Physiological Rest

By this is meant giving rest to a part of the body in the position most favourable for the biological processes of growth and repair, while safeguarding functional restoration. Its purpose is to promote healing by reducing the local physiological demands of the limb, by avoiding the aggravation of pathological processes and the spread of infection by movement, and by bringing to bear upon the lesion the whole general metabolic resources of the patient. The rest is graduated according to the activity of the disease and should readily permit progressive activity as infection becomes controlled. During the phase of acute inflammation perfect immobilization is required. For each limb and every joint there is a physiological position which is optimal for the average needs of the limb. This position is not a fixed one but varies, and is usually near the middle of the normal range of movement of the joint concerned. In the lower extremity joints are generally rested in positions rather more extended than the previous statement suggests. A list of suitable joint postures is given in the Table.

Optimal Positions for Physiological Control

Joint	Position	Joint	Position
Shoulder	Abduction 45°; flexion 30°; external rotation 15°	Hip	No abduction or adduction; rotation nil; flexion 20°
Elbow ..	Extended to about 100°	Knee	Flexion 15°
Forearm ..	Mid-prone-supine position	Ankle	Right angle or, in woman, a degree or so below
Wrist ..	Extension 15–20°	Tarsal	Neutral as to inversion or eversion
Digits ..	All joints flexed about 25°. Thumb abducted and opposed moderately	Toes	Maintain flexion of metatarsophalangeal joints and extension of interphalangeal joints
Spine ..	Normal curves maintained		

It is important to avoid makeshift appliances which do not fit comfortably or maintain perfectly the position required. For the lower extremity the Thomas splint cannot be improved upon. There is no contraindication to the use of plaster-of-Paris splints, provided they are split to enable adequate observation of the limb. In many cases these may be preferable because of the better immobilization and comfort which they provide.

Antibiotic Treatment

The importance of maintaining an adequate blood concentration of the appropriate antibiotic when indicated has been repeatedly stressed in this series of articles. If the response to antibiotic treatment is not adequate, either the organism is insensitive or surgery is needed. The move towards more exotic and more expensive antibiotic drugs should not be allowed to take the place of common-sense surgical judgment. In all cases in which the clinical signs (including the temperature chart and the white-blood-cell count) indicate an abscess or bone necrosis the bone should be opened as soon as possible.

The continued use of antibiotics over a long period because of the persistence of local activity and because of failure to operate at the right time may produce unresolved bone lesions of strange type which can even mimic radiologically such conditions as malignant bone tumours. Furthermore, these lesions, especially if in the central diaphysis, are vulnerable to stress and may cause pathological fractures.

Associated Lesions

Treatment of Suppurative Arthritis.—If a joint is involved secondarily to a neighbouring osteomyelitic lesion the proper surgical treatment for the latter is of first importance. Spread of infection from a neighbouring bone is the commonest way in which joints are infected in childhood. Aspiration of the joint in all types of septic arthritis is an important diagnostic procedure. Furthermore, aspiration readily permits the direct instillation of antibiotics; a method of treatment which is of special value. Penicillin, having a large molecule, is not readily removed from joints

into the blood stream, and a high concentration remains long after the injection has been given. During the early period of treatment, however, it is necessary to maintain a high concentration in the blood in order to deal with the general systemic aspect of the infective lesion. The unsatisfactory nature of this treatment in the presence of a neighbouring bone focus should be stressed. If the purulent effusion is clearly associated with a local bone focus and is not responding to antibiotic therapy, the need for surgery is particularly indicated for the bone itself.

Osteomyelitis in the Newborn.—During the first few weeks of life osteomyelitis, generally of the femur, may occur secondarily to umbilical infection. Compared with osteomyelitis in older children, it is relatively more often due to streptococcal infection. At a few weeks of age a painful swelling of the femur, or of any other bone for that matter, raises an interesting point in diagnosis, but while infantile hyperostosis corticalis is a rarity, the practitioner would do well to keep in mind the possibility of scurvy and syphilitic epiphysitis. The x-ray picture of a well-established case of scurvy is strikingly similar to that of osteomyelitis affecting the whole shaft of a long bone.

Other Sequelae of Osteomyelitis.—Most of the sequelae are beyond the scope of this paper because they come under the heading of chronic osteomyelitis. These include sequestration, sinus formation, Brodie's abscess, pathological fractures, and amyloid disease, all of which should, under modern conditions, become rarities. Cases from the pre-penicillin era, however, still appear and occasionally, alas, even now cases occur as the result of imperfect early treatment. Septic arthritis has briefly been mentioned. It is at the hip-joint that special complications may arise—namely, pathological dislocation and separation, with or without necrosis, of the upper femoral epiphysis due to massive infection of the metaphysis. Necrosis, as elsewhere, is dependent upon the extent to which the blood supply has been obliterated. When apparent, these complications become major surgical emergencies.

Next Refresher Course Article.—"The Backward Child," by Dr. B. H. Kirman.

Refresher Course Book.—The first 55 articles of this series (fully revised) are available as a book, price 25s. including postage, from the Publishing Manager, B.M.A. House, Tavistock Square, London, W.C.1.

IMPRESSIONS OF A VISIT TO KOREA AND JAPAN

BY

Sir NEIL CANTLIE, K.C.B., K.B.E., M.C., F.R.C.S.

Late Director-General, Army Medical Services

In January and February, 1952, I visited the British Commonwealth Forces in Japan and Korea by courtesy of the Commanding General, Far Eastern Command, and the General Officer Commanding, British Commonwealth Forces. Brigadier-General William E. Shambora, Chief Surgeon of Far Eastern Command, welcomed me and gave me every facility to visit all medical installations.

The first visit was made to the U.S. Army equivalent of a British Army base pathology laboratory, which was organized in seven sections, dealing with such subjects as bacteriology, epidemiology, blood transfusion, etc., and had a total staff of about 300. Here the problems being dealt with included the cause of epidemic haemorrhagic fever, research on infective hepatitis, and measures to render water safe from bilharzia.

Epidemic haemorrhagic fever was reported as being limited to a circumscribed forward area in Korea, and the greatest incidence appeared in the autumn months. I was told that the disease could at times be diagnosed from the appearance of the suffused conjunctivae. The mortality had been between 8% and 12%, and treatment was symptomatic, as no specific drug had been discovered that was able to affect the course of the disease. This may not be surprising, as the cause is so far unknown. I thought the use of the term "epidemic" was unfortunate, as this might lead uninformed opinion to believe that the disease was sweeping through the Forces. In fact, nothing in the nature of an epidemic had occurred, and the disease might be likened to the incidence of scrub typhus in Malaya and Burma. I saw only three cases of this disease in 29 General Hospital, the Commonwealth hospital at Kure, in Southern Japan.

Military Hospitals in Japan

29 General Hospital occupies the Japanese naval hospital, and has nearly 1,000 beds, staffed by British, Australian, and Canadian R.A.M.C., R.A.D.C., and nursing services, under an R.A.M.C. colonel. The hospital was a busy one, as all sick and wounded from our Forces in Korea were evacuated to it, either by plane or by ship. A full complement of specialists was present. As active operations were largely in abeyance during the truce talks in Korea, the medical cases under treatment were naturally much greater in number than the surgical. Surgery was mainly confined to accidental injuries and to burns caused by the petrol heaters which were much in use during the winter. In burns of the second degree the exposure treatment advocated by Wallace was followed with success in both the Commonwealth and the American hospitals, and early excision and skin grafts were carried out in burns of the third degree. Among medical cases infective hepatitis and V.D. were major causes of sickness.

Dried plasma for transfusion has not been popular with the U.S. Medical Corps because of the incidence of jaundice following its use, and the transfusion problem has been solved by the extensive employment of whole blood through blood banks. Donors were bled in Tokyo, but this supply was augmented by blood flown daily from the United States to as far forward as the surgical hospitals in Korea. In Commonwealth medical units dried plasma was in use, and dextran had also been on trial.

A convalescent training depot was situated close to 29 General Hospital, but on a site near the Kure docks which was not ideal, and there was a delightful convalescent leave station at an attractive hotel at Miyajima, one of the wooded islands in the Inland Sea.

I visited the U.S. base hospital in Tokyo (1,000 beds) occupying a modern hospital building which was formerly a civil hospital built from American funds. Here good surgery was done by a U.S. Medical Corps neurosurgical unit, to which all Commonwealth cases were sent.

Mobile Army Surgical Hospitals

In Korea I visited hospitals at Seoul and Pusan and the U.S. mobile army surgical hospitals (M.A.S.H.), which correspond to our C.C.S. These carried out all forward surgery for our troops as there was no Commonwealth C.C.S., and two M.A.S.H. serve the Commonwealth Division, one U.S. Medical Corps, and one Norwegian. They had tented wards which were comfortable, being warmed with the latest type of petrol heaters. There was a team of surgeons and anaesthetists on the C.C.S. and field surgical team pattern. I saw some excellent operation results following very severe wounds, and these successes were partly dependent on rapid methods of evacuation.

A special feature of this speed of evacuation was the presence of helicopters employed solely in casualty evacua-

tion at the M.A.S.H., the pilots actually living in the medical mess. This was an excellent arrangement, as not only were the pilots immediately on call but they became steeped in the medical atmosphere. These helicopters flew under almost ideal conditions, as no hostile enemy aircraft came up to interfere. They have saved many lives by evacuating from advanced dressing stations of field ambulances, and even from regimental aid posts. At one R.A.P. I was shown the drill for calling up a helicopter to evacuate a priority casualty, and this efficient and speedy method of evacuation served to raise the morale of the fighting soldier.

One M.A.S.H. was located close to the 38th Parallel, and I was made an honorary member of the 38th Parallel Medical Society, which was started by the surgeon of an American Corps, and which holds meetings to discuss clinical cases and administrative medical problems. It served the excellent purpose of a common meeting-ground for the medical officers of all the United Nations Forces in Korea.

Commonwealth Division Medical Units

The Commonwealth Division medical units were of the orthodox pattern—three field ambulances (one British, one Canadian, and one Indian) and a Canadian field dressing station. The F.D.S. located in a school at Seoul treated the divisional light sick and played an important part in preventing the evacuation of such cases to Japan. In addition, all field ambulances under existing circumstances were also holding the lightest types of sick under tented conditions. A noteworthy feature was the growing policy of treating patients suffering from all types of V.D., and other diseases, either as out-patients or in the forward medical units, and these included types of cases which formerly were thought to require hospital treatment. The success of such a policy was entirely due to the efficacy and rapid curative powers of the new antibiotics. Even the R.M.O.'s armamentarium was being improved to an extent which allowed him, under static conditions, to hold and treat types of case which formerly were evacuated.

The field ambulances were deployed to form casualty-collecting posts and advanced dressing stations. The Indian field ambulance—a parachute unit—has served with a British brigade with great success. The C.O. has been awarded the Indian equivalent to the D.S.O. for his work during the last 15 months, and the unit which I inspected was highly efficient. The Indians withstood the winter conditions remarkably well, and their morale was high. The Canadian field ambulance was running well-organized wards for the light sick, with a lavish use of some of the more expensive antibiotics, which for the British Army cost so many dollars. The British field ambulance has an excellent record of service since the beginning of operations, and both the C.O. and the second in command had received American decorations.

Six of the battalion medical officers were visited, including those of two Canadian and one Australian battalion. The R.M.O.s with British battalions were all National Service, and were keen and well thought of by their commanding officers. It was interesting to see these young medical officers so obviously identifying themselves with the *esprit de corps* of their own battalions, as indeed they should. The R.A.P.s of battalions in the line consisted of sandbagged dugouts familiar to all who have served in the world wars. Casualties were brought back to R.A.P.s by company jeeps rather than by stretcher-bearers, and evacuation from R.A.P.s was by ambulance cars, mostly of the jeep type.

The winter of 1951–2 was a mild one compared with that of 1950–1, and during the truce talks the front-line troops were not experiencing a war of movement, so there had been little exposure to severe winter conditions and casualties due to the effect of cold had been very few. A small number which occurred in one battalion were immediately brought to an end when strict foot drill and changing of socks were enforced.

Evacuation of Casualties

At Seoul a United States Army Evacuation Hospital accommodated in a fine school building has 1,000 beds, and receives all Commonwealth cases for evacuation to Japan. They proceed either by plane from Kimpo airfield near by, or by ambulance train to the base at Pusan. The Royal Australian Air Force has a fine record of achievement in air evacuation.

At Pusan I visited the Swedish Red Cross Hospital, which treated Commonwealth patients from this base area. Many Korean civilians were being treated in available beds, and several were seen recovering from extensive burns resulting from fires, which occurred frequently in their wooden habitations. Much excellent medical work was done for civilians in the United Nations hospitals, and at the U.S. Army M.A.S.H.s it was interesting to see many Koreans receiving expert surgical care and treatment.

Evacuation to the U.K. or to Australia or Canada from 29 General Hospital was carried out mainly by air. The speed of air evacuation assisted the definitive treatment of long-term cases. The R.A.F. Medical Services employed Hastings aircraft, staging at Singapore and other stations en route to the United Kingdom. Not only Commonwealth troops but those of many other United Nations countries were being evacuated: French, Belgian, Turkish, Greek, and Abyssinian cases were sent to their respective countries either by R.A.F. plane or by our troopships.

Health Under Winter Conditions

The general health of the troops during the winter was excellent. The cold was often dry and stimulating, with sunshine and blue skies. As billets, the tents and dugouts were made warm and comfortable by the petrol heaters in use.

One of the lessons apparent from this war is the improvement which has taken place in heating and cooking equipment, especially items of American pattern. It was noteworthy how eager British units were to acquire American equipment.

There were no complaints on the scale of winter clothing, which had certain items that were an improvement on those of the previous winter. The rations were pronounced excellent, and included a daily allowance of 10 oz. (285 g.) of meat.

The advent of the newest antibiotics has made some of the previous drugs out-of-date and unnecessary, and this process must be expected to continue. This means keeping a close watch on the supply side in Army medical equipment depots and avoiding the building up of too large a reserve of any particular drug, which may become outdated.

It was a pleasing feature to see the close co-operation with the U.S. Medical Corps at all levels. I visited the headquarters of the 8th Army and of the American Corps of which the Commonwealth Division is a part, and found the surgeons of both fully appreciative of the Commonwealth medical problems and arrangements. I was able to pay a tribute to the U.S. medical authorities for their active and efficient care of all our wounded carried out at the M.A.S.H.s since the beginning of hostilities.

The Commonwealth medical services in Japan and Korea were competent and well equipped, and, with excellent U.S. Medical Corps co-operation, our casualties were well cared for.

According to a report in the *New York Times* (November 13) the Supreme Court of New York County is instituting an inquiry into reports that a number of drug companies were violating anti-monopoly laws by peddling shares of their stock to members of the medical profession, with the understanding that the stockholders would prescribe those companies' preparations in preference to products marketed by competitors. An action against one pharmaceutical company has already been started.

Correspondence

Because of the present high cost of producing the Journal, and the great pressure on our space, correspondents are asked to keep their letters short.

R.M.B.F. Christmas Gifts Fund Appeal

SIR,—The distribution of Christmas gifts will be made in a few days. I ask your readers who have not yet responded to the President's appeal (October 11, p. 830) to forward their contributions as soon as possible to the Royal Medical Benevolent Fund, 1, Balliol House, Manor Fields, Putney, London, S.W.15, marked "Christmas Gifts."

I hope there will be a very generous response to this reminder.—I am, etc.,

F. A. JULER,
Honorary Treasurer.

London, S.W.15.

Cross-resistance between "Daraprim" and Proguanil

SIR,—It has been reported by Rollo¹ that laboratory strains of *Plasmodium gallinaceum* and *P. berghei* made resistant to proguanil could be successfully treated with pyrimethamine ("daraprim"). We have been unable to confirm this with our proguanil-resistant strain of *P. gallinaceum*, which has proved to be markedly resistant to pyrimethamine, and we have now had the opportunity of showing that cross-resistance may also occur to *P. falciparum*, although Wilson's² preliminary results in Malaya had suggested that schizonticidal resistance to proguanil does not influence the probable response to pyrimethamine.

We obtained a strain of *P. falciparum*, at least partially resistant to proguanil, with the co-operation of Drs. Edeson, Field, and Wilson, of the Institute for Medical Research, Malaya, who had shown that it was refractory to treatment with proguanil. We have now been able to demonstrate in volunteers that it is also resistant to treatment with pyrimethamine. The results, briefly, are as follows:

(1) Four European volunteers were given 25 mg. of pyrimethamine (the present recommended suppressive dose) at the time of first being bitten by infected mosquitoes and again a week later. All four developed overt malaria within 12 days of the first bites. Subinoculations were made in each case on the seventh day, and all the recipients developed overt malaria. Admittedly, irrefutable evidence of cross-resistance between the two drugs is provided by these results only if it is assumed that the dosage regime of pyrimethamine used would have been effective with the parent (non-resistant) strain. But they certainly suggest that such cross-resistance exists for two reasons. First, the overt attack in each volunteer occurred within the usual incubation period of *P. falciparum*, and there was no indication that pyrimethamine had influenced the course of the infection in any way. Secondly, in later experiments (see below) the resistance of the blood parasites to treatment with pyrimethamine was demonstrated.

(2) Two African volunteers, each given 25 mg. pyrimethamine 72 hours after being bitten by infected mosquitoes, and a third, given 100 mg., also at 72 hours, all developed malaria within the normal incubation periods, so demonstrating complete failure of causal prophylaxis. In similar experiments with an African strain of *P. falciparum* pyrimethamine was entirely successful in preventing the development of parasites.

(3) Two European volunteers (recipients of the subinoculations made in the first experiment) with parasites in their blood showed no clinical response when treated respectively with 25 mg. twice daily and 50 mg. once daily. Parasites continued to increase in number, and by the third day in one case and the fourth day in the other the patients were so ill that the treatment had to be changed and chloroquine therapy given.