvanism, douching, and massing. In reply, I would point out that up to the time of operation, the course was rapidly down-hill. From about a week after operation, progress in the right direction was continuous, though slow.

In concluding, I think I may venture to repeat a warning as to the possible dangers of the elastic tourniquet. About ten years ago, I had a case in which the use of an Esmarch's tube, in the operation of excision of the elbow-joint, in the case of a very emaciated man, led to partial paralysis of all the muscles and of the sensibility of the hand and forearm—a condition which, however, completely and satisfactorily passed away in a few days. Since that occurrence, I have always, in the case of children or thin people, used a stout india-rubber bandage instead of a tube. By winding this round and round the limb, coil over coil, any amount of cumulative pressure may be obtained; but it is diffused over a surface represented by, or corresponding with, the width of the bandage.

EPSOM COLLEGE.—Mr. France has presented another female scholarship at St. Anne's School to the Council of Epsom College. This is the sixth scholarship he has purchased. Mr. France is doing good work with both hands. With the one he gives a large sum of money to a most deserving institution; with the other he enables the members of Council of the College to give in perpetuity a first-rate education free of all charge to six girls, the orphan daughters of medical men. Lucas, Mair, Norman, Barron, Griffiths, and Hardcastle, pupils of Epsom College, have all passed in the first division of the matriculation examination of the University of London.

REMOVAL OF ACCESSORY LIMB AND MENINGOCELE FROM THE BACK OF A CHILD, AND ITS ANATOMY.

By ROBERT JONES,

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AND

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THE patient, an infant of four months, was sent by Mr. H. O. Thomas. It was born with a tumour at the back of its neck, which had attained to the size of a small cocoa-nut. This was attached by a broad base to the back in a line with the upper surface of both shoulder-blades. At its upper part was a dimple of retracted skin, and lower down an extension which felt like a forearm, and terminated in three fingers, which were perfectly formed, even to the nails; the third being less firmly attached by a narrow fleshy neck. On feeling the mass, bones could be diagnosed, which seemed to correspond to an elbow, humerus and possibly scapula. It could be freely manipulated without giving the child any discomfort. The family history was very interesting. The aunt had a supernumerary digit on the left forefinger, and an uncle died in infancy after an operation upon a lumbar spina bifida.

Mr. Jones exhibited the patient at the Medical Institution before operating, and the opinion of all those who took part in the discussion was, that it had no connection with the vertebral canal, and that operative measures would be safe. It was believed to be connected with the shoulder girdle. On careful and repeated examination no deficiency could be detected in the vertebral column; and apart from its position, there was nothing to suggest a spina bifida. The base of the tumour was too solid to admit of accurate manipulative measures beneath it. The parents were strong advocates of operation, and after its dangers were forcibly put before them, they elected that the risk should be run.

Fig. 1.

Mr. Jones operated next day. He made an oval incision round the base of the tumour, leaving just sufficient skin to form flaps. The growth was found to be connected with the spinal cord, and the sac of the spina bifida was opened. A free discharge of spinal fluid escaped, and it was with difficulty that the flow was checked