"Sanitary effort in the army: what has it done, and what has it failed to do?", by Lieutenant Colonel R.H. Firth, RAMC, the Presidential Address to the Section on Naval and Military Hygiene of the London Congress

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SANITARY EFFORT IN THE ARMY: WHAT HAS IT DONE, AND WHAT HAS IT FAILED TO DO?

BY

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Being the Presidential Address to the Section on Naval and Military Hygiene of the London Congress.

In taking the chair this morning I desire to place on record my appreciation of the privilege and honour conferred upon me by my nomination to preside over this important Section of this Congress. From the nature of their duties officers of the naval and military medical services of the Crown have to take a very large share in carrying out the principles which are the objects of The Royal Institute of Public Health; and I think in nearly all sanitary developments during the past we may claim legitimately to have played no small part, while in the future there is every prospect of our playing an even greater part.

My first duty as President of this Section is to extend a cordial welcome to all who have come to take part in these proceedings. I do this with all sincerity, for I appreciate fully the difficulties which those experience who, in their devotion to science and the service, have prepared papers for discussion. I need hardly say that I trust your presence may result not only in pleasure and interest to yourselves, but also in some definite addition to our knowledge of sanitary science.

In taking the position of your President to-day, I am conscious of a difficulty; it is that I have to give an introductory address. Personally, I am disposed to regard the President's address as a somewhat unnecessary part of the Section's meeting—in fact, as someone has aptly said, bearing the same relation to the actual work of the Section as the *hors d'œuvre* at a dinner to the more satisfying fare which follows. In considering what subjects might be suitable for a few remarks to you to-day, I have fallen back naturally upon that topic in which I am most keenly interested—namely, army sanitation—and if in my remarks upon this well-worn theme I fail to put before you any new facts or views, I hope I may not fail to gain your interest and attention to what is really one of the great questions of the day.

In attempting to focus your attention upon this truly important subject, let us consider the answers to three main questions: (1) What has sanitary effort done for the army in the past? (2) What is sanitary effort doing for the army in the present? (3) What is sanitary effort going to do for the army in the future?

To the greater number of you, doubtless, the answer to the first question is sufficiently familiar, but to meet the case of those who may not be so conversant with the facts, permit me to make the following retrospect. The earliest records regarding sickness and mortality in the army upon which we can place any reliance are those prepared and issued intermittently during the period between the close of the Peninsular War and the outbreak of that in the Crimea. From these data we are able to construct the accompanying Table I., showing the average amount of sickness and mortality among every 1,000 men serving at each of the undermentioned garrisons during the periods specified:

TABLE I.

Garrison.	Period or Year.	Annual Ratio per 1,000 of Strength.		Period or Year.	Annual Ratio per 1,000 of Strength.	
		Admitted as Sick.	Died.		Admitted as Sick.	Died.
United Kingdom:						
Household Cavalry	1830-1836	—	14·5	1837-1846	—	11·1
Cavalry of Line ...		929	15·3		961	13·6
Foot Guards ...		830	21·6		862	20·4
Infantry of Line ...		946	21·6		1,044	17·9
Gibraltar	1818-1836	966	22·3	1837-1856	976	12·9
Malta	1817-1856	1.142	18·7	,,	1,128	18·2
Ionian Isles	,,	1,201	28·3	,,	1,168	17·9
Bermudas	,,	1 310	35·4	,,	1,080	35·5
Canada	,,	1,097	20·0	,,	950	17·2
Nova Scotia	,,	820	17·8	,,	836	15·1
Newfoundland ...	1825-1836	1,143	37·7	,,	689	11·0
Windward Isles ...	1817-1836	1.903	81·5	1837-1853	1,892	62·5
Jamaica	,,	1,812	128·0	1837-1855	1,371	60·8
Sierra Leone	1819-1836	2,978	486·0	,,	—	—
St. Helena	1816-1822	738	25·4	1837-1856	906	12·3
Cape, South Africa ...	1818-1836	991	15·6	1838-1856	875	15·9
Mauritius	,,	1.249	30·5	,,	909	24·0
Ceylon	1817-1836	1,678	74 9	1837-1857	1,407	38·6
India:						
Bengal	,,	1,577	75·6	1838-1856	2,047	76·2
Madras	,,	1,783	76·1	,,	1,741	41·5
Bombay	,,	1,451	62·8	,,	2,117	60·9
Tasmania	,,	—	—	1839-1856	726	11·8
New Zealand	,,	—	—	1844-1856	529	12·7

Although no elaborate details are given in these early returns, sufficient information is afforded to show how enormous was the death-roll, not only in some of our foreign garrisons, but also at home, during the earlier years of the last century. For further information concerning the sanitary condition of our army at that period we are largely indebted to the "Report on the Health of the English Soldiers Quartered in England," published in 1858. As directly bearing upon the present study, a brief review of the great and now almost forgotten facts contained in that report will be of interest.

From tables contained in the report it appears that in the period immediately preceding the Crimean War the annual mortality per 1,000 of strength among effective men of all ages in the army at home was 17·5.

In the Household Cavalry it was	11·0
,, Dragoon regiments ...	13·3
,, Foot Guards	20·4
,, infantry of the line ...	18·7

Among the civil male population of the same ages as the men in the army, the annual mortality per 1,000 persons was at that time:

In the town and country population ...	9·2
,, country alone	7·7
,, town of Manchester	12·4

Expressed in a different way, the mortality per 1,000 soldiers at home and of 1,000 persons of the civil male population at corresponding periods of age gave the following striking contrasts:

Ages 20 to 25 ...	...	Civilians 8·4
		Soldiers 17·0
Ages 25 to 30 ...	...	Civilians 9·2
		Soldiers 18·3
Ages 30 to 35 ...	...	Civilians 10·2
		Soldiers 18·4
Ages 35 to 40 ...	...	Civilians 11·6
		Soldiers 19·3

From these data we are able to conclude that had the army at home in 1858 been as healthy as the population from which it was drawn, the soldiers of that day would have died at one-half the rate at which they then died. Nor does this represent all that can be said, for, as the soldier's life was a picked life, as all men wishing to enlist

were rejected if they bore signs of physical weakness or any tendency to disease, and as all, even after enlistment, could be discharged on the representation of the regimental surgeon at any period within three years after admission into the army, all these rejected lives were thrown back on the general population.

Other facts are given in that report which show that, within corresponding ages, the mortality of soldiers at that time was something like two and a half times as great as the mortality of agricultural labourers, and about twice as great as that existing among indoor workers, such as printers. In attempting to elucidate the causes of this excessive mortality among soldiers of that day the Commissioners supplied a table, from which it appeared that, while in civil life at the soldiers' ages the deaths by pulmonary or chest diseases were 6·3 per 1,000, they amounted in the cavalry to 7·3, in the infantry of the line to 10·2, in the Guards to 13·8 per 1,000; and that of the entire number of deaths from all causes in the army, diseases of the lungs constituted the following proportion—namely, in the cavalry, 53·9 per cent.; in the infantry of the line, 57·2 per cent.; and in the Guards no less than 67·6 per cent. In commenting upon these figures, the Commissioners said: "It may be stated that in civil life insufficient clothing, insufficient and unwholesome food, sedentary and unwholesome occupations, and the vitiated atmosphere of unhealthy dwellings, all contribute to the prevalence of this class of diseases. But in the army it cannot be alleged that the clothing, the food, or the nature of the occupation itself are of a character which would justify the imputation that they are among the predisposing causes of the excessive mortality of the soldier by pulmonary disease."

To trace out the cause of this excessive lung disease in the army at home the Commissioners next proceeded to the investigation of the cause by a process of exclusion. Thus they were able to exclude as efficient causes night duty, want of exercise and suitable employment, intemperate and debauched habits; while they were led to discover a perfectly efficient and contributing cause in overcrowding, insufficient ventilation and nuisances arising from latrines and defective sewage in barracks. One cause alone, vitiated air, acted with such intensity, especially when added to a certain amount of exposure, as not only to produce in the Foot Guards an amount of the disease in question greater than was produced in civil life by all the four causes united, but which actually carried off annually a number of men in the infantry nearly equalling, and in the Guards actually exceeding, the

number of civilians of the same age who died of all diseases put together. In further support of this view they compared the mortality of the army when it was hutted before Sebastopol in 1856 with that of the troops at home, and discovered that the mortality before Sebastopol was nearly one-third less than the mortality of the infantry of the line, and two-fifths less than that of the Foot Guards when barracked in England. The numbers were as follows: The mortality of the army before Sebastopol during the twenty-two weeks ending May 31, 1856, was, including deaths by violence or accident, at the rate of but 12·5 per 1,000 per annum, as against 17·9 in the infantry and 20·4 in the Guards when at home. These are facts which should be borne in mind when considering the circumstances and hygiene of the modern barrack-room.

If the foregoing is a true picture of what was the state of affairs in 1858, it may be asked legitimately, What is the state of affairs to-day? We can truly say, infinitely better. The lessons so clearly demonstrated in the report, from which I have quoted, were taken to heart, and, thanks to the initiation of a wise policy of sanitary reform, also the amelioration not only of the housing of the soldiers, but of the general conditions of service, a notable change for the better has resulted both in the total mortality among soldiers and in the ineffectiveness resulting from general disease-prevalence. How far this favourable conclusion is warranted will be apparent from a study of our modern statistics relating to the health of the army.

As a comparative statement, the accompanying Table II. has been constructed to illustrate on these lines the varying incidence of disease and its effects upon efficiency in the army for the two years 1859 and 1903, these being the earliest and latest periods for which reliable facts can be obtained. It will be seen at once that the figures show a marked improvement upon those already given as to the conditions existing before the Crimean War. But bearing in mind that the military service represents a picked male population, and that those unable to maintain the required physical standard are rapidly eliminated, we are hardly justified in accepting them as the high-water mark of sanitary efficiency. Looked at in this light, there is every reason for further serious effort being made toward a reduction of total admissions for sickness and those dying from sickness. On the whole, we are disposed to think the figures for the United Kingdom distinctly good, and if we contrast the mortality at the present time among soldiers serving at home with that of the

TABLE II.

European Troops.	Ratio per 1,000 of Strength.								Days of Duty lost by each Sick Soldier.	
	Admissions for Sickness.		Deaths.		Invalided for Sickness.		Constantly non-effective by Sickness.			
	1859.	1903.	1859.	1903.	1859.	1903.	1859.	1903.	1859.	1903.
All troops at home and abroad	1,120	758	18·2	7·13	16	19	58	47	17	21
United Kingdom ...	1,028	587	8·9	3·41	13	21	60	35	19	13
Gibraltar	948	397	7·7	4·05	11	9	47	29	17	11
Malta	1,213	620	19·0	6·34	9	16	52	45	19	16
Ionian Islands ...	881	—	12·5	—	5	—	45	—	16	—
Egypt and Cyprus ...	—	748	—	5·05	—	7	—	44	—	16
Canada	545	323	10·4	3·02	15	10	28	19	10	7
Nova Scotia	557	—	7 2	—	7	—	22	—	8	—
Barbados	1,050	894	6·3	5·67	—	11	—	54	—	20
Jamaica	1,335	842	14·4	3·55	4	19	58	44	9	16
Bermuda	537	531	13·9	3·49	7	11	35	28	13	10
West Africa	580	1,929	25·0	15·15	—	15	—	67	—	24
South Africa	923	787	11·3	11·06	13	27	49	60	18	22
St. Helena	802	713	13·0	7·41	—	34	36	44	13	16
Mauritius	1,236	861	16·1	5 36	11	8	49	71	17	26
India	1,814	1,035	32·2	13 33	12	13	68	63	25	23
Ceylon	1,693	738	35 0	11·14	9	7	70	38	25	14
Straits Settlements ...	—	1,749	—	14·76	—	11	—	78	—	27
China	2,783	1,636	59·4	10·66	89	18	169	92	—	33

civil male population of corresponding ages, we find the ratio by no means unfavourable to the soldier. The following statement is on a basis of a thousand persons:

Ages 20 to 25 ...	...	Civilians 4·1 Soldiers 3·4
Ages 25 to 30 ...	...	Civilians 5·8 Soldiers 4·7
Ages 30 to 35 ...	...	Civilians 8·2 Soldiers 7·0
Ages 35 to 40 ...	...	Civilians 9·6 Soldiers 9·8

Satisfactory as these figures may be, there is no disguising the fact, however, that the same cannot be said with regard to white troops doing duty in tropical climates. I do not wish to imply that there has been no improvement, for that there has been; but the statistics suggest that we are marking time rather than advancing. It is conceivable that climatic conditions in the tropics furnish obstacles against a constant reduction in rates proportionate to that which has occurred in the home garrisons, still we must not remain content with the present conditions. Much remains to be done, and there is no reason to doubt that the current rates of disease incidence in more than one of our tropical and colonial stations can be much reduced.

So far I have spoken only of peace conditions; what are the facts in regard to war? and have the effects of sanitary effort been as equally satisfactory in the camp as in the barrack? The answer to these questions is not altogether easy to give, mainly because the data are not strictly comparable. The facts in regard to some of our earlier wars are difficult to obtain, owing to faulty statistical methods and the absence of reliable records. Perhaps one of the most notoriously mismanaged campaigns in our history was the Walcheren expedition of 1809, in which the mortality from diseases was 347 out of every thousand effective, while only 16·7 per 1,000 of strength were killed by the enemy. In the Peninsular War we lost three times as many men by disease as by the acts of the enemy, and the sick-rate was so great that it was estimated that more than twice the number of the whole army passed through the hospitals during the year. In the Crimea our mortality from disease amounted to a ratio of 230 per 1,000 of strength, while our losses from wounds were practically 150 per 1,000. Confining our attention to more recent experiences, especially in the various tropical and subtropical expeditions, which constitute so large a part of our field service, the acccompanying

TABLE III.

SHOWING THE LOSSES BY DISEASE AND INJURIES IN SOME RECENT WARS.

Expedition or War.	Ratios per 1,000 of Strength.					
	Admissions.			Deaths.		
	For Disease.	For Wounds or Injuries in Action	Total.	From Disease.	From Wounds or killed in Action.	Total.
Ashanti, 1873-1874 ...	474·0	70·0	544·0	16·00	6·0	22·00
Perak, 1875-1876 ...	227·0	1·6	228·6	20·00	1·6	21·60
Zululand, 1879-1880 ...	739·0	12·0	751·0	24·83	1·8	26·63
Afghanistan, 1879-1880	869·9	51·0	920·9	36·03	6·92	42·95
Egypt, 1882	554·0	29·0	583·0	6·06	7·15	13·21
Soudan, 1884	76·2	49·2	127·4	—	31·36	31·36
Nile, 1884-1885 ...	808·6	22·4	831·0	40·01	11·70	51·71
Suakim, 1885	282·9	13·7	296·6	7·87	6·50	14·37
Soudan, 1885-1886 ...	1,100·8	46·9	1,147·2	29·44	9·82	39·26
Nile, 1889	73·5	3·3	76·8	1·31	0·65	1·96
Ashanti, 1895-1896 ...	49·27	—	49·27	0·56	—	0·50
Chitral, 1895	1,530·00	14·0	1,544·00	49·39	5·10	54·49
Dongola, 1896	976·60	—	970·60	81·70	—	81·70
Bechuanaland, 1896 ...	531·00	11·0	542·00	28·60	2·6	31·20
Mashonaland, 1896 ...	782·00	53·0	885·0	3·80	15·0	18·80
Tirah, 1897-1898 ...	573·8	25·6	599·4	28·24	2·67	30·91
Nile, 1898	1,101·7	56·7	1,058·4	36·18	15·67	51·85
China, 1900-1901 ...	1,051·7	10·2	1,061·9	22·71	2·35	25·06
South Africa, 1899-1901	746·0	34·0	780·0	69·00	42·00	111·06

Table III. shows some interesting facts concerning European troops. Owing to faulty methods of tabulation, some difficulty has been experienced in marshalling the figures as to the earlier minor wars in a manner comparable to those of more recent date; but so far as possible the difficulty has been overcome, and the table may be accepted as an accurate summary of the facts. It will be seen at once that the degree of disease incidence, as well as the amount of losses sustained from acts of the enemy, has varied immensely: this is not to be wondered at, considering the diversity of conditions under which these little wars or expeditions have been conducted. The most striking feature of these statistics is the marked excess of the sickness admission rates over those received in action. The disparity is less marked in the corresponding death-rates, but even there it is quite the exception for the deaths from action effects to be in excess of those from disease.

It may be asked now, What are the chief diseases of warfare, and

by what influences are they brought about? Also, has sanitary effort reduced their prevalence? Although most of the diseases occurring commonly among soldiers during peace are met with in war time, still there is a marked tendency for some to predominate, notably those dependent upon such influences as exposure to climate, pollution of soil or water, and indifferent food. The influence of hostilities shows itself mainly in increased incidence and mortality from respiratory and digestive troubles, malaria, diarrhœa, dysentery, enteric fever, and cholera. The precise degree of increased incidence which these diseases display naturally varies according to the climatic and other circumstances under which any particular campaign is prosecuted. This is particularly the case in our own army, which serves all the world over; but in general terms it may be said that war conditions usually mean a six-fold increase of such diseases as diarrhœa, dysentery, and enteric fever, as compared with peace-time incidence; malarial fevers are increased about one-fifth, venereal diseases in camp-life drop to about one-fourth of the number in ordinary garrison or cantonment, respiratory and digestive affections generally show a slight increase, while injuries, other than those received in action, together with other common disabilities, do not as a rule prevail more than under circumstances of peace.

The closer one scrutinizes the medico-sanitary statistics of forces in the field, the more one realizes how large a part the so-called preventable diseases still play in rendering an army non-effective. Take, for instance, our recent experiences in South Africa. It is true the precise figures for the three years' campaign have not been fully worked out, still we may say that approximately the death-rate from disease in that war was about 69 per 1,000 of strength, while that from wounds or accident was 42. Putting it in another way, we may say that there were something like 450,000 admissions to hospital from sickness during the war, and some 22,000 admissions on account of wounds or injuries received in action. Now among those admitted to hospital on account of disease alone, there were 14,800 deaths during the whole war; further, so far as can be estimated at present, 42,741 of the total admissions to hospital on account of disease, and 7,998 of the deaths from disease, were due to enteric fever, while 31,363 of the admissions and 1,248 of the deaths were from dysentery. In other words, no less than one-tenth of the admissions on account of disease were for enteric fever, and one-fourteenth were for dysentery, or these two diseases alone were the cause of practically one-sixth of the total admissions and about two-thirds of the total deaths on

account of disease; these two diseases also accounted for nearly one-half of the total losses by death from all causes during the war. As we know that both enteric and dysentery belong to that group of diseases which are largely the outcome of faulty environment, the sanitary significance of these figures needs no argument.

Reviewing, then, the medical statistics for both earlier and recent wars, we are justified in saying that the figures indicate a marked improvement by way of lessened death-rates; but the degree of preventable disease incidence on field service is still enormous, exacting a heavy tax on military efficiency, and much greater than what we should experience had the effects of sanitary effort in war time been as proportionately good as they appear to be in peace.

The question doubtless occurs to you, Why is this? To my mind the explanation is sufficiently simple. We have to remember that during the last forty or fifty years the economic condition and education of the general population of this country has undergone remarkable developments, so much so that the greater number of present-day citizens are not only more prosperous, but also more healthy than those of a generation or two ago, thanks to the diffusion of sound knowledge regarding the laws of health. Now this has not been without its effect upon the army generally, upon individuals composing that army, and upon those responsible for the well-being of the soldiers of the State. In other words, the sanitary reforms of the country generally have had their effect upon the army; and what sanitary improvements have been brought about in the environments of the soldier in peace time, especially in the home garrisons—and that is where the greatest changes for the better are most obvious—these, I think, have been due rather to the force of public opinion outside the army than to spontaneous sanitary effort within the army itself. I do not wish to be misunderstood; do not think I mean that no one in the army, in all these years of progress, has appreciated the value of sanitary effort, or that no one has advocated change in the soldier's surroundings and circumstances for sanitary reasons. I know only too well that such is not the case, and you know it too. We know that there is no brighter feature in the history of the interior economy of the British army than the efforts of certain officers, drawn from all branches of the service, to ameliorate the conditions under which the soldier serves, and not the least in eminence or in number among those who have so laboured are officers of that branch of the service to which so many in this room belong—I mean the Medical Corps. But you know, as well as I know, that in not so very remote a past,

these efforts have not been so readily received, and that many sanitary reforms have had to be forced by the weight of public opinion upon an unwilling executive. I do not wish to overstate the case, and I hope I have not done so; but I want you to realize the fact that many of the changes for the better, such as the lessened incidence of disease and the lessened mortality-rates among soldiers in our home and other garrisons during peace times, of which we are so proud, are explicable as the result of forces at work throughout the whole population and the whole land—forces of which we have been largely unconscious, but which could not fail to influence the soldier in barracks. We have been too prone to attribute our improved conditions in the army to sanitary effort organized within, and constituting an essential part of the military machine. I know some will demur to this view, but I ask each one of you who has any intimate knowledge of the army, When and where has organized sanitary effort existed in the army in the past? Further, I would ask you, Does such a thing as sanitation, using the word as meaning organized effort in the sense in which we see it around us in civil life, exist in the army now? If the answer which you make to yourself in response to this question is such as I think it will and must be, then you will realize why our sanitary results in the field are so meagre and so unsatisfactory. If organized sanitary effort has been lacking in the army during peace, it is from no failure on the part of the medical service asking for its inception; but if organized sanitary effort has been so neglected in the army during peace, can we expect it to be effective during war—for sanitary effort is like every other act of offence or defence on the part of the soldier: it is an act that needs to be carried out in peace to be effectively executed in war.

Accepting this view of the case, we find no difficulty in understanding why the incidence of preventable diseases in war has failed to diminish in anything like the same proportion as the incidence of similar diseases in peace time has fallen. Of course, we can never hope to get the same results in war as in peace, but we surely can expect to preclude such incidence of preventable disease as characterized certain stages of the late war in South Africa. If we look into the facts closely, we find that much of the satisfactory sanitary circumstances of our home garrisons depends upon the excellence of the organized civil sanitary effort existing in their immediate neighbourhood, so much so that the moment we move a unit or group of units—be it as a brigade, a division, or an army corps—from their home surroundings, and disembark them upon a foreign shore, where

the highly specialized details of this country are wanting, we find evidence of sanitary unpreparedness and the incidence of much preventable disease. The reason for this is that, owing to the excellence of the conditions under which he serves at home, and the dependence of nearly every military garrison upon outside sanitary effort as organized and administered by the civil authorities, the soldier, and nearly every group of soldiers, is hopelessly at sea as to organized sanitary effort once he leaves these shores. So accustomed is the soldier at home to obtaining a good and safe water by simply turning a tap, that it takes some weeks of campaigning for the same man to be able to supply himself with a reasonably safe water on his own initiative. The same is true of such a matter as refuse and excretal disposal. The ubiquitous water-closet and the well-planned drainage-system of this country, as well as the ever-available contractor for refuse removal, practically unfit the soldier to cope with these fundamental sanitary problems when once he is removed from home conditions of life. There is no difficulty in understanding the sequence of events. To put it bluntly, the very excellence of our general home sanitation in the country at large has sapped the sanitary initiative of the army. The soldier and all those connected with the soldier have become so accustomed to sanitary efficiency all round them, an efficiency obtained practically without any sanitary effort on their part, that they have gradually lost sight of its existence, and become equally oblivious of what effort is needed to keep it going. It is only when brought face to face with the questions involved as a practical problem in the field, or on some foreign shore where the facilities of home life are wanting, that the soldier and the army at large realizes the penalties attaching to sanitary unpreparedness.

This may be an unusual way of looking at this question, but I feel convinced it is the right way, as it enables us to face this question fairly and free from bias.

We may now pass to a consideration of what sanitary effort in the army is doing at the present time. The answer to this question resolves itself practically into a statement of what the Royal Army Medical Corps is doing for the study and prevention of disease. It is my privilege and pleasure to be able to affirm that the corps to which I have the honour to belong is doing its utmost to cope with the problems which confront it. As in years gone by, so in the present day, the medical service of the army probably appreciates more keenly than any other branch the importance and true value of sanitary effort. At no time in its history has the Medical Corps been more

sensible of its responsibilities and capabilities, or more animated with a desire to fulfil those responsibilities than at the present, and I may also add at no time has the personnel of the Medical Corps been better fitted for its duties than it is now; but I have yet to learn that the Medical Corps has a free hand in regard to organized sanitary effort. The scientific investigation of the nature and causes of disease, especially tropical diseases, are the subject of constant and world-wide attention on the part of its officers, and we have signs already of much good fruit in this field. Further, by the location of specially trained officers in all the larger garrisons and commands as sanitary officers, a serious attempt is being made to level up sanitation, while by the routine instruction of the non-medically trained officers in the principles and practice of elementary hygiene, it is hoped to stimulate the army as a whole into a greater interest in this question of sanitary effort, so that individual officers may take a greater personal interest in sanitary detail, and recognise that sanitary prevision is as much one of the duties of a staff officer as signalling or knowledge of methods of supply.

All this is well and good, but I fear it touches merely the fringe of the question, no more, and my main reasons for thinking so are: (1) There is no evidence of co-ordination of sanitary effort; (2) there is no evidence of the organization and training of men during peace to cope with the two great problems on field service—namely, how effectively to supply soldiers with a safe or potable water, and how successfully to remove and render relatively harmless the effete material from men and animals; (3) there is no evidence as to whom to hold responsible for failure in sanitation. The present theory is, and the official regulations lay down, that principal and senior medical officers of commands are responsible for sanitation, but I have yet to learn that any such officer is in a position, or able, to carry out such sanitation, or that any officer endowed with this responsibility has ever been brought to book for failure to see that sanitation was effective. It would be a scandal were he indicted for any such failure, simply for the reason that he has no free hand in the matter, and has no power or organization at command to carry out what he knows to be needed.

This brings me to my third question: What is sanitary effort going to do for the army in the future? I am unable to say, because I do not know, and I doubt whether anyone knows. You will naturally say, But what do you think it ought to do? I am somewhat diffident to express my views on this point; but, having ventured to criticise existing conditions, I should, I think, be failing in my duty to you, as

President of this section, were I to make no attempt to explain my own thoughts on this matter of sanitary effort in the army. Now, in so doing, I think it very necessary that we should recognise at the outset that it is desirable that the scheme of disease prevention should be kept distinct from that of disease treatment, and the administration needed to organize and render effective the cure and care of the sick. I am well aware that many will be disposed to demur at this as tending to lessen the power and importance of principal medical officers. I am sorry to differ from any who think in this way, but I ask them to consider seriously whether it is worth while to perpetuate a tradition and a system which saddles certain able and hard-worked officers with duties and responsibilities which, from the specialization and multiplicity of detail, they are incapable of carrying out satisfactorily. Therefore I say, let us candidly admit that the preventive side of medicine, in its practical working, needs to be considered separately from the therapeutic or curative. No derogation of personal ability is implied; it is merely a matter of administrative efficiency.

Passing on to detail, my first proposal is that a Sanitary Bureau should be established in the War Office, as a section of the office of the Director-General of the Medical Service. This Sanitary Bureau should be presided over and controlled by an officer thoroughly conversant with the whole theory and practice of preventive medicine, and he, acting as the agent or deputy of the Director-General, should administer and be responsible for the whole sanitary effort and organization of the army. We here call into being an officer on whom we can directly put our hand, casting him out if he fails in his efforts, and rewarding him if he succeeds. But, before we can condemn or approve, we must put him in a position so that he can really carry out what we expect of him—in other words, we must endow him with the power and means for doing what is asked of him. On this point let there be no ambiguity; it is the pivot on which the structure turns. To this officer's bureau should come all statistical returns and reports of a sanitary nature, and dealing with disease incidence throughout the army: for their tabulation and publication he would be responsible. His agents throughout the garrisons of the Empire would be the sanitary officers of commands, divisions, or districts, whose work he would co-ordinate and control both by correspondence and personal inspection.

The sanitary officers themselves would be, as is now the case, officers specially selected for their abilities in the matter of scientific work in the nature and causes of disease, as well as for administrative

capacity. These officers would, and should, be directly responsible for the whole scheme of practical sanitary effort in their respective commands, districts, or areas. To this end they would be staff-officers in the fullest sense of the term, issuing instructions "by order" of the officer commanding. Working under them, *qua* sanitation, would be the various officers in medical charge of units, and, in the case of the very large garrisons or commands, one or more quartermasters or staff-sergeants specially qualified for, and acting in the capacity of, inspectors. The sanitation of individual lines or barracks would devolve, as now, upon the officers commanding the units in occupation, much as the sanitation of individual dwellings in civil life devolves upon the occupant or householder, the disciplinary or corrective measures in the case of sanitary default in lines or barracks being the direct outcome of inspection and action on the part of the sanitary officer, acting "by order" of the local commanding officer, just as a civil sanitary officer takes action, in case of default, as the agent or exponent of the local sanitary authority. The sanitary officer of garrisons I would further place in direct control of, and render responsible for, the efficient working of all conservancy methods, whether carried out by civil or military labour. In the four large commands of Aldershot, Salisbury Plain, Colchester, and the Curragh, the local sanitary officer should be responsible for the training of sections of men belonging to the Royal Army Medical Corps, not exceeding fifty in number in each place, in all methods of water-supply and purification suitable for field service, having for this purpose the fullest equipment and means of repairing and keeping such equipment for immediate use in the field. If the scheme worked well, these numbers could be increased.

Such, in brief, are my views as to the lines on which sanitary effort in the army must be evolved. They secure co-ordination of effort and bring into operation an organization susceptible of a direct chain of responsibility from above down. The scheme secures organized effort during peace, while at the same time providing for a trained personnel capable of dealing with the water question on field service, and of men sufficiently accustomed to sanitary organization and police during peace to be able to organize and elaborate, from cheap native labour, conservancy cadres in the event of mobilization or disembarkation on a foreign shore. The proposals have the further merit of placing sanitary effort on a higher plane, mainly by recognising the magnitude of the issues at stake and endowing the responsible officers with positions and powers commensurate with their responsibilities.

Possibly many of you may regard these proposals as Utopian and impracticable. I put them to you after serious consideration and in no dogmatic spirit, but I do claim for my suggestions that they are logical, and aim at sanitary efficiency. Whether you concur or agree with me is immaterial, so long as I have succeeded in arresting your attention to this subject and made you and, through you, a larger audience than I have to-day realize that, so far as sanitary effort in the army is concerned, there is need for much to be done. Our present attempts at sanitary effort can hardly be called a system of sanitation: they are incoordinate, colourless, involve no definite scheme of preparation for war, and are devoid of any chain of responsibility. It remains for the army and the country to rouse themselves from their apathetic attitude in regard to sanitary effort in the army. In conclusion, let me say that I have no hesitation in stating that were the principles of disease prevention more fully appreciated by the army and their practical application made a matter of organized administration and effort, as much as is the supply of ammunition and food, the cost in money and the loss in military efficiency by disease incidence alone in time of war might be reduced to at least a third, possibly more. Till such is the case, we may continue to expect, as we virtually had in the late South African War, two-thirds of our total losses in every campaign to be from disease alone, and, of these, nine-thirteenths to be due to two single diseases—namely, enteric fever and dysentery. Further, so far as the three questions, which I put to you are concerned, we are forced to conclude that sanitary effort, though it has done something for the army in the past, has not done so much as many among us think; next, although it is doing something at the present time, that something is inadequate, and, moreover, that, so far as the future is concerned, unless there is a complete change in our methods, the outcome of our sanitary efforts in the army will be no better than they have been in the past. If I have trespassed too much on your time and attention, or thrown doubt upon cherished beliefs, I ask your indulgence, but the magnitude of the issues at stake demands that we look at the facts fairly and squarely, in order to avoid the mistakes and misfortunes of the past. It is not a question which concerns merely the medical profession—it is a question which concerns the whole nation, and especially those who have friends and relatives in the army.

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