THE WAR IN SOUTH AFRICA.

ANTITYPHOID INOCULATION.

DR. A. E. WRIGHT, Professor of Pathology in the Army Medical School, Netley, sends us the following note on the results obtained by the antityphoid inoculations in the beleaguered garrison in Ladysmith:

By the kind permission of Surgeon-General Jameson, C.B., I am enabled to publish the following officially collected statistics with regard to the results obtained by the antityphoid inoculations in the military garrison during the siege of Ladysmith.

TABLE I.—*Results obtained by the Antityphoid Inoculations in the Case of the Officers and Men of the Military Garrison during the Siege of Ladysmith.*

	Number under Observation.	Number of Cases of Enteric.	Proportion in which Attacks stand to Total Number of Men in Group.	Number of Deaths from Enteric.	Proportion in which Deaths stand to Total Number of Men in Group.	Proportion in which Deaths stand to Total Number of Attacks in Group.
Not inoculated...	10,529	1489	1 in 7.07	329	1 in 32	1 in 4.52
Inoculated ...	1,795	35	1 in 48.70	8	1 in 213	1 in 4.40

In addition to the above summary of results, obtained on officers and men combined, the figures relating to officers separately are also given in the official statistics. With regard to these last it may be pointed out that quite apart from the fact that these figures relate to a quite small group of persons (44 in number) the figures considered as statistics are probably fallacious, owing to the fact that the group of inoculated officers (consisting as it must have done almost, if not exclusively, of young men at the most susceptible age), is compared with a group of officers which includes all the older and less susceptible men and the men who have already suffered from typhoid. The figures referred to are none the less subjoined with a view to conforming to the arrangement adopted in the official statistics.

TABLE II.—*Results obtained by the Antityphoid Inoculations in the Case of the Officers of the Military Garrison during the Siege of Ladysmith.*

	Number under Observation.	Number of Cases of Enteric.	Proportion in which attacks stand to Total Number of Men in Group.	Number of Deaths from Enteric.	Proportion in which Deaths stand to Total Number of Men in Group.
Not inoculated...	171	43	1 in 4	5	1 in 34.2
Inoculated ...	44	9	1 in 5	2	1 in 22.0

In drawing inferences from the figures in this table it is to be borne in mind that the erroneous inclusion or exclusion of a single case or a difference in the event in the case of any patient included in the category of the inoculated would sensibly alter the present aspect of the table.

The same circumstance must be borne in mind in connection with any attempt to base a comparison of the case mortality in inoculated and uninoculated upon the figures in Table I. For it will be manifest that in no circumstances could a trustworthy estimate of case-mortality be based on a series of only 35 cases. Least of all would it be permissible to do this under conditions such as those of Ladysmith during the siege, where many other factors in addition to the severity of the attack must have determined the favourable or unfavourable event of the cases. It would, however, appear probable in view of the figures given in the table that the case-mortality was not influenced by the inoculation. On this subject further light must be awaited, especially as it would appear from certain statements, which have emanated from the seat of war, that the disease generally runs a milder course in the inoculated.

The question of case-mortality is, however, quite subordinate in interest to the question as to how far the figures presented in Table I enable us to estimate in quantitative terms the reduction in incidence and mortality which can be achieved by the process of antityphoid inoculation.

To answer this question it will be necessary to inquire on the one hand whether there were any circumstances other than inoculation which may have tended either to diminish the incidence of typhoid among the inoculated in Ladysmith or unduly to swell the roll of typhoid among the inoculated.

In connection with the former question, the only point which comes up for consideration is the question as to whether the inoculated were more favourably circumstanced in the matter of the sanitation of their camps than the uninoculated. No detailed data for the determination of this are at present at hand. But this will be seen to be unimportant in view, first, of the fact that there was in each regiment and corps an uninoculated majority who must, equally with the inoculated, have benefited or suffered from the sanitary or insanitary condition of the various camps; and secondly, of the fact that the inoculated who were attacked were drawn from twelve different corps and regiments. It may therefore be assumed that the inoculated and uninoculated were equally exposed to the risk of infection.

The question as to whether there were any circumstances which tended unduly to swell the roll of typhoid among the inoculated is one which requires to be treated at somewhat greater length. The following points must be kept in view:

1. So far as is known, with hardly an exception, the men who are set down as inoculated were only once inoculated. It seems probable, from the fact that only two cases among twice-inoculated persons have as yet come to my knowledge, that second inoculation confers a considerable additional protection.

2. It is possible that certain of the officers who are set down as inoculated may have been inoculated with an antityphoid serum, and not with a vaccine consisting of a sterilised typhoid culture. Two or three instances have been reported to me where this error was committed in the case of officers proceeding to South Africa. In the case of the statistics now in question the date and place of inoculation are in the case of 5 out of the 9 officers attacked set down as unknown.

3. It is possible in the case of the men, as distinguished from the officers, that revaccination against small-pox, which, like anti-enteric inoculation, was in many cases carried out on board the transports, may in certain instances have been confused with the latter inoculation. Instances of this confusion have already several times come to my knowledge.

4. Lastly, it is possible that, owing to the exigencies of military service, or owing to other reasons, the full prescribed dose of typhoid vaccine may not in all cases have been injected. Instances of the employment of the vaccine in fourfold reduced doses have come to my knowledge. It is conceivable, but there is nothing either to support or rebut the suggestion, that some reduction of the dose may have been found necessary in the case of the Liverpool Regiment, which was inoculated (presumably, as in the case of other regiments, only very partially inoculated) at Ladysmith on the eve of the outbreak of hostilities. At any rate, it is noticeable that this regiment furnished 13 cases of enteric among the inoculated men, whereas the whole rest of the garrison of Ladysmith furnished only an equal number of such cases.

In view of the above points regarding which there is not at present any information available, it is at this stage impossible to determine precisely to what extent the inoculated were protected by inoculation. But the results set forth in Table I would appear to be distinctly encouraging, inasmuch as they show that the proportion, on the one hand of attacks, and on the other hand of deaths, from typhoid was seven times smaller in the inoculated than in the uninoculated, and it may be borne in mind that if the number (no doubt a considerable one) of men who had previously suffered from typhoid had been subtracted from the number of the uninoculated, as might quite legitimately have been done, the statistics would have borne an even more favourable aspect.

THE INCIDENCE AND MORTALITY OF TYPHOID FEVER.

THIS subject is at present attracting the anxious attention of the public owing to the severe epidemic which has affected the troops in South Africa, but which is now, there is reason to hope, beginning to decline.

INCIDENCE.

While it is a truism that prevention is better than cure, this aspect of the subject seems to have been almost entirely overlooked, except by Sir Walter Foster, in the discussion which took place in the House of Commons. From this point of view the statement of percentage mortality is of very little value, because if there had only been a small incidence of the disease a heavy mortality would not have been a very serious matter, but when we are informed that about 10 per cent. of the whole army of 220,000 men have been affected with typhoid fever, a death-rate of 21 per cent. gives a total mortality of four or five regiments, or over 4,000 men. It would seem, therefore, that the primary defect must have been in the sanitary administration of this large body of men. While the difficulty of preventing soldiers in a hot climate, after an exhausting march, from drinking the polluted water of the Modder River may be admitted, it seems clear, from Mr. Watson Cheyne's letter, published in the BRITISH MEDICAL JOURNAL of May 5th, that the transport was so cut down that there were no means for boiling water, while the filtering appliances failed to supply this deficiency.

Epidemics rarely occur when men are on the march, but only after they have settled down in camp for a few weeks, and it is evident that this is what occurred in South Africa. When men are on the march they leave their dejecta, the sick, and other sources of contagion behind them; but when they have halted for a few weeks it has been the invariable experience of all previous campaigns that typhoid fever has made its appearance. Our painful experience on this occasion will, it is to be hoped, impress on commanding officers the paramount importance of attention to the sanitary administration of camps in the future.

The Special Commission for which Lord Roberts has asked will doubtless inquire what means were adopted to prevent the occurrence and limit the spread of this disease; what means to prevent the contamination of the water supply, and to destroy any pathogenic organisms which it contained; what means were taken for the disposal of the excreta; whether Mr. Treves's plague of flies was allowed to carry typhoid bacilli direct from the fæces to the food supply; what means were adopted to disinfect the emanations from the sick.

The reply of the Under-Secretary of State for War to Sir Walter Foster shows that the means adopted were ineffective. The admissions of cases and of deaths from typhoid fever in the Bloemfontein hospitals during the eight weeks ending May 11th were:

	Admitted.	Died.
March 23rd	88	5
,, 30th	160	9
April 6th	166	21
,, 13th	377	34
,, 20th	263	44
,, 27th	224	54
May 4th	226	54
,, 11th	583	65
Total	2,087	286

Of course it must be apparent to everyone that the mortality of these 2,087 cases is not yet told, so that it is impossible to return the death-rate. Dr. Conan Doyle, while speaking very highly in our last issue of the manner in which all concerned met and dealt with this "calamity," draws a very gruesome picture of the epidemic itself.

It was appalling in its severity, both in quantity and quality; I know of no instance of such an epidemic in modern warfare. I have not had access to any official figures, but I believe that in one month there were from 10,000 to 12,000 men down with this, the most debilitating and lingering of continued fevers. I know that in one month 600 men were laid in the Bloemfontein Cemetery. A single day in this one town saw 40 deaths.

Such an epidemic in any of our large towns would have created a panic.

It is practically impossible to get exact data as to the incidence of typhoid fever in civil life, notwithstanding the notification of infectious diseases, but we can readily get the mortality in every 100,000 inhabitants.

	Year.	Per 100,000
England and Wales	1888-97	17.2
London	,, ...	15.0
Birmingham	,, ...	16.●
Leeds	,, ...	22.0
Manchester...	,, ...	26.0
Liverpool	,, ...	35.0
Glasgow	1891-97	20.0
Edinburgh	,, ...	15.0

British army in South Africa, 220,000 men (incidence, 10 per cent.; deaths, 21 per cent.) = ? about 2,000 per 100,000.

When an army is in camp the water supply is a matter of the first importance, but many other preventive measures should be adopted, the majority of which can be summed up in the words "absolute cleanliness." When the disease broke out it would become necessary to take special precautions regarding the disinfection and disposal of the excreta, and this applies to the urine and other emanations from the sick as well as to the fæces. The supervision of all food supply to the sick and healthy to ensure that it is above suspicion is another duty which calls for the exercise of great care.

Regarding the mortality all information supports Dr. Conan Doyle's statement that everything possible was done for the patients by the medical men, nurses, and orderlies with the means at their disposal, and that the death-rate was as low as could be expected under the circumstances.

RESULTS OF EXPECTANT AND SYMPTOMATIC TREATMENT.

Still there may be an advantage even now of comparing death-rates under widely different systems of treatment with the view of arresting medical attention, and improving on the expectant and symptomatic treatment which has hitherto prevailed in this country. The Under-Secretary of State for War says that "the percentage mortality in enteric cases during the war, and more especially at Bloemfontein, has been 21 per cent. of the admissions to hospital." This no doubt represents the condition up to date, but as there is likely to be still further mortality among the recent admissions, it is too soon to arrive at any definite conclusion on the subject. No doubt 21 per cent. compares favourably with many of our statistics both at home and abroad, as will be seen from the following table. As our soldiers are mostly young men between 20 and 30 years of age, in comparing army with civil statistics we have taken the mortality of males at similar ages.

	Year.	Mortality in Typhoid Cases
Nile campaign, 1898		28.00 per cent.
Dongola, 1896...		50.00 ,,
Matabele, 1896-97		32.00 ,,
Chitral, 1895		28.00 ,,
Soudan, 1884-85		39.00 ,,
British Army (United Kingdom), 1889-98 ...		19.16 ,,
British Army (India), 1889-98		26.17 ,,
London Hospital, 1895-99 (20 to 30 years of age)...		22.35 ,,
Metropolitan Asylums Board:		
20 to 30 years of age, 1871-98		23.23 ,,
20 to 25 ,, ,, ...		22.30 ,,
25 to 30 ,, ,, ...		24.40 ,,
30 to 35 ,, ,, ...		27.80 ,,
35 to 40 ,, ,, ...		27.90

The above statistics are drawn from a large number of cases, and fairly represent the results which have been attained by the expectant and symptomatic system of treatment in males at the ages specified. For the purpose of comparison with the results of hydrotherapeutic measures, we must take the figures for all ages and both sexes. During the years 1871-98 the number of cases of enteric fever treated in the hospitals of the Metropolitan Asylums Board was 12,017, with a percentage mortality of 17.4.

RESULTS OF HYDROTHERAPEUTIC TREATMENT.

No doubt there have been many large epidemics in this country where the type of the disease has been comparatively mild and the mortality low. In the Maidstone epidemic there were 1,886 cases and 141 deaths, giving a percentage mortality of 7.6. Perhaps the only favourable statistics in

this country over a series of years from the expectant treatment were obtained at the Cork Street Fever Hospital, Dublin, where between 1871 and 1890 inclusive there were 1,405 cases at all ages, with a death-rate of 8.6 per cent.

These exceptional statistics do not detract from the value of the uniformly favourable results which have attended the use of hydrotherapeutic measures. Liebermeister showed that at the Basle Hospital the death-rate was reduced under the cold-bath treatment from 27.3 to 8.2 per cent. Dr. Hare has shown that at the Brisbane Hospital during the expectant period out of 1,828 cases 271 died, giving a percentage mortality of 14.8, while during the bath period out of 1,902 cases only 143 died, or 7.5 per cent. This is very striking evidence in favour of the bath treatment obtained from two sets of cases in the same hospital under otherwise precisely similar conditions. Of 685 cases under the care of Professor Osler only 8 per cent. died; in the Red Cross Hospital at Lyons the death-rate was 7.3 per cent.; at the German Hospital, Philadelphia, under the care of Dr. J. C. Wilson, the death-rate was 7.8 per cent. In the *Philadelphia Medical Journal* of March 3rd Dr. J. C. Wilson and Dr. J. L. Salpinger give the result of ten years' experience in the treatment of enteric fever by systematic cold bathing based on 1,904 cases collected from fever hospitals in Philadelphia, with a death-rate of 7.5 per cent. In the German army, where Brand's system is rigorously carried out, the death-rate for many years has been less than 8 per cent. In the American army from 1888 to 1897 inclusive, out of 1,303 cases there were 141 deaths, or 10.8 per cent. In 1898 there were 1,415 cases, with a death-rate slightly under 9 per cent.

It may have been quite impossible to carry out any systematic bath treatment in the South African hospitals, but cold sponging and cold compresses are always available. Dr. Barr, of Liverpool, has been for some time swinging severe cases in hammocks in substitution for his continuous bath treatment. Here the patients can be submitted to a continuous stream of tepid water or an occasional douche of cold water. This method is very simple and very effective in controlling the temperature. Under no circumstances should overcrowding be permitted. Personally, if suffering from typhoid fever, we would rather sleep under the canopy of heaven than in any close hospital or tent. Febrile patients do not catch cold.

THE IMPERIAL YEOMANRY HOSPITALS.

THE work done by the Committee of the Imperial Yeomanry Hospitals is remarkable both by its extent and its excellence. The original Imperial Yeomanry Hospital of 500 beds, which was established at Deelfontein, was shortly followed by the the Imperial Yeomanry Field Hospital and Bearer Company.

The hospital at Deelfontein has been increased until Mr. Fripp, the Senior Surgeon, was able to report on June 18th that he had 600 beds completely equipped. A branch hospital at Maitland Camp, near Capetown, has now been taken over and will be placed in the charge of Dr. Saunders, one of the medical officers of the Deelfontein Hospital. In addition a branch hospital for 400 beds will be opened at Pretoria within the next few weeks. Major Reade, R.A.M.C., has been appointed commandant, and the members of the medical staff sent out from this country are as follows:

Mr. W. Langdon Brown, Physician, M.A., M.B., and Mr. Herbert Williamson, Surgeon, M.A., M.B., St. Bartholomew's Hospital; Dr. Sandwith, M.D., F.R.C.P., M.R.C.S., Kasr-el-Aini Hospital, Cairo; Mr. Stanley F. Crowther Smith, Physician and Surgeon, M.B., M.R.C.S.; Mr. A. R. J. Douglas, M.B., B.S.Lond., F.R.C.S.Eng.; Mr. Howell Davies, Surgeon, M.R.C.S., L.R.C.P., St. Bartholomew's Hospital; Mr. F. Brickwell M.B.Lond., M.R.C.S., L.R.C.P.; Mr. F. L. Provis, Tottenham Hospital, M.R.C.S.Eng., L.R.C.P.Lond.; Mr. A. H. Hayes, M.R.C.S., L.R.C.P.; and Mr. C. S. Frost, M.B.Lond., M.R.C.S., L.R.C.P.

The nursing staff consists of 40 lady nurses, and there are in addition 82 ward orderlies and 8 ward maids.

The Imperial Yeomanry Field Hospital and Bearer Company have reached Pretoria, after having on the way up been of great service at the action of Roodeval.

Mr. Alfred D. Fripp writes that on June 15th the hospital at Deelfontein received two trains full of sick and wounded. The first train was the earliest out of Mafeking, the second train brought the sick and wounded from Winberg and Senekal, and out of its 96 occupants no fewer than 50 were stretcher cases, that is to say patients so gravely ill that they had to be carried from the train to their beds. Of the wounded from Senekal he writes:

Many of the wounded from the latter neighbourhood presented a feature which was entirely novel to our experience in that they were burned more or less severely. It seems that our troops had had to advance through veld fires. A few of them were burned in running through; others only got their burns when they fell to the ground wounded; but from the accounts of the survivors I fear that there must have been others again still less fortunate, who, when they fell to the ground, were unable to move, and were burnt to death.

Colonel Sloggett, the military medical officer in command of the Imperial Yeomanry Hospital, left at once with this train for Mafeking, to bring down the remainder of the sick and wounded from that place. Fortunately, when the railway was blown up north of Kroonstadt the hospital trains were south of that place. There are now three such trains, a third having recently been improvised out of ordinary saloon carriages, with a kitchen truck in the middle.

Mr. Fripp has to report a considerable amount of sickness among the staff at Deelfontein. He writes:

We have had to turn one of the smallest huts into a sick room for the sisters. They are so closely packed in the ordinary sisters' sleeping huts that it is extremely inconvenient there when one of them is ill. I am glad to say that there are no serious cases amongst them, but their work is very heavy now, and their sick room is in perpetual request for slight cases. Greenfield and Parker, the other two doctors who I told you had enteric, are both doing well. Three others of our medical staff have had to be admitted the officers' ward during the past week, but we do not think that any of them have enteric. Exactly a quarter of the orderlies we brought with us are now sick in hospital.

THE PRINCE AND PRINCESS OF WALES'S CONVALESCENT HOME.

IT is announced that the Prince and Princess of Wales have fitted up a very pretty farmhouse close to Sandringham for the use of officers invalided from the war who need convalescent help. The intention is to offer the home in the first place to colonial officers, who during their stay will be the guests of the Prince and Princess.

HOSPITALS IN ROUMANIA.—In the *Archives Orientales de Médecine et de Chirurgie*, Dr. Cosma de Ploiesti gives some statistics which appear to show that Roumania is more liberally supplied with hospitals than most countries of larger size. For a total population of 5,000,000 there are 188 hospitals, with an aggregate number of 7,334 beds. All patients are treated gratuitously, without distinction of nationality, and the foreigners from neighbouring countries admitted every year to the hospitals of Roumania are numbered by thousands. The hospitals are kept up by the State or by the Communes, or by the private administrative bodies called "Ephorias," which manage special funds bequeathed by charitable persons. The hospital establishments are subdivided as follows: — Fifty-three departmental or district hospitals, with 1,355 beds; 26 communal hospitals, with 756 beds; 33 rural hospitals, with 1,602 beds; 10 belonging to the Bucharest Ephoria, with 1,016 beds; 11 under the Jassy Ephoria, with 638 beds; 10 maintained out of private funds, with 591 beds; 11 maintained by Jewish communities, with 289 beds; 5 lunatic asylums, with 749 beds; 11 homes for infirm people, with 405 beds; 1 hospital for sufferers from pellagra, with 40 beds; 16 homes for aged persons, with 324 beds; 2 night refuges, with 40 beds. In addition to these there are 6 nursing homes with 137 beds for paying patients.

THE QUEEN'S NURSES.—The annual report of the Queen Victoria Jubilee Institute for Nurses states that the demand during the past year invariably exceeded the supply, although more nurses had been placed on the roll than in the previous year. The expenditure for the year had amounted to £8,746, of which £2,500 was paid out of the money of the Queen's Commemoration Fund. Princess Henry of Battenberg presented the badges and certificates to the nurses on July 5th. The President of the Institute said that 1,000 nurses had been enrolled, of whom 533 had been trained in England and at least two-thirds of the whole number in the United Kingdom. The Treasurer stated that the financial resources of the institute were taxed to the utmost and that the original endowment was now found to be insufficient for the work to be done. After the distribution Sir Dyce Duckworth, one of the Council of the Institute, congratulated the nurses, and said that though the training already given was of a high character he hoped that it would be improved in the future, and in particular that a term of three years' training in hospital would be required.