homologous serum jaundice is enhanced by using a large pool like this.

If fresh frozen plasma is used to raise the AHG level, it has to be given by drip transfusion. Veins are very precious to hæmophiliacs: 'cut downs' must be avoided and used only as a last resort; great patience is needed in transfusing a small male child, almost invariably plump from lack of exercise and also invariably with a total absence of accessible veins.

Apart from fresh frozen plasma, AHG is available from the Blood Products Laboratory at the Lister Institute, but the distribution is strictly limited.

Animal AHG prepared from cattle, pigs or sheep can be purchased commercially and is best used for major surgery as it is not in short supply. For a course of treatment to cover a major operation, about 75 to 80 ampoules, each equivalent to 800 ml human plasma are used. There are snags with using animal AHG. First, it is antigenic; although recent reports suggest that it is possible to give more than one course of the same animal preparation, it is probably wisest to avoid this and, if a second course is subsequently needed, to use a different animal preparation or to use human AHG. Secondly, difficulties are sometimes experienced in getting animal AHG into solution, especially without frothing. Thirdly, anaphylactic and pyrogenic reactions can occur which can be alarming.

None of these preparations, animal or human AHG concentrate, is usually advocated for the treatment of a hæmarthrosis and in the past fresh frozen plasma has been used. More recently a new advance has paved the way for yet another preparation of Factor VIII which has many definite advantages. This is the cryoprecipitate first described by Judith Pool of the Coagulation Department of Stamford University (Pool *et al.* 1964). In 1959 she first reported that the cold-insoluble precipitate which forms when frozen plasma is thawed in the cold is rich in AHG. At that time it was not realised how rich this product was but now it has been conclusively demonstrated that these cold precipitates contain over 70% of the total plasma AHG.

A very simple method of preparing this material has now been developed, demanding only a refrigerated centrifuge and plastic double containers. Donors are bled into the larger of the two plastic bags, the primary bag, in standard acid citrate dextrose solution and the blood mixed thoroughly during the collection. The primary bag is then centrifuged in a pre-cooled, refrigerated centrifuge at 4°C. This packs the red cells and the supernatant plasma is then expressed into the attached transfer bag. It flows easily and with little or no contamination by red cells. After clamping, the plasma in the secondary bag is deep frozen in a dry-ice alcohol mixture until it is frozen solid. Meanwhile, the red cells in the primary bag are kept on wet-ice for protection. Once the plasma is frozen solid, it and the primary bag are placed in a standard 4°C refrigerator for cold thawing. This takes about twenty-four hours. The supernatant plasma which has thawed is then drained back into the primary bag. The two bags are sealed and separated. There is now the AHG-rich, frozen 'sludge' in one bag, and in the other an ordinary plastic pack of whole blood minus most of its Factor VIII. This 'sludge', when required for use, is easily thawed and dissolved, either in saline or a little residual plasma; it can then be taken into a 20 ml syringe and given by simple intravenous injection, which can be repeated as often as required.

There are the following advantages: no intravenous drip need be set up; there is little risk of hepatitis; the correct ABO group can be used but, as the number of red blood cells carried over is minimal, this is not of importance; there is no wastage of blood, the AHG concentrate is merely a by-product of the blood and can be stock-piled for future use.

In conclusion, therefore, hæmarthroses are best treated by immediate plasma infusion with or without aspiration of the joint, with every chance that the incapacity to the joint can be resolved in a matter of days.

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The Work of the Hospital Rehabilitation Officer

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The statutory procedure for dealing with the resettlement of disabled patients is by referral to the Disablement Resettlement Officer (DRO) of the Ministry of Labour. This involves the completion of a medical form DP1 which must include a statement that the patient will have a residual disability for twelve months. It generally follows that any action concerning resettlement will not be put in hand until the patient's treatment is completed.

Certain hospitals and medical rehabilitation units hold resettlement clinics which are attended by the local DRO whose contributions on placement possibilities are invaluable to the discussions that take place. Some patients, however, may not come from the immediate locality: such cases will be passed on to their local DRO, who will not have contact with them until after they have been discharged. Furthermore, cases discussed at resettlement clinics are generally referred at the end of their treatment, and the fact that a case is brought up for discussion is an indication that the patient has either lost his job or is in the process of losing it.

The Ministry of Labour has set up a number of industrial rehabilitation units where such patients may spend a maximum of twelve weeks for the purpose of being assessed for work.

The Royal National Orthopædic Hospital Approach

The Royal National Orthopædic Hospital employs its own hospital rehabilitation officers. It is the method used by this hospital which is discussed here.

By being a member of the hospital staff, the hospital rehabilitation officer can start practical plans for the patient's resettlement soon after admission. This is the routine procedure for patients admitted after an accident. The system has now been developed to the extent that patients on the list for admission for 'cold' surgery can be interviewed in the outpatient department before admission. This means that the patient is encouraged, from the outset, to take an optimistic view of his future as a wage earner; he will become better adjusted to the problems associated with disability and consequently more co-operative as the plans that are being made for him start to take shape. The need for personal contact and continuity in the work of resettlement is of paramount importance.

To this end the hospital rehabilitation officer is in an advantageous position. He will be working in close co-operation with all departments of the hospital and will, therefore, have the opportunity of informal discussions about the patient at any time; he will have the benefit of medical opinion about current cases at any stage of treatment. By regularly visiting the wards and departments he will see the patient frequently throughout his stay in hospital and will, therefore, have a better understanding of the patient and his disability. By observing the patient at work in the occupational and physiotherapy departments, he will have a visual means of charting the patient's progress. The permanency of his position provides him with an excellent opportunity of continually improving his efficiency from the experience he is gaining over the years. By the same token, the medical staff have the benefit of personal knowledge of and immediate contact with the officer concerned.

Apart from his work in the hospital the rehabilitation officer visits factories and workshops to study the physical requirements of jobs and to follow up patients who have been resettled. This enables him to work in close co-operation with managements and unions and is of great value to all who are working towards efficient resettlement, i.e. the hospital rehabilitation officer himself, the management, the unions and the patient. In the selection of a hospital rehabilitation officer it is essential that he should have had personal experience of industrial conditions.

Normal procedure for resettlement: Following the interview with the patient an initial visit is made to the patient's place of employment for the purpose of investigating functional requirements for the job. A report, accompanied by photographs where necessary, will be presented to the rehabilitation team and at this early stage of treatment it can be decided whether the patient will be capable of returning to his former employment. If medical opinion suggests that this is possible, then the hospital staff will have a good measurement to work to and physical treatment will be related to functions at work.

For those patients considered physically incapable of returning to their former work further investigations will be made, preferably with the original employer, to find alternative work and ascertain the standards required. The rehabilitation programme may then be modified to include re-education or retraining or, when this is indicated, surgical reconstruction.

After discharge the patient is followed up for five years and the information included in the questionnaire is distributed to the various departments of the hospital.

Case Histories

Case 1 A young man suffered a left brachial plexus lesion and amputated left thumb as a result of a motorcycle accident. He had already returned to his original firm as a printing machine operator. At a subsequent outpatient clinic it became apparent that his speed and efficiency at work were not keeping pace with the functional recovery of the arm. The hospital rehabilitation officer visited the place of employment and noted six manœuvres in the patient's work where speed and efficiency were both limited because of the absence of the left thumb. A set of photographs was then taken, comparing the patient with an average operator, and the comparative times of these operations were noted. The information was passed on to the surgeon. The employers have given a guarantee that the patient's job will be kept open for him and

they will make his wages up for the time he is in hospital for any reconstructive surgery.

Case 2 A fifth-year apprentice monotype caster operator was admitted with a swollen knee which was diagnosed as due to early rheumatoid arthritis. Contact was made with the employers, who had no keyboard facilities. The hospital rehabilitation officer thereupon contacted the Typographical Association, who arranged for the patient to be given a Union card to their Association. A local firm agreed to take him on their staff as a keyboard operator provided he could have initial training in this work. This was achieved in the first two weeks of the patient's treatment. When he was ready for discharge from hospital arrangements were made for him to undertake a three-month course in keyboard operating at Monotype House, and the Ministry of Labour financed this course. In spite of severe residual disability he has been employed for the past six years as a keyboard operator on an income of approximately £32 per week.

Case 3 A mechanical plant driver was admitted to hospital following injury to an arm at work. The arm became gangrenous and was amputated six weeks after admission. Three days later the hospital rehabilitation officer visited the place of work and the employers modified a bulldozer so that it could be driven with one hand. Contact was also made with the Ministry of Transport, who tested the patient driving the modified bulldozer. Sixteen weeks after injury the patient returned to work and remained with his employers until he received £2,500 compensation which he invested in capital equipment. For the past five years he has been self-employed, hiring himself and his equipment out on contract work. His annual income has been in the region of £4,000.

Case 4 A young man suffered multiple injuries including fractured hip, knee and brachial plexus lesion. He was a trainee engineer who spent nine months in hospital having treatment for the fractured hip. At two months contact had been made with his employers, and a retraining programme was organized, including educational studies and job sample. Two weeks after discharge the patient returned to work with his old employers on the new job that had already been found for him. He remained in this employment for two years, and was then readmitted for arthrodesis of the shoulder. He was in a shoulder spica for two and a half months, and returned to work two weeks later.

Case 5 A young man suffered a fractured femur and brachial plexus lesion as a result of a motorcycle accident. He spent seven months in hospital having treatment for the fractured femur. Following this he had two and a half years of daily physiotherapy and was eventually referred to the Royal National Orthopædic Hospital with a completely flail left arm. He was a third-year apprentice compositor at the time of his injury. No contact had been made with his employers during his three years' treatment, and his apprenticeship had lapsed. He was placed with a new employer as a copy holder on an eighteen-month apprenticeship, at the end of which he was retained on the staff as a proof reader at £25 per week. Since proof readers are recruited from qualified compositors and since proof reading is a one-handed job, it was regretted that this action had not been taken at a much earlier stage in the patient's treatment.

[This paper was first presented to the Section of Physical Medicine of the Royal Society of Medicine on May 14 1966.]

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Dr Ronald Cant
The Splint-making Department
Mr F Christian
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Mr T Glyn Thomas

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Reflections on Muscular Pain
Dr R W Barter

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Mr P R Wright
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