BACTERIOLOGY IN THE NEXT WAR.
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I.
In war, an army is opposed not by one enemy but by two. One is the hostile enemy, and the other, an enemy common to both armies, is disease. In this sense an army fights on two fronts. On the military front it can assume the offensive or rest on the defensive at the will of its commander, though victory is to be won only as the result of offensive action. But on the disease front a steady defensive must ever be maintained, for the initiative rests always on the side of disease.

An army in the field possesses eyes and ears, important organs, necessary for the attainment of victory, which are represented on its military front by aircraft, intelligence, cavalry, cyclists, tanks and other mobile troops; on the disease front the eyes and ears of an army, less fully developed, are located chiefly in its mobile laboratories.

II.
An important aspect of military medical administration in future wars is the development of these eyes and ears, in order to “speed up” and facilitate two essentials required for the adequate protection of an army against disease—early, accurate diagnosis and early disease detection, carried out among the troops in the front line when the soldier first reports sick, and not after arrival at the casualty clearing station. The able and interesting article on “Laboratory Diagnosis in the Tropics and Sub-tropics in War Time,” contributed to the Royal Army Medical Corps Journal by Major Philip Manson-Bahr, D.S.O., merits our close attention, as it demonstrates the value of mobile diagnosis units to a force, and shows clearly that the bacteriologist and his laboratory cannot continue to be restricted to the back area of an army and the lines of communication, as his presence is equally required in the midst of the fighting troops. In the next war the bacteriologist and his laboratory, more mobile and forming part of an expanded service, may become a permanent addition to the R.A.M.C. of an infantry division.

III.
Major Manson-Bahr suggests also that the regimental medical officer should be equipped with microscope, stains and slides. This raises another point which will require consideration, and that is whether the divisional medical units and the regimental medical officers are to continue to work
under the professional limitations necessarily imposed upon them during the late war or whether, more particularly as regards means of carrying out scientific diagnosis and treatment, they should be equipped with instruments and material formerly considered unnecessary and unsuitable for the forward area.

IV.

Bacteriology is a science which is capable of rendering great service to the high command of an army in the conservation of fighting man-power, by early detection of commencing epidemic disease. It can do this more effectively if it is more universally employed in the forward area. The present establishment of mobile laboratories is one hygiene and two bacteriological for each army. (Casualty clearing stations are provided with laboratory equipment.) On this scale one bacteriological laboratory serves two corps and this does not appear sufficient to allow of effective employment, more especially in Eastern theatres. So essential has the laboratory become to the profession that even now it is doubtful whether a mobile medical unit such as the field ambulance can fulfil efficiently all the functions that it may be called upon to perform in war if it continues without laboratory equipment. Able to operate along the simple, straightforward lines of action like the collection and evacuation of casualties, but unable without outside assistance to pierce the gloom of difficult diagnosis, as in malaria and other diseases that cripple an army in war, *is not a field ambulance without laboratory equipment in the same condition as a motor-car without headlights?*

V.

The principle of evacuation, the foundation of medical policy in war, is partly responsible for the retention of the bacteriologists in the rear of an army.¹ The speedy removal of the sick and wounded from the fighting troops limits the professional scope of the regimental medical officers and those of the field ambulances, as their duty towards the serious case is to evacuate him as soon as possible. The presence of a medical officer with a battalion in the line is necessary, but more perhaps on account of reasons connected with hygiene and *moral* than with medicine and surgery, as in those his duty is little above what is termed “First-aid.” As the late war progressed the scope of the field ambulances was narrowed by the rise in importance of the casualty clearing stations, first with regard to surgery and later with regard to medicine, as, for example, when a casualty clearing station was set apart for the investigation and treatment of dysentery cases occurring in divisions.

¹ *Note.—* The principle of evacuation tends to keep all specialists “down the line;” the patient being evacuated if requiring specialist advice. Within certain defined limits this tendency has to be watched. Evacuation of cases requiring specialist’s advice can be overdone.—M. B. H. R.
Thus it came about that the infantry division, a community of 15,000 souls with about thirty-five medical officers on its establishment, was devoid of specialist or scientific personnel and equipment, though every kind of specialist assistance was available for the use of this community a few miles away to the rear. There was no microscope nearer to the line than the casualty clearing stations and mobile laboratories. Motor transport enabled the bacteriologists to visit divisional areas when required, and this arrangement worked satisfactorily in France where communications were good and the casualty clearing stations within a few miles of the line.

In the case of the dental service which was located at the casualty clearing stations, it has now been recognized that the community of 15,000 requires a permanent dental establishment of its own up in its midst. It appears equally important for the bacteriological service to be represented in the division also.

VI.

The future role of bacteriology and the bacteriologist in medicine is apparent even now in routine peace duty in the wards of a military hospital in a tropical or sub-tropical station. An officer in charge of cases of commencing tropical diseases—"N.Y.D. pyrexia" for example—if not himself doing bacteriological work, is dependent on the bacteriologist for the early accurate diagnosis of his cases. If use is not made of the scientific methods of investigation which are available, diagnosis is based on what is little more than guess-work. A good clinical sense is a valuable asset, but in tropical diseases it does not possess the same range of action as the laboratory. Diagnosis was determined formerly by the consideration of physical signs, symptoms and progress of a case, and was confirmed or not by the laboratory findings; but the process has become reversed, as it is the laboratory that is the chief factor in diagnosis, symptoms and physical signs having become supplementary because the essential point is the identification of the organism causing the disease.

The physician, suspecting some disease and requiring confirmation of his opinion, would call in the bacteriologist; nowadays it is frequently the bacteriologist, seeing and investigating cases in the early stages, who puts the physician on his guard. The microscope has supplanted the stethoscope and the bacteriologist has begun to supplant the physician; the former (the bacteriologist) is the complement of the latter, for a physician in charge of tropical and many other types of cases, if not himself carrying out laboratory methods of diagnosis, cannot move along his ward from bed to bed and investigate cases intelligently on modern scientific lines without a bacteriologist beside him. At the present day "the Lab's the thing."

VII.

As the great war period recedes slowly from us, we have to readjust our orientation of medicine to future wars in accordance with changing
conditions and the advance of the scientific side of the profession. What was not required in the medical organization of an army in 1918, or was too elaborate or non-portable for use at the front, may have become an essential and a matter of everyday routine before another British army takes the field. The new generation of medical men will be better instructed and more competent to undertake bacteriological work as it becomes more generally employed in practice and more relied upon for diagnostic purposes. The microscope will become an instrument which the regimental medical officer cannot do without, and the more tropical the theatre of war the more indispensable does the microscope become. The absence of the microscope from the divisional medical units of the great war is remarkable; the provision of microscopes was never suggested in France so far as the writer is aware. It is interesting, however, to recall that in India fifteen years ago the then Director of Medical Services considered that the microscope was a necessary article of the regimental medical officer’s equipment.

The mobile laboratory in France, having to deal with the needs of two or more corps and several casualty clearing stations, surrendered its mobility and overflowed into a building in order to become a large central institution. In the next war it must regain its mobility and limit its sphere of action to a smaller formation, probably the division (or its equivalent in man-power if another type of formation is created). Expansion of the bacteriological service will take place; early, accurate diagnosis and early disease detection are factors of immense administrative importance which cannot be effectively realized without an expanded service.

VIII.

In the majority of diseases that menace the man-power of an army in war, a scientific diagnosis is obtainable in the commencing phases of the illness—in some cases it is more accurately made than than later. And in the case of an early-recognized illness, treatment on the correct lines can be commenced at a time when it is most likely to bring about an early cure. Also, pathological specimens do not travel well, and communication between divisions and rear medical units does not permit of the rapid dispatch of specimens and the early notification of results.

Taking these points into consideration, it is obvious that the patient and the bacteriologist must be within reasonable distance of each other, so that the patient can be attended in the early stages of his malady and the bacteriologist can deal with fresh specimens.

IX.

A consideration of the potentialities of bacteriology in future wars will demonstrate how important it is likely to become. If the high command of an army in the field is to obtain full value from its medical service, the
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more general employment of mobile laboratories is essential. Whether a lighter type of vehicle will be employed, working in close communication with more elaborate institutions in rear, whether one field ambulance of a division will have a laboratory attached, and whether the distinction between the hygiene and the bacteriological laboratories will continue under future war conditions, are matters of technical administration that are outside the limit of this article. But the routine bacteriological examination of water supplies used by the troops at the front may become necessary in the future in order that an army may know the quality of water it is drinking, and whether purification is effective; if so, this is another rôle for the divisional mobile laboratory to play.

X.

The bacteriologist and his laboratory belong to that important group of units termed the eyes and ears of an army, and under some circumstances may be as necessary for the attainment of victory in the field as any other member of the group. The laboratory is a medical unit; it is in effect a valuable agent in the conservation of fighting man-power, and its military aim is to protect each individual soldier in a force from disease, so that on the day of battle he may be at his post and not in a hospital bed.

On this assumption the mobile laboratory is a unit to be employed in the forward area where its presence is most required, and one that must take the risk of being put out of action by hostile shelling. And its replacement is relatively less costly than most of the other eyes and ears of an army. "Good laboratories and plenty of them" is an axiom of medical administration in future warfare; with the assistance that increased bacteriological facilities can afford, we shall be enabled to go a long way towards the solution of problems that still baffle us in our endeavours to maintain a successful defensive on the vulnerable disease front of an army in war. Without this assistance a medical service will be working only by candlelight.