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BACILLI AND BULLETS

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AN ADDRESS TO THE OFFICERS AND MEN IN THE CAMPS AT CHURN

I HAVE been asked to say a few words on the question of health in war-time, that you may realize its importance. Formerly an army marched on its belly ; *now* it marches on its brain. Only by utilizing existing knowledge, in all grades from Commander-in-Chief to private, is the maximum of success available. To put the largest number of the enemy out of action with a minimum of loss to his own men is the aim of every general. While in one way modern war merges the individual in a great machine, on the other hand the intelligent action of the unit has never been so important a factor in making the machine work smoothly and efficiently. After all, it is the man behind the gun who wins the victory.

What I wish to urge is a true knowledge of your foes, not simply of the bullets, but of the much more important enemy, the bacilli. In the wars of the world they have been as Saul and David—the one slaying thousands, the other tens of thousands. I can never see a group of recruits marching to the dépôt without mentally asking what percentage of these fine fellows will die legitimate and honourable deaths from wounds, what percentage will perish miserably from neglect of ordinary sanitary precautions ? It is bitter enough to lose thousands of the best of our young men in a hideous war, but it adds terribly to the tragedy to think that more than one-half of the losses may be due to preventable disease. Typhus

fever, malaria, cholera, enteric, and dysentery have won more victories than powder and shot. Some of the diseases I mention need no longer be dreaded. Typhus and malaria, which one hundred years ago routed a great English army in the Walcheren expedition against Antwerp, are no longer formidable foes. But enough remain, as we found by sad experience in South Africa. Of the 22,000 lives lost in that war—can you believe it ?—the bullets accounted for only 8,000, the bacilli for 14,000 ! In the long arduous campaign before us more men will go into the field than ever before in the history of the Empire. Before it is too late, let us take every possible precaution to guard against a repetition of such disasters. I am here to warn you soldiers against enemies more subtle, more dangerous, and more fatal than the Germans, enemies against which no successful battle can be fought without your intelligent co-operation. So far the world has only seen one great war waged with the weapons of science against these foes. Our allies the Japanese went into the Russian campaign prepared as fully against bacilli as against bullets, with the result that the percentage of deaths from disease was the lowest that has ever been attained in a great war. Which lesson shall we learn ? Which example shall we follow, Japan, or South Africa with its sad memories ?

We are not likely to have to fight three of the greatest of former scourges, typhus, malaria, and cholera, though the possibility of the last has to be considered. But there remain dysentery, pneumonia, and enteric, against two of which we should be able to bring to bear successfully resources of modern science.

Dysentery, an inflammation of the large bowel, has been for centuries one of the most terrible of camp

diseases, killing thousands, and, in its prolonged damage to health, one of the most fatal of foes to armies. So far as we know, it is conveyed by water, and only by carrying out strictly, under all circumstances, the directions about boiling water can it be prevented. It is a disease which, even under the best of circumstances, cannot always be prevented ; but with care the incidence should be reduced to a minimum, and there should never again be widespread outbreaks in the camps themselves.

Pneumonia is a much more difficult disease to prevent. Many of us, unfortunately, carry the germ with us. In these bright days all goes well in a holiday camp like this ; but when the cold and the rain come, and the long marches, the resisting forces of the body are lowered, the enemy, always on the watch, overpowers the guards, rushes the defences, and attacks the lungs. Be careful not to neglect coughs and colds. A man in good condition should be able to withstand the wettings and exposures that lower the system, but in a winter campaign pneumonia causes a large amount of sickness and is one of the serious enemies of the soldier.

Above all others one disease has proved most fatal in modern warfare—enteric, or typhoid fever. Over and over again it has killed thousands before they ever reached the fighting line. The United States troops had a terrible experience in the Spanish-American War. In six months, between June and November, inclusive, among 107,973 officers and men in 92 volunteer regiments, 20,738, practically one-fifth of the entire number, had typhoid fever, and 1,580 died. Fortunately, in this country typhoid fever is not prevalent in the districts in which camps are placed. The danger is chiefly from persons who have already had the disease and who carry the germs in their intestines, harmless messmates in

them, but capable of infecting barracks or camps. You can easily understand how flies lighting on the discharges of such typhoid carriers could convey the germs far and wide. It was in this way probably, and by dust, that the bacilli were so fatal in South Africa. Take to heart these figures: there were 57,684 cases of typhoid fever, of which 19,454 were invalided, and 8,022 died. More died from the bacilli of this disease than from the bullets of the Boers. Do let this terrible record impress upon you the importance of carrying out with religious care the sanitary regulations.

One great advance in connexion with typhoid fever has been made of late years, and of this I am come specially to ask you to take advantage. An attack of an infectious disease so alters the body that it is no longer susceptible to another attack of the same disease; once a person has had scarlet fever, small-pox, or chicken-pox, he is not likely to have a second attack. He is immune, or has what is called immunity. When you expose a solution of sugar to the air, or if you add to it a pinch of yeast, a process goes on which we call fermentation, accompanied by a growth of little germs of the yeast in the fluid, and by an increase in temperature (in fact the solution has a fever), and the composition of the fluid alters, so much so that you can inoculate it afterwards again and again with the same germ, but no further change takes place. Now this is what happens to us when bacilli make a successful entry into our bodies. They overcome the forces that naturally protect the system, and grow just as the yeast does in the sugar solution; but the body puts up a strong fight, all sorts of anti-bodies are formed in the blood, and if recovery takes place, the patient afterwards has immunity, for a time at least, from subsequent attacks. The body has mobilized its

forces, and is safe for a few years at least against that disease. It was an Englishman, Jenner, in 1798, who found that it was possible to confer this immunity by giving a person a mild attack of a disease, or of one very like it. Against small-pox all of you have been vaccinated—a harmless, safe, and effective measure. Let me give you a war illustration. General Wood of the United States Army told me that, when he was at Santiago, reports came that in villages not far distant small-pox was raging and the people without help of any kind. He called for volunteers, all men who showed scars of satisfactory vaccination. Groups of these soldiers went into the villages, took care of the small-pox patients, cleaned up the houses, stayed there until the epidemic was over, and not one of them took the disease. Had not those men been vaccinated, at least 99 per cent. of them would have taken small-pox. Now what I wish to ask you is to take advantage of the knowledge that the human body can be protected by vaccination against typhoid fever. Discovered through the researches of Sir Almroth Wright, this measure has been introduced successfully into our own regular army, into the armies of France, the United States, Japan, and Germany. I told you a few minutes ago about the appalling incidence of typhoid fever in the volunteer troops in America during the Spanish-American War. That resulted largely from the wide prevalence of the disease in country districts, so that the camps became infected: and we did not then know the importance of the fly as a carrier, and other points of great moment. But in the regular army in the United States, in which inoculation has been practised now for several years, the number of cases has fallen from 3·53 per thousand men to practically nil. In a strength of 90,646 there were in

1913 only three cases of typhoid fever. In France the enteric rate among the unvaccinated was 168·44 per thousand, and among the vaccinated ·18 per thousand. In India, where the disease has been very prevalent, the success of the measure has been remarkable. In the United States, and in France, and in some other countries this vaccination against the disease is compulsory. It is not a serious procedure; you may feel badly for twenty-four hours, and the site of inoculation will be tender, but I hope I have said enough to convince you that, in the interests of the cause, you should gladly put up with this temporary inconvenience. If the lessons of past experience count, any expeditionary force on the Continent has much more to fear from the bacillus of typhoid fever than from bullets and bayonets. Think again of South Africa with its 57,000 cases of typhoid fever! With a million of men in the field, their efficiency will be increased one-third if we can prevent enteric. It can be prevented, it *must be prevented*; but meanwhile the decision is in your hands, and I know it will be in favour of your King and Country.