rum sham is indeed no small matter, seeing that warm nourishment enables a man to shoot better and encourages him to go forward, whereas rum makes him shoot badly and inclines him to sit still or even go back.

There remains another point of no little national importance too. Probably 200,000 to 250,000 men in the ranks now were teetotalers. At the least the empire ought to provide fully for these men who have followed Lord Roberts's lead, and it should not attempt to ruin their physique and moral with a spirit ration, under the false statement that it is "absolutely essential to safeguard their health."

Whatever else happens, if only the foregoing facts are made widely known, the reputation of the medical profession will at least be safe from the accusation that they are responsible for this gross injury done to our country and its defenders.

REFERENCES.

- ¹ Medical Sketches of the Expedition to Egypt from India, 1804.
² Hamilton, A Treatise on Military Surgery and Hygiene, 1865, p. 70 et seq.
³ Notes and Recollections of a Professional Life, Longmans, 1816, p. 73.

BATHS FOR WOUNDED SOLDIERS.*

BY

R. FORTESCUE FOX, M.D.LOND., M.R.C.P.,
 F.R.MET. SOC.

In setting forth the value of medical baths for patients from the military services of the country I shall rely upon a three-fold argument: firstly, historical evidence; secondly, the contemporary practice of other countries; and lastly and chiefly, the known facts as to the action and uses of baths which have afforded in recent years the sure foundation of medical hydrology.

It is not surprising that upon the Continent, which has been so often ravaged by wars, this department of practice should have been studied and followed far more than in our own favoured country. The greatest military empire in history, that of Rome, fully appreciated the value and indeed the necessity of health resorts for its home and colonial populations. We have ample evidence of the fact that not only senators and officials, but the legionaries exhausted by campaigning, had recourse to natural hot baths for periodical treatment and rest. Wherever thermal springs were found bath establishments were maintained by the Government with great care throughout the empire—in Italy, Northern Africa, Egypt, Gaul, Germania, Syria, and Britain. At the sites of many of these baths inscriptions are still found testifying to their medical use by the military. Indeed, for 600 years the Roman *thermae* were regarded as *munera Divum*, and afforded one of the chief means of medical aid to all classes, both for the prevention and the cure of disease.¹ Many of the Roman baths have been irretrievably lost; many were subsequently re-discovered and restored by the Mohammedans; many others have been in continuous use for 2,000 years.

In some Continental countries, as in Italy, the employment of bath treatments for the military has been traditional almost from the Roman period. At the present time there is in many countries an organized system under Government direction.

France.

In France (1) the large military hospitals and (2) the hospitals *militarisés* (that is, civil hospitals used for the reception of military patients) include, in each case, special establishments for the reception of military patients at certain selected watering places and health resorts. These are known as *hôpitaux d'eaux minérales* and *établissements civils d'eaux minérales* respectively.

This branch of the military hospital service is regarded as an essential part of the organization for the after-treatment of soldiers in France. Out of the thirty-three permanent French military hospitals, three are situated at health resorts—namely, that of Vichy with 212 beds, that of Barèges with 225 beds, and that of Amélie-les-Bains with 418 beds. Among the 216 hospitals described as *mixtes* or *militarisés* are included bath hospitals at the well-known spas Plombières, Bourbon-l'Archambault, and Bourbonne-les-Bains, as well as others at climatic resorts

such as Nice, La Rochelle, Dunquerque, and Dieppe. In Algeria and Tunisia there are the military establishments of Hammam R'hira (with 50 beds) and Hammam Lif. It will be noted that some of these hospitals have been set up at the seaside as summer resorts, and that others, like those at Nice and Marseilles, have a winter season but are available throughout the year.

A few particulars of the French *hôpitaux thermales militarisés* may be of interest.

Barèges is a mountain spa at an elevation of 4,000 ft., in the Pyrenees. The waters are thermal and sulphided, containing a glairy organic substance—Barègine—and have enjoyed for three hundred years a reputation for old gunshot and other wounds and painful cicatrices. The thermal baths, like the semi-alpine climate, are stimulating and "excitant," and are taken in vast piscines or bathing-pools, in flowing water at 99° F.

Eaux Bonnes is another of the group of sulphur spas in the Pyrenees. The old name, Eaux des Arquebusades, was given to it after the Béarnese soldiers wounded in the battle of Pavia (1525), who resorted thither to be cured.

Bourbonne-les-Bains, in the Vosges, is a hot spring, feebly muriated and calcareous. Dr. Martin tells me that it has been a resort for wounded soldiers for centuries, and the baths are considered good both for rheumatism and for wounds. The military hospital at Bourbonne has more than 300 beds, and is fitted with a modern equipment for the baths, as well as for massage, hydrotherapy, and mechanotherapy.

Algeria.—Upon the conquest of Algeria by the French in the fourth decade of last century, they found here or there some dilapidated but still massive bathing pools or *piscinae* of the Roman age. It occurred to the French military doctors, familiar with the historical practice in France, to use the thermal waters of Algeria for treating the sequelae of wounds, and for the anaemia and debility in the soldiers which resulted from the climate or from fever and the fatigue of war. The engineers were accordingly directed to restore the Roman baths. The *piscinae* were again excavated, made good and fenced in, and at several of the ancient hot springs a kind of camp was organized, where the officials and the sick were lodged in tents. The results following these simple means were so good that a few years later the military authorities decided to erect regular establishments, of which the first in date was that of Hammam Meskoutine, founded by Médecin Inspecteur Bégin in 1843. Complete statistics of the cases treated at Hammam Meskoutine, including diagnosis and results, were kept from the beginning, and case-records of about 2,000 cases have been preserved.² It is probable that these figures may be accepted as fairly representing the treatment of medical and surgical military cases at thermal baths. Rheumatism accounts for nearly half the total, or 904 cases, including both the civil and military, rheumatic affections being common in Algeria. Of these, 789 were cured or relieved by the baths. The next group is exclusively military, 509 cases resulting from traumatic lesions. These comprised unhealthy or adherent cicatrix, nerve pains, muscular atrophy, bony deformation, articular and periarticular effusions—all following gunshot wounds; also fractures, dislocations, sprains and other injuries. Of 283 cases resulting from gunshot wounds submitted to the baths, 225 were cured or relieved; of fractures 90 out of 101; of dislocations 10 out of 13; of sprains 19 out of 23. At Hammam R'hira the military bath hospital is furnished with three piscines of moving water, also with bathrooms and douches, and has accommodation for fifty officers and men.

Italy.

Italy is the chief inheritor of the Roman tradition, and for hundreds of years Italian physicians have been foremost in the advocacy of the rational employment of waters and climates. I need only refer to Savonarola, grandfather of the ill-fated prophet, to Baccius of Venice in the sixteenth century, to Giannini of Milan in the beginning of the nineteenth century, to Semmola and Vinaj and Maggiora in our day. Professor Casciani, Lecturer on Medical Hydrology in the University of Rome, tells me that there are at present five military bath stations in Italy (*Stabilimenti Balneari Militari*)—namely, Acqui (160 beds), Recoaro (60 beds), Castellamaro-di-Stabia, on the Bay of Naples, and Salsomaggiore (30 beds), besides the hospital at Ischia, founded in 1875, with 120 beds. It is recorded

* Read before the Balneological and Climatological Section of the Royal Society of Medicine.

that the baths of Bormio and Abano were used for soldiers in the sixth century.

In Italy, as in France, most of the great hospitals, civil as well as military, are equipped with appliances for hydrotherapy—that is, for baths at various temperatures and for douches with and without massage, together with the ubiquitous electric light bath, so that in general physiotherapy is available in those countries for hospital patients, including military cases, without recourse to the special treatment of the health resort. Consequently many military patients in those countries obtain bath treatments during their stay in hospital.

The establishments at the Italian health resorts are open in the summer months, and the cure is divided into twenty-day periods, or *mute*. Lists of the cases recommended for treatment are made out in April and "forwarded to the administrative medical officer of the (territorial) division, who prepares a consolidated return, with remarks as to whether the case is suitable or not for undergoing a *mute* in the bathing establishment concerned. This goes to the War Office, and there a general roster of *mute* is prepared and issued to the army corps commanders for necessary action."³ There is a scale of payments, ranging from 1d. a day for privates to 8s. for general officers. Both officers and men may be sent to any of the sea-bathing resorts (*bagni marini*) for similar twenty-day periods of cure, under local divisional arrangements.

Austria-Germany.

In Germany, in addition to the convalescent homes there are seventeen institutions (*Militär-Kuranstalten*) for special after-treatment distributed in various health resorts and watering places. Among them may be mentioned the Wilhelm-Heilanstalt, which was established at Wiesbaden for wounded and sick officers and men after the wars of 1864 and 1866. Wiesbaden has a warm salt water, but the establishment is also fitted for simple hydrotherapeutic and medico mechanical treatment. At Landeck there is a similarly equipped *Militär-Kurhaus*, founded after the Danish campaign in 1864.

Teplitz-Schönau in Bohemia is *par excellence* the "soldiers' spa" for Austria-Germany. The *Militär-bade-Institut* was founded by Friedrich Wilhelm III for the Prussian Army in 1825, with accommodation for 3 officers and 56 men. There are also separate establishments for the soldiers of Austria and of Saxony. The fame of these weakly mineralized thermal waters for wounds and injuries dates, like that of Eaux Bonnes, from the experience of a single battle, the great battle of Leipzig in 1813, after which large numbers of the wounded were brought to Teplitz for treatment. I should also mention the military bath hospital at Nauheim (43 beds); and there are other establishments at Driburg (Westphalia), Norderney, Suderode, Salzburg, and elsewhere.

Austria-Hungary has military hospitals (*Militär-heilanstalten in Kurorten*) at most of the medicinal spas. According to Surgeon-General Macpherson, to whose writings I am indebted for these notes, they are twelve in number—namely, two at Baden near Vienna, and one at each of the following places: Carlsbad, Teplitz-Schönau (already referred to), Herclenles-Fürdo, Hof-Gastein, Pöstyén, Trenčsin-Teplitz, Budapest, Topusco, Lipik, and Töplitz. There is also for the Landwehr an establishment at Esiz.

Russia.

In Russia, according to the same authority, there are twenty-three army medical stations (*sanitarniya stantsii*) devoted to the treatment of sufferers from chronic disease, and for special treatments at health resorts.

United States of America.

The Surgeon-General at Washington informs me that the United States Government maintains an army and navy general hospital at Hot Springs, Arkansas, where suitable military cases obtain the natural baths and medical care at a nominal cost. These springs were reserved many years since by Act of Congress for the use of the State. This institution is at present the only one of its kind in America. It is complete in its hydrotherapeutic appliances, provision being made for all forms of baths, as well as for massage and temperature therapy. I am given to understand that all the larger general

hospitals for the army and navy in the United States are equipped with a system of hydrotherapy.

Japan.

I am told that in Japan wounded soldiers have been sent to the warm salt springs of Yamanaka and Atami, and for rheumatism to the hot sand baths of Beppu.

British Empire.

There is no military bath hospital in connexion with any of the British waters, either in the three kingdoms, or at the hot springs of the empire—whether in India, New Zealand, or elsewhere. Some of the British health resorts are well adapted for such a purpose, and many years ago our Honorary President, Sir Hermann Weber, proposed the establishment of a military hospital at Bath. It should further be borne in mind that in most of the countries we have mentioned the thermal and other springs are the property of the State; and not only the springs, but even the great hospitals are State institutions. A State recognition of health resorts has not hitherto existed in our country.

Chronic Military Disorders Amenable to Bath Treatment.

The reactions of the body in various conditions of disorder and disease to medical baths have been recognized and defined with some precision, and many of them follow with almost mathematical accuracy the slightest variation in the temperature, duration, or other character of the bath.

With reference to surgical indications, I may quote the summary given in the French *Cliniques hydrologiques*.⁴ In simple fracture it is held that consolidation of the bone and restoration of the limb may be accelerated by several months by the use of baths. In compound fractures and where osteitis and necrosis have occurred certain baths, particularly some thermal and sulphur waters, seem to have the power, by modifying the nutrition of the part, to alter the suppurating surface and promote absorption of exudation and the discharge of sequestra. In the case of fractures in the proximity of joints—for example, the knee, with stiffness following immobilization—natural thermal baths at a certain heat bring about decongestion of the tissues and the reabsorption of periarticular exudations and at the same time counteract muscular atrophy and tendinous and articular stiffness. We may note here a familiar observation that the movement of stiff and painful limbs, otherwise almost impossible, may often be performed with comparative ease in deep hot baths. Long-continued baths at a somewhat lower temperature are employed in surgical cases, not only for their general sedative effect, out to reduce oedema, relieve pain, and restore the local circulation.

Every kind of thermal bath is contraindicated, not only in the presence of cardiac weakness, but also in febrile cases, and in acute or subacute or inflammatory conditions of all kinds; and these baths, of which the heat is superior to that of the body, should be exclusively reserved for chronic cases, where the tissue reactions are defective and sluggish, or perverted. It may often be observed in the history of a somewhat protracted case that there comes a moment when a stimulating or thermal bath treatment is indicated, although previously inapplicable. Such stimulating measures would be injurious in the early stages of serious sprains, or in peri-articular contusion, or in a traumatic arthritis or synovitis, in which it is above all necessary to allow the acute symptoms to subside. But two or three months after the accident, should the pain and swelling persist, and muscular atrophy set in, salt or sulphur or thermal baths, according to individual conditions, together with massage, movements, and douches, have their proper and invaluable place.

The degree of heat to be employed in surgical cases needs careful consideration. Continued bathing at a moderate heat is by itself favourable to asepis and to the cicatrization of wounds. But higher or thermal temperatures, to quote again the French *cliniques*, may often be injurious—for example, where an unhealed cicatrix leads to an intermuscular sinus. On the other hand, these thermal temperatures, with or without douches and mechanical treatment, are helpful in the later stages of many injuries, and particularly for nerve lesions, if the

nerve has not been divided or has been reunited, and when motor, sensory, and trophic symptoms result from contusion or concussion of nerves in dislocation of a joint or splintering of bone; and lastly, for removing articular adhesions and contractions, if not of too long standing. The same authorities emphasize the importance in surgical cases of choosing, not only appropriate local treatment, but a bath station which is well adapted to the general condition of the patient's health.

Rheumatic affections bulk largely in the health statistics of armies in times of peace, and the diagnosis "rheumatism" is quite as commonly used for those who are invalided in war. The conditions so designated are, of course, various, but sometimes appear to be analogous to what has been described as "fatigue fever," met with after extreme and long-continued physical exertion—as in forced marches, especially when the men are not fully trained. An excessive muscular metabolism causes in this condition an accumulation of waste products within the muscles, and a slight general septic intoxication, the symptoms being exhaustion and stiffness and acute pain on movement. If the muscular work is too greatly prolonged, what has been called "organic exhaustion" ensues, perhaps with cerebral disturbance.³

In slighter cases immediate relief is obtained by stimulating the circulation in the muscles, and so sweeping away the waste products. A good example of this rapid cure of abnormal fatigue is the regulation hot bath after a day's hard deer-stalking in Scotland. We are told that at the front hot baths are now greatly appreciated by men fatigued from duty. Even when the case is serious and of many weeks' duration, the judicious use of hyperthermal baths sometimes gives surprising relief.

Professor Russell of Edinburgh has recently given me a verbal account of some soldiers admitted under his care in the Royal Infirmary from the fighting line in France. Those men had been in the retreat from Mons and in the advance to the Aisne, and had been invalided on account of "rheumatism." One of the men who was in the R.F.A. was so bad before he left the front that he had to be helped on to his horse, and when admitted to the infirmary seemed to have little power in his legs. All the men were very greatly and promptly relieved by a hot bath; the effect in the artilleryman was marked and immediate. The treatment in all the cases was curative. The bath was used as hot as the patient could bear it, and some ammonia was added to the water.

Painful synovitis in a single joint, especially the knee, appears to be common in those who have occupied cramped positions in the trenches. In others there are deposits and thickenings in the connective tissues, more or less generalized, to which the names "fibrositis" and "neuritis" are variously applied. Such cases, when the acute phase has passed away, furnish a large proportion of successes in practice at the health resorts.

Finally, with reference to nervous disorders, to the prevalence of which, especially amongst officers, there is much evidence, we have a sure basis for hydrological practice. It has been proved that treatments operating upon the surface of the body have a powerful influence not only upon the circulatory but upon the nervous system. Moreover, according to the procedure employed, it is within our power to obtain widely different, and indeed opposite, results. For example, with a proper choice of temperature we may stimulate and increase, locally or generally, a depressed nervous action. At another range of temperature we can with equal readiness mitigate and diminish an excessive action, and that is as regards temperature alone. It is not too much to say that functional disturbance in either direction is amenable to surface treatment.

It follows that in many nervous disorders stimulant or sedative baths, skilfully adjusted to the case in hand, can be suitably employed. Where a stimulant effect is desired, hot-air and other thermal baths and douches are to be preferred; but where, as is now too often the case, a more profound exhaustion is shown by irritability, depression, and insomnia, the sedative type of bath, given at a lower range of temperature, and often continued for a considerable time, can be recommended.

In chronic nervous diseases and disorders but little distinction can be drawn between military and civil cases, but the treatment of these affections forms an important chapter in hydrological medicine.

Taken together, the foregoing indications, medical and surgical, appear to point to the conclusion that baths of one kind or another have an important place in the treatment of military cases. The treatment must first of all be in the hospital, if and when such baths are to be found; secondly, in the town, where adequate baths and also means of transport are available; and thirdly, in the last stage, at the health resort.

During the coming year many men will leave our hospitals free from acute trouble, but suffering from its results. Not a few will exhibit, in addition to their local injuries, the effects of physical and mental shock. They cannot be returned to their homes, or even to convalescent homes, without further relief. They will need not only patient and prolonged care, but the knowledge that something is being done for them. The necessary physical and psychical remedies belong to the health resorts. Indeed, the health resort has for its object to apply those remedies with science and sympathy to the problem of incipient and chronic disease.

REFERENCES.

¹ Spender, *The Bath Thermal Waters*, 1882. ² Henriot, *Les eaux minérales de l'Algérie*, 1911. ³ Macpherson, *Handbooks on the Medical Services of Foreign Armies*. ⁴ *Bibliothèque de thérapeutique clinique*, 1909. ⁵ A. Mosso, *Fatigue*, 1904.

Memoranda:

MEDICAL, SURGICAL, OBSTETRICAL.

PETROLEUM IN LARYNGEAL DIPHTHERIA.

I WOULD like to call attention to the treatment I have adopted in four consecutive cases of laryngeal diphtheria sent into Sheriff Hill Isolation Hospital for tracheotomy. Their respective ages were 3, 2½, 4, and 2 years. Two of the cases were in such a condition on arrival that I considered them past operative interference; the other two were breathing badly, yet in such a condition as to foster an idea of success after tracheotomy.

Tracheotomy was not performed in any of the cases. I injected 4,000 units of antidiphtherial serum, and afterwards administered ordinary petroleum oil (the taste being covered with decoctum sarsae co.), in 30 minim doses, for three successive doses, every four hours, and afterwards reduced to 10 minims three or four times daily up to the establishment of normal breathing, which in each case occurred in about forty-eight hours.

From the first the breathing was slightly easier, but not to the extent of dispelling anxiety, yet with each successive dose it became more tranquil. When it became normal the petroleum was stopped, a dose of castor oil given, and a mixture containing tr. lobel. aeth. and vin. ipecac. substituted.

There were no distressing symptoms accompanying the petroleum such as irritation of the stomach, vomiting, diarrhoea, rapid pulse, or rise of temperature. In two cases the petroleum could be smelt in the perspiration, in three cases in the urine and faeces; in the fourth case it was not smelt in any of the excretions.

It is difficult to know how much credit can be claimed for the antitoxin, but suffice it to say that I have seen similar cases die with repeated doses of antitoxin both with and without tracheotomy, yet these four successive cases all recovered without any paralysis or other bad after-effects. I cannot but infer that the petroleum was the agent which brought about the recoveries.

These cases too were in *extremis*, and I feel so satisfied of the efficacy of petroleum that I am convinced many lives would be saved by its early application in the conditions variously diagnosed spasmodic croup, membranous croup, and laryngeal diphtheria.

I believe petroleum to possess great potentialities for other diseases provided it be given a fair and just trial by an unbiased mind. The petroleum oil used was a good clear specimen obtained for ordinary lighting purposes. I am not certain that oil which may be considered medicinally purified will give the same results, for it is just possible that in the purification the active and necessary agents (whatever they may be) for our purpose may be extracted.

T. M. CLAYTON, M.D., D.Hy., F.R.S.E.,

Gateshead,

Medical Officer of Health.