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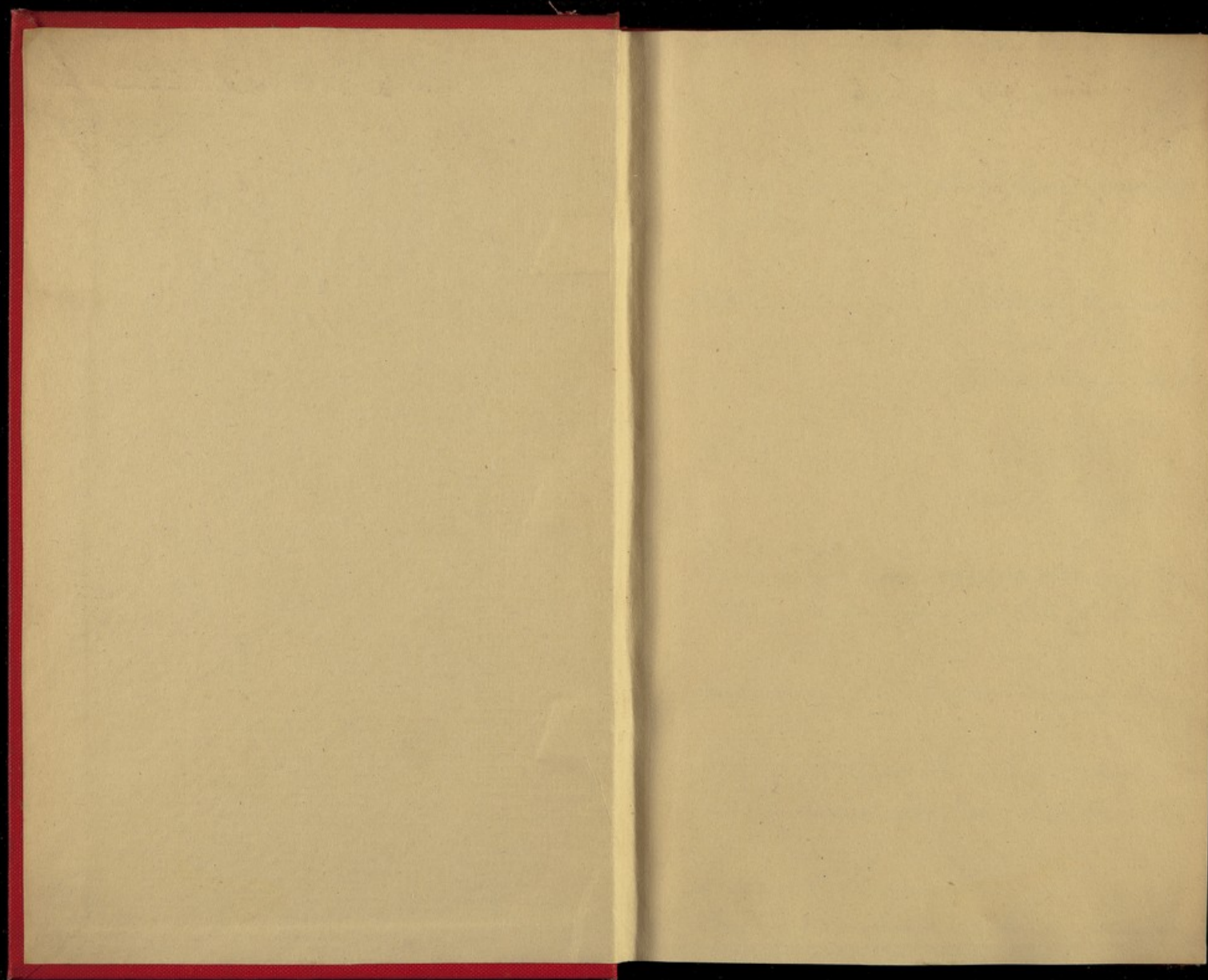
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MEDICAL ARRANGEMENTS

FOR THE

BAJOUR EXPEDITIONARY FORCE.

20-5-95



Army Head-Quarters, India,
Medical Division;
Simla, 19th March 1895.

SIMLA:

PRINTED AT THE GOVERNMENT CENTRAL PRINTING OFFICE.

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MEMORANDUM.

THE instructions contained in this pamphlet connected with the medical arrangements for the Bajour Expeditionary Force should be carried out without further reference to this office.

By order,

A. A. GORE, Surgeon-Colonel,
Principal Medical Officer, Her Majesty's Forces in India.

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MEDICAL ARRANGEMENTS
FOR THE
BAJOUR EXPEDITIONARY FORCE.

Section I.—ORGANIZATION.

1. The Bajour Expeditionary Force consists of the following troops :—

1st Infantry Brigade.

1st Battalion, King's Royal Rifles.
1st Battalion, Bedfordshire Regiment.
15th Sikhs.
37th Dogras.

2nd Infantry Brigade.

1st Battalion, Gordon Highlanders.
2nd Battalion, King's Own Scottish Borderers.
4th Sikhs.
Guides' Infantry.

3rd Infantry Brigade.

2nd Battalion, Seaforth Highlanders.
1st Battalion, East Kent Regiment.
25th Punjab Infantry.
2nd Battalion, 4th Gurkhas.

Divisional Troops.

Guides' Cavalry.
11th Bengal Lancers.
13th Bengal Infantry.
23rd Pioneers.
No. 15 Field Battery.
„ 3 British Mountain Battery.
„ 8 British Mountain Battery.
„ 4 Hazara Mountain Battery.
No. 1 Company, Sappers and Miners.
„ 4 Company, Sappers and Miners.
„ 6 Company, Sappers and Miners.

Lines of Communication.

1st Battalion, East Lancashire Regiment.
29th Punjab Infantry.
30th Punjab Infantry.
No. 2 Derajat Mountain Battery (4 guns).

Departmental Units.

Engineer Field Park.
Ordnance Field Park.

Section II.—ADMINISTRATION.

2. Surgeon-Colonel W. T. Martin, Army Medical Staff, is appointed Principal Medical Officer with the field army, and Surgeon-Colonel G. Thomson, Indian Medical Service, as Principal Medical Officer on the lines of communication. These Officers should report themselves to their respective commanders at Peshawar.

3. Each principal medical officer is allowed two clerks, one first and one second grade, drawn from the following districts:—

For Surgeon-Colonel W. T. Martin. J. Ramsell.

Sirhind district	...	...	First grade clerk.
Meerut district	...	...	Second " "

For Surgeon-Colonel G. Thomson.

Lahore district	...	...	First grade clerk.
Presidency district	...	...	Second " "

4. The second grade clerks in the Sirhind and Lahore districts respectively should be temporarily promoted to 1st grade, and temporary second grade clerks employed in all four districts to fill vacancies.

5. Each principal medical officer in the field is allowed a general service 80lb tent for his office and clerks, which should be obtained from the nearest arsenal.

Section III.—CORPS-UNITS.

6. Corps will be equipped as laid down in Appendix No. 1, *Field Service Departmental Code, Medical*, and first field dressing packets should be issued to every officer and soldier from stock maintained with corps.

7. The medical charge of mountain batteries (British and Native) and companies of sappers and miners will be arranged for by the principal medical officer as a collateral duty.

8. A hospital assistant with pair of field medical panniers will be provided for each commissariat-transport unit, and that department will arrange to supply the authorised transport (ambulance and general) and camp equipage.

Section IV.—FIELD HOSPITALS.

9. The following field hospitals will be mobilised and will be despatched to the front under instructions issued by the Quartermaster-General in India.

1st Infantry Brigade.

No. 1 British	...	...	...	...	Peshawar.
" 14 Native	...	...	...	...	Peshawar.

2nd Infantry Brigade.

No. 2 British	...	...	...	...	Rawal Pindi.
" 35 Native	...	...	...	...	Rawal Pindi.

3rd Infantry Brigade.

No. 8 British	...	...	...	...	Umballa.
" 19 Native	...	...	...	...	Agra.

Divisional Troops.

No. 4 (Sections A and B) British	...	...	...	...	Allahabad.
" 17 Native	...	...	...	...	Allahabad.
" 18 (Sections A and B) Native	...	...	...	...	Allahabad.
" 18 (Sections C and D) Native	...	...	...	...	Rawal Pindi.

Lines of Communication.

No. 4 (Sections C and D) British	...	...	...	...	Agra.
" 24 Native	...	...	...	...	Bareilly.

For sick and wounded returning from front to base.

No. 5 British	...	...	...	...	Meerut.
" 6 British	...	...	...	...	Meerut.
" 28 Native	...	...	...	...	Lucknow.
" 29 Native	...	...	...	...	Lucknow.

10. Field hospital establishments will be provided as follows:—

BRITISH FIELD HOSPITALS.*Appointed by General Officer Commanding District.*

Army Medical Staff Officers.	
Assistant Surgeons.	
Pack-store Sergeants.	
Pack-store Privates.	
Ward-servants	} Army Hospital Corps.
Cooks	
Water-carriers	
Ward-sweepers.	

Appointed by Commissary-General of Circle.

Hospital Store-keepers.
 Hospital Store-keepers' Assistants.
 Tailors.
 Head Washerman.
 Washermen.
 Tindals.
 Tent-lascars.
 Carpenters.
 Pakhali-bhistis.
 Conservancy-sweepers.

NATIVE FIELD HOSPITALS.

Appointed by General Officer Commanding District.

Indian Medical Officers.
 Hospital Assistants.
 Hospital Havildars.
 Pack-store Havildars.
 Regimental Ward-orderlies.

Appointed by Commissary-General of Circle.

Hospital Store-keepers.
 Hospital Store-keepers' Assistants.
 Washermen.
 Tindals.
 Tent-lascars.
 Carpenters.
 Conservancy-sweepers.

Miscellaneous.

No. 14 Native Field Hospital.—Cooks, water-carriers and ward-sweepers. One each from 15 Sikhs and 37 Dogras and two each for Commissariat Department.

No. 35 Native Field Hospital.—Cooks, water-carriers and ward-sweepers. One each from Guides' Infantry and 4th Sikhs and two each for Commissariat Department.

Nos. 17, 18, 19, 24, 28, and 29 Native Field Hospitals.—Cooks, water-carriers and ward-sweepers from Commissariat Department.

11. Medical officers in charge of field hospitals will indent for such reserve supply of essential medicines as may be deemed necessary, and the Commissary-General of the Circle concerned will arrange for a special reserve of medical

comforts. These reserve stores should be packed in boxes suitable for mule transport and should not exceed 80 lbs. in weight. They should accompany the field hospitals from equipping station.

12. As roads are unsuitable for wheeled transport, riding mules and ponies with saddles will be substituted for ambulance tongas. The Commissary-General of the Circle will inform the District Principal Medical Officer where the transport will be provided for field hospitals.

Section V.—LINES OF COMMUNICATION.

13. In addition to the field hospitals referred to in paragraph 9, a rest camp will probably be established at Nowshera, where sick and wounded returning from the front can be temporarily detained pending transfer to the general hospitals at Peshawar.

14. Twelve ambulance tongas will be supplied for the road between Jalala and Nowshera, with change of cattle at Hoti Mardan and half way between Jalala and Hoti Mardan and between latter station and Nowshera.

15. The field hospitals sanctioned for accommodation of sick and wounded returning from front to base (paragraph 9) will be stationed at such points on the lines of communication as may be fixed by the Principal Medical Officer with the approval of the Officer Commanding the Lines of Communication.

Section VI.—FIELD MEDICAL STORE DEPOT.

16. No. 1 Field Medical Store Depot will be mobilized at Meean Meer under the orders of the General Officer Commanding Lahore District and sent to the front under orders issued by the Quartermaster-General in India. The menial establishment will be provided from the Medical Store Depot, Meean Meer.

Section VII.—GENERAL HOSPITALS.

17. Two general hospitals, one British and one Native, each for 500 beds, will be established at Peshawar under the orders of the Principal Medical Officer, Her Majesty's Forces in India, to which all sick and wounded returning from the front will be sent. As the men are discharged, they will be sent to the military depot for transfer to their respective stations.

Section VIII.—RETURNS.

18. Field service returns will commence from date of the field hospitals being attached to their respective brigades and will continue until they are finally closed.

*The Library
Army Medical School
from the author*

ON THE IMPROVEMENT
OF
MILITARY MEDICAL ARRANGEMENTS
IN INDIA SINCE 1871

AS ILLUSTRATED BY

THE LUSHAI CAMPAIGN OF 1871

AND

THE TWO MIRANZAI EXPEDITIONS OF 1891.

Reprinted from

"The Journal of the United Service Institution of India."

BY

SURG.-COL. R. HARVEY, M.D., D.S.O.

PRINCIPAL MEDICAL OFFICER PUNJAB FRONTIER FORCE.



ON THE IMPROVEMENT
OF
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BY

SURG.-COL. R. HARVEY, M.D., D.S.O.

PRINCIPAL MEDICAL OFFICER, PANJAB FRONTIER FORCE.





ON THE IMPROVEMENT
OF
MILITARY MEDICAL ARRANGEMENTS
IN INDIA.

THOSE who remember the Crimean war, will remember also the storm of public indignation roused by the letters of Dr. W. H. Russell describing the terrible sufferings of the troops, due to the complete collapse of all the departments of the army; commissariat, transport, and medical alike. "The cankers of a calm world and a long peace" had led to a degree of inefficiency which—though overcome in the end by the admirable endurance of men and officers and an expenditure which is felt to this day—cost us many thousands of valuable lives which would undoubtedly have been saved by better organisation. Fortunately for us, our enemies were no better organised, or it might have gone hard with us and our French allies, whose sufferings were even greater than our own, although less generally known and talked about.* Fortunately, too, we are a practical people, and popular indignation having upset the Ministry supposed to be responsible for the blunders, insisted on the appointment of a Royal Commission, which in its turn originated the great modern improvements which have for their aim the perfecting of our army as a fighting machine. The rapidity with which campaigns are now conducted, leaves no time for

* The French lost in the Crimea 20,240 by the fire of the enemy, and 75,375 from disease.

preparation after a declaration of war, and the army which is best organised has, *ceteris paribus*, the best chance of success. Although in the stress of battle Providence may still favour the big battalions, these are comparatively useless unless they can be properly fed, promptly moved, and kept in health. The importance of this last factor is only now beginning to be fully recognised, and a neglect of sanitary precautions has many times in our military and naval history led to grave disasters, while it has come to be regarded as a natural law that in every campaign disease carries off far more victims than the assaults of the enemy. Medical science has protested against this doctrine, but has been, until lately, like wisdom crying out in the streets, no one regarding; and the medical department has time after time had to bear the blame, after having had its recommendations ignored or neglected. The lessons of the past have borne fruit, however, and of recent years the department has been given a comparatively free hand, the principle being admitted that where responsibility rests the initiative must rest also.

The result has been in peace a reduction of the death-rate among British troops in India from 69 to from 12 to 16 per 1000 per annum, a saving of some 3500 valuable lives yearly in India alone, to say nothing of an enormous amount of non-fatal sickness. The experience of other countries has been similar. "*Prenez bien garde*," says the Great Napoleon, "*que mes troupes ne soient pas placées dans des lieux malsains*;" but this advice, addressed to Generals unschooled in sanitation, bore little fruit: and the French armies withered away from disease rather than from battle, great as their losses in action were. Mention has already been made of their sufferings in the Crimea. But the French medical department was in those days a mere branch of the Intendance. The doctors were powerless, and when the war with Austria followed the Crimea the complete failure of the medical arrangements due to neglect of the advice of the sanitary department was a considerable factor in the premature peace which astonished Europe. The greater

part of the surgical equipment was left behind, and as a consequence many thousands of French wounded were left unattended to for days. Speaking of these things in his book, *De la mortalité dans l'armée*, published early in 1870, M. Chenu, director of the medical department, pointed out that, in spite of experience and the repeated protests of medical officers, the system remained unchanged, and that were war to break out again the gravest disasters were to be anticipated for France, a prophecy which a few short weeks were ample to justify.* At the beginning of the great war in America the medical department of the little standing army was quite inadequate to cope with the sickness of the large armies required. But the common sense and practical sagacity of the people were equal to the occasion; and the Sanitary Commission, a purely voluntary organisation which at an expense of many million dollars followed close on every column with its ambulances and comforts, organised its own transport, provided hospital trains and fleets, and so managed matters that even in the darkest days of the war the sick and wounded were almost always promptly and properly attended to, still lives in the grateful recollection of the American people. The unavoidable miseries and sufferings of war are necessarily great, the avoidable miseries and sufferings have hitherto been many times greater; and while seeking to alleviate the one, the medical department hopes in time to altogether abolish the other. The military authorities have come to see that to be efficient fighting machines soldiers must be kept fit and well, that the prevention of disease is better than its cure, and that a system which aims at general efficiency, though more expensive at first, is in the end more economical than one which, seeking to save money, spoils the ship for want of a ha'p'orth of tar.

There are therefore two great ends kept in view by the medical department of an army in war: (1) keeping the men

* The French statistics of 1870-71 do not discriminate between cases due to the enemy and those from disease, but the deaths are given at 138,871, and the admissions to hospital at 470,521.

in health, (2) attending them when sick or wounded, to which may be added, (3) sending them back from the front as quickly as possible, so as to avoid cumbering the hospitals with useless men who consume food and employ transport required elsewhere: and one of the greatest advances in modern military medicine is the recognition that questions of food, clothes, and transport are doctors' questions; and that physiology is a better guide than so-called common sense. A Commissary-General, finding that men cannot eat 2 lbs. of rice or wheat, and rising to the fact that transport would be saved by reducing the ration, proposes it should be fixed in future at 1 lb. 8 oz. The physiologist steps in and shows that the men could not eat it because it was unaccompanied by the condiments to which they were accustomed, and thus palled upon and disagreed with them; and statistics showed in a heavy avoidable mortality that the physiologist was right. Our latest scientific expedition to the Arctic circle failed of success mainly because difficulties of transport caused lime juice to be left behind on the sledge journeys, although repeated experience had shown that without it scurvy was certain to develop.

The primary importance of keeping men in health being thus recognised, the authorities, both in peace time and on the breaking out of war, are most anxious to adopt all reasonable measures to secure this end. They are, however, naturally desirous to secure it as cheaply as possible, and are specially and rightly jealous of new suggestions which savour of theory, and have not been proved. There are also the respectable traditions that soldiers should not be coddled, and that the hardships of war should be borne without murmuring. In this, medical officers will agree with their brethren of all departments; they only strive for the avoidance of *unnecessary* hardships which experience has shown to limit the usefulness of the fighting machine. It has happened over and over again that on the conclusion of a successful campaign, difficulties and dangers which may have imperilled its success are tacitly ignored. Our arms

have been successful, and it is ungracious to complain. Mutual congratulations efface the memory of the difficulties, and the dangers are forgotten, to reappear next time unaltered and unremedied. The principle is a dangerous one, and had much to do with the collapse of the French armies when a great strain fell on them; but it is by no means confined to the French. It is perhaps the more dangerous because it merits respect in many ways, and because croakers are looked upon with suspicion, as troublesome or even as unpatriotic. There is a wide difference, however, between grumbling because of personal hardship or discomfort, and showing how these may be avoided by others in the future; and unless defects and shortcomings are freely pointed out to the authorities, they cannot be remedied; a false security and satisfaction are engendered, and when war is undertaken, as by an Olivier, with a light heart, it is found that more important things than gaiter buttons are wanting.

During a campaign difficulties are to be trampled on, and impossibilities ignored; but the campaign over, they should be fully discussed and reported on, so that all efforts may be made to prevent their recurrence. In this way only are progress and improvement possible, and it is interesting to note how in recent expeditions the experience of the past has been utilised with most excellent results, although there is still room for improvement. The scope of this pamphlet does not contemplate a description of the changes in the medical department, which has, as most of our readers know, been entirely remodelled and reorganised since the Crimean break-down; but the difference in method between the old regimental and modern field hospital systems will be illustrated in the following comparison of their working as exemplified in the Lushai campaign of 1871-72, and the late expeditions on the Samána. The contrast is startling, and shows what immense advances have been made in recent years. It may be of interest also as showing the arrangements now in force for the care of troops and followers in time of war.

The expedition of 1871-72, undertaken to punish the Lushais for head-hunting raids within our territories on the borders of Kachar and Chittagaon, was in many ways a novel one, and the most thoughtful care was given by the Government of India and the military authorities to ensure its success. The country was known to consist of a continuous succession of steep hills covered with the densest jungle, destitute of roads and entirely unknown to us. It was supposed, and the supposition was correct, that every ounce of food would have to be carried, and it was known that we should have to march "far into the bowels of the land," subject to all the impediments that Nature and the ingenuity of the enemy could devise. Water carriage was available as far as Tipai Mukh for the left or Kachar column, which will alone concern us; but beyond that coolies had to be almost entirely relied on, although a number of elephants were sent up. A fleet of country boats was collected at Kachar, a corps of 1924 Panjābi and Hindustani coolies was organised and sent from Calcutta, and another of 840 hill coolies was raised at Darjeeling, while a local corps of Kuki coolies was got together at Kachar. In order to keep them in health an issue of free clothing, consisting of a blanket, a woollen coat, a pair of shoes, and flannel leg-bandages was sanctioned for each, but for some reason was never given to the Kuki coolies. A free ration sufficient in quantity was laid down, but the widely different food habits of the various classes of coolies employed was not sufficiently understood: rice was frequently issued to flour-eaters, and flour to rice-eaters; the local custom of fish-eating was ignored, and the supply of condiments, vegetables, and other adjuncts by which the natives vary the monotony of an otherwise unchanging diet, was during the first six weeks quite insufficient, if not entirely wanting.

The fighting men numbered some 1800, and there were about 350 camp followers in addition to the coolies. Supplies for all had to be carried on the heads of the porters, beyond Tipai Mukh. Starting on this footing, the force

proceeded to cut its way in the most literal sense through the jungle. The country is thus described by the principal medical officer, the late Dy.-Surgeon-General Buckle, C.B.: "Separating the succession of hills are tortuous ravines, water-courses and swampy hollows. The hill-sides are covered to their summits with masses of vegetation. Forest trees, bamboos, wild plantains, creepers, ferns, and parasitic plants are matted together in a tangle of impenetrable jungle; throughout the night till late in the day this sea of jungle is shrouded in a mass of vapour; every article exposed is saturated with wet, and the dew pours from the trees like heavy rain." Every yard of road for about 110 miles had to be laboriously hewed with axe and kukri, the hill-sides were exceedingly steep, the ravines between the ranges so narrow that the road was never level, and almost always slippery; work was incessant, and became more and more arduous as sickness increased and devolved more work on those still equal to it. Supplies of food were not always available, and the ration had to be reduced; the men were constantly exposed to great vicissitudes of temperature, and though the troops who had waterproof sheets managed to protect themselves, the bulk of the followers and coolies were wet through nightly by the heavy dews. The resistance of the enemy was not very formidable, although a considerable number of casualties occurred. The exact number cannot be ascertained from the medical reports, which show seven men killed in action and three as dead from wounds, but do not give the number of the wounded, and take merely incidental notice of a number of elephant drivers killed and wounded at Tipai Mukh. From a military point of view, the expedition was a complete success. The enemy was severely punished, the captives recovered, and the fines imposed duly paid; but there can be no question that the chain was strained at times nearly to breaking point, and that success obtained through the strenuous efforts of all concerned was terribly dearly bought. The statistical results are nowhere clearly tabulated, the strengths nowhere accurately

given, and no dates are fixed either for the beginning or the end of the campaign, so that it is very difficult to get out figures to compare with those of more recent expeditions. What figures there are, however, are very significant. Taking the strength of the troops at 1800, and the duration of the campaign at five months—the actual campaign lasted less than three—they gave 2453 admissions and 89 deaths; being at the rate of 3268 admissions and 120 deaths per thousand of strength *per annum*. The Panjābi and Hindustani coolies, who are noted in the report for their “comparative immunity from disease,” had a strength of 1924 with 113 deaths, equal to an annual ratio of 160 *per mille*, or 16 per cent. The hill coolies lost 257 out of 840, or at the appalling rate of 717 *per thousand per annum*. Only one of these men was killed in action, two were drowned, but 201 of the deaths occurred prior to their joining the column in January 1872. If we omit these they lost 50 men out of 639 in three months, or at the rate of 313 *per thousand per annum*, nearly one in three. The strength of the Kuki coolies is nowhere given, nor is that of the boatmen. They are debited with 88 and 32 deaths respectively, while followers are put down at 11, but in all these cases the numbers are understated, for many died out of hospital in the jungle. The total of these figures, all of which are taken from the official reports, is 584, though in an abstract at the end of the report the deaths are put at 309 only. This discrepancy appears to be due to the exclusion of coolies who died before joining the column, and of the Kuki coolies, and there can be no doubt that the larger number, terrible though it is, is below the truth.

Before going on to explain this frightful mortality, let us take the figures for the two Samāna expeditions of 1891, the statistics of which are, it is believed, complete and trustworthy. In the first there was no fighting, but the climatic conditions were extremely trying—constant rain or snow with intense cold—and the work of both troops and followers exceedingly hard. Yet the total admissions among

the troops were only at the rate of 574 *per 1000 per annum*, and the deaths 9.57; while an average strength of 2345 followers had 573 admissions, and only 4.09 deaths *per 1000 per annum*. Only five sepoys and one follower died in all. In the second expedition there was some sharp fighting, but including all losses at the enemy's hand, the death-rate of the force was 16.89 for troops, and 18.76 for followers *per mille per annum*. Exclusive of the casualties of war, the rates from diseases were 4.58 and 11.66 respectively. These figures are focussed in the following table:—

	Strength.	Total Deaths.	Ratio per 1000 per annum.	Deaths from Disease.	Ratio per 1000 per annum.	Remarks.
<i>Lushai Expedition:</i>						
Troops. . . .	1,800	89	119.83	80	106.65	88 deaths among Kuki coolies, 32 among boatmen, and 11 among followers are omitted; the strength returns not being available, or the tale of deaths incomplete. The strengths given are not mean strengths, as they should be for statistical purposes, but the maximum strength at starting, so that still higher death-rates would be worked out from the true strength if available. The writer can testify to at least 15 additional deaths not included in the official returns.
Hindustani and Panjabi Coolies	1,924	113	160.95	113	160.95	
Hill Coolies . .	840	251	717.12	250	712.25	
Total. . . .	4,564 ^a	453	238.21	443	232.95	
<i>1st Miranzai Expedition:</i>						
Troops. . . .	5,019	5	9.57	5	9.57	
Followers. . .	2,345	1	4.09	1	4.09	
Total. . . .	7,364 [†]	6	7.83	6	7.83	
<i>2nd Miranzai Expedition:</i>						
Troops. . . .	7,203	18	16.89	5	4.58	
Followers. . .	2,882	8	18.76	5	11.66	
Total. . . .	10,085 [†]	26	17.42	10	6.65	

* Maximum strength at starting.

† Mean daily strength.

What then were the causes of this enormous difference? To what was the great mortality of the one, and the insignificant death-rate of the other, expeditions due? What lessons do they teach us for the future? What to aim at, what to avoid? The reply is simple, and may be expressed by the scientific formula "non-conformity to environment" in the one case, "conformity to environment" in the other. Had the arrangements for the Lushai campaign been as perfect as those for the Miranzai, a deplorable amount of suffering and loss would have been saved. Had the latter been conducted like the former, the death-rates would have approximated too. In these remarks no reflection is intended to be cast on any one. Government based the rules for the general conduct of the first expedition on previous experience and traditions, and on the best advice available; every officer with the force used his most earnest endeavours to carry out orders and remedy defects. The country was unknown, and the calculations as to requirements proved miserably inadequate, but the calculations were made in good faith on the best information available; and the very proper desire to do things as cheaply as possible, led in the end to a great extra expenditure both in money and life.

Nature is inexorable, and shows no mercy to those who wilfully or ignorantly break her laws. In the Lushai campaign every law of hygiene was outraged, and the figures given are the measure of Nature's revenge. Men, overworked to their utmost power of endurance, were at the same time fed with unsuitable food, often of bad quality and insufficient quantity; they were exposed with insufficient clothing to great diurnal vicissitudes of temperature, and left without shelter, exposed to a nightly dew "pouring from the trees like heavy rain." The arrangements for their treatment were quite insufficient, although the medical department of that day thought the provision ample, and it might possibly have sufficed had there been less sickness.

The main cause of all the trouble was the fact that

everything had to be carried by coolies, and that in a hilly country 40 lbs. was considered a full load for a cooly. As he had to carry his own food, it is obvious that when the force reached its furthest point, the available balance carried for service purposes was very small, and it was thus necessary to overwork or overload the men to get up sufficient supplies. Each cooly had of course to carry his own clothes, cooking pots, bedding, &c., in addition to his burden of 40 lbs., and it may readily be imagined that he could not carry much. One blanket was no protection whatever against either cold or dew, the food issued to them was frequently not what they were accustomed to, and being without condiments soon palled and disagreed.

Dysentery, "the disease of armies," and diarrhoea, the result of chills and improper food, were speedily universal; the hospitals were full of cases, though only the most severe were allowed to go on the sick lists. One medical officer reports having to administer 500 doses of astringents daily to a force of 700 men, not in hospital. In the first Miranzai expedition about 1 per cent. of the whole force suffered from dysentery, but there were only three admissions from diarrhoea! In the Lushai campaign 33 per cent. of the total deaths in hospital were from dysentery and diarrhoea, and 50 per cent. from cholera.

Before half the distance to be covered was completed, the British officers in the Lushai country were suffering so severely as to endanger the success of the expedition, and compel the principal medical officer to protest against the food supplied to them. This was practically a pound of salt meat, beef or pork, with a pound of biscuit, 8 ozs. of potatoes (frequently bad), pickles, tea, sugar, &c. They were entitled to a pound of fresh meat once a week, but in practice this took the form of tinned Australian mutton of inferior quality, which was issued in 6 lbs. tins, and was supposed to last six weeks, although it became poisonous after the second day. The greater part of the salt beef was putrid, so that "pickled pork and captain's biscuit" were

the main ingredients in the diet. Two officers died "from disease induced by unwholesome food, several others showed alarming symptoms, some were obliged to seek change to Europe, and others are still suffering" (Report of M. O. of 42nd Assam Light Infantry). In the first Miranzai expedition no British officer was on the sick list: in the second there were 12 admissions out of an average strength of 172, but five of these were for wounds, and all the others were slight cases.

With the exception of the heavy dews, the climatic conditions of the Lushai campaign were favourable, and fevers and chest diseases were much less troublesome than might have been expected. Yet the former caused 12 and the latter 13 deaths. In the first Miranzai expedition 66.66 per cent. of the deaths were due to pneumonia caused by constant exposure to wet and snow, but 66.66 per cent. means only four deaths in all.

The chief cause of mortality with the Kachar column was, however, cholera, which caused, according to the official return, 155 deaths in hospital, after deducting the 201 deaths among the hill coolies, and most of the 88 casualties among the Kukis, say 444 deaths. If we deduct all these cases from the total of 584, and deduct, moreover, 10 more for men killed in action or dead of wounds, we shall have 130 deaths from disease, to set against the 6 of the first and the 10 of the second Miranzai expedition, in neither of which did cholera appear, and as to which it cannot be pleaded that the difference was due to special and unavoidable causes. It is hardly fair, however, to class cholera as a special and unavoidable cause, for although we are not yet in a position to dogmatise as to the exact etiology and pathology of cholera, we know that all conditions which lower health, lower thereby the power of the human body to resist disease, and so favour its development; while sanitation when thoroughly and systematically carried out can practically banish it. It has been banished from Fort William. It is now extremely rare in the European

quarter of Calcutta, formerly "the white man's grave." It never occurs in the Fort at Kohat, where sanitary rules are observed, though it causes in that station more deaths by many times than in all the other frontier stations put together, and it is now generally recognised by sanitarians to be a preventable disease. There can be no question whatever that the general conditions, both natural and artificial, during the Lushai campaign were such as to favour the spread of the disease and increase its ravages should it once get a foothold. By natural conditions are meant that cholera is endemic in the country through which the troops had to pass to reach the scene of action, and experience has repeatedly shown that men passing through that country, especially hill men, are obnoxious to the disease, the danger increasing in proportion as men are massed together. By artificial conditions are meant details as to space, ventilation, cleanliness, clothing, food, water supply, shelter, work, opportunities for medical attendance, &c. Let us take the case of the Nepalese, or hill coolies. They were specially selected men, for the most part of splendid physique, though some were too young. Provided with the sanctioned scale of clothing they marched from Karsiong to Dhubri, eleven marches, and remained three weeks before embarking. With the exception of one suspicious case which recovered, and seems to have been "caused by a surfeit of chura (parched rice)," they had no serious sickness. The question of their transportation had been the subject of the most serious thought, and full directions had been worked out with a view to keep them in health during the passage from Dhubri to Chattak, these instructions including rules for use in case of cholera. The rules are admirable, and could not be improved upon at the present day. Rules, however, are useless unless they are properly enforced, and if the authorities "*les respectent comme théorie, mais ne les mettent pas en pratique*," as Chenu says of the French administration, the rules are not answerable for "*les doulou-*

veux et funestes effets." Eight hundred and forty coolies were to be transported, but the transports provided had room for only 780, allowing to each man only six feet by two, just room to lie in. There is nothing to show how far this space was "real, or whether, as is likely," says the head of the medical department in reviewing the outbreak, "its amount was curtailed by the presence or movements of the crew, or by objects, fittings, baggage, &c., which might occupy a measured deck area." "In consideration of the lateness of the season, the adoption of strict sanitary precautions, and the pressure of circumstances," the medical authorities had agreed that 800 men might be put on board, but the 840 men were somehow stowed away in the space which without encroachment of any kind only allowed 780 to be packed like sardines, and the voyage began. A hospital assistant was in medical charge, and had an ample supply of medicines and disinfectants, but only one uneducated compounder to help him. A regiment of less strength would have had a medical officer, two hospital assistants, and a complete hospital establishment. The day the voyage began the hospital assistant developed pneumonia. Within three days diarrhoea became very prevalent, and was ascribed by all to the "villanously bad" ghi supplied. "Its smell was sickening, its taste bitter, and when taken with food it caused nausea and retching." Orders were issued that it was not to be used, and on Captain Hidayut Ali touching at Dakka the whole of it was condemned by a committee as "rancid and quite unfit for use." One case of cholera occurred the day the steamer reached Dakka, but there was nothing to indicate the approaching calamity, and the vessel was allowed to proceed, another hospital assistant having relieved the first, who was landed dangerously ill. By the end of the next five days 57 deaths had occurred, and the coolie corps was a terror-stricken demoralised mob, the moral influence of fear and the consciousness of neglect helping still further to develop the disease. For the new hospital assistant had

become demoralised also, and sought to drown his fear and helplessness in rum. He was constantly drunk and unfit for duty. Captain Hidayut Ali kept his head and carried out the instructions for his guidance to the best of his ability, but, as may be imagined, the rules did not help him much under the circumstances. Men deserted in scores, some were caught and brought back, others were drowned, others died of cholera in the jungle. The voyage ended on November 22nd, but the disease continued worse than ever, and when effective assistance arrived on the 26th, Dr. J. B. White found "68 men in various stages of cholera, and fresh cases occurring hourly, 25 having been reported in the previous twenty-four hours." It is unnecessary to dwell on the vigour and promptitude with which he acted; it must suffice to say that only one fresh case occurred after his arrival, and that the disease was promptly stamped out by isolation of actual cases, constant inspection of the men, prompt treatment of premonitory symptoms, and a general enforcement of sanitary rules. The remainder of the corps did excellent service throughout the expedition. The outbreak was the subject of a prolonged inquiry, and various theories were propounded as to its cause. The men themselves attributed it to the ghi, Dr. White to the overcrowding, the Surgeon-General to endemic influences. All probably contributed. For while it may be conceded that neither bad ghi nor overcrowding can *originate* cholera, which is believed to be due to a specific cause, germ, bacillus, bacterium, or what not; there can be no doubt that they would operate in favour of the germ existing in the endemic area. Wheat sown on a rock will not germinate; sown in good ground it bears fruit an hundredfold. Cholera germs sown on a rock will not germinate either, and perfect sanitation is such a rock. They require a suitable soil, and such is prepared by bad food (disturbing the digestion and lessening the power of resistance to disease), filth, overcrowding, and all insanitary conditions. In such a soil they, too, bear fruit an hundredfold, and the occurrence of the outbreak under the

conditions present was no more to be wondered at than was its immediate cessation when the reverse conditions were promptly introduced by Dr. White. This is not theory but sober fact, based on universal experience in all countries.

It would be wearisome to trace the subsequent course of cholera in the force. Cases occurred in small groups all along the Barák river, but with the exception of one outbreak, which caused 21 deaths among a batch of 400 coolies sent up to replace losses, it never assumed epidemic dimensions until the force left Tipai Mukh, on its return to India. It had then to descend the river and pass through the district where these cases had occurred. Almost every detachment was attacked, the totals running to about 120 cases with 70 deaths. The force *had* to run the gauntlet and every effort was made to avoid disease, but there can be little doubt that had the men not been reduced in strength by the hardships of the preceding three months, they would have suffered less. The main causes of the very heavy mortality of this campaign have been already indicated, but may be briefly recapitulated.

1. *Want of personal cleanliness.*—This was specially true of the Nepalese and Kuki coolies who were "indescribably filthy" and "little removed from animals."

2. *Insufficient clothing.*—The one blanket and blanket coat were quite insufficient to protect against the cold at night, which was considerable even between Kachar and Tipai Mukh, and very considerable at the advanced posts, some of which were over 5000 feet above sea level.

3. *Want of shelter.*—The troops had waterproof sheets, and with these and materials cut from the jungles, managed to protect themselves from the heavy dews. The local coolies also managed to contrive rude huts, but the bulk of the Panjabis and Hindustanis were very helpless and were constantly drenched to the skin.

4. *Excessive work.*—During the whole three months every man with the force was overworked. The only limit was physical exhaustion. The troops were constantly engaged

in road and stockade making, building huts, escorting convoys, &c. They "came off picket to go to work, and returning from work went on picket." (Report of the M. O. 44th Sylhet Light Infantry.) During December and February the men were in bed only every other night, and on the march each soldier carried a weight of 49 lbs.; quite as much as the coolies, who moreover escaped picket duty.

5. *Improper diet.*—In quantity the diet was sufficient, and so far as the troops were concerned the quality was good. For the first six weeks, however, the essential condiments were not available, and the men came to loathe the sameness of their diets. Advantage was taken of this to reduce it by 25 per cent., and as condiments were eventually supplied, the men did better on the smaller quantity than they had on the larger, because they could eat it with relish. All the reports are, however, agreed that an immense amount of sickness was caused at first by the want of seasoning materials. The defects in the rations of the officers have been sufficiently commented on, so have the mistakes which gave rice to wheat eaters and flour to those habituated to rice. "They mixed it with water and ate it raw: this diet caused dysentery and severe bowel affections" (Dr. Buckle's report). The water supply was usually excellent, being obtained bright and sparkling from running streams. A dram of rum was given to the troops every other day, and was grateful, comforting and much looked forward to after a hard day's work. Coolies were not allowed to have it during the first six weeks, but this rule *had* to be relaxed, and an occasional dram was found to be the best means of preventing their deserting, and putting heart into them for their heavy work.

6. *Insufficiency of medical attendance.*—The supply of medicines was ample, but the paucity of medical officers was greatly felt. The regimental system was still in vogue, but a large base hospital was established at Kachar and another at Tipai Mukh to receive sick from the front and pass them to the rear, and as a long chain of posts, some

seventeen in number, had to be held, it was necessary to have medical aid in some form at each. A number of these posts were supplied by regimental medical officers and hospital assistants, but the rest had to be officered by the staff sent for general duty. This consisted of three medical officers and nine hospital assistants. At the Kachar Dépôt Hospital, under the care of the civil surgeon, 1569 cases were treated. The average daily sick, spread over five months, was 76, but the actual number at times was three times as many. The whole of this work was in addition to his ordinary duties as civil surgeon, and for the greater part of the time he had no assistance whatever. At Tipai Mukh 1937 cases were treated in less than three months; the average daily sick was over 200, and the number more than once exceeded 400. A modern field hospital for 100 sick has four medical officers, one for each section, and seven hospital assistants. During the greater part of the time there was but one medical officer with one hospital assistant at Tipai Mukh. With the best will in the world it was impossible that he could do justice to his cases; and he was in addition medical store-keeper to the force, had to inspect and treat the sick at cholera camps, and had the whole administration of his hospital to look after—diets, sanitation, statistics—in addition to his medical duties. There were neither clerks nor nurses nor orderlies, and the treatment of the sick was necessarily somewhat perfunctory. There can be little doubt that with a larger staff and more complete equipment many lives would have been saved.

The medical arrangements at the small stations and at the headquarters of regiments were of the most primitive description. The regimental hospital equipment, being too heavy for human carriage, was left behind, and a pair of field panniers substituted; but these were very different from those now in use. The modern field panniers are the most ingenious epitome of medical and surgical wants. They contain everything likely to be wanted in any conceivable contingency, so packed as to be immediately available; the

place of every article being known. The Lushai panniers had neither drawers nor partitions, they were mere rattan baskets covered with waterproof cloth, into which stores were thrust *pêle mêle*, the individual bottles being wrapped up in tow to prevent breakage. Great delay and inconvenience were thus caused when medicines were wanted on the march, and there was neither time nor opportunity for scientific prescribing. A few stock medicines, chiefly astringents and quinine, had to do general duty, and the bulk of the medical stores went back unopened at the end of the expedition.

7. *Over-crowding*.—Beyond that on board the transport with the Nepalese coolies there was little of this, for though at times it existed technically in the different hospitals, their walls of bamboo mats were so well ventilated that no bad results ensued, and the wounded did remarkably well.

8. *Conservancy*.—Was very carefully attended to at the camps, most of which were kept scrupulously clean; but there were unavoidable defects on the connecting roads.

We see then that in respect of almost all the rules of health there were serious defects. The most strenuous efforts were made to remedy them, and in many directions with considerable success. Before the end of the campaign the commissariat department had managed to arrange for a supply of fresh meat for the British officers, established bakeries, got up condiments, fresh vegetables, salt fish for the Kuki coolies, and so on.

We now pass on to consider in a little fuller detail the operations of the two Miranzai expeditions of 1891. The first was undertaken to punish a long course of outrages on the part of the Orakzai tribes; the second to punish a treacherous attack on troops left to guard the posts and make roads on the frontier. Physically the country is not unlike Lushailand except that the hills are higher and almost entirely bare of vegetation. The first expedition extended from 18th January to 25th February, the second from 14th April to 7th June, the climatic conditions of the first being

those of a Panjáb winter, those of the second of the hot weather. Ample time for preparation was allowed for the first; we struck at our own time. Hardly any time was allowed for the second, the enemy having attacked the working parties on the 4th April, and the retributory force starting ten days later. In the first, which had an average strength of 5019 troops and 2345 followers, only natives were employed; in the second with a strength of 7203 troops and 2882 followers, 624 of the former were English soldiers, most of them belonging to the 1st King's Royal Rifles, very young soldiers just arrived in the country and quite inexperienced in the art of campaigning. The maximum distance from the base did not exceed 70 miles, mule carriage was available, and although a great deal of labour had to be given to road-making, the more open nature of the country made this less than in the Lushai jungles. In the original programme for the first expedition, the troops were ordered to bivouac; but on the strong representations of the general officer commanding tents were eventually allowed. Less carriage being available during the second expedition in consequence of the Hazára and Manipur Field Forces having to be supplied, tents were left behind at first, but were ultimately got up to the stationary camps, although men with detached columns had to bivouac. Both troops and followers were perfectly equipped with suitable clothing. On the first occasion, when it was known that great cold would be experienced, every fighting man had a postín (sheepskin coat), most of them woollen jerseys in addition, while all troops and followers had two blankets and a waterproof sheet; and each follower had, besides, a jersey, a blanket-coat, a pair of woollen socks and leg bandages. Shelter was provided as already mentioned; an inexhaustible supply of firewood was to be had for the trouble of cutting it. Each sepoy had 30 lbs., each follower 10 lbs., of baggage carried for him. On the Lushai campaign the soldier's allowance was 12 lbs., while the follower had nothing carried for him. The arrangements of the commissariat left nothing

to be desired. A full and varied ration of excellent quality was supplied with unfailing regularity, and included the necessary condiments, while fresh meat, rum and tea were freely issued as extras when extra work or exposure to inclement weather rendered such issues advisable. Both troops and followers were most carefully selected, all sick or weakly men being left behind at the dépôts, so that the force started in the best possible order, and by universal consent no expedition was ever better fitted out. The medical arrangements were on a liberal scale, although not quite up to the standard laid down in regulations. Each regiment had its medical officer and field medical equipment

- 1 Pair Field Panniers.
- 1 Field Medical Companion.
- 1 Surgical haversac.
- 8 Field Stretchers.

as noted in the margin, and, in addition, eleven Field Hospital sections, equal to 2½ Field Hospitals, with 8 medical

officers and 14 hospital assistants, were posted at convenient places all along the line of communications, or accompanied the columns at the front.

Beyond one small skirmish there was no fighting, except against the elements. From the first, throughout the expedition, these made war on the force. The advance was delayed for a week by torrents of rain, which converted the camps into quagmires, and caused the greatest possible discomfort. Snow fell on many occasions, severe frost, sometimes as many as 20°, was of nightly occurrence, and storms of rain and wind were numerous. On one occasion the whole force was practically snowed up for two days, and a complete change in the programme of operations was rendered necessary; on another a march of about four miles took the greater part of the column from fourteen to seventeen hours; on yet another a column on the top of the Samána, 5000–6000 feet above the sea, had to bivouac without tents after a tramp of twelve hours in deep snow. The climatic conditions were throughout as trying as they could be, and infinitely more so than in the Lushai country. Yet the force, as a whole, troops and followers together, lost only

six men, the admission rate was 573.91, and the death-rate 7.83 per thousand *per annum*, probably about half what it would have been had the men been doing ordinary duty in cantonments.

That these unprecedented rates were due to the precautions taken, to the adaptation of conditions to environment, there can be no possible doubt. Had troops or followers been exposed to the foul weather met with, insufficiently clad, sheltered, warmed, improperly fed and overworked, they would have died off just as they died in the Lushai country. The precautions taken and the results obtained stand as clearly to each other as cause and effect. If proof of this were needed it is at hand. "On the night of the 15th-16th January a convoy of provisions was sent from Kohat to Sherkot by a private contractor acting for the commissariat. The men were his servants, had neither shelter nor warm clothing. Three of them lay down and died of cold and exposure by the roadside. The troops and Government followers at Ibrahimzai, Sherkot, and Kohat, sheltered, well clothed and fed, were practically unaffected by the same storm, except the 2nd Panjáb Infantry, and this regiment was the only one unprovided with warm clothing or waterproof sheets. Between the 18th and 25th January before they crossed the frontier they had sent 20 men to hospital, more than all the rest of the troops put together. They then received a partial supply of clothing and waterproof sheets for about 60 per cent. of their strength, and immediately improved in health, their additional admissions to the close of the expedition being only 30. Many of these were, however, bronchitis, pneumonia and dysentery, and the regiment had a far larger proportion of severe cases than any other" (Report of P. M. O.).

Small as the sickness and mortality were they would have been still smaller had the fine dry cold weather usual at the time of year been experienced. Over 84 per cent.

of the admissions were directly due to exposure or the conditions of service, and the particular share of each regiment, in exposure and hardships was faithfully reflected in its sick returns. The 3rd Sikh Infantry, which had some terribly hard work on the Samána in snow and rain, and formed the rear guard when the Zira Pass was blocked by snow, had an admission rate of 882 per 1000 *per annum*. The 5th and 22nd Panjáb Infantry, which were with the force only about a fortnight each, and so escaped many privations, had only 460 and 548 respectively. The 29th Panjáb Infantry, employed on demolition duty, on February 2nd had to cross an icy cold river repeatedly in snow and rain, many of the men losing their shoes, with the result that 20 men went to hospital frost-bitten, and at least 20 more slight cases occurred, though the men continued at their duty. Four out of the six deaths were from pneumonia, the result of exposure. The almost complete absence of diarrhoea has already been commented on, and was due to good water, good food, and sufficiency of warm clothing preventing chills.

The whole history of the expedition shows how by the proper adaptation of means to ends, taught alike by science, experience and common sense, these ends can be attained with all but perfect certainty at a minimum expenditure of human suffering and human life. From a financial standpoint, too, it is probably more economical so to fit out an army that there shall be no breakdown, and consequently no need for heavy expenditure not contemplated in the original estimates to remedy this, and prevent the objects of the expedition from being jeopardised.

The history of the second Miranzai expedition teaches the same lesson, and while from a medical point of view the results were very similar to those of the first, there are several interesting and important variations in details, all of which help to point the same moral and enforce the same lesson, that when each link of a chain is perfect the chain

will stand all tests, and that any imperfect link is a source of danger.

Scant time was given for preparation. On April 4th, 14 men were killed and 7 wounded in the working parties of the 29th Panjáb Infantry. By the 14th the avenging force was ready, and by the 23rd the tribes broken and beaten, and, having lost 600 of the flower of their strength, were abjectly suing for mercy. Surely swifter Nemesis never overtook a people. But the necessity for haste made the preparations less complete than in the first instance. Indents for various articles of equipment could not be responded to in time, and deficient transport made it difficult to forward anything but the absolutely necessary supplies of food. The commissariat officers, however, worked with a will, and all essentials were eventually supplied. No tents were taken at first, some regiments had few or no waterproof sheets, and others were without portions of their field medical equipment. Fourteen sections of field hospitals, sufficient for the accommodation of 350 sick and wounded, were eventually supplied, but during the first week only six sections were available, one of which was on the line of rail 70 miles away, while two formed a base hospital at Hangu, leaving only three sections available at the front, one with each column, capable of caring for and carrying only 25 sick each. During that week, all three columns were frequently engaged, 14 men were killed in action and 66 wounded, and the strain on the medical department was severe. Had the losses in action been much heavier difficulties *must* have arisen, but by utilising the ambulance transport of the two sections left at Hangu, convoys of sick and wounded were sent to the base almost daily, and the sections with the force kept as empty as possible, ready to deal with fresh cases. A bearer column was sent out daily with the troops, who were of course accompanied by their own medical officers, field medical equipment, and field stretchers. As soon as a man was hit he was picked up and placed on a stretcher, given such first aid as was necessary by the

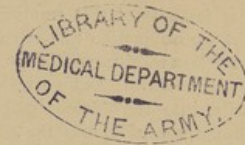
medical officer of his corps, and then carried to the dressing station of the bearer company by two of his comrades trained as stretcher-bearers. There he was further attended to and sent back to the field hospital, where he remained till again fit for duty, if his wound was slight, or till he could be safely sent under proper escort to the sections at the base, and so in due course back to the station he had come from. To the foot of the hill he was carried in a dandi, or on a mule, if able to ride. From there to the railway, ambulance carriages (tongas) took him in great comfort either sitting or lying as the nature of the case required. At each stage he found a section of a field hospital, where his wounds could be dressed and his wants attended to, and the general efficiency of the service is attested by the fact that of 73 wounded men, including 7 wounded on April 4th, only 2 died, both of them from gunshot injuries involving the lungs. It is worthy of note, too, that the usual rule was reversed, and that the losses at the hands of the enemy exceeded those from disease, 16 men having been killed or died of wounds, 10 only having died from disease. Excluding casualties in action the sick returns show an admission rate of 595.83, and a death rate of 6.65 *per mille per annum*, or very nearly the same as in the first expedition. The greater part of the sickness also was again directly due to conditions of service, but the items composing the totals are widely different. In the first expedition, with its snow and rain, chest diseases, fevers and frost-bite, the result of exposure to unfavourable weather, caused a large proportion of admissions and two-thirds of the deaths. In the second the weather was for the most part fine, with occasional heavy storms, but great diurnal variations of temperature, sometimes as much as 45 degrees. There was of course no frost-bite; the few cases of chest disease were due to exposure to wet without shelter. But diarrhoea, formerly conspicuous by its absence, was now very prevalent and severe, partly owing to the bad water found on the crest of the Samána, but chiefly to the great daily

variation of temperature and the difficulty of inducing young troops to take proper precautions against chills. Bowel complaints gave 23 per cent. of the total admissions. The chief sufferers were the European troops, mostly young men fresh from England and quite raw and inexperienced. Their admission rate was 1690 per thousand *per annum*, while that of the seasoned native soldiers was only 534, less than a third. No European soldier died of disease, one man was killed in action, 11 were wounded, including officers. The native troops had a death rate of 5.25, and the followers of 11.66 per 1000 *per annum*, but the total deaths among both classes were only ten. The larger death rate of the followers was no doubt mainly due to their being less carefully selected than and inferior in physique to the soldiers. In the second, as in the first expedition, supplies were excellent and abundant, fresh meat, rum, and tea were issued when required, and the main defects were the want of sufficient protection against climatic conditions and an inferior water-supply. These defects were unavoidable in the circumstances of the case, but Nature makes no allowance for the unavoidable, and the prevalence of bowel complaints was the direct consequence of the defects mentioned, and of the youth and inexperience of a section of the force. The net results again show admission and death rates far below the average of cantonments, and prove still further the possibility of keeping troops healthy under the conditions of active service.

The circumstances and conditions of no two expeditions are or can be precisely alike, and it is in many ways unfair to compare the statistics of a campaign like the first Lushai one, with those on the Samána. Still they all show the great truth that given favourable conditions, whether natural or artificial, the results will be good, and that given unfavourable conditions, whether natural or artificial, the results will be bad, and that it is only by adapting its conditions to its environments that an army can emerge triumphantly from the struggle for life. In the Lushai cam-

paign great natural difficulties were met with, and the means taken to cope with them were inadequate; the result was in many ways disastrous, and the success of the operations was more than once endangered. In the Miranzai expeditions great, though perhaps not quite so great, difficulties were also encountered, but the means taken to meet them were adequate, and the result was a triumphant success, and a complete vindication of the scientific statement that disease can be banished from armies if proper precautions are taken for that purpose. It is gratifying to know too that past unfavourable experience has not been thrown away. The commissariat department is not likely again to supply salt beef and pork 50 per cent. of the weight of which is made up of kegs and brine, while the residue has little nutritive value. Animals might have been driven with the force and found abundant fodder, while saving the over-taxed coolies. The objections to human carriage were fully shown in the one case, the possibility of taking laden mules over an almost impossible country and thereby of carrying ample supplies and tents was shown in the other. The evil effects of a monotonous and imperfect diet stand out plain in the Lushai, as the opposite effects of a sufficiently varied and wholesome diet do in the Miranzai countries. The importance of proper clothing and shelter, the dangers of overwork and exposure, the value of a good water-supply, are all illustrated, so is the wondrous improvement which has taken place in the medical department in the last twenty years. That perfection has been attained, or that equally good arrangements could be made for one or two *corps d'armée* as were possible for the small field forces engaged on the Samána, in Hazára and in Manipur, are not proper subjects for discussion here, and do not lie within the writer's competence to discuss; but as evidence of the spirit of progress and of the earnest desire of the military authorities to use every effort to improve and render effective our military machine, the medical history and statistics of the two small campaigns on the Samána may be appealed to

with confidence. A considerable number of minor improvements tending to simplify the working details of field hospitals have already been adopted, and others are under consideration, and as at present constituted, they are as nearly perfect as care and forethought can make them.



ON THE NATURE OF THE PHYSIOLOGICAL
ELEMENT IN EMOTION.

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It is the signal merit of Prof. James to have recognised that the physiological element is the predominant element in the emotions, and that the problem of the nature of the emotions is essentially a physiological problem. The following study of the emotions consists in an attempt to apply to the solution of that problem the more adequate conceptions of the spinal centres and the somatic and visceral nerves which we owe to the researches of Gaskell.

Obviously the easiest way to approach the study of the emotions is to proceed by the method of physiological experiment.

An appropriate experiment would consist in taking a kitten and in noting the changes that occur in it when it is suddenly confronted with a strange dog. The emotional stimulus which would thus be applied would evoke a whole series of reflexes. The rhythm of the kitten's respiration would be altered, its heart-beat would be affected, the size of its pupils would be altered, and the hairs upon its tail would stand on end. All these would be reflexes upon visceral efferent nerves. Superadded to these involuntary visceral reflexes there would be reflex responses upon the semi-involuntary facial muscles; the lips would probably be drawn back so as to show the teeth. And, lastly, there

would be reflex responses in the voluntary muscular system; the kitten would assume an attitude of self-defence.

The essential features of this emotional reaction would appear to be (a) the origination of the emotion in a violent sensory stimulus; (b) a resulting condition of extreme neural tension in the reflex centre; and (c) an outflow of neural energy, primarily, into the efferent paths associated with involuntary muscles, secondly, into the efferent paths associated with semi-involuntary muscles, and thirdly, into the efferent paths associated with voluntary muscle.

What holds true of the emotion which is evoked in the kitten by the encounter with the dog holds true of all other emotion. Wherever we have a condition of high neural tension, followed by reflexes upon involuntary muscle, we are dealing with emotion.

The descriptions which the poets give of emotion are in evident agreement with our definition. Two will suffice. We have Dante's "io ch'avea d'orror la testa cinta," and Juliet's "hood my unmanned [*i.e.*, untamed] blood bating [*i.e.*, beating as a hawk's wings beat] in my cheeks." Each of these descriptions of emotion tells of a condition of high neural tension, and of an outflow of neural currents into the involuntary muscular system. The "girdling of the head with horror" would indubitably be a function of the overflow of neural energy into the cervical sympathetic nerves, for Sherrington has demonstrated that the stimulation of the cervical sympathetic nerves¹ in the macaque produces the erection of a fringe of hair upon the head, and gives the monkey a terror-struck appearance. Similarly in the case of Juliet, the condition of emotion is associated with high neural tension and visceral reflexes. The latter result in tumultuous heart-beats and vaso-dilatation.

Moreover, the results of clinical observation accord well with our physiological inferences, for we find that heart

¹ Langley similarly showed that the erection of hairs on a cat's tail was brought about by the stimulation of the sympathetic fibres. On the other hand, as my friend Prof. Sherrington has pointed out to me, the labial vibrissae in the cat are innervated, not by sympathetic fibres, but by branches of the fifth. This is exactly what we should expect *a priori*, for the erection of the vibrissae of course occurs quite independently of any emotional reaction.

disease, Bright's disease, jaundice, and dyspepsia are occasional sequelæ of profound emotional disturbance. The emotional reflexes have in these cases evidently been correlated with serious nutritional disturbances of the viscera.

We must not, however, suppose that these visceral reflexes constitute the physiological essence of the emotion.¹ The physiological essence of the emotion is the high neural tension in the reflex centre, and not the visceral reflexes that result from that condition. For the psychological phenomena of any emotion precede the manifestation of that emotion, and they are coincident, not with the visceral reflexes, but with the antecedent neural tension in the reflex centres.

Having thus obtained a definition of emotion which conforms to the data of our physiological and psychological experience, we may pass on from this to consider the transformation of the reflexes that occurs when the stimuli which originally evoked emotions lose, as all stimuli gradually do, their emotional potency.

This transformation is a question of a replacement of the generalised somatico-visceral reflex by a specialised somatic reflex.

It is a transformation which is in gradual process all the time the child is growing up into the adult. In childhood the reflexes approximate to the primitive generalised type of reflex. There is as yet no differentiation into somatic and visceral reflexes, and every afferent phenomenon evokes a response both upon voluntary and upon involuntary muscle. In all such reflex responses there is therefore an element of emotion. When, however, the child grows older, the outflow of neural energy which occurs in response to the ordinary afferent impulses becomes more and more restricted to the somatic efferent channels. And gradually, hand in hand with this elaboration of the purposive voluntary action,

¹ We may perhaps note that the child does not discriminate between the essence of the emotion and its manifestation. The unsophisticated child will, for instance, say "Now you have made me cry." He will never say "Now you have made me *sorry*," for he does not attend to his psychological condition. He attends only to the results of his reflexes.

the emotional visceral element¹ fades out from the reflex process.

An example or two will serve to show what is involved in this substitution of a somatic for the primitive somato-visceral reflex. When a tyro-sportsman goes out for the first time after game, the sight of a rabbit jumping up before him evokes a considerable volume of emotion. This expresses itself in a violent start, and in tumultuous heart-beats. When, however, the sportsman has become familiar with these sensations, and when he has practised the voluntary responses which are appropriate to such an occasion, the jumping up of a rabbit will no longer evoke an emotional reaction. It will evoke, instead, the purposive reflex responses which are associated with aiming and firing.

Similarly a surgical operation will evoke a considerable emotional reaction in any unaccustomed onlooker. But when a medical student sets himself to learn his surgical work, he learns to respond to such sensations with the appropriate somatic reflexes. And when the adaptation of these purposive voluntary responses to the sensory phenomena of the operating table has been achieved, the student, who now merits the title of "*surgeon*," finds that the nerve currents "no longer keep running down into his viscera."

We must, however, note that the education of the reflexes is never even tolerably complete. When any startlingly novel phenomenon—any sensation in short to which a voluntary reflex movement cannot be immediately adapted—presents itself, the neural tension will overflow with full force into the involuntary muscular system, and particularly into the respiratory system. We therefore

¹ The fading out of this emotional element from the reflex process is a frequent theme in Wordsworth's poetry.

It is, for instance, the theme of his "Intimations of Immortality from Recollections of Early Childhood." The "something that is gone" is the visceral reflex. The bringing down of all life to the lower level of the somatic reflex is the "closing of the prison house upon the growing boy." Childhood is "the hour of splendour in the grass and glory in the flower." Manhood is the time when the "celestial light" which originally illuminated every common thing has completely faded out "into the light of common day."

speak of such a startling sensation as something "that takes the breath away."

What has been effected, either by natural processes or by education is, therefore, not a suppression of the tendency of the neural tension to overflow into the visceral nervous system, but rather a diversion of the nerve outflow into the somatic efferent channels in the case of a certain number of constantly recurring sensations. And we must note that this more effective outflow through the somatic efferent channels goes hand in hand with a diminution of the neural tension in the reflex centres.

Very obvious physiological advantages accrue from this transformation of the reflex processes. *First*, the neural energy will no longer run to waste in visceral reflex movements. *Secondly*, when the visceral reflex is eliminated there will no longer be any danger of the visceral commotion, which is initiated by that reflex, reacting in an unfavourable manner upon the reflex centres. *Lastly*, when the high neural tension is abolished in the centre, the conditions will obviously be more favourable to the delicate adjustment of the reflex responses upon voluntary muscle. The advantages from the point of view of practical utility need not be further insisted on.

Considerations of utility do not, however, effect physiological changes. We have, therefore, still to seek for the effective physiological motive force which brings about this transformation of the reflexes. As a preparation for undertaking this task, we must, however, consider, *first*, the *a priori* necessity for some systematic control of the reflexes, and, *secondly*, the nature of the provision which actually exists in the organism for the exercise of that control.

The *a priori* necessity for some system of control becomes obvious when we consider that if each minimal stimulus were to evoke a separate reflex movement in an organism which was endowed with a sensitiveness at all approaching that of the human organism, life would be a mere chaos of muscular movement. If there were no storing away of nerve-energy there would be no continuity of purpose, and no possibility of making the present subserve the requirements of the future.

It is, however, precisely this continuity of purpose, this making provision for the future, this "looking before and after," which is the specially characteristic note of human life. And of all this an effective control of the reflex processes is the precondition.

In the case of the reflexes upon voluntary muscles, the control, which we have seen to be so essential, is exercised almost exclusively through the medium of the inhibitions. These are of course continuous in their operation. And so effective is this control that a stimulus cannot, even in the most sensitive organism, evoke a movement of voluntary muscle, unless it can first effect the lifting off a considerable dead weight of inhibition from the reflex centres.

In the case of the visceral reflexes inhibitory control plays a comparatively subordinate rôle. But on the other hand, the reflex centres are so constituted that no outflow of neural energy can take place into visceral efferent nerves until a very considerable neural tension has been achieved in the reflex centre. This provision operates as a very effective check upon the visceral reflexes.

The voluntary and the visceral reflexes are thus sharply contrasted. The voluntary reflex movements (*a*) correspond to low tension discharges from the centre (*b*) the mechanism which controls them is extraneous to the spinal reflex centre, and (*c*) the control of that mechanism can be relaxed. The visceral reflexes, on the other hand, correspond to high tension discharges from the reflex centre, and the mechanism that controls them is to a large extent intrinsic in the centre.

We have confirmation of this in the fact that a very different intensity of stimulus is required to evoke, on the one hand, a reflex on voluntary muscle, and on the other hand, a visceral reflex. We react with a movement of voluntary muscle to even the lightest touch, but when we react with a visceral reflex, it is always either a question of a very intense form of stimulus, or of a long series of stimuli which have gradually summated themselves in the centre. We may, for instance, contrast the facile culmination of our ordinary uninhibited somatic reflexes with the prolonged

molimen which precedes the culmination of the reflex process in either the vomiting or the ejaculatory centre. It is always easy to initiate any voluntary muscular movement that may occur to us, while it is always difficult to call up an emotion *ex æquo*.

Again, we have clear indications of the high neural tension which is associated with the more important visceral reflexes in the fact that the summation of stimuli which leads up to the reflex action is attended with an outflow of energy along vasomotor and other visceral nerve channels. This is no doubt to be interpreted as a leaking¹ out of the nerve energy which is being accumulated at high tension in the reflex centre. We may take as an example the flushes and shivers and salivation which manifest themselves when the neural tension is rising in the vomiting centre.²

Lastly, the enormously greater neural tension, which is associated with visceral as contrasted with somatic reflexes, can be inferred from the intensity of the physiological urgency which precedes the culmination of a visceral reflex.

We here touch the central point of our problem. All high neural tension is attended with a sense of distress.³ It is this physiological urgency, and not any calculation of utility which presides over the transformation of the condition of high neural tension which is associated with

¹ This leakiness of the reflex centres must obviously operate as an effective drag upon the visceral reflexes. For wherever a certain interval of time is allowed to elapse between stimulus and stimulus the neural tension of the centre sinks to zero again, and the whole process of summation has to be taken under practically *de novo*. This is a fact which is in the experience of nearly everyone, not only after a rough cross channel passage, but also in connection with emotional disturbances in other centres.

² The distinguishing mark of what are spoken of in physiological text-books as "centres" (*e.g.*, the centre for vomiting, the centre for micturition, the centre for respiration) is the fact that these are high tension (visceral), as distinguished from low tension (somatic), reflex centres.

³ It is this sense of general neural distress, and not actual pain, that is the true physiological opposite of pleasure. All neural distress is associated with a condition of high neural tension, and all such neural distress urges forward to the euphoria, which is associated with the condition of neural equilibrium. It is the rebound from the condition of neural distress to the condition of neural equilibrium which constitutes, as indeed Schopenhauer discerned, the essence of pleasure.

emotion to the condition of low neural tension which is associated with purposive action. It is, for instance, not a consideration of utility which urges on a nervous woman to try to learn to cross over a crowded thoroughfare without an emotional reaction. But it is the feeling of distress which is associated with the condition of high neural tension which she seeks to evade. It is with a view to compassing this object that she strives to respond with unhesitating purposive voluntary actions to the multiform stimuli of the street crossing.

We have thus been able to discern what the compelling force is that brings about a gradual supersession of the generalized somatico-visceral reflexes of inexperience and childhood by the specialized purposive reflexes of experience and adult life. We have seen that it is not so much a question of substituting one variety of reflex for another, as it is a question of substituting a condition of low neural tension for a condition of high neural tension.

Now we cannot conceive any other means by which this transformation could be effected except by a more prompt and more adequate outflow of energy through the low tension somatic efferent channels. And such freer outflow of neural energy is almost certainly obtained by facilitating the somatic reflex responses of the spinal centre by a prompt relaxation of the inhibitions which are continuously passing down from the higher to the subordinate centres.

All these points in the physiology of the emotions can readily be illustrated if we allow ourselves to compare the complex of reflex centres, which Gaskell has taught us to group together under the concept of a "complete spinal segment," to a water cistern.

In accordance with Gaskell's scheme, such a water cistern would evidently be supplied by two inflow pipes, corresponding to the somatic and visceral inflow, and with two outflow pipes, corresponding to the somatic and visceral outflow.

Now these outlet pipes will be situated at different levels. The low level outlet will correspond to the efferent paths to voluntary muscle, and the high level outlet will correspond

to the efferent paths to the visceral system. We have further to imagine, first, that the low level outlet was primitively partially obstructed by a valve, and secondly, that this valve has subsequently been geared up to a mechanism which can raise and depress it in such a manner as to completely free or to completely obstruct the flow of water through the lower outlet.

The primitive somatic and visceral reflexes of the child will now correspond to (a) a rapid inflow of water; (b) the development of a considerable head of pressure in the cistern; and (c) an outflow through the low level outlet, and, because of the insufficiency of this outlet, also (d) an outflow through the high level outlet.

The transformation of the reflex processes in the direction of a freer outflow into the voluntary muscular system will correspond to such more ample outflow through the low level outlet as will result from a removal of the inhibitory obstruction.

If we now make the further assumption that a considerable strain would be put upon the cistern by the pressure of the full volume of water, we shall be able to realise the utility of a provision for increasing the lower level outflow.

Our illustration will also bring it home to us that the undeniable utility of a provision for an ampler low level outflow is something totally distinct from a physical force such as would necessarily effect an alteration in the system of outflow.

Not only will our illustration make this plain, but it will supply us with something which is completely analogous to the physiological force which is ever tending to bring about a substitution of a somatic for a visceral outflow. The analogous force in the case of our cistern is obviously the pressure of the water, and we can easily conceive methods by which this pressure of water could be made to operate as a constant force in the direction of the removal of the valvular obstruction from the lower outlet.

Again, we can represent to ourselves the emotional results of violent, or sudden, or unfamiliar stimuli if we assume that the mechanism that controls the outflow

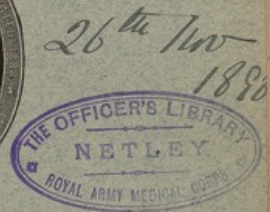
through the lower outlet has only been adapted to the circumstances of the ordinary inflow, and that it is inadequate to control the rise of water in the cistern under the circumstances of any unusual inflow. Any such defect of adaptation would obviously bring about an outflow of water through the high level outlet.

Lastly, if we suppose our cistern to leak, and to leak through wider openings as the water pressure increases, we shall evidently constitute a further analogy between our water cistern and the spinal nerve centre.

With the author's compliments

THE SANITARY INSTITUTE.

CONGRESS AT BIRMINGHAM, 1898.



INAUGURAL ADDRESS

BY

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[Excerpt from Vol. XIX., Part III., of The Journal of
The Sanitary Institute.]



INAUGURAL ADDRESS,

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(FELLOW.)

Delivered September 27th, 1898.

My first duty on taking the chair is to acknowledge the honour conferred on me in selecting me as President of this Congress; and my next to offer a cordial welcome to all who propose to take part in its proceedings, and to express a hope that they may not only derive pleasure and profit from them, but at the same time confer benefit upon the cause they advocate.

It is also my duty to convey the thanks of the Congress to the Right Honble. the Lord Mayor and Corporation for the hospitality and courtesy which has been extended to it in the important city of Birmingham, a great and populous centre of activity, to which the problems to be considered in the forthcoming conferences must be of deep and abiding interest.

It is not without misgiving that I have assumed the office entrusted to me, for when I think of those who have been my predecessors, I feel painfully conscious of my inaptitude for the post that they have filled so well. I must confess, moreover, that I found some difficulty in selecting a topic suitable for an inaugural address, but can only hope that my shortcomings may be redeemed by the proceedings of the various sections into which the Congress is divided.

I shall not attempt to deal with any special branch of

preventive medicine or hygiene, but shall endeavour to take a brief general survey of progress during recent times. It should be a retrospect full of interest, offering scope for many addresses on special branches of sanitary science—such, indeed, as I hope will characterise the coming Conference.

We live in an age of progress and discovery. Intellectual activity has never been greater, scientific research never more profound or far-reaching, whilst the practical applications of the discoveries of science are not less remarkable. Among many subjects of interest which were laid before our gracious Queen on the completion of the sixtieth year of her glorious reign, few perhaps if any afford better ground for congratulation than the improvement in the vital statistics of her people, as shewn by reduced death-rate, enhanced expectation of life, decline in some of the most potential death-causes, and the almost total disappearance of others.

In effecting this improvement, the Institute which I have the honour to represent and which holds its 17th Annual Congress this year has taken an important part. It was the outcome of the impulse given to sanitary science by the Public Health Act of 1875, which itself was a result of the growing conviction that public health was a subject which demanded more consideration than it had hitherto received.

At a public meeting held in London in July, 1876, presided over by His Grace the Duke of Northumberland, it was resolved that the sanitary condition of the country is still very unsatisfactory, that further legislation is necessary with a view to its improvement, and that for the purpose of collecting and imparting information upon all matters connected with the subject of "Public Health," a society be formed to be styled "The Sanitary Institute of Great Britain," and a committee was appointed to give effect to the terms of the resolution. Since then the progress of the Institute thus founded has been uninterrupted, and its influence for good has steadily increased. In the same year, 1876, the Parkes Museum was founded at University College as a memorial to Dr. E. A. Parkes, first Professor of Hygiene at Netley, and in its galleries were exhibited various hygienic appliances for the purpose of affording information by the objective method of teaching. Its Council originated and managed the International and Sanitary Exhibition at South Kensington in 1881, which was presided over by the Duke of Edinburgh. It was in 1882 incorporated as a society, its treasures were transferred to the present premises in Margaret Street, where it was joined by the Sanitary Institute, and the two institutions having a common object worked harmoniously together and practically became one. In August,

1888, they were formally amalgamated and re-incorporated under the title of The Sanitary Institute. In 1887, just before the amalgamation took place, the Institute, in conjunction with the Society of Medical Officers of Health, invited the International Congress of Hygiene and Demography to meet in London, which it did in 1891 with great success.

The object which the Institute has kept steadily before it from the outset has been the advancement of sanitary science by the promulgation of sound scientific and practical teaching of those principles on which health depends, by which life is prolonged, and the physical and thereby the moral welfare of the people promoted.

One of its earliest steps, taken in 1877, was to establish examinations for Local Surveyors and Inspectors of Nuisances, in order that the officers who had to carry out the provisions of the Public Health Act should be competent for their duties. The Council also arranged to hold an Annual Congress in some provincial town, in order that papers should be read and discussions take place, whilst, at the same time exhibitions of sanitary appliances were arranged as object lessons, and judges appointed to examine the exhibits and award prizes. Since the amalgamation with the Parkes Museum the same work has been continued, with the addition of periodical meetings, at which papers are read and discussed, the publication of transactions, and advanced examinations; while to aid the important teaching work it was carrying on, it collected and published the works of Farr and of Simon, which deal exclusively with the problems of sanitary science. It has gradually accumulated an excellent library, and instituted lectures and practical sanitary demonstrations for the benefit of medical men and of sanitary inspectors, which subsequently were considerably extended and more elaborately organized. Under the patronage of the Duchess of Albany and the Presidency of the Dukes of Northumberland and Westminster, and latterly of the Duke of Cambridge—who had already been connected with the Institute for fourteen years, and had not only displayed great interest in its work, but had rendered it valuable assistance, and under the guidance of such men as Sir Douglas Galton, Earl Fortescue, Sir Francis Powell, Mr. Rogers Field, Prof. Corfield, and others who had been its early supporters and founders, it steadily developed its purpose of diffusing practical sanitary knowledge throughout the country and attained its present influential position.

An idea may be gained of the scope of the operations of the Institute by reference to the epitome of the work done in 1897, which was as follows:—

LONDON LECTURES AND EXAMINATIONS.		Total Attendance.
4 Sessional Meetings for discussion of Sanitary Subjects	...	285
36 Lectures to Sanitary Officers	...	2,251
2 Special Demonstrations, Inspection of Meat	...	140
34 Practical Demonstrations for Sanitary Officers	...	925
2 Examinations in Practical Sanitary Science	...	34
2 Examinations Sanitary Inspectors	...	213
38 Classes brought to the Museum	...	1,674
Other persons visiting the Museum (estimated)	...	17,500

PROVINCIAL EXAMINATIONS.

8 Examinations Sanitary Inspectors and Practical Sanitary Science	...	316
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CONGRESS AND EXHIBITION AT LEEDS.

6 Sectional Meetings	...	706
8 Conferences	...	850
3 Addresses and Lectures	...	956
Exhibition open for 23 days, at which a number of Lectures and Demonstrations were given	...	75,790

All this is effected entirely by private enterprise, unaided by any subsidy either from Government or other public authority, by which it is from time to time consulted, and to which its services are most willingly rendered. As an illustration of the progress made it may be stated that when the first Congress took place in 1877, there were 150 members and the income was £240. In 1897 the members were 2,100 and the income £6,000. In 1877 five candidates were examined for certificates, in 1897 521 were examined, of whom 300 obtained certificates.

Such is a brief outline of the history of The Sanitary Institute. But it is by no means the only source of instruction in matters relating to Hygiene and Preventive or State Medicine, for all our Medical Schools and Universities, the Army and Navy Medical Schools at Netley and Haslar, and many technical schools now give instruction in those subjects, and the Universities and Colleges of Physicians and Surgeons attest the fitness of candidates for the Diploma of Public Health. One great national reproach, moreover, has lately been removed by the foundation, by private enterprise of the Institute of Preventive Medicine, under the presidency of Lord Lister, with which is amalgamated the College of State Medicine. The object of this Institution is to search out the causes of disease, a knowledge without which we cannot hope to deal effectively with modes of prevention. The Medical

Departments of the Navy, the Army, and the Local Government Board, the Army Sanitary Committee, the Royal Institute of Public Health, many municipal and rural Health Societies, and Societies of Medical Officers of Health, are actively employed in extending the practical application of the knowledge imparted by the various educational institutions as well as by individual research.

The time at my disposal does not permit of tracing in detail the history of the growth of Sanitary Science from times of ignorance and superstition to its present well-established foundation on a scientific basis, but I may at once say that it is indeed only comparatively recently that preventive as distinguished from curative medicine has assumed the position of a science at all; it is now from a hygienic point of view, the more important of the two, though the difficulties attending its application are still considerable and largely such as arise from ignorance and incredulity.

Half a century ago the great mass of the population lived and died under conditions which violated all the now well known principles on which health depends; prejudice, ignorance, and vested interests stood in the way of progress, and but little effort was made to correct the one or remove the others; government looked on with indifference; the people knew little and thought less of the efficacy of pure air, pure water, cleanly and uncrowded dwellings, temperance, and other conditions which are now well known to be essential to health. They had no idea that infective disease is but too frequently the scourge of uncleanness, overcrowding, and disregard of simple laws of health.

Under the influence of such reformers as Chadwick, Parkes, Richardson, Simon, Southwood Smith, Sutherland, Bristow, Buchanan, Netten Radcliff, De Chaumont, Corfield, Thorne, Notter, Seaton, L. Parkes, Ballard, Power, A. Hill, Armstrong, Russell, Littlejohn, Cameron, Smith, Ransom, and others, to say nothing of Sanitary Engineers such as Rawlinson, Galton, Rogers Field, Hawkesley, Mansergh, etc., measures which were regarded as mere theories or fads of no practical value, are now accepted as of cardinal importance. Statesmen have learnt to realise that Sanitary Science comes well within the sphere of practical politics, and that it is an important part of the duty of executive governments, whether general or local, to protect the people from disease which may be prevented or controlled.

Numerous Acts of Parliament have been passed, such as the Public Health Act of 1875, Rivers Pollution Prevention Act 1876, Public Health (Water) Act 1878, Acts for Housing

the Working Classes 1885 and 1890, Infectious Diseases Notification Act 1889, Infectious Diseases Prevention Act 1890, Isolation Hospitals Act 1893, Public Health Act for London 1891, and many others. Officers of Health, Sanitary Engineers and Sanitary Inspectors have produced a better state of things; the poor are no longer left to be a law unto themselves on such matters. Public health is cared for in a sense which was utterly unknown in the past; houses are better built, sewerage, drainage and ventilation are provided for, the land is better cultivated, the subsoil better drained; the absolute importance of pure drinking-water is recognised, food is more varied and more nutritious in its character, clothing is better adapted to climate; and were all the existing official provisions enforced, little would remain to be desired on the part of the Executive government; but as some of these Acts are permissive, not compulsory, and as others are utterly neglected, much of the benefit they might confer is lost.

Though education has done much as far as the better classes are concerned, and upwards of 200 millions have been spent on sanitary work, with great benefit to the public health, popular teaching and example, and the general diffusion of education, are still necessary in order to convince the proletariat of what so intimately concerns their vital interests. The death-rate is susceptible of further diminution, expectancy of life may be enhanced, and the general conditions of living and exemption from certain forms of disease are by no means as perfect as they might be; tainted water is still drunk, as was illustrated by the condition of Maidstone and King's Lynn last year, where an extraordinary visitation of typhoid fever was traced to impure water, shewing either that legislation was imperfect or that its provisions had not been duly observed. Chimneys still vomit forth their smoke and chemical fumes, rivers are still polluted, cesspools and imperfect drains, badly constructed, ill-ventilated houses, and so on, still defy alike sanitary law and common sense; and it will perhaps not be until the more complete organisation of the public health administration under a Minister of Public Health be effected, that the full benefits of sanitary legislation will be realised and the people attain to that standard of health and duration of life for which they have a right to hope.

Even our great cities with all their improvements leave much to be desired. Notwithstanding Acts of Parliament, all the efforts of sanitary authorities, all the advice that may have issued from this and other similar sources, serious defects remain. Even your own great city, according to the journals, notwithstanding the splendid municipal arrangements for which

it is remarkable, has still a higher death-rate than some other great cities. Since 1882 up to 1897 it has stood at from 21.6 to 20.2, and the same authority points out sanitary defects which one may venture to think might be ameliorated.

In the first week of July in thirty-three of the largest English towns the rate of mortality, which had been 15.1 and 14.9 per thousand in the two preceding weeks, declined to 14.7. It was 14.3 in London, whilst it averaged 14.9 in the thirty-two provincial towns. The lowest death-rates were 9.4 in Cardiff, 9.7 in Huddersfield, 10.3 in Brighton. The highest rates were 17.9 in Plymouth, 20.3 in Newcastle, 21.4 in Sunderland. When the last quinquennium is compared with the preceding decennium it is found that Blackburn and Huddersfield have reduced their death-rate 4, Halifax and Cardiff 3.8, Oldham 3.7, Preston 3.4, Manchester 3.3 per thousand, while Birmingham has been practically at a stand-still.* If I am not mistaken, your own eminent health officer thinks that if the death-rate is to be reduced, it is essential that the improvements should be continued which had such a good effect some years ago. I merely venture to suggest it as a hint that may be worthy of the consideration of the municipal authorities.

Apropos of London, Sir Henry Burdett said in a speech made last year: "London, unfortunately, in regard to certain health matters is still under the control of the Vestries. * * * In the district of ——— for example, in this year of the Diamond Jubilee (wherein the greatness and majesty of the British Empire has been so convincingly exhibited,) the streets of one of the wealthiest portions of London are left unswept and uncared for from Saturday to Monday in each week. No matter how high the temperature, or how filthy the streets may be, the streets of probably the wealthiest district in the Metropolis of the Empire are made dangerous to health. * * * Some of the most influential of the residents have entreated and protested in vain. The intelligent foreigner, to his surprise and disgust, may see in the streets of ——— on any Sunday when the principal residents are at home all day, fermenting filth and even dead cats, dirty papers and various kinds of offal, which offend the senses and infect the atmosphere to the danger of the inhabitants. Such a state of affairs is as shameful as it is unaccountable."

He might have added a paragraph upon the abominable and insanitary practice of sending out the vestry dust-carts to take away the house refuse at all times of the day. This

* "Lancet," July 16th, 1898.

proceeding is not only offensive to the eye and nose, but prejudicial to health. It ought to be promptly discontinued, and on no pretext ought dust-carts to be allowed in the streets after an early hour in the morning. Recent discussions in the House of Commons shew that the question of pure water supply also has not yet been satisfactorily settled or brought under the control of the sanitary authorities. It is to be hoped that disputes upon a question of such vital importance will not long remain unsettled.

Nevertheless, when we contrast the present state of our country with its 29 millions of inhabitants, with that of the Elizabethan era with its 4 millions, we have ample proof of the ignorance of science in those days and of the great improvements which have taken place in these. When we think of the ill-ventilated dwellings, the ill-built towns and villages, the narrow, unpaved, unlighted streets, uncultivated, marshy country, unreclaimed land, the wretched houses, often of wood or earth, without drainage or ventilation, with floors covered with straw or rushes saturated with filth and reeking with noxious miasmata, the stagnant gullies and open cesspools, to which must be added the wretched diet, often of salted meat, with little or no vegetable food, the intemperate habits, and frequently the most impure water, we can understand how under such conditions disease found a congenial nidus, and frequently assumed the epidemic proportions in which it proved so destructive to life, manifesting itself in the forms of the black death, sweating sickness, typhus, plague, eruptive fevers, small-pox, leprosy, scurvy, malarial fevers, and dysentery. Many of these have disappeared—never, we hope, to return—others have been mitigated.

But can we feel confident that the immunity will continue? I am afraid not! Sudden invasions of cholera and other epidemics, and, as now, of plague in India, are warnings that our vigilance must never be relaxed. But the experience of our country under the greatly improved sanitary administration of the present time has shewn how much we may rely on preventive measures wisely enforced, especially when these are based on experience and enlightened observation, and not upon mere theories of causation.

A brief enquiry into the statistics of some well known diseases will show that they have become less severe in their incidence if not less frequent in their recurrence, and how far they are thus subject to the influence of hygienic measures.

In Small-pox, for example, there has been great reduction, more so than in any other disease. Since the passing of the first Vaccination Act in 1841, the death-rate has fallen from 576 per

million to 20 per million in 1891-95. Vaccination, isolation, attention to rational treatment, whether therapeutic or hygienic, have preceded or accompanied, and as most people believe, induced these results; and theories which ignore vaccination as a preventive must, it appears to me, necessarily be rejected until a better explanation of the cause of the diminished incidence and mortality from the disease can be offered.

As to the value of vaccination, all the evidence that is forthcoming seems to shew that there can be no doubt of it. As to the methods by which every individual is to be vaccinated or re-vaccinated, that is a subject for the State to determine. That the Acts in existence up to the present time are inadequate to this end is plainly shewn by the fact that large and increasing numbers of the population are known to be unvaccinated, despite their compulsory character. Lord Lister said in his speech in the House of Lords last August that one-third of the children born are unvaccinated, and that one-fourth of the Boards of Guardians do not put the law in force.

The most recent Vaccination Act, whatever may be its advantages, is certainly defective in this: that it makes no provision for re-vaccination, the necessity for which is universally admitted by the medical profession, whilst it is very doubtful whether the modification of the compulsory clauses will have the effect, as it is hoped, of extending vaccination. This remains to be seen during the five years for which the new Act is to be operative. Whatever the Government may have thought proper to enact, though there seems good reason to believe that as far as it is concerned faith in vaccination is unshaken, it must be borne in mind that the Royal College of Physicians have recently expressed their unaltered conviction, and it is endorsed by the whole profession, that vaccination "properly performed" and "duly repeated" is the only known preventive of small-pox, a view "which is confirmed by the experience of every epidemic, and is endorsed by those whose office it is to combat such outbreaks by all the resources of science. The characters of small-pox, its high degree of contagiousness, the rapidity of its spread on congenial soil, defy the efforts to suppress it by isolation alone or to arrest it in its earlier days of invasion, and if vaccination were not at hand to render its remarkable aid, the disease would become as common and as widespread in this country as it was in times when sanitary science was unknown."*

In 1838 the death-rate from fever at all ages was 1,053 per million; in 1891-95 it was 185 per million. It was not until

* "Lancet," August 6th, 1898.

1869 that enteric fever was separated from typhus, so that it is not possible to say how much of the reduction should be assigned to each, but the death-rate from enteric fever has been reduced by about 53 per cent. since the diseases have been differentiated, whilst typhus has almost ceased to exist. Now these fevers notably flourish where sanitation is defective, and as dirt, overcrowding and destitution have been diminished so has typhus disappeared, whilst with improved drainage, the removal of excretal filth, and the supply of pure water, enteric fever has become less.

There is reason to think that Cholera is similarly influenced, for though it has appeared in England several times since its first invasion in 1831, as in 1845-49, '53-54, '65-66, and even since as at Grimsby in 1893, yet its virulence and activity have been gradually diminishing. I believe we do not know all the conditions on which the origin and diffusion of cholera depend, but it has been shewn here, as in India, that whatever may be its ultimate cause it is amenable to sanitary laws; and that though we may not be able to prevent it altogether, we can so mitigate its incidence and severity as to deprive it of much of its terrors. Happily the antiquated system of prevention by coercion has in our country been replaced by that of sanitary measures and isolation, and it is to the wise and judicious exercise of these by the medical authorities of our Local Government Board and County Councils, and by Municipal authorities and Health Officers throughout the kingdom, that whilst neighbouring countries in the full practice of coercion and quarantine were decimated, England has lately remained almost exempt. It seems to me that few better examples of the benefit arising from vigorous action by Government, under the guidance of scientific authority, could be adduced.

Scarlet fever and diphtheria were formerly tabulated together; since 1859 they have been separately returned, and I learn from Dr. Louis Parkes (a most worthy successor of his distinguished relative and namesake) that "in 1838-42 the joint mortality was 797 per million living; in 1891-95 it was 435 per million, a reduction of 45 per cent. Since 1861-65 the scarlet fever death-rate has been reduced 81 per cent., but the diphtheria death-rate is now very much the same as it was over thirty years ago (1861-65), and about double the rate prevailing in the fifteen years 1866-80. Whilst there can be little doubt that improved sanitary and social conditions have played some part in the reduction of the scarlet fever death-rate, still the larger proportion of the diminished mortality is probably attributable to a change in the type of the disease."

With regard to diphtheria, it would seem "that sanitary

arrangements as such have had little or no effect upon the behaviour of the disease. The exciting cause is now known to be a bacillus, but we know little of the conditions—the predisposing causes—which favour the growth or virulence of this micro-organism, either inside or outside the human body, or which facilitate its transference from the sick to the healthy—conditions which must be studied if we are to ascertain why it is that diphtheria has made certain large centres of population its abiding place, and in its endemic homes assumes at times epidemic proportions. There is evidently some connection between elementary school attendance as now carried out and diphtheria prevalence, but the relation is not a very simple one, and is incapable of explaining all the facts of increased diphtheria incidence in rural populations."

Dr. Louis Parkes' remark suggests the necessity for studying all collateral conditions of other diseases as well as diphtheria, as being of equal importance with the microbe, which is believed to be the *causa causans*, and of more practical value as far as preventive measures are concerned.

In 1835-42 the death-rate from tuberculous disease was 3,959 per million, in 1891-95 it was 2,124, not so remarkable a diminution as in other diseases; but it serves to shew that sanitation has done good by helping to improve the ill-ventilated crowded dwellings, damp, waterlogged soil, impure water, and protection against noxious trades. Better drainage and drying of the subsoil have been shown by Sir G. Buchanan in this country, and Dr. Bowditch in America, to have been attended by diminution in the death-rate from this cause.

Dr. James Pollock, in a recent Report on the Hospital Treatment of Consumption, makes the following pertinent remarks: "In seeking for the cause of this vast improvement in the health of the country, we must attribute it mainly to improved drainage of the subsoil, more cleanly habits, removal of insanitary surroundings, better dwellings, and a higher standard of comfort in the lower classes. Bacteriology is the study of the hour, but it is plain that the presence of bacilli alone is not sufficient to account for all the phenomena of tubercular affections, and we are perhaps in danger of substituting the work of the laboratory and the microscope for clinical observation. However this may be, we have witnessed an enormous decrease of deaths from phthisis, and a decided lengthening of its duration. Fewer die of it, and are slower to die when affected. As yet we know of no agents which we can apply locally to the interior of the body for the destruction of bacilli or septic material. The energies of medical men are to-day devoted to preventive medicine, and in this consists our hope that the more

fatal diseases of our time may be extinguished." It is satisfactory to know that an Association has already been formed which has for its object the Prevention of Consumption and other forms of Tuberculosis, and as this is supported by the heads of the medical profession and other influential authorities, it is to be hoped that effective war will be waged against what is now considered to be a preventible disease.

As to malarial diseases, we may include them, in England at least, among those that have become all but extinct. The improved state of land drainage, the reclamation of marshy and swampy ground and more extensive cultivation have almost, though not altogether, eradicated a prolific source of disease and death which, though much diminished even in the early part of this century, had in past times caused the loss of many lives and great deterioration of health.

This disease is still the prominent cause of death in our Eastern Empire, as will be shown later; but the results of improved sanitation and the extension of cultivation and subsoil drainage, under the direction of the admirably conducted sanitary department of the Government of India, are there too producing good results.

It is not to be supposed that zymotic disease can be altogether exterminated, but we can modify and diminish its incidence, and as our knowledge of the real causes and the concomitant conditions which foster its evolution extend, we may hope, at least, if not to extinguish, so to attenuate as to render it comparatively harmless, as, indeed, has been the case with more than one scourge of our race.

The scope and aim of Sanitary Science in its preventive aspects should not be limited to the consideration of zymotic and other acute diseases, but should extend to the results of abnormal social conditions arising out of the strain and struggle for existence, involving over-competition in various occupations by which life is supported, or wealth and distinction acquired, and under the pressure of which so many lose their health or even succumb. For example, it frequently suggests itself that the over-pressure now exerted on the younger of the rising generation may not only involve the risk of miscarriage of true education, but dangers against which it is as much the duty of preventive medicine to guard young people as it is to protect them from scarlatina, small-pox, measles, cholera, or any other disease.

Again, as regards the food of the people, how necessary it is to exercise control and supervision; and it is satisfactory to know that not only does science teach the recognition of improper food, but executive sanitary regulations endeavour to

protect them from the consumption of tuberculous or otherwise contaminated flesh or milk—which, unhappily, are far too common—oysters and shell-fish grown up under the influence of water polluted with sewage, etc., as effectively as it does or should do from impure water.

The influence exerted on vital statistics by sanitary science may be seen by reference to the returns of the Registrar-General.

In the birth-rate, however, we find a diminution, especially since 1871–80, when it fell 3 per thousand. It has fluctuated from time to time, but since 1876—when it was 36·3 per thousand, the highest recorded—it has steadily declined, and for the quinquennium 1891–95 was 30·5 per thousand. This must be due to a variety of social conditions, which need not be discussed here.

The great increase in the population is an indication of the increasing prosperity of the country. This, of course, is attributable to many causes apart from sanitation, though, no doubt, improved hygienic conditions have some share in it, as is shewn by the diminished death-rate. The census of 1841 returned the population of England and Wales as 16,049,554, that of 1891 as 29,002,525, and it is still progressing at a similar rate,* and not likely to be restricted whilst the present state of prosperity continues, and the Empire is ever enlarging its boundaries.

One indication of the effect of sanitary work is observed in the death-rate of the country. In 1841–50 it stood at 22·4 per thousand; in 1891–95 at 18·7 per thousand; but for the four years 1890–1893, it had risen owing to epidemic influenza, the lowest rate, 1884, having been 16·6 per thousand. It varies considerably according to locality. In some parts of England where health is the main object considered, it has been as low as 9 per thousand; in others where the chief objects are manufacture, trade, or money-making, it has been 30 per thousand. The death-rate is susceptible of considerable modification, and we know how it may be increased or diminished; it behoves the nation to exert its power and stand credited with the lowest figure. In fact, it is, within certain limits, at our own control, and whether the people shall die at the rate of 13 or 23 per thousand depends on how we recognise our responsibility and put in force sanitary regulations. It is mainly a question of finance. Our sanitarians can say how it is to be done and are perpetually saying it, but more money, more faith, more energy are needed to deal with this question satisfactorily.

* In the Registrar-General's quarterly return for the second quarter of 1898 it estimated at 31,397,978.

The death-rate has fallen proportionately more in the towns than among the rural population. In 1861-70 the town death-rate was 24·8 per thousand whilst the country was 19·7, but in 1891-95 the town rate was 19·5 and the country 17·3—in both cases a diminution but more marked in the urban, probably because sanitation was better in the towns than in the country.

There is a leading article in the *Standard* of June 23rd stating that the death-rate for London, one of the healthiest cities in the world, for the previous week had been 13·8 per thousand, the lowest for five years with the exception of one week in July last year, when it was 13·5. This shows that improvement has taken place of late years, for in 1855 it was 24·3 per thousand, in 1887 it was 19·3, and two years later it was 17·3.

The tendency to migrate to towns no doubt helps to reduce the general health, and it would be well to discourage this as much as social and economic requirements will permit; for a strong and healthy peasantry is more conducive to the national welfare than a weakly urban population.

The registration system came into force the year of the Queen's accession under the auspices of Dr. Farr, and it is since then that we have been able to get accurate vital statistics, upon which depends our knowledge of the state of public health, and from which also we can estimate the mean expectation of life. Statistics show that in 1838 to 1854 the mean expectation of life was for males 39·81, for females 41·85 years. From 1871-80 it had increased to 41·35 for males, 44·66 for females. "When Dr. Farr commenced his labours the mean duration of life in Surrey was 45 years. It was not more than 37 years in the Metropolis and 26 years in Liverpool. Now, the mean duration of life throughout the whole of England and Wales is higher than the first named figures."* Dr. Tatham, in the Registrar-General's report for the last ten years, gives the mean expectation of life for males as 43·7, females 47·2 years. From a comparison of the tables of 1841 and 1881-90, it will be seen that this has increased both for males and females up to the age of 30, but diminished after that age.

Age.	1841.	1881-90.	1841.	1881-90.
20	39·88	40·27	40·81	42·44
30	33·13	32·52	34·25	34·76
40	26·56	25·42	27·72	27·60
50	20·02	18·52	21·07	20·56

* "Practitioner," June, 1897, p. 704.

showing that though improved sanitation saves more children's lives, the conditions of life being harder as time progresses, the expectation of adult life has become rather less: for the very causes which enabled the weak and sickly to survive have perhaps in the end thus tended to diminish the value of the adult life of such survivors.

It has been suggested that whilst our improved sanitation, our amended condition of living, and our more extended charity have done all this good, and have generally bettered the human race, on the other hand they have prolonged the existence of those who formerly would have succumbed rather than promoted the survival of the fittest. To a certain extent it may be so, but the moral sense insists that the benefit of our knowledge must continue to be exerted in the direction of ameliorating the sufferings, and prolonging the life of the individual as well as of the race.

As to the registration of sickness, to quote Dr. Farr:—"It is true that notification of the chief infective diseases has been secured in the majority of districts; but the wider returns of all sickness treated at the public expense, whether in rate-supported or State-supported institutions, or in hospitals supported by charity, are still left almost completely un-utilised. As Farr said, 'the thing to aim at ultimately is a return of cases of sickness in the civil population as complete as is now procured for the army in England.' By means of such returns 'illusion will be dispelled, quackery as completely as astrology suppressed, a science of therapeutics created, suffering diminished, life shielded from many dangers. The national returns of cases and of causes of death will be an arsenal which the genius of English healers cannot fail to turn to account.'"

I have already alluded to the benefits that have accrued to the vast population, over 280 millions, of our great Indian Empire, and I trust that a few remarks on the subject may not be considered inopportune. My former connection with India, and the experience derived from observation of its diseases and their effects, in addition to the interest that attaches to whatever concerns the health and well-being of our own as well as the indigenous races, will I trust be accepted as justification for introducing this into an address to a Congress that deals with public health as its chief topic of interest.

The beneficial results of sanitary work have nowhere been better illustrated during the last half-century than in India. Up to that time little or nothing had been done to control disease, or to organise measures upon which public health and

* "British Medical Journal," June 19th, 1897.

the preservation of life depend. The disastrous effects of the want of such precautionary measures on our Army in the Crimea led to the appointment of a Royal Commission to enquire into the sanitary condition of the British Army, and to devise measures for remedying such defects as might be revealed. And here I may say that the result of that Commission was that the mortality of the British Army has fallen from 16 or 18 to 6 or less per thousand. In 1859 this enquiry was extended to India; first to the European and subsequently to the Native Army and jail and civil population. The enquiry having to deal with a large body of men the conditions of whose lives were well known, a vast amount of reliable information was obtained; and it was ascertained as one result of the investigation that the ordinary death-rate of the British soldier had stood for a long period of time at the appalling figure of

84.6 per 1000 from 1800—1830
56.70 " " 1830—1856.

It resulted in certain sanitary changes and improvements in the housing, clothing, food, occupation and discipline of the soldiers, which were followed by a signal decline in the death-rate, though marked by fluctuations:—

1886 ... 15.8 per 1000	1891 ... 15.89 per 1000
1887 ... 14.20 "	1892 ... 17.07 "
1888 ... 14.84 "	1893 ... 12.61 "
1889 ... 16.60 "	1894 ... 16.07 "
1890 ... 13.54 "	1895 ... 15.26 "

It has been even lower, down to 10 per thousand. Epidemics such as fever, cholera, &c., disturb the regularity of the death-rate, but it is certain that on the whole there has been great reduction of this.

If we roughly estimate the value of a British soldier as £100, a simple calculation will show the amount of gain in the value of lives saved, to say nothing of the suffering and invaliding avoided.

I confine myself here to a simple reference to one form of preventable disease which has recently attracted much public notice, as it seriously menaced the efficiency of the army in India. Its rapid increase was attributed, erroneously, I believe, to the suppression of a Contagious Diseases Act which could only from the nature of things have been of very limited application in that country. But even granting that it may have been to a certain extent concerned, the main causes are to be sought far more probably in the absence of other preventive measures rather than in the sphere of military discipline

As attention has been directed to this, as well as to other possible causes, it is to be hoped that the evil may be controlled. The death-rate of the Native Army does not shew so great a diminution, but here too there is improvement.

In 1889 the death-rate was 12.94 per thousand.

" 1890	"	"	15.91	"
" 1891	"	"	15.44	"
" 1892	"	"	14.97	"
" 1893	"	"	10.29	"
" 1894	"	"	10.76	"
" 1895	"	"	11.60	"

Another class about which we have reliable statistics is the jail population, and here the mortality is higher, despite sanitary measures. For example—

In 1889 it was 36.56 per thousand.

" 1890	"	31.49	"
" 1891	"	31.89	"
" 1892	"	36.83	"
" 1893	"	25.01	"
" 1894	"	31.87	"
" 1895	"	27.61	"

The high rate of sickness and mortality in the Indian jails has been a subject of anxious consideration to the Government of India and the sanitary authorities. No pains—I may say no expense—are spared in dealing with it. The abnormal conditions of prison life, and perhaps occasional defects in architectural construction, may in some measure account for it, and the probability is that were not every sanitary precaution rigidly enforced the mortality would be higher than it is.

As regards the vast civil population we have not only got to deal with epidemics, famine and long established modes of living, which obstruct improvement, but also with ignorance, prejudice and religious scruples, which tend to make the natives doggedly resist all measures taken for the amelioration of their condition. They persist in their ancestral modes of social life, resist all changes, and, as we have lately seen, have risen in revolt against the well-meant measures devised by authority for saving them from plague, cholera, and other pestilence. Their indolent habits, prejudiced minds and fatalistic creed all stand in the way, but even the natives of India are being gradually educated into a better comprehension of the value of sanitary measures, and, as time progresses, it is to be hoped that under the firm and judicious administration of the authorities, sanitation may prove as beneficial to them as it has been to others. Though we know that improvement is in progress it is not so easy to shew

by statistics the actual rates of mortality of the vast civil population, because so many disturbing causes exist; and though registration is greatly improved there is not the accuracy and reliability that belong to the returns of the army and jail population, which are all under supervision and control.

Referring to the published mortality returns during the period between 1882 and 1895, they have oscillated between 23 and 33 per thousand. This is after all not a very high death-rate considering the circumstances, but is susceptible of diminution, and this I trust will take place.

Since 1866 a well-organised sanitary department has existed and every effort is made to give effect to its teaching, whilst the ample and carefully constructed reports by the Chief Commissioner, as well as those of subordinate local governments and municipalities, afford ample data upon which to construct preventive measures, and at the same time shew that public health forms one of the most important considerations of the Government.

The annual Report of the Sanitary Commissioner with the Government of India for 1892 shews that out of a registered population of 217,255,655, 4,621,583 died of fevers. Compare this with the year 1895, when out of a registered population of 226,010,428 (note the increase) there was a death-rate from fevers of 4,266,293. These returns fluctuate, but at any rate the figures shew a tendency towards improvement. How much more fatal, fever is than any other disease is shewn by the following figures for 1892:—

Fevers caused	...	...	4,621,583 deaths.
Cholera "	...	...	727,493 "
Dysentery and diarrhoea caused	...	...	234,370 "
Small-pox	"	"	101,121 "

The plague which has appeared in India within the last two years, and has so largely added to the death-rate in certain localities, its modes of invasion, diffusion, and recrudescence, are all being carefully studied, and already it has been shewn to be amenable to sanitary laws like other epidemics; we may, therefore, hope to ultimately control and get rid of it altogether, though there is reason to fear that this will not take place for some time to come.

It is satisfactory to know that the etiology of cholera, plague, and fevers is being carefully investigated by competent observers, and we are warranted in believing that we are approaching the solution of important problems of ultimate causation of disease which have hitherto remained without satisfactory explanation, and the knowledge of which will enable

us to construct our measures for prevention upon an even more assured basis than they occupy at present.

In connection with the subject of sanitation and preventive medicine in India, one may not omit to refer to the names of its great pioneers, such as Ainsley, who wrote as early as 1788 upon measures for the protection of the health of soldiers; Ranald Martin, who was one of the foremost pioneers in India as he was in this country, and to whose initiation many of the sanitary measures now in force in both countries are due; later on J. M. Cunningham, Bryden, Cornish, Hewlett, Ewart, D. Cunningham, Vandyke Carter, Simpson, Manson (China), whose investigations into the causation of malarial fevers have justly excited so much attention; and to these, did time permit, I might add a number of names of younger men to whose admirable work I gladly bear testimony.

I have already noticed the great progress that has been made of late years in the knowledge of the etiology of disease. This is not the time or place in which to describe or dilate on the various steps by which it has been or is being acquired; but one must not omit to acknowledge that its importance in relation to hygiene and as a scientific basis on which to found any rational system of proceeding with regard to prevention as well as cure of disease is incalculable, for without it, although empirical methods may be of some value, no real progress can be maintained.

It is impossible to exaggerate the value of these researches, which have already led to the antiseptic methods of preventing the noxious action of micro-organisms and their products, and to the knowledge of the immunising or curative effects produced by inoculation of the attenuated virus, toxins or antitoxins (blood serum therapeutics), as well as to the aid that has been afforded to diagnosis. Already, indeed, important practical results have been obtained.

I am indebted to Dr. A. Macfadyen, the able Director of the Institute of Preventive Medicine, himself one of the most distinguished workers in bacteriology, for the following lucid account of the progress already made in the application of bacteriological science to the prevention and treatment of disease, and which holds out promise of further advance in this most important branch of science. The successful establishment of the Bacteriological Department of the Institute as well as of that of the Royal Colleges, is an earnest of further development in our own country of a branch of scientific enquiry which is obviously of such vital importance to public health and to those interests with which this Congress is so closely concerned.

"There can be no better memorial to Jenner than to carry on his work in his spirit. The fresh impulse to this was derived from the labours of Pasteur and Koch, who not only demonstrated the part that living agents play in the causation of disease, but also gave us the methods whereby these might be investigated. In this way the foundations of bacteriology were laid.

The main problems connected with the causation and prevention of disease and many sanitary questions are bacteriological in their nature, whilst some of the most pressing questions connected with water and sewage are of a biological character. The soil, air, and water, as well as our food, have to be considered as possible media for harbouring and conveying the living germs of disease.

The question of questions has been that of immunity to disease. We know that animals are insusceptible to certain diseases that affect man, and that the converse holds good. We also know that certain individuals remain unaffected in times of epidemic, though equally exposed to the infection. Further, that recovery from certain diseases protects the individual against a subsequent attack of the same disease.

The attempt has been made to follow nature's methods in the hope of protecting the system from the attack of a disease or of alleviating its symptoms. The discovery of the principle of vaccination for small-pox remained a unique achievement until the successful isolation of the living agents in many infectious diseases rendered it possible to work with greater certainty of success in this field.

The attempt was made to use the modified living virus to produce a mild attack of a disease with a view of protecting the system against infection with the fully virulent virus, *e.g.*, Pasteur's attenuated anthrax vaccine for cattle.

The endeavour was also made to use as a vaccine, substances which no longer contained the living organisms, but their products. Bacterial toxins of varying origin have been experimented with for the purpose, *e.g.*, products obtained from the cultures or the bodies of pathogenic bacteria; as in the case of the cholera and typhoid fever organisms, and more recently the disintegrated bodies of tubercle bacilli.

The results are not yet of a final character, though much hopeful work is being done in connection with cholera asiatica, enteric fever and tuberculosis.

The greatest modern advance in the treatment of disease has been the introduction of serum therapeutics through Behring's labours, which have found their special application in connection with diphtheria and tetanus.

Diphtheria and tetanus may be described as toxic diseases, inasmuch as the general intoxication of the system due to the poisonous products of the diphtheria bacillus or the tetanus bacillus outweighs in gravity the local action of these organisms at the seat of infection. These bacilli when cultivated in suitable media produce the same toxins that they elaborate in the body, and it is these toxins which

are utilized for immunizing purposes. The animal used is usually the horse, which after treatment with progressively increasing doses of the toxin becomes ultimately insusceptible to otherwise fatal doses of these poisonous products. The animal is then said to be 'immune,' in virtue of antitoxic bodies produced in its system through the introduction of the toxins. The blood serum of the immunized animal contains the antitoxic bodies in large quantity, and can, when transferred to other susceptible animals, confer a like protection in virtue of the immunizing substances it contains. The method adopted is appropriately termed 'blood serum therapeutics.' This procedure is technically known as 'passive' immunity, *i.e.*, the animal has not to go through an attack of the specific disease in order to acquire protection.

The bodies that are produced in the course of immunizing a horse, say to diphtheria, are called antitoxins, because they act not so much on the specific microbe as on its products. In the course of an attack of such a disease the human body elaborates similar substances, which are in a certain sense antidotes. If formed in a sufficient quantity a neutralization of the toxins that are being formed by the microbe in the system occurs and recovery takes place. At the 'crisis' nature effects a process of self-immunization. In the older methods it was sought to produce immunity by inducing a mild attack of the disease. In the case of blood serum therapeutics, immunity is brought about by introducing into the system ready formed 'antitoxins' from a previously immunized animal, and the result, if successful, is an immediate one. The immunity is transient however, lasting only a few weeks.

The preparation of such antitoxic serums has only a prospect of success, when the poison to which the fatal effects of the illness are due is known, and can be obtained of an adequate strength for immunizing purposes. This has been the case in diphtheria, tetanus, and snake poisoning, and hence the most encouraging results that have been obtained are in connection with these complaints.

Experiment has shown that an antitoxin can act both as a preventive and curative agent. Thus, in the case of experimental tetanus, the serum from a previously immunized animal when injected into a guinea-pig is not only able to prevent the disease but also to cure it, even when tetanus symptoms have supervened.

It is in connection with diphtheria that the most successful results have been obtained in man. The Imperial Board of Health, Berlin, has published statistics in relation to diphtheria, which deal with 9,581 cases treated in hospitals with diphtheria serum from April, 1895, to March, 1896, and shew that for every 16 cases that recovered 3 died. In previous years before the serum was used there were on an average 6 deaths for every 16 recoveries. The mortality was accordingly reduced by one half.

The diphtheria serum has also preventive properties, and can be used for immunizing healthy persons exposed to infection.

In the case of tetanus in man the results have hitherto not been so satisfactory. This may be due to the fact that the serum has

not been of sufficient antitoxic strength, or because the disease was too far advanced previous to its employment.

In all cases the best results are obtained by the earliest possible use of the antitoxic serum.

The facts that seem proved are, that in human diseases characterised by an intoxication of the system, immunity occurs at the moment of recovery, and that by the artificial introduction of the substances to which this immunity is due it is possible to prevent or cure such infections.

If this be so the present endeavours of bacteriologists are based on Nature's methods, and we can confidently look forward to still greater achievements in the field of serum therapeutics.

Bacteriology has also supplied agents which are of proved value in the diagnosis of certain diseases. Thus *Mallein*, a preparation from the glanders bacillus, is successfully used for the early diagnosis of this disease. *Tuberculin*, a similar preparation from the tubercle bacillus, allows of an early diagnosis of the disease in cattle. An early diagnosis enables one to adopt timely preventive measures, and therein is the great value of tuberculin, inasmuch as we are here dealing with a communicable disease between man and animals.

Bacteriology has also rendered valuable help in the diagnosis of diphtheria and typhoid fever, and medical men and sanitary authorities are now largely availing themselves of this help.

The yearly increase in the work the British Institute of Preventive Medicine is asked to undertake on behalf of sanitary authorities demonstrates how keenly alive they are becoming to the importance of adopting the latest methods calculated to safeguard the health of the community."

Evidently, a great future is before preventive medicine, and we may confidently look to the eminent men of science who are now pursuing with such indefatigable zeal their researches into the mysteries of bacteriology for its fulfilment. But those who admire and appreciate their work the most, and look forward hopefully to its results are anxious that progress should not be retarded by hasty deduction and premature generalisation, which may only end in disappointment.

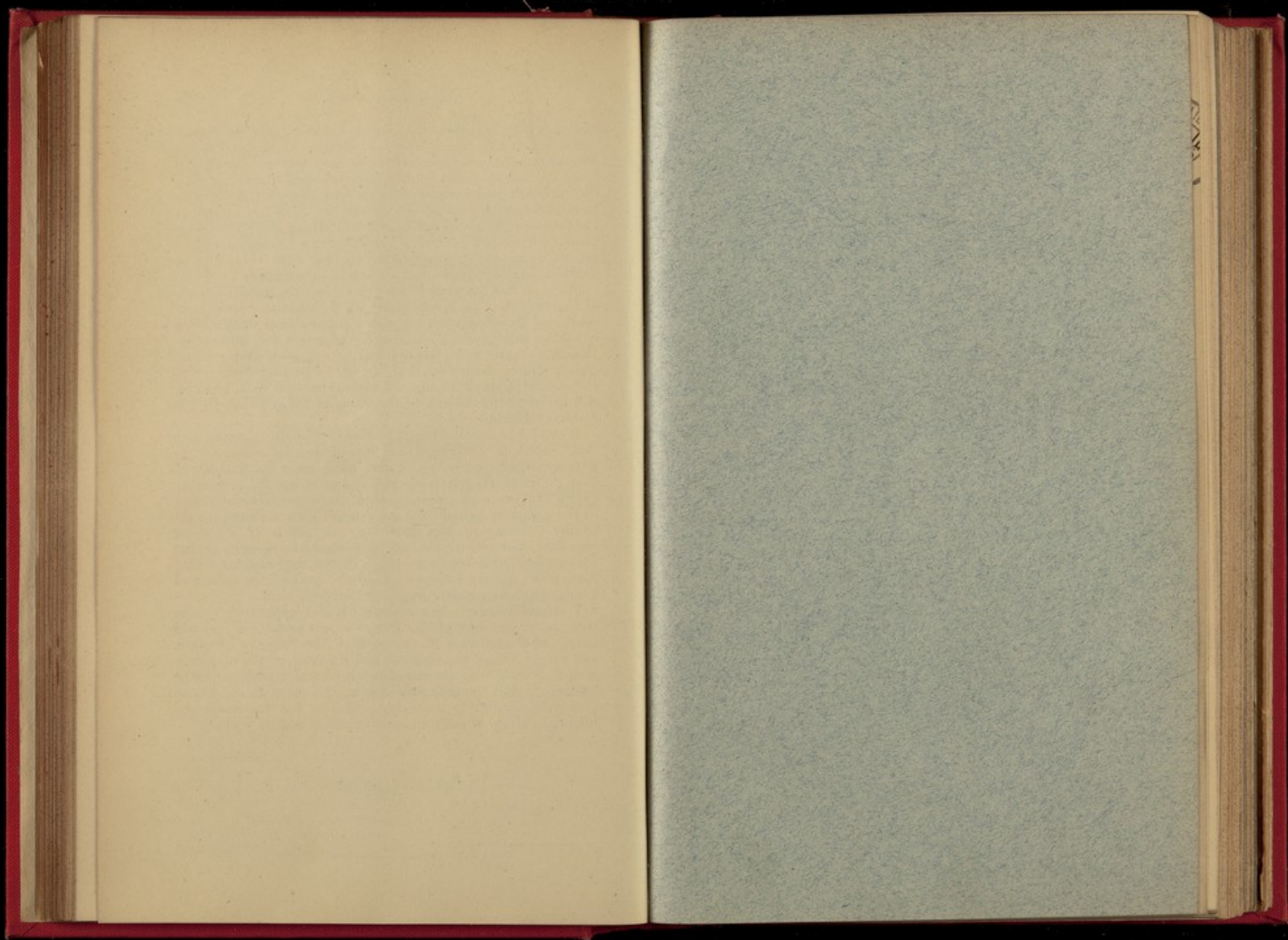
I venture to suggest that however great may be the importance of the study of bacteriology and the various conclusions resulting from it with regard to the origin, diffusion, and prevention of disease, there are other factors of no less importance to be considered, and it can only be by the study of all these that we can hope to arrive at the complete knowledge which will enable us to fulfil the requirements of sanitary science. Whilst on the one hand it is of the utmost significance that we should be able to demonstrate the actual cause, whether a micro-organism or not, on the other hand it is not of less—nay, from a practical sanitary point of view it is of

more—importance that we should know all the conditions under which this cause becomes effective. It is not enough that we know the seed, but it is necessary that we should also know the nature of the soil, the meteorological and other conditions which determine whether it is to grow and multiply or to remain inert and harmless. If one can learn how to destroy the seed or sterilize the soil in which it attains its full development, or if we can neutralise the favouring conditions and so prevent or impede its growth, then we shall have solved a great problem, and conferred a lasting benefit on mankind.

Much of this has already been done, and the splendid work of Pasteur, Davaine, Koch, Lister, B. Saunderson, Sims Woodhead, and their followers, has added and is almost daily adding to the knowledge which confirms the hope that the consummation so devoutly to be desired will be achieved, that zymotic disease will be minimised, that life will be prolonged nearer to the natural term of human existence, and that man, in short, will no longer be subject to the curse of dying before he has reached the prime of life.

It cannot be doubted that The Sanitary Institute has already done excellent work, and has contributed its share to the advance which public health has made since its foundation. The Spirit of Hygeia is abroad, and measures for preserving health and preventing disease, which at no very distant period in the past were looked on as mere hypotheses, are now, thanks to the teaching of this Institute and others of a similar character, and notwithstanding the obstacles to research arising out of ill-considered sentimental opposition, regarded as of vital importance, and an integral part of the basis of the system of administration on which the public health depends.

I cannot conclude this address without expressing a hope that the proceedings of this Congress now assembled may add largely to the influence of the work of The Sanitary Institute, and widely diffuse the opinions and teaching of the numerous men of science who are associated here and elsewhere in the crusade against insanitation, and in the great humanitarian project of furthering not only the health, but the moral and material welfare of our own country and of all the world.



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AUTONOMY OF THE MEDICAL SERVICE OF THE ARMY OF FRANCE.

Report of the Commission ordered to report upon the bill modifying the law of 16 March, 1882, regulating the administration of the Army, and having for its object the giving a complete autonomy to the Military Medical Service brought before the Chamber of Deputies at the meeting of 4th April, 1889, by M. Gadaud, deputy.

GENTLEMEN,—The law of July 24th, 1873, and that of 16th March, 1882, have created the autonomy of the Military Medical Service, but this latter law has limited this autonomy (*fonctionnement*) in such a manner "that it should only become complete by successive steps, so that experience might be able to decide upon the necessity of endowing the medical service with the very great powers desired for it."

M. de Freycinet, introducer (*rapporteur*) of this law, stated to the senate that "when the medical service shall have exercised with success the powers which have been conceded to it, which," he added, "it cannot fail to do, we shall see if it will be prudent to go further, and to give to it this last degree of autonomy, which nothing in the nature of the thing imperatively calls for now."

This was then in 1882; the trial has been made; the outcome of the limited autonomy in the *Corps d'Armées* in France and in Algeria, the opinions expressed by the generals commanding the *Corps d'Armées*, and by the directors of the Intendance service, the report of General Fay preceding the decree of 28th December 1883 upon the medical service of the interior, the campaign of Tonkin, have proved in the most demonstrative manner the indispensable necessity of giving the Medical Service the entire disposal of its staff and of the means necessary for the performance of their duty, to endow them, in a word, under the military authority, with an autonomy as complete as that of the artillery and engineers.

It is necessary for this to entrust it with the care of providing its special supplies, to assure its full authority over the

purveyors and quarter-masters (*officiers d'administration*) of the hospitals, and over the military hospital orderlies (*infirmiers militaires*), it is necessary also that it should receive by delegation from the Minister the vote which Parliament grants it (*les crédits que le Parlement lui alloue*), and that it should control its own expenditure. Now, all these powers are actually exercised in whole or part by the Intendance Service.

1. Purveyors and quarter-masters of hospitals and hospital orderlies (*officiers d'Administration des hôpitaux et infirmiers militaires*).—"When," said M. le duc d'Harcourt in 1875, in his report to the National Assembly, "we look at the medical service and the administrative services with a view of comparing them, we find nothing but differences; differences in the duties, in the necessary knowledge, in the results aimed at."

Nevertheless the law of 16th March, 1882, has left to the Intendance service the provision of supply (*les approvisionnements*) for the medical service and superior authority over the purveyors and quarter-masters of the hospitals (*officiers d'administration des hôpitaux*) as well as over the sections of hospital orderlies (*infirmiers*).

As regards the staff (*personnel*), the report of the commission which, under the presidency of General Fay, recommended the rule of 28th December 1883, said expressly:—

"The law, in maintaining the sections of hospital orderlies (*infirmiers*) under the authority of the Intendance service, has placed the commission under the necessity of creating a complicated mechanism; it necessitates a continual exchange of positions between the directors of the medical services and of the Intendance through the medium of the general officers commanding the *Corps d'Armées*, and of applications to the latter for orders on the subject of constant moves, of little importance, between the dépôts of the sections and the detachments attached to the military hospitals.

"It is very true that this mechanism offers the advantage of leaving to the director of the medical service the entire disposal of the unemployed (*disponibles*) hospital orderlies," but the director of the medical service never knows if the hospital orderlies present at the dépôt are disengaged (*disponibles*) or not; such information being in the province of the Intendance service, he can only express his demands without being able to enforce them (*sans disposer réellement de l'ensemble de la section*).

The inconveniences of this position are such that to put an end to the difficulties which it produced daily in the central administration, the decree of 11th February 1887 has re-attached the purveyors and quarter-masters of the hospitals

(*officiers d'administration des hôpitaux*) and the hospital orderlies (*infirmiers*) to the authorities of the medical service established at the ministry of war; but in the *Corps d'Armées*, by virtue of the law of the 16th March, the dualism exists and the unity of the ministerial control is divided between the Intendance and the medical services. Also the staff (*personnel*) whom it concerns is placed in a delicate situation; they cannot serve at the same time under two different authorities, the duality embarrasses those who ought to obey. The complete re-attachment of the purveyors and quarter-masters of the hospitals (*officiers d'administration*) and of the hospital orderlies (*infirmiers*) to the medical service for which they exist is then a logical necessity; it will simplify immediately the performance of the duties of the service, and will put everyone in practical knowledge of his rights and duties.

Is there any need to add the following conclusion by which a high official of the Intendance service concludes a report after a general inspection of many sections of hospital orderlies (*infirmiers*)? "Will you permit me to express a desideratum? The command and the administration of the sections of hospital orderlies (*infirmiers*) ought to be given entirely to the medical service. The law of the 16th March, 1882, in leaving this command and this administration to the officials of the Intendance service, has given them a responsibility without assuring to them the means of fulfilling it."

2. Two of our colleagues, MM. le Baron Reille et de Lanjuinais, have proposed the re-attachment to the squadrons of the transport train for recruiting and central administration, of the sections of military labourers and of hospital orderlies (*d'ouvriers d'administration et d'infirmiers*) under the conditions anticipated by the bill now submitted to Parliament. This amendment had been accepted in principle, but upon the observation that the idea of the autonomy of the medical service is a modification not of any future law, but of an existing law of 16th March 1882, our colleagues have themselves recognised that such a reform could not be introduced incidentally into a special bill and that the study of it ought to be reserved until the time when the Chamber would be occupied with the general revision of the law upon military administration. They have in consequence withdrawn their proposition.

On the other hand, our colleagues have demanded that the purveyors and quarter-masters of hospitals (*officiers d'administration du service de santé*) might no longer in future be allowed to compete with their colleagues, the *officiers d'administration* of the offices of the Intendance, of the commissariat and of the camp, for entrance into the *Corps de l'Intendance*.

In vain we express the fear that such a measure would injure the recruiting of the *officiers d'administration* of the hospitals.

Our colleagues think that the recruiting of the *officiers d'administration* of the medical service will be in no way hindered. In their opinion, if we could admit that the *officiers d'administration* of the hospitals had the power of entering the Intendance service when they were raised directly for that corps, to-day we could not understand a like liberty, since they are going to form a corps apart, removed completely from the authority of the Intendance, and placed henceforth under the exclusive command of the medical staff.

M. le Ministre de la Guerre being heard upon this special point by the commission, has declared that it appeared to him in effect logical that from the moment when the *officiers d'administration* of the medical service had no longer any connection with the Intendance, they could no longer be allowed to aspire to join it.

Your commission, relying on the opinion of the Minister, considering moreover that it would always be possible for the *officiers d'administration* of the medical service to exchange with those of the Intendance, and that thus their legitimate ambition of competing to enter into the Intendance properly so-called would not be absolutely destroyed, it inclined to the opinions of MM. le Baron Reille et de Lanjuinais and has acknowledged the justice of the demand of our honourable colleagues.

In consequence it has decided to suppress the third paragraph of Article 40, *bis section ii., chapitre 3*. But, as we all have to the same extent the greatest desire possible not to injure any acquired rights, it is well understood that the new law will have no retrospective effect. All the *officiers d'administration* of the medical service who, at the time of its promulgation, find themselves in a position to compete for the Intendance shall keep that right.

Central Dépôts.—That which has been said of the administrative personnel of the medical service ought to be understood also as applying to the supply departments (*approvisionnements*). Medical stores (*matériel sanitaire*) are special in the highest degree. Nothing is more natural than to leave to the competence and vigilance of the medical service the care of forming, keeping and maintaining them by its own resources and in its own magazines. To decide that the organisation, the constitution, the distribution of medical stores shall belong exclusively to the medical service is to cut short the delays, the difficulties and the complications of the actual work; it will fix the responsibility. With the dualism

now in force, who will bring to the notice of the military authority or before public opinion the responsibility for the delays which would have, in war time for example, the most grievous consequences?

The decree of 27th May, 1882, giving the organisation of a medical control to the Minister for War, has comprised in the powers of that control "the superintendence of the hospital and field stores as well as of the supplies (*des approvisionnements*) in reserve." That which has been considered indispensable in the central management is not less so in the direction of the *Corps d'Armées*; in fact, the trial has been made at Tonkin. It is the *dépôt* of the hospital at Hanoi, which has received, maintained and distributed the immense supplies of medical stores to all the medical centres, hospitals, ambulance infirmaries, corps and ambulances accompanying the expeditionary columns. This *dépôt*, formed and renewed by the care and under the responsibility of the director of the medical service of the expeditionary force, has been in the extreme east what the docks and central magazine as well as the central dispensary of the hospitals are at Paris, what the reserve magazines are at Marseilles and Algeria, of which the Intendance service keeps the management, although it is solely for the medical staff that they exist and which alone can make use of it. These central magazines ought to be, as was the hospital at Hanoi, administered by the medical service.*

3. *Financial Control (Ordonnancement).*—The law of the 16th March, 1882, grants the assignment of the money vote (*délégation des crédits*) to the directors of the principal services of the army, but it "makes the exception for the medical service, the votes (*les crédits*) of which are received and the expenses arranged (*les dépenses ordonnancées*) by the Intendance service." Art. iv.

The result is that no expense, no matter what its object is, can be entertained without the permission of an outside authority which, not in any way managing the medical service, can however stop its work, since the law of 16th March gives the right to the officials of the Intendance, and places on them

* This dualism has not only the inconveniences of uselessly multiplying correspondence, but also of causing extreme delays in the performance of duties. Here are the terms in which General Fay expresses the opinion of the Commission which drew up the regulation of 28th December, 1883. "So in that which affects the supplies for the military hospitals, the commission having to regard the dualism created by the law, has endeavoured to lessen the inconveniences of it in proposing that, for the regimental orderlies (*infirmiers*), the demands for stores and medicines, after having been signed by the under-officer of the Intendance (*sous-intendant militaire*) shall be approved for issue by the director of the medical service."

the obligation of ascertaining the exactness of all the expenses which they are ordered to control (*qu'ils sont chargés d'ordonner*). In times of peace this system entails considerable delays in the execution of duty and a correspondence which overburdens the service; in time of war the absence of the "controller" or his refusal can have the most direct and grievous results. However, "the responsibility, even pecuniary, of the expenses not provided for by the regulations" falls entirely on the directors of the medical service, in virtue of Article 16 of the law of 16th March which gives them the right of ordering them. It is a principle of administration that the financial control (*l'ordonnement*) is one of the essential powers of direction: it implies the right of superintendence (*surveillance administrative*) over all the work of the executive (*gestionnaire*). If the limited direction accorded to the medical service has already produced very notable economies everywhere where the military surgeons direct the hospital services, one has a right to expect more from their direct intervention, from their personal responsibility in the superintendence over the daily expenses, that is to say in the local control of the management of the hospitals. Already in the central direction of the medical service with the Minister of War a section of accountants are at work to whom are referred all questions relative to the financial administration of the hospital establishments, of the central magazines, of the medical service of the troops. It is only necessary to add a new class to the assistant accountants already provided by Article 28 of the Regulations of April 3rd, 1869, in the Accounts Branch of the War Department by making for the medical service that which exists for all the other services, without causing otherwise any modification under the conditions of which the control is now exercised in regard to it.

He, alone, who has the responsibility of controlling the expenses, superintends carefully the employment of the cash, and is naturally anxious only to charge to the State the expenses necessary for the proper work of the service.

These new powers would have the consequence of rendering complete and efficacious the direction of the Medical Service without interfering with the professional duties of the directors.

CONCLUSION.

In recapitulation, even as the report of General Fay has shown upon the regulation of December 28th, 1883, the duties of the Medical Service, regulated by the law of March 16th, 1882, entails considerable difficulties. "These difficulties

spring from the provisions of Articles 18, 32, and 41 of the law which maintain in the functions of the Intendance Service:—

1. "The financial control of the expenses, the providing of medical stores and of supplies.

2. "The personnel of the *officiers d'administration* of the hospital and of the hospital orderlies" (*infirmiers militaires*). The Commission of the army considers that the experience of the last five years has shown the grave inconveniences of the present legislation in time of peace as well as in time of war, and it has the honour to propose to you to give to the law of March 16th, 1882, the alterations which are the object of the following bill.

[Here follows the bill voted without modification and which is inserted further on.]

The President of the French Republic,

On the proposal of the Minister of War,

Having seen Article 1, paragraph 2 of the constitutional law of July 16th, 1875, in relation to public authority, which lays down that the ministers can be assisted in the two Chambers by commissioners in the discussion of a bill resolved upon,

Decrees,

Art. 1.—M. DUJARDIN-BEAUMETZ, Medical Inspector of the Military Medical Service, is appointed a commissioner to assist the Minister for War in the Chamber of Deputies and in the Senate in the discussion of the bill for altering the law of March 16th, 1882, on the administration of the Army, and having as its object to give a complete autonomy to the Military Medical Service.

Art. 2.—The Minister of War is charged with the carrying out of this decree.

Done at Paris, April 11th, 1889.

CARNOT.

By the President of the Republic:
The Minister of War, C. DE FREYCINET.

(*Bulletin du Service de Santé Militaire*, No. 370, Mars-Avril, 1889, page 2,041, et seq.)

CHAMBER OF DEPUTIES.

Meeting of April 11th, 1889.—Adoption, after urgency had been declared, of the bill modifying the law of March 16th, 1882, relating to the administration of the Army, and having for its object the giving a complete autonomy to the Medical Service.

M. le Président: The order of the day names for the first discussion the bill modifying the law of March 16th, 1882, relating to the administration of the army, and having for its object the giving a complete autonomy to the medical service.

M. Gadaud, rapporteur: In accord with the Government the Commission demands urgency.

M. le Président: I consult the Chamber as to urgency.

(The Chamber declares in favour of urgency. It decides to at once pass to the discussion of the articles.)

Art. 1.—The following modifications are added to the law of March 16th, 1882, relating to the administration of the army.

FIRST TITLE.—General arrangements.

"Art. 4.—The delegation of money votes (*crédits*) is made by the Minister to the directors of the departments (*services*), which are entrusted with the control of the expenses.

"In the Intendance service the directors have the power to delegate all or part of their vote (*crédits*) to the officers of the Intendance under their command.

THIRD TITLE.—General arrangements of the Medical Service.

"Art. 16.—The directors of the Medical Service of the *Corps d'Armée*, as well as the chiefs of the Medical Service in the hospital, ambulance and pharmaceutical establishments, are taken from among the members of the Medical Service.

"The correspondence of the officials with one another and with the military authority and other services is regulated by the articles already laid down.

"They have, in all that relates to the duty of the Medical

Service, authority over all the *personnel*, military or civil, attached either permanently or temporarily to their service. They give their orders, in consequence, to the apothecaries, to the *officiers d'administration* (purveyors and quarter-masters), and to the hospital attendants (*infirmiers*), as well as to the transport troops and others attached to them for duty. The hospital attendants (*infirmiers*) and the troops attached are under their respective chiefs in that which relates to administration, police and interior economy.

"The orders of the director or of the chiefs of the Medical Service are to be carried out by the *personnel* entrusted with the executive duties within the limits of the regulations and scale of rates.

"They can, in urgent cases, order on their own responsibility, even pecuniary expenses not provided for by the regulations; but, in this case, they give a written order and report the occurrence to the military authority.

"Art. 17.—The apothecaries and *officiers d'administration* (purveyors and quarter-masters), whose duty it is to carry out the orders of the director or of the chiefs of the Medical Service, can be rendered pecuniarily responsible for incurring expenses not provided for by the regulations, for which the written order above mentioned shall not have been given.

"Art. 18.—The directors of the Medical Service in the *Corps d'Armée* regulate and control all the expenses of their service. These directors, as well as the medical chiefs of the service, certify the cash expenses and the expenditure of stores of the apothecaries and *officiers d'administration* placed under their orders. They give them direct instructions for proper keeping of the books and for attention to the rules and regulations regarding accounts.

"The Medical Service is equally entrusted, under the military authority, with providing the materials and supplies necessary for the hospitals and ambulances.

SIXTH TITLE.—Personnel.

CHAPTER II.—SERVICE OF THE MILITARY INTENDANCE.

SECTION II.—*Officiers d'Administration* of the Intendance service.

"Art. 32.—The *personnel* of the *officiers d'administration* of the Intendance Service forms a distinct corps.

"It has its own cadre (*hiérarchie*) regulated as under:

"Officier d'administration adjoint de 2e classe;

"Officier d'administration adjoint de 1re classe;

- "Officier d'administration de 2e classe ;
- "Officier d'administration de 1re classe ;
- "Officier d'administration principal.
- "The *officiers d'administration* enjoy all the benefits of the law of May 19th, 1834, relating to officers.
- "The *officiers d'administration* of the Intendance Service are divided into three sections, as :—
- "(1) *Officiers d'administration des bureaux de l'Intendance.*
- "(2) *Officiers d'administration des subsistances.*
- "(3) *Officiers d'administration de l'habillement et du campement.*
- "The officers of the three sections can be employed in one or other of these services according to the orders of the Minister.

CHAPTER III.—THE MEDICAL SERVICE.

SECTION I.—*Corps de Santé Militaire.*

- "Art. 37 to 40.—No change.
- SECTION II.—*Officiers d'administration of the Hospitals.*
- "Art. 40 bis.—The *personnel* of the *officiers d'administration* of the hospital services form a distinct corps of which the *cadre* is fixed agreeably to Table E attached to the law of March 16th, 1882.
- "This corps has a *cadre (hiérarchie)* of its own, agreeably to that defined by Article 22 for the *officiers d'administration* of the Intendance service. The *officiers d'administration* of the hospital service are recruited in accordance with the rules fixed by Article 34.
- "In case of mobilisation, the *cadres* of the *officiers d'administration* of the hospital services are completed by the *officiers d'administration* of the reserve and of the territorial army, who will fulfil the conditions laid down by a Ministerial order.

CHAPTER IV.—SECTIONS OF HOSPITAL ATTENDANTS (INFIRMIERS) AND MEN EMPLOYED IN ADMINISTRATION (TROUPES D'ADMINISTRATION).

- "Art. 41.—The sections of military *infirmiers* shall be twenty-five in number.
- "The number of the sections of clerks and military labourers is equally twenty-five.
- "The Minister settles according to the needs of each *Corps d'Armée* the *effectives* and the *cadres* of each section.
- "The sections are commanded and administered by an

officier d'administration of their service. In all that relates to the police and the interior discipline of corps, the sections of military *infirmiers* are placed under the superior authority of the military surgeons, chiefs of the Medical Service, and the sections of clerks and military labourers under the officials of the Intendance, chiefs of the administrative services.

"The under-officers of the sections of *infirmiers*, of the clerks, and military labourers compete with the under-officers of the infantry for admission into the Military School of Infantry at Saint-Maixent.

"Art. 1 having been put to the vote is adopted.

"Art. 2.—The decrees and ministerial regulations will provide for the complete carrying out of the alterations of the present law. Adopted.

"Art. 3.—All provisions of the laws, ordinances, decrees, and regulations contrary to the present law are cancelled. Adopted.

"The whole of the bill having been put to the vote is adopted."

COMPLETE AUTONOMY OF ARMY MEDICAL SERVICE.

The bill on the administration of the Army, having for its object the giving a complete autonomy to the Army Medical Service, has been adopted with an amendment by the Senate on June 13th, 1889.

This amendment, though very trifling, has necessitated the return of the bill to the Chamber of Deputies; the law had been voted without discussion at the meeting of June 18th.

In his report M. Gadaud on June 17th thus explained the reason of this amendment.

GENTLEMEN,—The law which you passed on the autonomy of the medical service has been adopted by the senate with a simple amendment which your military commission proposes to you to accept.

We have said in the third paragraph of Article 16, title iii.

"The army surgeons give their order to the apothecaries, to the purveyors and quarter-masters (*officiers d'administration*) and to the hospital attendants (*infirmiers*), also to the troops of transport and others attached to them for duty (*ainsi qu'aux troupes des équipages militaires et autres détachés auprès d'eux pour assurer le service de santé*)."
Le rapporteur du Sénat, M. Général

Defins, represented, and the Senate agreed with him, that that expression, "et autres" could be misinterpreted. From our text it seemed, he thought, that an army surgeon could consider himself in the future as being authorised in certain cases to give orders to officers of the combatant branches (*aux officiers des armées effectivement combattantes*), a thing which is contrary to the essence of military authority.

Now, it had never entered into the mind of anybody, no more of the army surgeon than of the Chamber, to attribute to the new law any such meaning. We simply demand that the army surgeons who are responsible for all that relates to the medical service may have under their command all the *personnel* neutralised under the Geneva Convention and who wear its brassard, even though at the same time the *personnel* comprises men of the military corps attached to them for duty (*comprendrait des hommes de troupe détachés auprès de ce service*).

Now, this distinction being very easy to establish in practice, it is indispensable that it should be made legal in order that it may not cause any confusion.

We see, then, a real advantage in accepting the new amendment of the Senate.

The text of paragraph 3 of Article 16 will then henceforward run:—"They give their orders in consequence to the apothecaries, purveyors and quartermasters, and to the hospital attendants as well as to the transport and to the *soldiers temporarily attached to them for duty*. The hospital attendants and men of the transports," &c., &c.

AUTONOMIE DU CORPS DE SANTÉ*

Rapport fait au nom de la commission chargée d'examiner le projet de loi modifiant la loi de 16 mars 1882 sur l'administration de l'armée et ayant pour but de donner une autonomie complète au service militaire de santé; déposé à la Chambre des députés dans la séance du 4 avril 1889, par M. GADAUD, député.

Messieurs,

La loi du 24 juillet 1873 et celle du 16 mars 1882 ont créé l'autonomie du service de santé militaire, mais cette dernière loi a réglé le fonctionnement de cette autonomie de telle sorte "qu'il ne devint complet que par étapes successives, afin que l'expérience pût prononcer sur la nécessité de doter le service de santé des vastes attributions qu'on ambitionnait pour lui."

M. de Freycinet, rapporteur de cette loi, déclarait au Sénat que "quand le service de santé aurait exercé avec succès les attributions qu'on lui avait concédées, ce qui "ajoutait-il," ne saurait manquer, on verrait s'il convenait d'aller plus loin, et de lui donner ce dernier degré d'autonomie que rien dans la nature des choses n'appelait impérieusement."

On était alors en 1882; l'épreuve est faite: la mise en œuvre de l'autonomie restreinte, dans les corps d'armée en France et en Algérie, les opinions émises par les généraux commandant les corps d'armée, et par les directeurs du service de l'Intendance, le rapport de M. le général Fay, précédant le décret du 28 décembre 1883 sur le service de santé à l'intérieur, la campagne du Tonkin, ont prouvé de la manière la plus démonstrative l'indispensable nécessité de donner au service de santé l'entière disposition des agents et des moyens qui concourent à son exécution, de le doter, en un mot, sous l'autorité du commandement, d'une autonomie aussi complète que l'est celle de l'artillerie et du génie.

Il faut pour cela lui donner le soin de constituer ses approvisionnements spéciaux, lui assurer pleine autorité sur les officiers d'administration des hôpitaux et sur les infirmiers

* Bulletin du Service de Santé Militaire, mars-avril, 1889, page 2041, et seq.

militaires ; il faut aussi qu'il reçoive par délégation du Ministre les crédits que le Parlement lui alloue, et qu'il ordonne ses propres dépenses. Or, toutes ces attributions sont actuellement exercées en totalité ou en partie par le service de l'Intendance.

§ 1er.—*Officiers d'administration des hôpitaux et infirmiers militaires.*—“ Lorsque, disait, en 1875, M. le duc d'Harcourt dans son rapport à l'Assemblée nationale, on envisage pour les comparer le service sanitaire et les services administratifs, on ne trouve que des différences ; différences dans les fonctions, dans les connaissances nécessaires, dans les résultats poursuivis.”

Cependant la loi du 16 mars 1882 a laissé au service de l'Intendance les approvisionnements du service de santé et l'autorité supérieure sur les officiers d'administration des hôpitaux, ainsi que sur les sections d'infirmiers.

En ce qui concerne ce personnel, le rapport de la commission qui, sous la présidence de M. le général Fay, a élaboré le règlement du 28 décembre 1883, dit expressément :

“ La loi, en maintenant les sections d'infirmiers militaires sous l'autorité du service de l'Intendance, a mis la commission dans l'obligation de créer un mécanisme compliqué... il nécessite un échange continu de situations, entre les directeurs des services de santé et de l'Intendance, par l'intermédiaire du général commandant le corps d'armée, ainsi que l'intervention de ce dernier pour les décisions à prendre au sujet des mouvements incessants et de peu d'importance, entre les dépôts des sections et les détachements affectés à des hôpitaux militaires...”

“ Il est bien vrai que ce mécanisme offre l'avantage de laisser au directeur du service de santé l'entière disposition des infirmiers disponibles,” mais le directeur du service de santé n'a jamais à savoir si les infirmiers présents au dépôt sont disponibles ou non ; de telle sorte que cette appréciation étant dans les attributions du service de l'Intendance, il ne peut que formuler des demandes sans disposer réellement de l'ensemble de la section.

Les inconvénients de ce fonctionnement sont tels que pour faire cesser les embarras qui se produisaient journellement à l'administration centrale, le décret du 11 février 1887 a rattaché les officiers d'administration et les infirmiers à la direction du service de santé institué au ministère de la Guerre : mais dans les corps d'armée, en vertu de la loi du 16 mars, le dualisme subsiste et l'unité de la direction ministérielle se divise entre le service de l'Intendance et le service de santé. Aussi le personnel dont il s'agit est-il placé dans une situation délicate ; on ne peut servir à la fois sous deux autorités différentes, dont la dualité embarrasse ceux qui doivent obéir. Le rattachement complet des officiers d'administration et des in-

firmiers au service de santé pour lequel ils existent est donc une nécessité logique : il simplifiera immédiatement l'exécution du service et mettra chacun dans la vérité pratique de ses droits et de ses devoirs.

Est-il besoin d'ajouter la conclusion suivante par laquelle un haut fonctionnaire du service de l'Intendance terminait un rapport sur l'inspection générale de plusieurs sections d'infirmiers ?

“ Veuillez me permettre de vous exprimer un desideratum. Le commandement et l'administration des sections d'infirmiers devraient être donnés complètement au corps de santé. La loi du 16 mars 1882, en laissant ce commandement et cette administration aux fonctionnaires de l'Intendance, leur a donné une responsabilité sans leur assurer les moyens de la couvrir.”

§ 2.—Deux de nos collègues, MM. le baron Reille et de Lanjuinais, avaient demandé le rattachement aux escadrons du train, pour le recrutement et l'administration centrale, des sections d'ouvriers d'administration et d'infirmiers, dans les conditions prévues par le projet de loi organique soumis aux délibérations du Parlement. Cet amendement avait été accepté en principe ; mais sur l'observation que le projet d'auto-nomie du service de santé est une modification apportée non pas à une loi future, mais à la loi existante du 16 mars 1882, nos collègues ont eux-mêmes reconnu qu'une semblable réforme ne pouvait être introduite incidemment dans un projet de loi spécial et que l'étude devait en être réservée jusqu'au moment où la Chambre s'occuperait de la revision générale de la loi sur l'administration militaire. Ils ont, en conséquence, retiré leur proposition.

Par contre, nos collègues ont demandé que les officiers d'administration du service de santé ne fussent plus à l'avenir autorisés à concourir avec leurs collègues, les officiers d'administration des bureaux de l'Intendance, des subsistances et du campement, pour entrer dans le corps de l'Intendance.

En vain exprimerait-on la crainte qu'une pareille mesure pût nuire au recrutement des officiers d'administration des hôpitaux.

Nos collègues estiment que le recrutement des officiers d'administration du service de santé n'en sera nullement entravé. A leur avis, si l'on pouvait admettre que les officiers d'administration des hôpitaux eussent la faculté d'entrer dans l'Intendance, quand ils relevaient directement de ce corps, aujourd'hui on ne comprendrait pas une pareille latitude, puisqu'ils vont constituer un corps à part, soustrait complètement à l'autorité de l'Intendance et placé désormais sous le commandement exclusif du service de santé.

M. le Ministre de la Guerre entendu sur ce point spécial par la Commission, a déclaré qu'il lui paraissait en effet logique, du moment où les officiers d'administration du service de santé n'auraient plus aucune relation avec l'Intendance, qu'ils ne fussent plus autorisés à aspirer à en faire partie.

Votre Commission, s'appuyant sur l'opinion du Ministre, considérant d'ailleurs qu'il serait toujours possible aux officiers d'administration du corps de santé de permuer avec ceux de l'Intendance, et qu'ainsi leur ambition légitime de concourir pour entrer dans l'Intendance proprement dite ne serait pas absolument détruite, s'est rangée à l'opinion de MM. le baron Reille et de Lanjunais et a fait droit à la demande de nos honorables collègues.

En conséquence, elle a décidé la suppression du troisième alinéa de l'article 40 bis, section II, chapitre III.

Mais comme nous avons tous au même degré le plus vif désir de ne porter aucune atteinte aux droits acquis, il est bien entendu que la nouvelle loi n'aura pas d'effet rétroactif. Tous les officiers d'administration du corps de santé qui, au moment de sa promulgation, se trouveront en situation de concourir pour l'Intendance conserveront ce droit.

Magasins centraux.—Ce que l'on a dit du personnel administratif du service de santé doit s'entendre aussi des approvisionnements. Le matériel sanitaire est spécial au premier chef. Rien n'est plus naturel que de laisser à la compétence et à la vigilance du service de santé le soin de le constituer, de le conserver, de l'entretenir par ses propres ressources et dans ses propres magasins. Décider que l'organisation, la constitution, la répartition du matériel du service de santé appartiendra exclusivement à ce service, c'est couper court aux lenteurs, aux difficultés, aux complications du fonctionnement actuel; ce sera fixer les responsabilités. Dans le dualisme en vigueur, qui portera devant le commandement et devant l'opinion la responsabilité de retards qui auront eu, en campagne, par exemple, les plus fâcheuses conséquences?

Le décret du 27 mai 1882, portant organisation d'une direction du service de santé au Ministère de la Guerre, a compris dans les attributions de cette direction "la surveillance du matériel d'hôpital et d'ambulance ainsi que des approvisionnements de réserve." Ce qui a été jugé indispensable à la direction centrale, ne l'est pas moins dans les directions de corps d'armée; au reste, l'épreuve a été faite au Tonkin. C'est le magasin de l'hôpital d'Hanoi qui a reçu, entreposé et réparti dans toutes les formations sanitaires, hôpitaux, infirmeries-ambulances, corps de troupes et ambulances accompagnant les colonnes expéditionnaires le matériel immense du service de santé. Ce magasin constitué et renouvelé par les

soins et sous la responsabilité du directeur du service de santé du corps expéditionnaire, a été en extrême Orient ce que sont les docks et le magasin central ainsi que la pharmacie centrale des hôpitaux, à Paris, les magasins de réserve à Marseille et à Alger, dont le service de l'Intendance conserve l'administration, alors que c'est uniquement pour le service de santé qu'ils existent et que lui seul en dispose: Ces magasins centraux doivent être, comme l'a été celui de l'hôpital d'Hanoi, administrés par le service de santé.¹

§3.—*Ordonnancement.* La loi du 16 mars accorde la délégation des crédits aux directeurs des grands services de l'armée, mais elle "fait exception pour le service de santé dont les crédits sont reçus et les dépenses ordonnancées par le service de l'Intendance (art. 4)."

Il en résulte qu'aucune dépense, quel qu'en puisse être l'objet, ne peut être engagée sans la permission d'une autorité latérale, qui, ne dirigeant point effectivement le service de santé, peut cependant en arrêter l'exécution, puisque la loi du 16 mars donne le droit aux fonctionnaires de l'Intendance et leur impose l'obligation de s'assurer de la régularité de toutes les dépenses qu'ils sont chargés d'ordonnancer. En temps de paix, ce système entraîne des lenteurs considérables dans l'exécution des affaires, et une correspondance qui surcharge le service; en temps de guerre, l'éloignement de "l'ordonnateur" ou son refus peuvent avoir les conséquences les plus directes et les plus fâcheuses. Cependant, "la responsabilité, même pécuniaire, des dépenses non prévues par les règlements," incombe tout entière aux directeurs du service de santé, en vertu de l'article 16 de la loi du 16 mars, qui leur donne le droit de les prescrire. C'est un principe de droit administratif que l'ordonnancement est une des attributions essentielles de la direction: il implique le droit de surveillance administrative sur les opérations du gestionnaire. Si la direction limitée accordée au service de santé a déjà produit de très notables économies partout où des médecins militaires dirigent les services hospitaliers, on est en droit d'attendre bien davantage de leur intervention directe, de leur responsabilité personnelle dans la surveillance des dépenses journalières.

¹ Ce dualisme n'a pas seulement l'inconvénient de multiplier inutilement la correspondance et d'entraîner d'extrêmes lenteurs dans l'exécution du service. Voici les termes dans lesquels M. le général Fay exprime l'avis de la Commission qui a rédigé le Règlement du 28 décembre 1883. "Si, en ce qui concerne l'approvisionnement des hôpitaux militaires, la Commission a dû respecter le dualisme créé par la loi, elle a essayé d'en atténuer les inconvénients en proposant que, pour les infirmeries régimentaires, les demandes de matériel et de médicaments, après avoir été visées par le sous-intendant militaire, seraient approuvées, pour exécution, par le Directeur du service de santé..."

lières, c'est-à-dire dans le contrôle local de la gestion des hôpitaux. Déjà à la direction centrale du service de santé, au ministère de la Guerre, fonctionne une section de comptabilité à laquelle ressortissent toutes les questions relatives à l'administration financière des établissements hospitaliers, des magasins centraux, du service médical des corps de troupes. Il ne s'agit que d'ajouter une nouvelle catégorie aux ordonnateurs secondaires, déjà prévus par l'article 28 du règlement du 3 avril 1869, sur la comptabilité du département de la Guerre, en faisant pour le service de santé ce qui existe pour tous les autres services, sans apporter, d'ailleurs, aucune modification aux conditions dans lesquelles le contrôle s'exerce actuellement vis-à-vis de lui.

Celui-là seul qui a la responsabilité d'ordonner la dépense, surveille utilement l'emploi des deniers et est naturellement porté à ne charger l'Etat que des frais indispensables à la bonne exécution du service.

Ces nouvelles attributions auraient pour conséquences de rendre complète et efficace la direction du service de santé, sans nuire à l'action technique des directeurs.

CONCLUSION

En résumé, ainsi que l'a exposé le rapport de M. le général Fay, sur le règlement du 28 décembre 1883, le fonctionnement du service de santé, réglé conformément à la loi du 16 mars 1882, entraîne des difficultés considérables :

" Ces difficultés proviennent des dispositions des articles 18, 32 et 41 de la loi, qui maintiennent dans les attributions du service de l'Intendance :

" 1° L'ordonnancement des dépenses, la fourniture du matériel et des approvisionnements ;

" 2° Le personnel des officiers d'administration des hôpitaux et des infirmiers militaires."

La commission de l'armée estime que l'expérience des cinq dernières années a démontré les inconvénients graves de la législation actuelle, pour le temps de paix comme pour le temps de guerre, et elle a l'honneur de vous proposer d'apporter à la loi du 16 mars 1882 les modifications qui font l'objet du projet suivant.

[Suivait le projet de loi voté sans modification et qui est inséré plus loin.]

Le Président de la République française,
Sur la proposition du Ministre de la guerre,
Vu l'article 6, paragraphe 2, de la loi constitutionnelle du

16 juillet 1875 sur les rapports des pouvoirs publics, qui dispose que les ministres peuvent se faire assister dans les deux Chambres par des commissaires pour la discussion d'un projet de loi déterminé,

Décète :

Art. 1er.—M. DUJARDIN-BEAUMETZ, médecin inspecteur du corps de santé militaire est désigné en qualité de commissaire du gouvernement pour assister le Ministre de la guerre à la Chambre des députés et au Sénat, dans la discussion du projet de loi modifiant la loi du 16 mars 1882 sur l'administration de l'armée, et ayant pour but de donner une autonomie complète du service militaire de santé.

Art. 2.—Le Ministre de la guerre est chargé de l'exécution du présent décret.

Fait à Paris, le 11 avril 1889.

CARNOT.

Par le Président de la République :
Le Ministre de la guerre, C. DE FREYCINET.

CHAMBRE DES DÉPUTÉS

Séance du 11 avril 1889.— Application, après déclaration d'urgence, du projet de loi modifiant la loi du 16 mars 1882 sur l'administration de l'armée et ayant pour but de donner une autonomie complète au service de santé militaire.

M. le Président. L'ordre du jour appelle la première délibération sur le projet de loi modifiant la loi du 16 mars 1882 sur l'administration de l'armée et ayant pour but de donner une autonomie complète au service militaire de santé.

M. Gadaud, rapporteur. D'accord avec le gouvernement, la commission demande l'urgence.

M. le Président. Je consulte la Chambre sur l'urgence. (La Chambre déclare l'urgence. — Elle décide ensuite qu'elle passe à la discussion des articles.)

" Art. 1er.—Les modifications suivantes sont apportées à la loi du 16 mars 1882, sur l'administration de l'armée :

TITRE Ier.—Dispositions générales.

"Art. 4. — La délégation des crédits est faite par le Ministre aux directeurs des services qui sont chargés de l'ordonnement des dépenses.

"Dans le service de l'Intendance, les directeurs ont la faculté de sous-déléguer tout ou partie de leurs crédits aux fonctionnaires de l'Intendance soumis à leur direction.

TITRE III.—Dispositions générales du service de santé.

"Art. 16.—Les directeurs du service de santé dans les corps d'armée, ainsi que les chefs du service de santé dans les hôpitaux, ambulances et établissements pharmaceutiques, sont pris parmi les membres du corps de santé militaire.

"Les rapports de ces fonctionnaires entre eux et avec le commandement et les autres services sont réglés par les articles qui précèdent.

"Ils ont, en ce qui concerne l'exécution du service de santé, autorité sur tout le personnel militaire et civil attachée d'une manière permanente ou temporaire à leur service. Ils donnent des ordres, en conséquence, aux pharmaciens, aux officiers d'administration et aux infirmiers des hôpitaux et ambulances, ainsi qu'aux troupes des équipages militaires et autres détachés auprès d'eux pour assurer le service de santé. Les infirmiers et les troupes ainsi détachés relèvent de leurs chefs de corps respectifs, en ce qui concerne l'administration, la police et la discipline intérieures du corps.

"Les prescriptions du directeur ou des chefs de service de santé sont exécutoires par le personnel chargé de la gestion, dans la limite des règlements et des tarifs.

"Ils peuvent, dans les cas urgents, prescrire sous leur responsabilité, même pécuniaire, des dépenses non prévues par les règlements; mais, en ce cas, ils donnent leurs ordres par écrit, et en préviennent immédiatement le commandement.

"Art. 17. — Les pharmaciens et officiers d'administration, chargés d'exécuter les ordres du directeur ou des chefs de service de santé, peuvent être rendus pécuniairement responsables du montant des dépenses non prévues par les règlements, pour lesquelles l'ordre écrit susmentionné ne leur aurait pas été délivré.

"Art. 18.—Les directeurs du service de santé, dans les corps d'armée, ordonnent toutes les dépenses de ce service. Ces directeurs, ainsi que les médecins chefs de service, véri-

fient la gestion en deniers et en matières des pharmaciens et officiers d'administration placés sous leurs ordres. Ils leur donnent directement des instructions pour la bonne tenue des écritures et l'observation des lois et règlements sur la comptabilité.

"Le service de santé est également chargé, sous l'autorité du commandement, d'assurer la fourniture du matériel et des approvisionnements nécessaires aux hôpitaux et aux ambulances.

TITRE VI.—Personnel.

CHAPITRE II.—SERVICE DE L'INTENDANCE MILITAIRE.

SECTION II.—Officiers d'administration du service de l'Intendance.

"Art 32.—Le personnel des officiers d'administration du service de l'Intendance forme un corps distinct.

"Il a une hiérarchie propre réglée ainsi qu'il suit :

"Officier d'administration adjoint de 2e classe ;

"Officier d'administration adjoint de 1re classe ;

"Officier d'administration de 2e classe ;

"Officier d'administration de 1re classe ;

"Officier d'administration principal.

"Les officiers d'administration jouissent des bénéfices de la loi du 19 mai 1834 sur l'état des officiers.

"Art. 33. — Les officiers d'administration du service de l'Intendance sont répartis aux trois sections, savoir :

"1° Officiers d'administration des bureaux de l'Intendance ;

"2° Officiers d'administration des subsistances ;

"3° Officiers d'administration de l'habillement et du campement.

"Les officiers des trois sections peuvent être employés dans l'un ou l'autre de ces services, suivant les décisions du Ministre.

"Le cadre constitutif de corps est fixé conformément aux tableaux B, C, D, annexés à la loi du 16 mars 1882."

CHAPITRE III.—SERVICE DE SANTÉ.

SECTION Ier.—Corps de santé militaire.

Articles 37 à 40 sans modifications.

SECTION II.—Officiers d'administration du service des hôpitaux.

"Art. 40 bis. — Le personnel des officiers d'administration du service des hôpitaux forme un corps distinct, dont le cadre constitutif est fixé conformément au tableau E annexé à la loi du 16 mars 1882.

"Ce corps a une hiérarchie propre, conforme à celle définie par l'article 32 pour les officiers d'administration du service de l'Intendance.

"Les officiers d'administration du service des hôpitaux se recrutent d'après les règles fixées par l'article 34.

"En cas de mobilisation, les cadres des officiers d'administration du service des hôpitaux sont complétés par des officiers d'administration de réserve et de l'armée territoriale, qui rempliront les conditions déterminées par un règlement ministériel."

CHAPITRE IV. — SECTIONS D'INFIRMIERS D'ADMINISTRATION.

"Art. 41. — Les sections d'infirmiers militaires sont au nombre de 25.

"Le nombre des sections de commis et ouvriers militaires d'administration est également de 25.

"Le Ministre détermine, d'après les besoins de chaque corps d'armée, les effectives et les cadres de chaque section.

"Les sections sont commandées et administrées par un officier d'administration de leur service.

"En ce qui concerne la police et la discipline intérieures des corps, les sections d'infirmiers militaires sont placées sous l'autorité supérieure des médecins militaires, chefs du service de santé, et les sections de commis et ouvriers militaires d'administration sous celle des fonctionnaires de l'intendance, chefs des services administratifs.

"Les sous-officiers des sections d'infirmiers, de commis et ouvriers d'administration concurrent, avec les sous-officiers des corps de troupes d'infanterie, pour l'admission à l'Ecole militaire d'infanterie de Saint-Maixent."

(L'article 1er, mis aux voix, est adopté.)

"Art. 2. — Des décrets et des règlements ministériels pourvoient à la complète exécution des dispositions contenues dans la présente loi." — (Adopté.)

"Art. 3. — Sont abrogées toutes les dispositions des lois, ordonnances, décrets et règlements contraires à la présente loi." — (Adopté.)

(L'ensemble du projet de loi, mis aux voix, est adopté.)

AUTONOMIE COMPLÈTE DU SERVICE DE SANTÉ MILITAIRE¹

Le projet de loi sur l'administration de l'armée ayant pour but de donner une autonomie complète au service de santé militaire a été adopté avec modification par le Sénat, le 13 juin 1889.

Cette modification, bien que légère, a nécessité le renvoi du projet à la Chambre des députés; la loi a été votée, sans discussion, dans la séance du 18 juin.

Dans son rapport, déposé le 17, M. Gadaud s'exprimait ainsi pour faire connaître le motif de cette modification :

Messieurs,

La loi que vous avez votée sur l'autonomie du service de santé a été adoptée par le Sénat avec une simple modification que votre Commission de l'armée vous propose d'accepter.

Nous avons dit au 3e paragraphe de l'article 16, titre III.

"Les médecins donnent des ordres aux pharmaciens, aux officiers d'administration et aux infirmiers des hôpitaux et ambulances, ainsi qu'aux troupes des équipages militaires et autres détachés auprès d'eux pour assurer le service de santé."

Le rapporteur du Sénat, M. le général Deflis, a fait observer, et le Sénat a partagé cette manière de voir, que cette expression "et autres" pouvait être mal interprétée.

D'après notre texte, il semblerait, paraît-il, qu'un médecin militaire pourrait se considérer à l'avenir comme étant autorisé à donner dans certains cas des ordres aux officiers des armes effectivement combattantes, ce qui serait contraire à l'essence même du commandement.

Or, il n'est jamais entré dans l'esprit de personne, pas plus des médecins de l'armée que de la Chambre, d'attribuer à la loi nouvelle une telle portée.

On demande simplement que les médecins militaires chefs responsables de tout ce qui concerne le service de santé aient sous leur commandement tout le personnel neutralisé de la convention de Genève et qui porte le brassard, alors même que ce personnel comprendrait des hommes de troupe détachés de ce service.

Or cette distinction étant très facile à établir dans la pratique, il est indispensable qu'elle soit faite au point de vue légal, afin de ne prêter à aucune confusion.

Aussi voyons-nous un avantage réel à accepter la nouvelle rédaction du Sénat.

Ce texte du paragraphe 3 de l'article 16, serait donc désormais ainsi libellé : "Ils donnent des ordres, en conséquence, aux pharmaciens, aux officiers d'administration et aux infirmiers des hôpitaux et ambulances, ainsi qu'aux troupes des équipages militaires et aux hommes de troupe momentanément détachés auprès d'eux pour assurer le service de santé. Les infirmiers et hommes de troupe... etc..."

¹ Bulletin du Service de Santé Militaire, mai-juillet 1889, page 2114-5.

The Library Table -
From the Author

LETTER

TO THE



RIGHT HON. VISCOUNT CROSS,
G.C.B.,

Secretary of State for India,

BY

SURGEON-GENERAL MACLEAN,
C.B., M.D., LL.D.

Southampton:

HANTS ADVERTISER COMPANY, LIMITED: PRINTED BY H. KING.

MDCCCLXXXVIII.

*To the Right Hon. Viscount Cross, G.C.B.,
Secretary of State for India.*

MY LORD,

As I have for a considerable time ceased to have any official connection with the Army Medical School, I feel I may, without impropriety, respectfully address your Lordship on the subject of the proposal, now before your Lordship in Council, for discontinuing sending the young Medical Officers of H.M. Indian Medical Service to undergo the course of special training in the Army Medical School, still deemed indispensable in the case of the Medical Staff of the British Army.

This serious matter has been discussed in the press, more particularly with reference to a letter which appeared in the *Times* under the signature of "Civis" advocating this measure, a letter which has called forth replies in defence of the School from Medical Officers of rank, experience, and long service.

The proposal to dispense with the Netley training is defended—(1st) on the ground of economy; (2nd) on the inefficiency of the training at Netley; and (3rd) on the ground that a superior course of special instruction can be given in India.

It is understood that the authorities are not inclined to discuss the question on merely economical grounds, as it has been demonstrated that to substitute a course of special training in India for that at Netley, far from being a measure of economy, would be more costly than the present system. I therefore propose to argue the question on the other two grounds.

First, the inefficiency of the training. I am not concerned

to take up your Lordship's time by a defence of my own teaching. I have ceased to be a professor, and the subjects I taught are now in other hands. I content myself by appending to this letter a syllabus of the course of lectures I delivered, when I held the Chair of Military Medicine in the Army Medical School. I do not suppose any one, with any pretension to speak with knowledge and authority on such a subject, will venture to assert that the subjects dealt with in this syllabus are other than of vital importance for Medical Officers about to devote their lives to the practice of their profession in India. This being so, I add without fear of successful contradiction, that in the many years of my professorship, I never found one man in fifty of the Surgeons on probation sent to Netley, who had any practical acquaintance with the diseases which formed the subjects of my teaching. I further say that the Surgeons on probation have, nine times out of ten, been ready to make this confession themselves, which they could well do without shame, in as much as Military Medicine has never formed, and never can form, a part of the course of instruction in Civil Schools. It has been my good fortune to keep up friendly intercourse with large numbers of "Netley men," after they have served in tropical climates, and I have had the gratification to receive letters from them gratefully thanking me for the instruction given, with the assurance that in the early and inexperienced days of their service the lessons given at Netley have been of inestimable use to them.

I never supposed it would fall to my lot to have to defend the work of the late Professor Parkes, and his distinguished successor, the late Professor De Chaumont. The name of Parkes runs like a golden thread through the warp and woof of modern scientific medicine, it is to this day a household word in every school of medicine in the kingdom, and, I may add, in every Capital of Europe. He may be said to have in this country created the science of Military Hygiene. As a teacher he was *facile princeps*, and to his teaching, directly and indirectly, no small share of the enormous diminution of mortality in the Army at home and in India can be distinctly traced. De Chaumont was a worthy successor, and obtained for himself an European reputation as a successful teacher and high authority on Hygiene in all its branches, until his career was closed by a too early death.

The chair is now held by Professor Notter, a pupil of Parkes' and for five years the assistant of De Chaumont. In his hands it is certain that Military Hygiene will be taught on the lines and in the spirit of his distinguished predecessors.

It is said that Hygiene is taught in the Civil Schools. It is in some schools as a post graduate course; but what is taught is not the Hygiene of Armies. In addition to all that is comprised in the term Public Health, the course at Netley embraces the service of the soldier; the conditions in which he is placed in barracks at home and in hot climates, in huts, tents, and camps; hospital encampments; his food, cooking, clothing and equipments; the work he has to do, gymnastics, marches in all climates, and the duties of medical officers during marches; effects of military service; army statistics in all their various branches; service on board ship; transports for healthy troops, the same for sick troops; hospital ships; preparations for war, entry on war, actual war, regulations in war; causes of sickness and mortality; hospitals in war; sieges; climate; meteorology; disinfection and deodorisation; the prevention of specific and non-specific diseases.

The above subjects occupy about 32 lectures. In addition, on every other day, an hour and a half is given to chemical and microscopical examination in the laboratory; the examination of water, air, food, beverages, and condiments. Is knowledge of the above a necessary part of the training of a modern Army Surgeon wherever he serves? There can be but one answer to this question—it is. If so, can this knowledge be given in the Civil Schools, in addition to the long course which the young medical student has to go through, to enable him to "qualify" and satisfy the yearly increasing demands of his examiners? The only possible answer is, it cannot. When we are told that all that is required in the way of practical Hygiene for Army Medical Officers is what is embraced in an ordinary course of lectures on Public Health, we are told what is not correct; nothing but sheer ignorance of the subject can justify such an assertion. If this doctrine comes to be received and acted upon, the public must be prepared to see the education of the medical officers of the British and Indian Armies revert to what it was in pre-Crimean days, with the inevitable consequences.

Is Military Surgery taught in Civil Schools? It is not, and it cannot be. When we are told that since the introduction of anti-septic surgery the treatment of gunshot wounds has become the same as of all other wounds, we are only told a small part of the truth. Military Surgery in the present day embraces a great deal more than the treatment of wounds—gunshot or other. The Military Surgeon has to learn all the arrangements of modern war for first and secondary aid to the wounded; the position of dressing stations; the removal of the injured from the field, their transport to the base hospitals along the lines of communication; familiarity with all the means and appliances in use to mitigate the sufferings of the wounded; to say nothing of the effects on the human body of the terrible weapons of modern war; the examination of recruits for service; the duties of medical officers in the important matters of Boards of Invaliding; the granting of certificates to guide the authorities in the important matter of pensions, and a hundred other subjects; among which may be mentioned the exact terms of International Conventions regarding the position of hospitals in war, and the movement of wounded men under those conventions; to say nothing of an intimate knowledge of the literature on the above subjects by the surgical experts of the great military nations on the Continent. Once more, can all this be taught in Civil Schools? And, without this knowledge, what will be the position of our Military Surgeons in a few years, when the present race of Netley trained men have passed away?

Is the pathology of military diseases a subject to be lightly esteemed? What is pathology? It is the science of disease. Where can this important subject be well taught, if not in a great Hospital like Netley, where the invalids from every climate are brought, bearing on their persons the indelible marks of their service and sufferings? The Netley Professors, after twenty-eight years of experience, can testify to this fact, that until taught at Netley not one in ten of the young surgeons on probation knew how to make a *post-mortem* examination of a human body in such a way as to be of the smallest use to themselves or to science. Some gentlemen, who have had exceptional opportunities, and have used them, do come to Netley, able to use the various aids to diagnosis that modern science has

placed at the disposal of physicians. But by far the majority are first taught the use of such instruments in the Army Medical School.

I am aware that since this discussion has arisen certain gentlemen have spoken in disparaging terms of Netley as a school of clinical instruction. I venture, on this subject, to say, that in my service in India and China, extending over twenty-two years, I was not a careless observer of disease, yet I aver that I learned many a precious lesson in the wards at Netley; and I can conceive no better preparation for the study of the acute forms of tropical disease than the impressive lessons to be learned there. Parkes had served in tropical climates, was a high authority on the diseases of such climates, and it is consistent with my knowledge that to the day of his death he never ceased to approve of Netley as the home of the school, mainly on account of its enormous value as a school of clinical observation. This also—I speak with knowledge—is the opinion entertained and expressed, times without number, by the foreign experts who have, year after year, visited Netley. This, I venture to say, is something more than a set-off to the rash judgments of Netley critics, who have never visited the wards of that great Hospital, have no personal knowledge of the nature and kind of teaching given within its walls, and who yet think themselves warranted in offering crude advice to those in authority who have to decide this important question.

And now to the last point can the work done at Netley be done in India? Unhesitatingly I answer no!

I think it has been shown that it cannot be done in the Civil Schools at home—now, the Medical Schools in India are Civil Schools—the Hospitals at the Presidency Towns are Civil, in no way resembling Military Hospitals. The able teachers in the Indian Presidency Medical Schools, most of them distinguished Netley men, have their hands full of their own duties, and have neither the time, the needful museums, the libraries, or the “teaching plant” that has been accumulating for nearly thirty years at Netley. The Surgeons on probation while at Netley are not Commissioned Officers, they are so to speak *in statu pupillari*. In India they are commissioned Officers, and I can conceive nothing more repulsive to them, after all the years of their pupilage, than to have to enter once more as Students, and to go

through all the labour of such a course of study as I have tried to explain, in a climate and under surroundings most unfavourable to real and profitable study. As a teacher of eleven years standing in India, and more than twenty-five in England, I venture to say, if the experiment I have argued against with all the earnestness of which I am capable is attempted to be carried into practice it will end in a disastrous failure.

I have the honour to be, my Lord,

Your Lordship's most obedient servant,

W. CAMPBELL MACLEAN, C.B., M.D., LL.D.,

SURGEON-GENERAL.

...I have the honour to be, my Lord, Your Lordship's most obedient servant, W. CAMPBELL MACLEAN, C.B., M.D., LL.D., SURGEON-GENERAL. ...Hants Advertiser Co., Limited: Printed by H. King, Southampton.

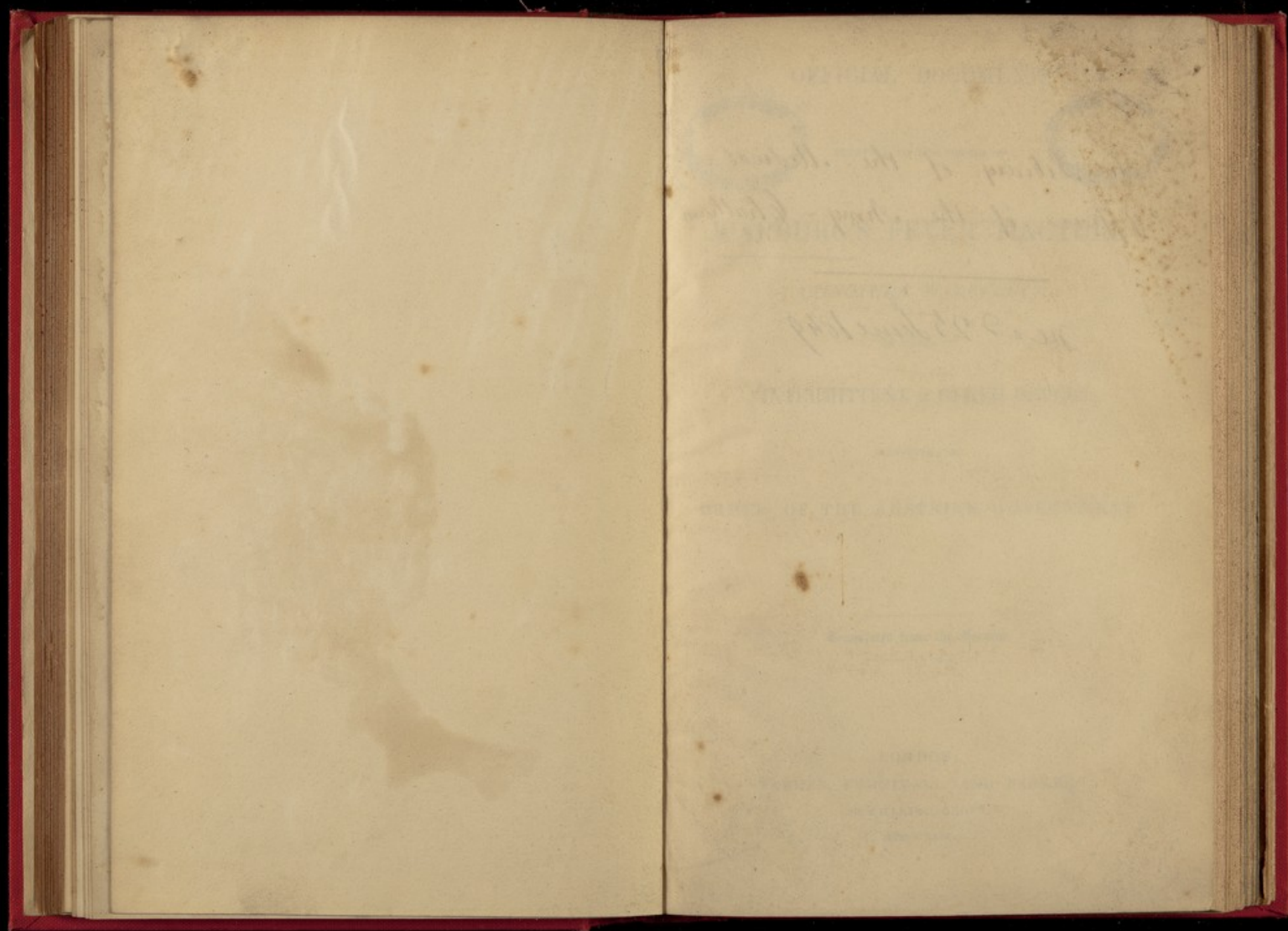
HOSPITAL REPORTS

AND OTHER

OFFICIAL DOCUMENTS.

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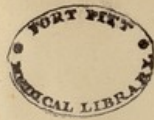
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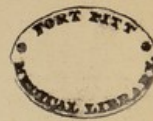
*The Library of the Medical
Officers of the Army - Chatham*

recd 25 June 1849

OFFICIAL DOCUMENTS



RELATIVE TO THE TRIALS OF



WARBURG'S FEVER TINCTURE

(TINCTURA WARBURGI)

IN CASES OF

INTERMITTENT & OTHER FEVERS;

INSTITUTED BY

ORDER OF THE AUSTRIAN GOVERNMENT.

Translated from the German.

LONDON:

PARKER, FURNIVALL, AND PARKER.

30, CHARING CROSS.

MDCCCLXIX.

LONDON:
SAVILL AND EDWARDS, PRINTERS, 4, CHANDOS STREET,
COVENT GARDEN.

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MEM.—The *Italic* headings to the Documents printed in the following pages, have been introduced by the Translator, for the convenience of reference.

Vienna, Josephstadt, No. 197,
December 18, 1848.

MY DEAR PARKER,

The great object of my life,—that for which, as you know, I have toiled, in and out of Europe, for the last twenty years,—is now at last, to a certain extent, accomplished.

After the severest and most extensive trials, which have been made by express order of the Government here, my Fever Tincture has been officially reported upon by the Chief Physicians of Austria, and declared to be,—as you will see by the Imperial Decree of February 10, 1847,—the safest and most efficacious febrifuge hitherto known, bark and its preparations not excepted.

You can easily imagine that this gratifying result has led to something more than merely giving the child a name, which is now Tinctura Warburgi, under which it is officially recognised, and incorporated in the civil and military Materia Medica of Austria. All apothecaries throughout the Empire are ordered to keep a supply of my tincture in their pharmacies; the civil and military hospitals are supplied from my laboratory; and all physicians and surgeons holding appointments under the government here, are, in endemic and epidemic cases, authorized to prescribe and use my medicine, at the expense of the Government funds. Again, see documents.

Here, before I go any further, I must ask you to spare a portion of your patience, or, better still, to take a good dose of the tincture, (of which I suppose you have still some left,) as I think you will require your nerves strengthened, in order to get through with the documents, which I shall send you to-day by the same post, under band.

I dare say you have thought me neglectful, or some such thing, in not writing to you for some time past; but it was my intention to have said not a word, until I could come to you personally, and witness your astonishment, when I should place in your hands and explain to you the documentary proofs of my success; but I have been compelled to alter my plans, owing to the late revolutionary proceedings here; having lost, by the pillaging of my house in the Jagerzeile,—which was sacked by the Croats in October last,—several valuable documents, which it will take some time to replace, and this can only be done by my personal attendance in the proper quarters.

However, as all my stock of medicine, ready for issue, (a large quantity, I can tell you,) as well as all my vegetable extracts yet remaining in this country, were destroyed by the Croats, I have no means left here, of preparing a fresh supply of the Tincture. I shall, therefore, use the utmost possible dispatch to get to London; and, in the meantime, I forward to you such of my documents as I was able to save from the wreck, on revisiting my pillaged home after the capitulation.

I will not dwell further upon the devastation which met my sight in returning to my ruined home; nothing, in fact, being left on the premises besides the broken furniture, too heavy to be carried away, which was smashed to atoms, and a few books and papers scattered about and damaged in various ways. The particulars of the horrid butcheries, and other atrocities, which I have been compelled to witness, and of which I remain a victim, I reserve until I shall have the pleasure of again sitting with you tête-à-tête in happy London.

Now again to business. I have numbered the documents in the proper order in which you should read them, and I will beg you to have them translated by some person who well knows and understands the German and English medical technicalities, so that no obscurity of expression shall remain. I have no inclination, at pre-

*sent, for this task myself. Perhaps our friend Dr. * * * * or Mr. * * * would be kind enough to assist you in this tiresome work.*

After what has been done here, and officially adopted as a State arrangement, by one of the most cautious Governments in Christendom, I should think there will be little or no opposition in England, on the ground of the medicine being, for the present, a secret one. That objection was, in the first instance, made here, and strongly urged too. But when all the facts of the case had been considered—when credit was given me for the discovery—when it was shown how many years of care and labour I had bestowed upon it—the large sums of money I had expended in bringing it to perfection, and in making it known in every quarter of the world—and the thousands and thousands of phials which I had gratuitously supplied for the purpose of testing its efficacy, wherever there was a disposition to give it a fair trial;—well, then, when all these things were fairly and generously considered, the Austrian Government, acting under the advice and approval of their public and private physicians—admitted to rank among the first medical authorities in the world—overruled that objection; and the Imperial Decree was issued, which, for the first time in this country, authorized an individual to prepare a secret remedy, and to supply with it, all dealers in medicine throughout the Empire.

Well; the documents to prove these facts, are now in your hands, verified and authenticated beyond all shadow of a question, and I do authorize and beg you, to make such use of them, as will bring the Tinctura Warburgi in the same fair and honourable way before the English nation, and, through that, before the whole world, solely on its merits, as was the case here.

After what has been proved, it might look like affectation to say, that should my febrifuge be not found to answer the purpose for which I offer it, let it be thrown to the dogs; but, instead of this, I say to you,

if any competent physicians or surgeons, particularly such as are connected with public hospitals, or with the medical journals, shall desire to put it to the test, I beg you to furnish them gratuitously with such quantities of the medicine, as will enable them to satisfy themselves, by trials made at their own discretion, of the efficacy which I claim for my Tincture.

* * * * *

Besides placing in your hands the original Decrees, and the Hospital Reports on which they are founded,—for inspection by members of the medical profession, who may desire to verify the facts,*—I bind myself to you, to make any quantity of the tincture which you may require, of the same strength and quality as that which has proved so successful here. Beyond this you must not expect me to do anything in the matter. Its introduction in Great Britain,—aided, as I hope it will be, by the same honourable assistance from my professional colleagues, which I have enjoyed in Austria and elsewhere,—and everything connected with it, partaking of a business character, must be done by yourself. I have already much snow on my head, and the time is come, when I must have peace and rest from the exhausting cares and labours of the last twenty years.

Let me hear from you soon, and believe me to remain,

My dear Parker, yours sincerely,

CARL WARBURG, M.D.

J. W. Parker, sen., Esq.,
30, Charing Cross, London.

P.S.—Please to acknowledge, by return of post, the receipt of the documents. I need not ask you to take good care of them, as you will see the value they have for me, being the originals.

C. W.

* The documents referred to may be seen, on application to Mr. Parker, 30, Charing Cross, London.

OFFICIAL ANNOUNCEMENT

[Of the adoption of TINCTURA WARBURGI in the *Materia Medica* of Austria, and of the reasons, in consideration of which, the Imperial Sanction was granted to DR. WARBURG, to prepare and dispose of his Fever Tincture throughout the Empire,]

Published in the Imperial Austrian Official Gazette,
"Wiener Zeitung," No. 97, April 8, 1847.*

Dr. Warburg's Fever Tincture.

THE Vegetable Tincture discovered by Dr. Warburg, and principally recommended as a remedy against intermittent fever, has proved, according to the trials instituted in the hospitals of Lower Austria, a very welcome enrichment of our medical treasury.

Notwithstanding the mistrust with which we necessarily receive every recommendation of an *arcanum*, after the experience of so many disappointments—seeing that for centuries past scarcely one of the infinite number of highly-prized arcana has justified its eulogists by its realized efficacy—the Austrian Government was induced, through the favourable reputation which the Warburg Fever Tincture had gained in other countries, to submit this medicine to a comprehensive test at the sick bed; the rather as Dr. Warburg offered to supply gratuitously a sufficient quantity of his medicine for this purpose, and that a previous chemical analysis of its ingredients, had satisfied the Government that no absolutely injurious, and particularly that no poisonous, substances were contained in it.

Consequently, by order of the High Court of Chancery, July 17, 1846, trials of its efficacy were directed to be made in all the hospitals of Vienna, and by the district physicians in the province of Lower Austria, during the months of August, September, and

* See page 75.—Tr.

October, 1846, according to the directions given by the discoverer; and the result of the observations made in compliance with this order, was reported to the following gratifying effect:—

"That in intermittent Fevers, of whatever character, this Fever Tincture unquestionably disputes the palm with every previously known remedy, even the highly valued preparations of Bark; and is chiefly distinguished, beyond all others, by the certainty and rapidity of its curative effects."

In the above-mentioned trials at the public hospitals,* this Tincture was administered to 167 patients, some of whom (having suffered under a prolonged duration of the disease) not only had to struggle with intermittent fever, but also with its dangerous consequences—such as enlargement of the liver and spleen, jaundice, dropsy, &c. The effect of the medicine displayed itself principally as follows—viz., that with *all fever patients*, after the administration of the usual dose of the Tincture, consisting of five drachms, the next anticipated paroxysm was either repelled entirely, or, recurring once only, with considerably diminished intensity, appeared no more in any case, where the prescribed dietetic precautions had been duly observed.

The Tincture of Dr. Warburg *invariably, and with certainty*, relieved the patients of their sufferings, and, in a surprisingly short time, restored them to their bodily vigour and healthy appearance.

Patients on whom, at their reception into the hospitals, a cachectic appearance was strongly marked, enjoyed, after their cure—which was performed in one day (in many cases within forty-eight hours)—a good appetite, an excellent digestion, and a very favourable change of physiognomy.

In several obstinate cases of consecutive dropsy, in which all the usual remedies had been employed without effect, the serious consecutive malady was also removed, with the fever, by a repetition of the doses of the Tincture.

* For official Reports of Trials at the Military Hospital at Comorn, during the Epidemic of 1846, see page 71, &c.—Ta.

This Tincture was found equally beneficial in what are termed disguised intermittent fevers, accompanied for months, with the painful symptoms of violent headach, faceach, earach, &c.

However highly a medicine may be esteemed from the *certainty* of its efficacy, it becomes still more valuable, if, at the same time, it restores health *quickly* to the sufferer, inasmuch as it not only saves him the pain and expense attendant on long sickness, but, by gaining—through a quick convalescence—that time to active life, which would otherwise be wasted in a lingering recovery, confers advantages which, in all conditions of life, must be extremely welcome.

In consideration of the beneficial effects produced by the employment of the Tincture in question, the preparation and issue of this medicine has been accorded to Dr. Warburg, by Supreme Resolution, of the 30th of January, this year, (intimated by Decree of the High Court of Chancery, No. 3747, and Regency Ordinance, No. 7201) throughout the Austrian Empire, on condition that he should prepare the medicine under his own superintendence, of the same quality as that already supplied to the public hospitals; that he should permit no admixture of a deleterious nature; and that the Tincture should be filled into the phials adopted by him, bearing a peculiar impression, securely corked, sealed, and provided with proper labels.

The dispensing of this Tincture is regulated by the Supreme Resolution, strictly in the same manner, as all other official preparations contained in the Austrian Pharmacopœia, denoted by a cross (†); consequently, Dr. Warburg is only at liberty to dispose of his Tincture in Austria, to those who are authorized to deal in medicine, viz., Apothecaries, Physicians, and Surgeons, and such Druggists as are licensed to deal in medicaments.

This medicine can only be dispensed to patients, by prescription of duly qualified physicians and surgeons, from public pharmacies, or authorized private dispensaries: the dispensation of the Tincture *directly* to the patient, either on the part of the discoverer, of drug-

gists, or of apothecaries, is prohibited; and every falsification or adulteration of this remedy, is to be punished according to the existing laws of Austria against such offences.

The ingredients and composition of this medicine being unknown, the Government was precluded from assessing its price to the public, in the ordinary manner, viz., in proportion to its cost; but, considering that the trials instituted on so extensive a scale, have cost Dr. Warburg large sums, and that by the adoption of this Tincture, more costly treatment, and much valuable time, are saved to the patient, the price was fixed at 2 fl. 30 kr.* per phial.

* Five shillings, English.—Ta.

AUTHENTICATION OF OFFICIAL DOCUMENTS

BY THE AUSTRIAN HIGH CHANCERY OF
COURT AND STATE,

AND ALSO BY THE TURKISH, FRENCH, ENGLISH, AND RUSSIAN
AMBASSADORS AT THE COURT OF AUSTRIA.

THAT the annexed documents, attached under seal of the Imperial Royal Presidium of Lower Austria, together with the enclosed printed High Chancery Orders, were communicated to Dr. Warburg, in the most legal form, partly in accordance with the Decrees of the Regency of Lower Austria, and partly by Supreme Resolution of his Imperial Royal Majesty, intimated through the United High Court of Chancery, is hereby confirmed.

Vienna, May 18, 1848.

L. S.

J. J. KNOLZ,

*Imp. Roy. Councillor to the Regency of Lower Austria,
Sanitary Referee, and Protomedicus.*

The genuineness of the above signature of Dr. J. J. KNOLZ, Councillor to the Regency of Lower Austria, and Protomedicus, is hereby certified by the Imperial Royal Presidium of the Regency of Lower Austria.

Vienna, May 19, 1848.

L. S.

ALBERT, COUNT MONTECUCCOLI,
*Marshal of the Regency of Lower Austria,
and President of the Council.*

The Imperial Royal Privy Chancery of Court and State, hereby certifies the genuineness of the foregoing signature of the Imperial Royal Presidium of the Regency of Lower Austria.

L. S.

Vienna, May 20, 1848.

R. VON KESAER,
Aulic Councillor.

Seen by us, Ambassador from the Sublime Porte, at the Imperial Royal Court of Austria, for legalization of the signature of M. de Kesaer, Aulic Councillor to his Majesty the Emperor of Austria in the Privy Chancery of Court and State.

L. S.

Vienna, May 23, 1848.

CHEKIB.

Seen at the Embassy of France, in Austria, for legalization of the above seal and signature of the Privy Chancery of Court and State, of his Imperial Royal Majesty of Austria.

L. S.

Vienna, May 23, 1848.

Secretary of the Embassy,
ALEXIS DE GABRIAS.

Certified to the signature of the Austrian Chancery of State.

L. S.

British Embassy, Vienna, May 25, 1848.

FREDERICK FOSTER.

No. 129.

That this certificate bears the real signature of the Aulic Councillor to the Court and State of Austria, is hereby certified.

Vienna, May $\frac{13}{25}$ 1848.

Office of the Imperial Russian Embassy.
By order of the Ambassador,
The Secretary of the Embassy,

L. S.

J. POCLOFSKOM.

DECREES

OF THE

IMPERIAL ROYAL AUSTRIAN GOVERNMENT.

A. From the Regency of Lower Austria, declining to Institute the Trials proposed by Dr. Warburg.

No. 21,752.

In reference to your Petition of the 14th March last, wherein you solicit that the Remedy which you have discovered against Fevers, may be submitted to trials in the Imperial Royal General Hospital of this city, the following communication is intimated to you.

In the year 1842, it was communicated to you, by the Privy Chancery of the Imperial Royal Court and State, through the medium of our Embassy at Paris, that by the existing Medical Laws of Austria, no trial whatever could be instituted of the Febri-fuge in question, until after a minute specification of its component parts, and of its preparation, should be made public.

The Austrian Regency continues to decline to authorize the Directors of the said Hospital to institute trials of your medicine, until you shall have complied with this requisition.

The Regency will, however, receive renewed applications from you on this subject.

The Vouchers are herewith returned to you.

Vienna, April 10th, 1846.

Presidium of the Regency of Lower Austria,
PRINCE PALM.
FELNER.

L. S.

To Carl Warburg, M.D.

B. From the Regency of Lower Austria, authorizing Trials of Dr. Warburg's Fever Tincture, in the Civil and Military Hospitals of Lower Austria.

No. 43,821.

In reference to your Memorials of March 14th and May 21st, 1846, addressed to this Regency, you are hereby informed that, the Imperial Royal United High Court of Chancery, by Decree of July 17th of the current year, No. 23,022, has sanctioned the application of the Regency, for permission that trials might be instituted

of the medicine discovered by you, against intermittent and typhus fevers, in the General Hospital, as well as in all other hospitals of the city, military and civil, in appropriate cases.

In conformity with this permission, the Regency has ordered the Direction of the Imperial Royal General Hospital; the Direction of the District Hospital of the Wieden; the Convent of Charitable Brothers, and the Convent of Charitable Sisters, in Leopoldstadt; the Convent of the Elizabethan Sisters, in the Landstrasse; the Chief Physicians at the Jews' Hospital, in the Rossau; at the Hospital of the Provincial House of Correction; at the Hospital for Criminals; at the Infant Hospital of Dr. Mauthner, near the Schottenfelde; at the Infant Hospital of St. Joseph, at Wieden; at the Asylum Hospital, in the Währingergasse; at the Hospital of the Asylum of St. Mark's; at the Infant Hospital of Dr. Löbisch; at the Infant Hospital of Dr. Hügel, at Wieden; and lastly, the Official Physicians of the Four Sub-Regencies, (Kreisämter;) forthwith to institute the trials indicated.

Through the Regency, the aforesaid hospitals and physicians have also been furnished with a quantity of the medicine, and a number of your printed treatises, containing the necessary directions for use, &c., out of the supply placed by you at the disposal of the Regency.

You are hereby directed to put yourself in personal communication with the physicians of the aforesaid hospitals, and should it be found, during the period appointed for the trials, that the quantity of medicine placed by you at the disposal of the Regency, is insufficient for the purpose, you will in that case deliver, either to the Regency, or on the requisition of the aforesaid physicians, any further quantity, which may be required.

Vienna, August 14, 1846.

Presidium of the Regency of Lower Austria.

L. S.

LAGO.
RUBUNA.

To Carl Warburg, M.D.

C. *From the Regency of Lower Austria, directing the Physicians of the respective Hospitals to Report the Results of the Trials.*

No. 58,828.

In consequence of your Requisition of the 9th inst., the Regency has this day, ordered the Governors of the Hospitals of Lower Austria to report to the Regency, before the end of this month, without fail, the detailed results of the trials made of your Febrifuge; which results will, without loss of time, be communicated to you.

The Regency has further notified to the Direction of the Imperial Royal General Hospital, your kind offer to supply it with an

additional number of two hundred phials of your Febrifuge, for the purpose of making further trials in typhus fevers only; and the Physicians of the Hospital have been directed to make a special report of these trials, in due time, to the Regency.

Vienna, October 13, 1846.

Presidium of the Regency of Lower Austria.

PRINCE PALM.
FELNER.

L. S.

To Carl Warburg, M.D.

D. *From the Regency of Lower Austria—Requisition to Dr. Warburg, to specify the mode and manner in which he intends to prepare and issue the Fever Tincture.*

No. 69,462.

In accordance with the Decree of the High Court of Chancery, dated 25th ult., No. 39,313, His Majesty has ordered, that, the Regency should report under what conditions and regulations you should be authorized to prepare and issue your Fever Tincture, throughout the whole of the Imperial Royal States: you are therefore invited to obey His Majesty's commands, and the above Decree of High Chancery, by minutely detailing the mode and manner in which you intend to prepare and issue the said Medicine, and this you are enjoined to specify by the 6th inst.

Vienna, December 1, 1846.

Presidium of the Regency of Lower Austria.

PRINCE PALM.
REICHEL.

L. S.

To Carl Warburg, M.D.

E. *From the Regency of Lower Austria, specifying the stipulations under which the Imperial Sanction to prepare and issue his Medicine, is granted to Dr. Warburg, and the conditions of its adoption, as an officinal preparation, throughout the Austrian Empire; also communicating an official summary of the Hospital Reports, on which this Decree is founded, and authorizing Dr. Warburg to publish the same.*

No. 7201.

By a Decree of the High Chancery, dated 2nd instant, No. 3747, his Imperial Royal Majesty has, through "Supreme Resolution," of 30th ultimo, most graciously sanctioned to you, but only to yourself personally, and not to your heirs and successors, the right to prepare and issue your Fever Tincture (*Tinctura Warburgi*) upon the strict observance of the following stipulations:—

1. You have to establish in Vienna, a laboratory for the purpose

B

of preparing your Tincture, and you must constantly keep on hand a supply of the ingredients thereof, adequate to the demands of the whole monarchy.

2. The Tincture is only to be prepared under your own immediate inspection and superintendence, to be of equal good quality to that with which you have hitherto furnished the public hospitals of Lower Austria; and you are forbidden to make use of any admixture whatever, of a deleterious nature.

3. This Tincture must be put into the phials, specially moulded, and adopted by you for that purpose; the phials to be properly corked, and sealed with your family seal; and, to guard against adulteration, each phial must be furnished with the peculiarly stamped label registered by you.

4. The fixed price of two florins and thirty kreutzers* c. mz. per phial, established as a general basis, must not be exceeded.

5. You have to establish at Vienna, or its immediate vicinity, a principal depôt, the locality of which, you must indicate hereafter to the Government, whence all duly authorized dealers in medicine may, at any time, obtain a supply of the said Tincture of genuine quality.

6. This Tincture shall only be dispensed under the denomination of "Warburg's Fever Tincture," (*Tinctura Warburgi*.) Public apothecaries, and physicians and surgeons, who are legally entitled to keep dispensaries in their houses, being alone authorized to dispense it. Apothecaries shall sell this medicine in the same manner as all other medicines, marked with a cross, (✚) in the Austrian Medical Tax Ordinance of the year 1836, but only under the regular prescription of physicians and duly authorized surgeons, who may also dispense the Tincture from their private dispensaries.

7. The interdicted direct sale to patients, or to any other persons who are not duly authorized to deal in medicine, whether by the discoverer out of his depôt, or by merchants, druggists, &c., will be punished according to Provisions 109 and 110 of the Statute Book relative to serious police offences; and the dispensation of this medicine on the part of an apothecary, without the regular prescription of a duly authorized physician, will be treated as a heavy police transgression, according to Clause 13 of the Medical Tax Ordinance of the year 1836, to which is prefixed the circular of the Regency of February 26, 1836.

8. Every proved falsification or adulteration of this medicine will be punished according to the existing regulations against such offences, in conformity with Clause 104 of the second part of the Penal Code upon Criminal Police Transgressions.

9. All officially appointed physicians are hereby authorized to prescribe this Tincture, in the same manner as all other official preparations, in appropriate cases, from the public pharmacies, at

* Five shillings sterling.—Tr.

the expense of the Government, should circumstances require it, in epidemic and endemic cases; but in this event, the full price of two florins thirty kreutzers, is to be charged to the Government, without the usual allowance of per centage.

It is, moreover, granted by the aforesaid Supreme Resolution of his Imperial Royal Majesty, of the 30th ultimo, that all druggists throughout the empire may sell this medicine by wholesale, but only to apothecaries, and to such physicians and surgeons, as are duly authorized to keep private dispensaries. The supervision and strict enforcement of this measure, is confided to the Board of Health.

In reference to your request, that the results of the trials, which were instituted in the Public Hospitals of Lower Austria, might be communicated to you, the required information is subjoined.

In the months of August, September, and October, 167 intermittent fever cases were treated with your medicine in the civil hospitals of Vienna, by the physicians thereof. Of this number, there were 71 males and 11 females with *quotidiana*, 73 males and 4 females with *tertiana*, 4 males with *quartana*, and 5 males with *febris larvata*,—disguised intermittent fever.

With the exception of 5 children, the patients were from 15 to 50 years of age, and of diverse bodily constitutions; the majority exhibiting that peculiar cachectic aspect, which indicates the presence of intermittent fever—viz., pale-yellow colour of the face, dulness of the eyes; pale-blue, thin lips; bloatedness of the physiognomy; shrivelled state of the skin, &c.

Various sporadic influences were assigned as the predisposing causes of these diseases; but it may confidently be stated, that at least 40 cases originated from endemic influence—patients who came to us from the marshy districts of Hungary, where they had already suffered with fever for months. In these patients, were also apparent the symptoms usually observed in obstinate and long-continued fevers, complicated with considerable enlargement of the liver and the spleen, jaundice and dropsy; and, in these cases, none of the known preparations of bark had any permanent effect.

The action of your Fever Tincture exhibited the following results—viz., that in all the aforesaid fever cases, after the administration of the general dose of the Tincture, (one phial, containing five drachms,) either the next paroxysm was averted, or, appearing once more with greatly diminished force, did not again recur.

The Tincture invariably, and with certainty, cured the patients of their fevers; and, in a surprisingly short time, restored them to their former bodily vigour and healthy appearance.

Patients on whom, at their reception in the hospitals, a cachectic appearance was strongly marked, enjoyed, in the shortest possible

time—frequently after 48 hours—an excellent appetite, a good digestion, and a very favourable change of physiognomy: the cures of these patients were effected *in one day*.

In several obstinate cases of consecutive dropsy, in which all the usual remedies had been fruitlessly employed, the enlargement of the liver and spleen, as also the dropsy, were subdued with the fever, by continuing the administration of the Tincture for a few days.

This medicine was found equally beneficial in what are termed "disguised intermittent fevers," exhibiting, for months together, the distressing symptoms of periodic headach, faceach, earach, &c., which cases were cured by the administration of two phials of the Tincture.

By the foregoing results, *Tinctura Warburgi* has proved itself to be a very efficacious remedy against intermittent fevers, and in intermittent diseases generally; surpassing bark, and all its known preparations, in the intensity and certainty of its curative power.

You are hereby authorized to impart to the medical public, the Treatise which you have already submitted to the Regency, describing your medicine, and the mode of administering it, together with the results of the trials herein communicated, and to append the original reports from the hospitals, upon which this decree is founded.

Vienna, February 10, 1847.

Presidium of the Regency of Lower Austria.

PRINCE PALM.
FELNER.

L. S.

To Carl Warburg, M.D.

OFFICIAL HOSPITAL REPORTS,

AS COMMUNICATED TO

THE REGENCY OF LOWER AUSTRIA,

BY THE RESPECTIVE PHYSICIANS;

Published Officially by order of the Regency, in the Austrian Medical Journal, "Medicinische Wochenschrift"—Consecutive Nos. 11 to 30, March 13, to July 24, 1847. By Dr. J. J. KNOLZ, Protomedicus.

No. 11. *Medicinische Wochenschrift.* Vienna, March 13, 1847.

OFFICIAL COMMUNICATION.

On the results obtained by treating Intermittent and Typhus Fevers, with Warburg's Fever Tincture, in all the hospitals of Vienna, and by several Officially-appointed Physicians in the provincial districts of the empire; in conformity with the decree of High Chancery, of the 17th July, 1846, No. 23,022.

JOSEPH JOHANN KNOLZ,
*Councillor to the Regency of Lower Austria,
Sanitary Referee, and Protomedicus.*

A.

Imperial Royal General Hospital; First Medical Division.

I. GENERAL REMARKS.

From the 1st Sept. to 26th Oct. 1846, in the First Medical Division, ninety-five phials of *Tinctura Warburgi* were administered to thirty-three patients—viz., thirty-five phials in intermittent fevers, forty-seven phials in abdominal typhus, five phials in intermittents, consequent on abdominal typhus fevers, and eight phials in a case of intermittent fever, complicated with *anasarca* and *ascites*.

Of these thirty-three patients, thirty-one recovered. In one case the medicine exhibited no effect, because the patient drank water in the interval between the doses, contrary to strict injunction; and one remains under treatment.

Of these thirty-three patients, twenty-three suffered with *Febris inter-*

mittens, six with *Typhus abdominalis*, three with intermittents, *sequela* of abdominal typhus, and one with *Febris intermittens cum anasarca et ascite*.

Two cases of relapse occurred after the use of this remedy.

In one instance, *Pneumonia metastatica*, and in another, *Bubo metastaticus*, were observed as consecutive maladies.

II. SPECIAL REMARKS.

a. Intermittent Fevers.

The remedy was given to twenty-three patients labouring under intermittent fever, seventeen of whom suffered with quotidian, and six with tertian fever.

Of these twenty-three patients, fourteen had suffered with intermittent fever, from three to nine weeks; the remainder, under three weeks.

Two of these came from Hungary.

Ten of these patients received two phials each; one, three phials; the remaining twelve, only one phial each.

With two patients, to whom the remedy was given shortly before the expected paroxysm, the fever did not again make its appearance.

With twenty patients, the impending paroxysm occurred; but, in most cases, less severely.

In one case, two paroxysms occurred after taking the medicine.

Twenty-two of these patients were cured. In one case, the remedy remained without effect; the patient having drunk water in the interval between the two doses, in spite of strict injunctions to the contrary.

In two cases, relapses occurred after the patients had left the hospital, and they consequently returned.

Twelve of these patients had a strongly marked cachectic appearance; one of whom complained of severe lancinating pains in the spleen. Considerable *cachexia*, and the recurrence in one instance, of a second paroxysm, induced me to administer more than one phial in those cases.

Tinctura Warburgi thus proved itself an excellent remedy in the treatment of intermittent fevers, as it not only promptly averted the paroxysms, but also exhibited a visible improving influence on the peculiar *cachexia*, generally attendant on fevers of long duration; while as regards digestion, it not only did not impair, but absolutely improved it; since the patients, on the second or third day after the cessation of the paroxysms, were enabled to take meat and other nutriment, for which they craved, without any injurious consequences; and in no instance, did the slightest inconvenience attend its employment.

b. Abdominal Typhus.

Trials were made with *Tinctura Warburgi*, on six patients suffering under this disease. Three were severe cases.

Of these six patients, three were of strong, and three of weak constitution; five were adults, and one a child. All six recovered.

The observed *sequela* were, in one case, *Pneumonia metastatica*, and in another, *Bubo metastaticus*.

Under the use of this remedy, of which three patients consumed ten phials each, one seven, one six, and one four phials, the following effects

were observed—viz., diminution of the evening exacerbations, of the *Meteorismus*, and of the diarrhoea; diminished delirium, greater calmness, sleep of some hours, earlier improvement of the sanguification, and quicker convalescence.

Critical phenomena were—urinary sediment, pustulae on the *nates*, and, in one instance, *Decubitus gangraenosus*.

From the above, a favourable effect of this remedy in abdominal typhus, may therefore be anticipated.

We believe, however, that we ought to defer a decided opinion upon it, as the trials were not sufficiently numerous, and as they occurred at a period, during which, *Typhus abdominalis* generally passed very favourably through its stages; and it is well known to physicians, that great importance must be ascribed to epidemic influence, in the course and termination of abdominal typhus.

c. Febris intermittens post typhum abdominale.

Cases wherein typhus ends in intermittent fever, are sometimes observed.

Three such cases were treated with Warburg's Tincture; all three had assumed the tertian type. All three were cured.

In two cases, only one phial was administered to each patient; in one case, three phials, because the patient had a decided cachectic and anemic (*blutleer*) appearance.

In two cases, the paroxysm recurred once, immediately after the remedy was taken. In the other, it did not re-appear.

In these cases, therefore, *Tinctura Warburgi* proved as efficacious, as in common intermittent fevers.

d. Febris intermittens, cum hydropse anasarca et ascite.

This patient had suffered during nine weeks, with tertian fever, complicated for the last fortnight, with dropsy of the abdomen and the skin. He came from Hungary, with a very strongly marked cachectic appearance. He has taken up to the present time, eight phials of *Tinctura Warburgi*, and still remains under treatment by this remedy. The impending paroxysm, immediately before which the Tincture was given, did not appear.

(P.S.) On the discharge of sedimentous urine, the *cachexia* was lessened, the dropsical effusions in the skin and abdomen diminished, and a complete cure ensued.

Vienna, October 26th, 1846.

DOBNER, Chief Physician.

No. 12. *Medicinische Wochenschrift*. Vienna, March 20, 1847.

Imperial Royal General Hospital; Second Medical Division.

In conformity with the order of the Regency, the undersigned has made trials in the Second Medical Division, of Dr. Warburg's Tincture, in twelve cases, of patients suffering with intermittent fever, and one, with typhus; the results of which, he has the honour to submit.

a. Intermittent Fever.

August 21st, 1846. Joseph R—, aged twenty-two, Catholic, single, labourer, of Vienna, had suffered for eight days, with tertian intermittent fever, the paroxysms of which recurred regularly at three P.M. The rigor was moderate, and lasted an hour, after which a fever, of from two to three hours' duration, ensued. During the apyrexia, the patient felt quite well.

On the 1st of September, half a phial of the Tincture was given, at seven A.M., the second half at two, P.M. The paroxysm which, in the ordinary course, would have appeared at three P.M., was averted, nor did any paroxysm occur afterwards.

R—, who found himself quite well, was discharged cured, Sept. 3rd.

August 31st. Joseph H—, aged eighteen, Catholic, single, of Vienna, Custom House officer, powerfully built; suffered, during three days, with intermittent fever. About four P.M., every day, rigor appeared, which lasted for an hour, and was followed by a violent burning heat, of three or four hours' duration.

On the 2nd of September, at seven A.M., the patient took half a phial of the Tincture, and at two P.M., the other half. The expected paroxysm was prevented, and no more fever appeared.

The patient convalesced rapidly, and was discharged cured, Sept. 13th.

October 20th, 1846. Johann B—, aged fifty-two, Protestant, single, of Bahlingen, in Wirtemberg, hatter; a stout, powerful man; had suffered for three months, with quotidian intermittent fever, contracted in Hungary. The paroxysms generally appeared about eleven A.M., and lasted three hours.

Oct. 24th. At seven A.M. half a phial of the Tincture was given; a paroxysm came on at nine, and was very violent, but at eleven it had ceased. At two P.M., the other half phial was administered. After this, no more fever occurred; the patient finds himself so well, and his recovery proceeds so rapidly, that, according to appearances, he will be discharged in a few days.

Aug. 21st, 1846. Anton P—, aged forty-two, Catholic, single, labourer, of Vienna; a stout strong man; had suffered for eight days, with tertian intermittent fever, free from any complication. The paroxysms appeared about six o'clock in the evening, and lasted about three hours.

Sept. 2nd. At seven A.M., the first, and at two P.M., the second dose of the Tincture, was administered. The usual paroxysm did not appear; convalescence progressed uninterruptedly, and the patient was discharged cured, September 7th.

Aug. 29th, 1846. George B—, Catholic, single, locksmith; had suffered originally with tertian intermittent fever, but for the previous six days, the paroxysms recurred every evening.

Aug. 31st. A phial of the Tincture was administered, the first half at seven A.M., the remainder at two P.M. The paroxysm did not appear;

the patient's convalescence was extremely rapid, and on the 5th of Sept. he was discharged cured.

Sept. 5th, 1846. Franz B—, aged forty, Catholic, single, from Prein, Austria; coachman, athletic; had suffered for eight days, with intermittent fever, the paroxysms appearing every second day, in the evening, lasting, with great intensity, about four hours.

Sept. 7th. A phial of Tincture was administered, one half at seven A.M., the other half at two P.M. The paroxysm did not reappear, and the patient was discharged cured, on the 12th of September.

Sept. 5th, 1846. Johann S—, aged nineteen, Catholic, single, of Bavaria, butler; suffered for eight days with intermittent fever, the paroxysms of which occurred regularly, in the evening of every second day, and lasted, rather severely, about three hours.

Sept. 7th. A phial of Tincture was given in two doses, one at seven A.M., one at two P.M. There was no return of fever paroxysm, and the patient was discharged cured, September 19th.

Aug. 25th, 1846. John R—, aged twenty-two, Catholic, single, of Vienna, ostler; had suffered for four months, with intermittent fever, recurring every other day at noon. The paroxysms were not very severe, and lasted two hours.

Aug. 27th. The Tincture was administered at seven A.M., and at two P.M., in doses of half a phial each. The paroxysm appeared at noon as usual, but less severely, and ceased at one P.M. There was no subsequent return of fever; the patient steadily recovered his health, and was discharged cured, September 22nd.

Sept. 3rd, 1846. Andreas K—, aged fifty-two, Catholic, married, of Moravia, labourer; suffered for several days, with intermittent fever, the attacks of which came on daily, between four and five P.M., and lasted from three to four hours, with moderate intensity.

Sept. 5th. A phial of Tincture was given him, divided into two doses, one administered at seven A.M., the other at two P.M.

No paroxysm ensued, and the patient was discharged cured, Sept. 10th.

Sept. 28th, 1846. Juliana B—, aged nine, of Silesia, a weak, cachectic, scrofulous child; labouring, since June, under tertian intermittent fever. The paroxysms occurred about noon, the rigor lasting nearly an hour, after which the fever ensued, lasting about two hours.

Oct. 16th. At seven A.M. a quarter phial of the Tincture was administered; and at two P.M., another similar dose.

Oct. 17th. When the paroxysm was expected, it did not occur, nor has any reappeared since. This child has recovered so well, and has acquired such a healthy and blooming appearance, that she will, no doubt, be discharged cured in a few days.

Oct. 13th, 1846. Francesca W—, aged thirty-three, Catholic, married, of Galicia, living on the poorest diet, a travelling beggar, of weakly constitution; had suffered for three months, with intermittent fever, which attacked her every evening with violence, and continued till towards morning, when it went off with a very profuse perspiration.

Oct. 16th. A phial of the Tincture was administered, in two doses, one at seven A.M., the other at two P.M.

The evening paroxysm did not appear, and convalescence proceeded so rapidly, that the patient was discharged cured, Oct. 28th.

Sept. 19th, 1846. Maria S—, aged thirty-five, Catholic, married, labourer; suffered for three months, with quotidian intermittent fever, the effects of which were seen in her cachectic appearance, œdema of the feet, and swelling of the abdomen, with distinct fluctuation.

Sept. 26th. At seven A.M. a half phial of Warburg's Tincture was administered, and a similar quantity, at two P.M.

From that time no further paroxysm occurred; the cachectic appearance vanishes, the dropsy diminishes, the urine is secreted abundantly, the patient's appetite and strength are returning, and it is to be hoped she will soon be declared convalescent.

b. Typhus.

Aug. 26th, 1846. Rosalia L—, aged twenty-two, Catholic, single, of Wittengau, Bohemia, laundress; of strong person and constitution, menstruates regularly, generally enjoys good health.

For eight days past, she had felt very weak, depressed, without appetite, her sleep disturbed, alternate rigor and heat, giddiness and heaviness of the head, humming in the ears, partial deafness, the eyes sparkling, the tongue light-red, dry, and tremulous, the abdomen meteorical, the skin dry and hot, the pulse small and accelerated,—in fine, it was typhus in the beginning of the nervous stage.

Aug. 27th. At seven A.M., and again at two P.M., a half phial of Warburg's Tincture was administered. After the first dose, the patient fell into a sleep, which however was much disturbed; after the second, there ensued two fluid stools; the pulse became quicker. In the evening, a severe exacerbation came on, the typhus symptoms became more developed, and the night was passed in a raving delirium.

Aug. 28th. This morning, early, the typhus was at its height, the patient being visibly much worse; under these circumstances, the further employment of the Tincture was out of the question, and the ordinary treatment was had recourse to, by means of which, we succeeded in carrying the patient through the dangerous crisis. However, she was only in a state to be dismissed from the hospital, on the 15th of October.

Warburg's Tincture has thus proved itself excellent against intermittent fevers, and if it succeed in exhibiting similar favourable results, in the infirmaries of the prisons and penitentiaries, and especially in marshy countries, where intermittent fevers rage endemically, the Treasury of Medicine will be enriched by a new and valuable febrifuge.

But the unfavourable issue of the first case of typhus, which might be considered as a most fit one for the trial of a new remedy; deterred the undersigned from further employing, in fevers of that description, a medicine, the constituents of which are totally unknown to him.

Vienna, Oct. 28, 1846.

Dr. CARL FOLWARCZNY, Chief Physician.

No. 13. *Medicinische Wochenschrift*. Vienna, March 27, 1847.

Imperial Royal General Hospital. Third Medical Division.

In the Third Medical Division, eight patients with intermittent, and three with typhus fever, were subjected to treatment with Dr. Warburg's Fever Tincture, in accordance with the order of the Regency.

There occurred, during the time appointed for making trials of this medicine, many more cases of intermittent and typhus fever; but as regards the former, they were for the most part of so slight a character, and yielded so readily to the usual remedies, that the Tincture was not employed in them. Of the typhus cases, on the other hand, the majority exhibited such a strong tendency to crethismus, that the use of so exciting a remedy, the ingredients of which are unknown, appeared inexpedient.

But in the eight cases of intermittent fever, which were of older standing, and of more obstinate character, Dr. Warburg's Tincture exhibited a brilliant effect.

By giving the medicine, in the quantity and at the time prescribed by Dr. Warburg, immediately before the access of fever, it produced a copious and uniform perspiration over the whole body. The next expected paroxysm occurred, but in a much lighter degree than its precursors, and was the last, in all the eight cases.

The patients cured by this medicine, and who were detained for some time in the hospital, in order that the results might be more fully observed, had no relapse; on the contrary, those who suffered from an advanced degree of cachexia, enlargement of the liver and spleen, and dropsy, recovered their health in an unusually short time. These highly favourable results therefore justify the conclusion, that in this Tincture a remedy is acquired, which can be relied upon, for curing the more obstinate cases of intermittent fever, with certainty, and immediately after its employment.

This remedy might therefore be preferred—in those cases where the immediate suppression of the paroxysms, is not contra-indicated by other causes—to the usual reputed febrifuges, and even to quinine, the employment of which but rarely suppresses the next paroxysm.

In the three cases of typhus fever, selected for treatment by this Tincture, on account of their more torpid character, the results were less striking, although in some symptoms amendment was shown; for instance, the diarrhoea lessened, the stupor of the patient diminished, and especially the general vitality improved.

Further trials are, however, necessary in this disease, in order that more definite results may be obtained, on which the undersigned will report hereafter.

Vienna, October 28th, 1846.

Dr. STERZ, Chief Physician.

Imperial Royal General Hospital. Fourth Medical Division.

In pursuance of the Imp. Roy. High Chancery decree of July 17th, 1846, No. 23,022, the use of Dr. Warburg's Vegetable Fever Tincture in all the public hospitals of Vienna was enjoined, especially in cases of intermittent fever; and just about this time (September) numerous cases of the quotidian and tertian types of this disease appeared, as if to afford the means of demonstrating the anti-febrile powers of this medicine.

Eighteen cases were submitted to treatment in this division, (namely, fourteen males and four females) to ten of whom (namely, nine men and one woman) Warburg's Fever Tincture was administered—out of the quantity placed at our disposal—with success.

In one case,—where, as in all the others, the medicine was administered in the prescribed doses,—the fever was immediately cured; in the other nine, a slight degree of feverishness remained, which disappeared by the use of a second phial, given in teaspoonfuls every three hours. Only in one case was there a relapse, which occurred after an omission of several paroxysms. The cases are specified as follows:—

1. A deaf and dumb man, on whom the fourth paroxysm of a tertian fever was impending, after taking the Warburg Tincture in two doses, fell into convulsive-like rigors, which lasted from half-past three till half-past six o'clock, on which a copious perspiration ensued.

He took, in teaspoonfuls, the contents of another phial; after which, no further paroxysms occurred.

2. A gastric fever, lapsed into intermittent. After the administration of the Fever Tincture, according to prescription, a slight feverishness appeared once, but no further paroxysm.

3. A servant, aged twenty-eight, had, according to his own statement, suffered five paroxysms of tertian fever. After taking both doses of Warburg's Tincture, a slight rigor only occurred, but there was no further fever paroxysm.

4. A labourer, aged twenty-five, suffered for a month, with quotidian fever, the paroxysms of which appeared at night.

After taking the Tincture at the proper time, a slight sensation of fever was observed; but the expected paroxysm did not recur, after the second phial had been taken in doses of a teaspoonful each.

5. A domestic, aged twenty-two, had been treated for quotidian intermittent fever, which, after eight paroxysms, was stopped by the remedies given by his medical attendant, (not *Tinct. Warb.*) Eight days later, the fever returned under the same type, but the period of the paroxysms varied so much, that it was difficult to fix the proper time for administering the Tincture; however as they generally appeared about midday, the two doses were given, (the second about half-past twelve,) and at about half-past one, a moderate sensation of fever was perceived by the patient, but no further paroxysm occurred.

6. A locksmith, aged twenty-two, had suffered in Croatia, from the 25th of June to the end of July, 1846, with a tertian intermittent fever, which left oedema in the feet, after the fever had been removed by medical treatment.

In this state, he undertook a journey to Steiermark, when after a fault of diet, the fever reappeared, under a quotidian type; it was now complicated with physconia of the liver and spleen, but the oedema had disappeared.

Warburg's Tincture was given, according to prescription, in two doses; and on a slight chilling coming on, two teaspoonfuls of a second phial were given, and no more, on account of heaviness of the head, and amaurotic weakness of the sight appearing; which, however, vanished after a few days, as did also the fever, which no more returned.

After the patient had remained in the division from the 25th of August, till the 10th of September, 1846, he was discharged cured. The physconia also having considerably diminished.

7. A tailor, aged eighteen, of Mannersdorf, laboured for several weeks under a tertian intermittent fever.

By the remedies applied, the fever was removed; it re-appeared, however, after six weeks, under a quotidian type; and recurred for four weeks every evening, about nine o'clock, with a violent rigor, lasting about two hours.

After administering the first half phial of the Tincture at six P.M., and the second at nine P.M., in half an hour (at half-past nine) a violent rigor came on, of two hours and a half duration, followed by heat which lasted till morning.

The following evening, another phial of tincture was given at the same hours, when, instead of the paroxysm, an abundant relieving perspiration ensued, lasting for an hour and a half, and no further paroxysm occurred.

After nineteen days, during which time the patient remained feeble, and complained of weakness in the feet, he relapsed; when, for want of Warburg's Tincture, he was treated with *Infus. amar. dos. 1, sal. ammon. dr. 1*, by which the fever was again stopped in the course of a few days.

8. A butcher, aged twenty, had suffered, in Slavonia, from intermittent quotidian fever, from the beginning to the middle of July, 1846, when he was relieved by the remedies employed.

In the month of August, a relapse occurred, the paroxysms appearing sometimes on the third, sometimes on the fourth day.

In this state he came to Vienna, where he was cured at once, by Warburg's Fever Tincture, without leaving the slightest trace of the disease. Anasarca, which subsequently appeared, was removed by diuretic remedies.

9. A porter, aged twenty, had suffered repeatedly, within a short time, from attacks of intermittent fever. As the paroxysms came on early, the first dose of Warburg's Tincture was given at four, the second at seven in the morning, shortly after which a slight chill came on, followed by about two hours of heat, succeeded by perspiration, after which no further paroxysms occurred.

10. A peasant's daughter, aged seventeen, had struggled for three weeks, with tertian fever. She was treated with Warburg's Fever Tincture, after which a slight feverishness appeared, but no further paroxysm.

Considering the cases in which Warburg's Fever Tincture was employed, and the results, it appears—

First. That a few of these cases were of a lighter nature, or of more recent origin, but that the majority were of a severe, inveterate, and often-relapsed description; some emanating from those parts of the country where fevers are most malignant, often not observing distinct periods of access, and complicated with symptomatic physconia and swelling of the liver and spleen. (Cases 2, 5, 6, 7, 8, 9.)

Secondly. That this medicine cured all the patients to whom it was administered, thus demonstrating its anti-febrile powers and value.

It may be observed, that the patients complained of the intensely bitter taste of the medicine, and of its burning heat in the stomach.

Imperial Royal General Hospital, October, 1846.

Dr. SEEBURGER, Vice Director.

No. 14. *Medicinische Wochenschrift.* Vienna, April 3, 1847.

Imperial Royal General Hospital. Fifth Medical Division.

In compliance with orders received, the undersigned has the honour to report, that he administered the Fever Tincture of Dr. Warburg in eleven cases of intermittent fever, as also in a case of febrile rheumatism, strictly according to the directions of the discoverer.

The characteristics of the eleven cases of intermittent fever, are essentially as follows.

1. O. Wenzel, aged twenty, journeyman shoemaker, (No. 106.) entered August 11th, 1846, with a slight attack of typhus, from which he gradually recovered. However, oedema of the feet, and an intermittent fever, at first of the quartan, afterwards of the tertian type, supervened. This fever not yielding to strict regimen, and to the use of an *Inf. acori*, the patient took, on the 9th of September, a phial of Warburg's Fever Tincture, divided in two doses—namely, one three hours, and the other immediately, before the beginning of the paroxysm. This appeared, nevertheless, but was moderate. From this moment the paroxysms ceased; the oedema, however, became general, and ascites appeared.

On the 23rd September, a violent fit of fever again occurred, without any new cause, (the food of the patient consisted of a portion of white bread, roast meat, and milk preparations, and at no time had he left the room.) The fit returned daily for several days, and was removed at last, by the use of the *Inf. acori*.

The patient is at this moment under treatment, as a convalescent.

2. M. Jacob, aged thirty-six, journeyman baker, (No. 104.) had suffered for five days, with intermittent quotidian, when he was put under treatment, the 22nd August. The paroxysms were rather violent. No

physconia, nor any other change in the abdominal viscera was observed. The paroxysms would not yield to the use of *Det. solvens* with *Sal. ammoniac*. The Fever Tincture was administered on the 27th August; a slight paroxysm followed on the same day, since which the patient remained exempt from fever till the 5th September, on which day he was dismissed cured.

3. C. Anton, aged twenty-one, journeyman clothmaker, (No. 103.) was put under treatment on the 26th August, for a gastric fever, which had already lasted a fortnight, and had latterly changed to intermittent tertian fever. After three paroxysms, the Fever Tincture was administered to the patient, on the 3rd September. The fit expected on the 5th, did not recur.

On the 7th September, also, no paroxysm appeared; and on the 8th, the man having asked to be dismissed, was consequently withdrawn from our further observation.

4. W. Franz, aged thirty, journeyman, was admitted the 26th Aug. with intermittent quotidian, which had lasted three weeks. The patient had a cachectic appearance, but no tumour of the spleen nor of the liver. He did not suffer under any other local complaint. After the use of a *Det. solvens*, there were observed two fits of fever, upon which the Fever Tincture was administered on the 28th Aug.

A very moderate paroxysm followed on the same day, which was, however, the last, till the dismissal of the man on the 3rd Sept.

5. T. Jos. aged nineteen, journeyman shoemaker, (No. 106.) came under treatment, on the 1st Sept., for a gastric fever, which had lasted eight days. The gastric symptoms yielded to *Pot. emet.*; and there appeared now a tertian fever, exhibiting very strong paroxysms, four of which were observed, while under treatment by *Decoct. gramin.*

On the 10th September, the patient took Warburg's Tincture. The paroxysm appeared, after that, very slightly, but was only totally removed on the 12th Sept.; and on the 14th, the man left the hospital.

6. B. Jacob, aged thirty-one, journeyman, (No. 106.) had recovered from typhus, a month before his entrance in the hospital, and was attacked, shortly after, by a daily intermittent fever.

Came into hospital Sept. 4th, when, besides the cachectic appearance, there was not perceived any material suffering of particular organs.

Two paroxysms occurred during the use of a *Det. solvens*; after which, the patient received, on the 7th Sept., Warb. Tincture. On the same day, he endured a paroxysm as violent as formerly; but afterwards remained exempt, and gradually recovered.

On the 23rd Sept., against every expectation, the fever reappeared, though we could not discover that the patient had committed any dietical fault. (Patient had the third portion, and never left the room.)

On the 24th and 25th, the paroxysms recurred with equal strength. On the 26th and 27th, the patient received *Sulph. chinini* in small doses; twelve grains of which sufficed to stop the fever, and the man was dismissed cured, on the 3rd Oct.

7. H. Josepha, aged twenty, labourer, (No. 95,) admitted on the 6th Sept. She had suffered for four weeks with intermittent *quotidiana*. Besides the symptoms of considerable *Anæmia*, no morbid state was discovered. Three fits were observed, while the patient was under treatment by a simple *Det. graminis*. On the 9th Sept. the Fever Tincture was administered; after which, no paroxysm occurred. She was dismissed cured, on the 21st Sept., without any other medicine being used.

8. I. Georg, aged thirty-two, (No. 105,) was put under treatment on the 10th Sept. for intermittent quotidian fever, which had lasted already five weeks. In this case there existed, besides the ictero-cachectic aspect, a particular sensibility and enlargement of the liver, as well as symptoms of a deranged excretion of the gall. The patient received, during five days, the *Det. solvens* with *Sal. ammoniac*, (half dr. daily,) and as he did not feel himself better, Warburg's Tincture was administered on the 15th Sept. The paroxysm was only averted on the following day, but the sensibility in the region of the liver, extreme oppression of the head, and unhealthy appearance, were still perceptible. Another phial of the Fever Tincture was now used, in teaspoonfuls, according to the directions of Dr. Warburg, in consequence of which the above-mentioned symptoms diminished, so that the man was almost cured, when, at his own request, he was discharged on the 19th September.

9. S. Georg, aged thirty-one, custom-house officer, (No. 106,) came on the 4th October, with intermittent *quartana*, contracted a month ago. It was relieved by the Brethren of Mercy, with quinquina, but relapsed about a fortnight since. In the apyrexia there were neither organical nor functional derangement to be detected.

The patient was treated at first with *Det. solvens* and *Sal ammoniac*, without success, the paroxysms recurring unmitigated on the 7th, 10th, and 13th. On the 16th Oct., the Fever Tincture was given, after which there appeared a mild paroxysm, which was the last. On the 29th Oct. the man was dismissed cured.

10. H. Joseph, aged thirty-two, publican, (No. 106,) had suffered already during eight weeks, with intermittent fever, when he was received on the 8th Oct. During the first five weeks, it remained of a tertian type, but in the last three weeks, assumed the quotidian. No infarctions, however, were present. After two observed fits of fever, the patient was treated with the Tincture of Dr. Warburg, after which there occurred a slight febrile sensation, but it totally disappeared on the following day. On Oct. 11th, the patient was transferred to the medical clinic, where he still remained free from fever.

11. K. Rosalie, aged forty-four, journeywoman, (No. 96,) arrived on the 8th October with quotidian fever, which she had caught three months ago, while employed on the construction of the railways in Hungary. This person had a decided cachectic appearance, and moderate swelling of the spleen.

After two observed fever paroxysms, the patient, on the 10th October,

received the Fever Tincture. She vomited the first dose, but took the second during the access, and retained it. The paroxysms did not return, but she recovered very slowly, so that I was obliged to prescribe, on the 22nd October, an *Inf. acori*. Her strength and appetite are gradually reviving, so that she will probably be dismissed cured, in the next few days.

In the two cases of typhus and febrile rheumatism, there was no perceptible remedial effect; on the contrary, I was obliged to discontinue the use of the Tincture in the typhus case, in consequence of the apparent increase of congestion to the brain, with frequent bleeding of the nose.

Relapses after the use of the Fever Tincture, appeared in two other cases, besides 1 and 6. W. Joh. aged thirty-seven, shoemaker, and H. Leop. aged twenty-one, turner, both were treated in No. 108 with Fever Tincture; both had tertian intermittent fever; in the first case after the fever had left the patient for eight days, and in the other for a fortnight, it returned without any apparent cause. Both relapses were treated with ipecacuanha, which sufficed to remove the fever after a few days. The former was under treatment from the 6th till the 24th, the latter from the 21st till the 27th of October.

Premising that in Vienna and its environs intermittent fever has not been of an obstinate character, inasmuch as out of fifty-nine patients, treated for this disease in the fifth division, during the last three months, (August, September, and October,) forty-eight were cured by the ordinary remedies, in a very short time, (viz., thirty by *Det. solvens* with *Sal. ammoniac*; four by *Inf. acori*; four by *Ipecacuanha*, and ten by *Sulph. chinini*, of which twelve grains sufficed to effect a cure,) the following conclusions may be drawn:—

1. That one phial of Warburg's Fever Tincture, containing five drachms, suffices, in every intermittent fever, of this country, to suppress it, either at the next, or the next but one paroxysm; an effect which, as is well known, can be as safely produced by half a drachm of sulphate of quinine, given in one or two doses before the attack.

2. That Warburg's Fever Tincture does not exhibit a more favourable influence on the symptomatic physconia and swelling of the liver and spleen, dropsy, jaundice, &c., than quinine and the other febrifuges.

3. That the said Tincture does not afford "a better protection against the extremely troublesome relapses than quinine;" while the solvent and slightly tonic remedies cure the fever more slowly, it is true, but more permanently.

4. In the absence of any "malignant or obstinate fevers in which quinine and its alkaloids, and even arsenic, remain without effect," I am unable to form an opinion on the value of Warburg's Tincture, as compared with the usual remedies, in cases of this description.

Vienna, Imp. Roy. General Hospital, October 28, 1848.

DR. BITTNER, Chief Physician.

No. 15. *Medicinische Wochenschrift*. Vienna, April 10, 1847.

Imperial Royal General Hospital. Sixth Medical Division.

Only a few cases of intermittent fever were subjected to treatment in this division by Warburg's Tincture, those cases being selected which were of longest standing, or the obstinacy of which had resisted the influence of sulphate of quinine.

The result in intermittent fevers was unquestionable, as in every instance the next paroxysm was averted. In seven cases, the fever was permanently cured; in one, a relapse occurred. The medicine was administered according to prescription. Accessory effects were sometimes observed,—namely, in one case, sickness and headach; and in two, several diarrhoea-like stools.

The result was not so favourable in typhus, in which disease it was first used in the full dose, and afterwards in *dos. refract.* The symptoms followed, nevertheless, their usual course. The pulse was even a few strokes quicker on the day the Tincture was administered. The medicine was given at the beginning of the disease. Whether accidentally, or in consequence of the use of this medicine, all three cases of typhus in which it was employed, ran their course with very severe symptoms. One patient died, the other two recovered after a very tedious convalescence.

When, moreover, it is considered that this medicine contains a large proportion of alcohol, which is certainly very exciting to the organism, the above few trials justify the conclusion, that this Tincture is not appropriate as a remedy against typhus fevers; but, on the contrary, its use may even be prejudicial in such cases.

Vienna, October 28, 1846.

DR. FOLWARCZNY, Chief Physician.

Imperial Royal General Hospital. Ophthalmic Division.

Three cases of intermittent fever were cured in this division by Dr. Warburg's Fever Tincture.

1. W. G.—, a strong young man, aged twenty-two, in whom the apoplectic *habitus* was strongly marked, was suddenly attacked three months ago with a violent headach, which was removed by the remedies employed by a surgeon; leaving, however, considerable weakness of the sight, with an oppressive pain and sense of fulness in the eyes. This state became gradually worse, and was accompanied also by pains in the super-orbital region, and *musce volitantes*. (Fliegensehen.)

With these symptoms, the patient entered the division on Sept 11, 1846, when we observed also *Amaurosis congestiva*, in consequence of which he was cupped in the neck, and took inwardly five grains of powdered nitre *per diem*; under which treatment, his sight considerably improved. We subsequently gave antimony in small doses, but were obliged to discon-

tinue this remedy, in consequence of repeated sickness. On the morning of the 7th of October, the patient was attacked by intermittent fever, the paroxysms of which were repeated on the 10th and 13th, thus clearly manifesting the quartan type. During this time he was treated by *Decoct. taraxaci, Decoct. cichorei, aa. unc. quatuor, Salis ammon. scrup. unum*. On the 15th of October a purgative was administered; in the evening of the same day, half a phial of Warburg's Tincture; and on the following morning early, the other half. The paroxysm, which was expected this day, did not occur, nor was there any re-appearance of fever during his stay in the hospital, which he quitted October 21. We learned from the patient's father, who applied at the hospital, about a fortnight afterwards, for further advice regarding his son's eyes, that no relapse had occurred up to that period.

2. A patient aged thirty-one, affected with rheumatic *Iritis, hypopyon* of the left, and *atrophia* of the right eye. Two weeks prior to his admission, he had been attacked by intermittent fever. Without dwelling longer on the disease of the eyes, we will only note, that on the 10th of October, 1846, twelve days after his reception, he suffered a relapse of fever, under the tertian type. We administered *Decoct. taraxaci*, and, previously to the appearance of the fourth paroxysm, after a purgative, we gave him *Tinctura Warburgi*, but not the full contents of the phial. The fourth paroxysm was not fully developed, but only faintly indicated, and thenceforth the patient continued free from fever. He remained in this division, on account of his eyes, until the 27th October, up to which time he continued without any return of fever.

3. P. B., a domestic, aged thirty-nine. This patient was transferred to our division, in consequence of want of room in the medical divisions. With the exception of an intermittent fever, under which she had suffered for a month, about a year ago, she had always enjoyed good health. A week prior to her admission, in consequence of a sudden alarm, she had started out of her bed, while in a state of perspiration. For some days afterwards, she felt very languid, and her menses, which had previously recurred with great regularity, continued only two days. A physician was called in, who prescribed a purgative, and strict regimen; which being unable to observe, while in service, she presented herself at the hospital, complaining of giddiness, oppressive pain in the region of the forehead, and ringing in the ears; the tongue was moist, and covered with a whitish thin phlegm, the edges and tip red, no appetite, increased thirst, respiration impeded and unequal, more performed by the right side of the thorax than the left. In the middle of the chest, and especially at the pit of the stomach, a feeling of oppression was experienced. No morbid symptoms were observed by auscultation or percussion. The abdomen soft, without pain. Two liquid stools.

On the 31st January, she was attacked by fever, which began at eleven A.M. The rigor lasted four hours, after which succeeded continued heat for five hours, followed by perspiration. The fever appeared again on 2nd February, but rather earlier—viz., at half-past eight A.M. It occurred again on the 4th February, at the same hour, thus establishing the tertian type. Up to this time, she was treated only with *Decoct. solvens cum arcan. dupl.* It is worthy of remark, that upon each occasion, the im-

pending paroxysm was indicated by restlessness and a feeling of heat on the previous night.

On the 5th February, at 10 P.M., I administered to the patient, one half phial only of Warburg's Tincture, in order to ascertain whether this dose was ever sufficient to cure the fever; reserving the other half to be used in the morning, in case the paroxysm should appear. The patient, however, slept very quietly during the whole night, and the fever was entirely removed. Until her discharge, on the 13th February, she remained quite well.

PROFESSOR VON ROSAS.

Imperial Royal General Hospital. Pectoral Division.

In this division the Fever Tincture of Dr. Warburg was administered according to prescription, in three cases of intermittent fever; two being of the quotidian, and one of the tertian type. All the patients recovered, without any relapse having been observed, during their stay in the Hospital.

The Tincture was also employed in a case of *Typhus abdominalis*; a violent excitation of the vascular system, and an increased disturbance of the mental functions, were observed, without any other apparent influence on the course of the disease; which was subsequently treated on the third day with the usual remedies, and the patient is now slowly convalescent.

Vienna, Oct. 27, 1846.

DR. BITTNER, Chief Physician.

Imperial Royal General Hospital. Cutaneous Division.

In obedience to an order to report on the results obtained from the trials of Dr. Warburg's Fever Tincture, the undersigned has the honour to state, that he has administered the said medicine according to the prescription of the discoverer, in six cases of intermittent fever, and one of typhus; and with the exception of the last mentioned, in every instance with perfect success.

In all the cases of intermittent fever, either the next paroxysm did not recur at all, after the administration of the Tincture, or appeared once only, in a very slight degree; but, taking into consideration, that the intermittent fevers of the season, generally ran a very favourable course, so that many were cured in a short time, simply by solvent remedies, I should require a more extended employment of Warburg's Tincture, before considering myself justified, in pronouncing a decided opinion, on the positive value of this *Febrifugum*.

Vienna, Oct. 27, 1847.

DR. HEBRA, Chief Physician.

Imperial Royal General Hospital. Fourth Surgical Division.

In compliance with the order received, the undersigned reports that he has made trials of *Tinctura Warburgi*, in three cases of *Febris intermittens quotidiana simplex*, and that in all the cases, the fever was cured without any relapse, as already stated to the Monthly Medical Committee of this hospital, in the protocol for September.

Vienna, October 27, 1846,
DR. SIGMUND, Chief Physician.

No. 16. *Medicinische Wochenschrift*. Vienna, April 17, 1847.

District Hospital of Wieden.

In conformity with the order of the Regency, August 14, 1846, No. 43,821, trials were made in this hospital, of the Fever Tincture discovered by Dr. Warburg, and according to his prescription,—viz., in typhus and intermittent fevers, and in one case of very obstinate intermittent headache, (*Cephalalgia intermit.*)

1. In typhus, no satisfactory results were obtained. Of four cases, two proved fatal, one patient recovered after a dangerous course of the disease, the other case went regularly through its stages.

It being of the highest importance to the question of specific influence, in the remedy proposed against the most dangerous type of fever,—typhus,—that it should be severely tested,—the disease being one against which the physician is still without a remedy, whereon he can rely with confidence; and the issue of which, is always watched with anxiety;—severe and perfectly developed cases of this disease, were, therefore, chosen for the trials; the patients being from 20 to 26 years of age, of good constitution, and in the *stadium nervosum* of the fever, when the Tincture was administered.

In three cases, the Tincture produced, soon after its employment, an unquestionable reaction, the heat was considerably augmented, the congestion to the head and chest increased, the stupor became greater, the pulse fuller and stronger. These appearances of reaction having lasted from one to two hours, a more or less general perspiration took place, producing, however, no abatement of the fever symptoms; on the contrary, it left the patients in a state of increased stupor, accompanied by a more severe and even bloody diarrhoea, greater *meteorismus*, and increased weakness. One of the patients died from the perforating ulceration of the intestines, peculiar to this disease; a second succumbed through complete exhaustion of his strength; the third recovered, after enduring, in a very tedious course of the typhus, the phases of the hypostatic pneumonia.

In the fourth case, which was one of less severity, the Tincture had no perceptible effect; the disease passed through its several stages quite regularly, and the patient recovered.

The result of these trials in typhus cases, although not conclusive,

nevertheless discouraged us from employing the Tincture further, in cases of this description. Indeed, a specific remedy for typhus can hardly be found, it being a disease of the whole organism, based on a morbid state of the blood itself—a disease, *sui generis*, which will pass through its regular degrees of development; like the exanthematous fevers, it cannot be cured by any interruption of its course, and it has hitherto been found as impossible to shorten this course, without endangering life, as to cut short the successive stages of small-pox; to which, and to the exanthematic diseases generally, it bears a striking analogy.

2. Little as this remedy justified its reputation in typhus, most brilliant and triumphant was its success in intermittent fevers. During August, September, and October of this year, eighteen intermittent fever cases were treated with Warburg's Tincture in this hospital—viz, one case of the quartan, three of the tertian, and fourteen of the quotidian type; the patients were of ages varying from fifteen to forty, of diverse constitution, most of them exhibiting the peculiar cachectic appearance which generally indicates the presence of intermittent fever—pale yellow complexion, dulness of the eyes, pale-blue thin lips, shrivelled skin, &c. Thirteen of these patients were males, and five females.

Various influences were assigned, as the original causes of these fevers, but the statements of the patients are not relied on with much confidence. Among the complications, the principal were gastric affections; in one case *Hydrops universalis*, and in almost all, enlargement of the spleen was apparent.

In all the cases, the fever was of long standing. In the hydropic case, it had existed seven weeks, when the Tincture was administered.

After a purgative, the general dose of the Tincture was exhibited, according to prescription, a few hours prior to the usual appearance of the paroxysm; which was consequently either averted permanently, or, recurring once with increased violence, returned no more.

The patients were in every instance cured completely and perfectly, and were restored in a surprisingly short time, as if by magic, to their former bodily vigour and healthy appearance.

Patients, on whom, at their reception in the hospital, a cachectic appearance was strongly marked, enjoyed, in repeated instances, within forty-eight hours after a cure completed in one day, an excellent appetite, a good digestion, and a very favourable change of physiognomy.

In the case complicated with dropsy, the morbid state was vanquished with the fever, by exhibiting the medicine in repeated small doses.

3. In a similar manner as in intermittent fever, this Tincture operated in the case of *Cephalalgia intermit.* After two doses, the headach, which had lasted for several months, was completely cured.

Considering the results detailed in the foregoing Report, the Fever Tincture of Dr. Warburg may fairly be ranked as an invaluable sovereign remedy against intermittent fevers, and in intermittent diseases generally; which in the certainty and intensity of its curative power, far surpasses quinine and its preparations.

Vienna, October 28, 1846.
DR. BESEDIKT, Chief Physician.

No. 17. *Medicinische Wochenschrift.* Vienna, April 24, 1847.

Convent Hospital of the Charitable Brethren,
Leopoldstadt, Vienna.

In obedience to the order of the Regency, Oct. 13, 1846, No. 58,828, requiring a Report of the result of the trials made in this hospital, with the Fever Tincture discovered by Dr. Warburg, the undersigned have the honour to submit to the Imperial Royal Government, the subjoined Report.

The said medicine was administered according to prescription, to twenty-one patients suffering under quotidian and tertian intermittent fever, with such decidedly favourable and rapid success, that in seven cases the patients were cured by the first half-dose, the expected paroxysm being permanently removed. Only two obstinate tertian fevers required a third half-dose to effect a complete recovery. In all the other cases, the ordinary two half-doses sufficed.

It is worthy of remark, that with two fever patients, in whom a daily paroxysm was observed under the disguise of neuralgic headach, all symptoms of fever disappeared, after the second dose of the Tincture, although they had resisted the influence of the vaunted quinine.

No relapses occurred, and all the patients had perfectly recovered, before dismissal.

Not less brilliant were the results of Warburg's Tincture administered in *refract. dos.*, to five patients labouring under *Typhus abdominalis*, in whom the unfavourable symptoms of great debility, copious diarrhoea, torpidity of the skin, and expression of deep-seated suffering, were in a surprisingly short time removed; the secretions and excretions were normally reinstated, and the patients speedily recovered.

Peculiarly beneficial was the operation of this medicine, in cases of general dropsy, whether induced by the long continuance of intermittent fever, and the swelling of the liver and spleen consequent thereon; or arising from a general poverty of diet, and laxity of the muscular fibre. In three cases of this nature, wherein the remedies previously employed, had remained almost entirely useless; Dr. Warburg's Fever Tincture, administered in doses of a teaspoonful, every three hours, effected an astonishingly quick amendment; producing, in the course of a few days, a general vivacity, a refreshing perspiration over the whole surface of the body, and a profuse discharge of urine; thus dispelling the morbid symptoms to such a degree, that the patients were able to leave the Hospital, strengthened and recovered.

These detailed results of the administration of Warburg's Fever Tincture, tried in conformity with the high Decretal order of the Regency, are hereby certified by the undersigned, as in accordance with the truth.

Vienna, Oct. 25, 1846.

EVARIST REIMANN, M.D., Physician to the Hospital.
AUREMANDUS JAHN, Prior.
CASSIANUS LENTNER, Chief Surgeon.

No. 18. *Medicinische Wochenschrift*. Vienna, May 1, 1847.

E. Civic Criminal Hospital.

("Inquisitionspital.")

In obedience to the order of the Mayoralty, dated October 27th of the present year, No. 10,359, the undersigned herewith submits the results obtained by the administration of Dr. Warburg's Fever Tincture, received for this Hospital, with the Decretal order of the Regency of Sept. 8th, No. 8752.

The Tincture was administered, according to Dr. Warburg's prescription, in two cases of clearly pronounced intermittent fever, of the tertian type. Both were of recent occurrence, and of moderate severity, without complication. The patients were of a strong constitution. The result, in both cases, was entirely satisfactory. The patients, who have remained under observation up to the present time, have not exhibited the slightest recurrence of febrile symptoms, but have continued in uninterrupted good health.

The Tincture was not administered in typhus fever, in this Hospital, no cases of that nature having presented themselves.

Vienna, October 31st, 1846. *

LINZER, M.D., Chief Physician.

No. 19. *Medicinische Wochenschrift*. Vienna, May 8, 1847.

Civic Hospital of St. Mark.

("Bürgerspital.")

In consequence of intimation G. 15,166 of the worshipful Magistracy of the Imp. Roy. Capital, ("Residenz,") Vienna, and by Decretal order of the Regency, August 14th, No. 43,821, with the order of the Imp. Roy. United High Chancery, July 17th, of the present year, No. 23,022, the following trials of the efficacy of Dr. Warburg's Fever Tincture, were made by the chief physicians of the hospital, in their private practice; no case of fever having occurred in the hospital itself, during the period appointed for that purpose.

(A.) Charles R—, messenger at the Custom House, was attacked in the month of August last, with tertian intermittent fever. After the administration of solvents, sulphate of quinine was prescribed, six to eight grains per diem, but without alleviating the obstinacy of the paroxysms; which, on the contrary, recurred several times with increased violence.

Dr. Warburg's Fever Tincture was then administered. The result was satisfactory, the Tincture producing a visible general reaction in the vascular, as well as in the nervous system, but principally in the abdominal regions, causing increased urinary and alvine excretions, and finally, uniform general perspiration; on which ensued perfect tranquillity, and undisturbed sleep.

One dose of the medicine sufficed to cure permanently, this severe attack of fever.

(B.) The wife of a gardener, of Simmering, aged twenty-six, hitherto in the enjoyment of good health, with the exception of a nervous fever, which occurred six years ago, was seized, in July last, with tertian intermittent fever, which apparently yielded to six grains of quinine; but the apyrexia lasted only eight days, when a new paroxysm came on, and recurred on the fourteenth and twenty-first days, after which it assumed the quotidian type. On the first three occasions, the patient was treated with quinine, but no permanent benefit having been derived, on the 21st of September, Dr. Warburg's Fever Tincture was resorted to, one dose of which sufficed to produce all the ameliorative phenomena, described in the foregoing case (A), and a perfect cure was effected.

(C.) Ignace B—, silk-dyer, of Erdberg, aged forty-eight, of a cachectic appearance, suffering in consequence of grief and poor living, with liver complaint and hæmorrhoids. In the month of August, 1846, he was seized with *Typhus abdominalis*, and was treated with the usual remedies. The most distressing symptoms were alleviated, but after treatment during four weeks, there still remained slight fever, weakness of the digestive organs, sleeplessness, nocturnal sweats, and great debility of the whole system. To remove these morbid symptoms, we had again recourse to the Febrifugum Warburgi, by which, as we anticipated, the cure was completed, with one dose.

In the month of October, the patient,—who lived near the Danube,—in consequence of damp, unhealthy lodging, and bad food, was attacked by quotidian intermittent fever; when, after evacuation of the sordes, one dose of the Warburg Tincture was found sufficient to vanquish the fever.

(D.) George S—, aged twenty-four, Custom-house porter, a strong hearty man, was seized, in the month of September, with tertian intermittent fever. Obstruction being apparent, he was at first treated with mild purgatives and solvents, after which, eight grains of quinine *per diem* were given, and this treatment continued for four days, when the fever apparently ceased; soon, however, to re-appear, although the quinine continued to be taken, and a strict regimen was observed. We then administered Warburg's Febrifugum, and in this case, also, a perfect cure was effected by the double dose.

The action of the Tincture was again shown in this case, in the increased vitality of the vascular and nervous systems, as well as in the continuous general perspiration produced; without which, experience teaches us that a permanent cure is rarely effected. In this case, we have a further strong proof of the efficacy of the medicine, four weeks having elapsed since the last paroxysm, when he returned to his employment, and has since remained in perfect health.

The above described cases prove, by their favourable results, that in this Fever Tincture of Dr. Warburg, we have acquired a therapeutic aid of great value.

Vienna, October 28, 1846.

NOVAG, M.D., Chief Physician.

WENGHART, M.D., Chief Surgeon.

No. 20. *Medicinische Wochenschrift*. Vienna, May 15, 1847.

Jews' Hospital.

The Fever Tincture of Dr. Warburg was tried in this hospital upon ten individuals—viz., eight men and two women, in three cases of gastric fever; one quotidian, one disguised quotidian, three tertian, one double tertian, and one quartan, intermittent fevers.

CASE 1. *Febris gastrica, cum nota typhosa*. Ignatz F—, aged thirty-five, of weakly constitution, phthisical habit, frequently troubled with cough; in other respects tolerably healthy. During twelve days past, has been incessantly occupied in nursing his child, who lies ill with typhus fever. For the last eight days he has felt unwell, with alternate rigors and heat. General debility, loss of appetite, and sleepless nights, have compelled him, at last, to seek medical assistance.

Oct. 10th. Admitted to the hospital, when the following *status præsens* was observed: The face flushed, head hot, oppressive pain round the forehead, dread of light, ringing in the ears, dry tongue, increased thirst, aversion to food, slight dry cough, sputa mixed with blood, the region of the stomach inflated, the abdomen about the right ileum sensitive to pressure, retention of the sordes; urine red, dark-coloured, skin dry, hot, (*Calor mordax*), violent fever. Exhibited *Decoct. salep. cum aq. oxymer.*

Oct. 11th. Night restless, disturbed by dreams; in other respects the same as yesterday.

Oct. 12th. A.M.: Same state as on the previous days. We administered to-day Warburg's Tincture, in doses of a teaspoonful every three hours. P.M.: the patient feels himself better. After the second dose of the Tincture, a moderate perspiration ensued, which continued to a late hour at night; the skin became soft. The urine deposited a brick-dust-like sediment; no alvine evacuation occurred; very little fever.

Oct. 13th. Had a good night's rest; the skin is soft; the fever almost null. From this time the patient continued to improve, till the 18th of October, when he left the hospital, cured.

CASE 2. *Febris gastrica*. Catherine S—, aged fifty five, bloated and indolent; has ceased to menstruate; has felt ill for twelve days past, in consequence of eating cold fat meat.

Sept. 3rd. Admitted into the hospital; she exhibited the usual symptoms of gastritis—eructation, vomiting, oppressive headach, strong fever. Administered a mixture of *Ext. tarax.*, with half gr. *Tartarus emeticus*.

Sept. 4th. The medicament, as well as every other liquid, was vomited. Slight delirium at night; fever very strong. Medicine continued.

Sept. 5th. No amendment during the night; constant inclination to vomit. An emetic.

Sept. 6th. The last emetic caused great quantities of bilious matter to be ejected, but without relief to the patient. The oppressive headach and severe fever, with dry skin, and the feeling of pressure on the stomach, remained as before; we therefore administered Warburg's Fever Tincture,

—viz., at ten A.M., one half of the phial, and afterwards in doses of a teaspoonful every two hours, with strict injunctions that the patient should not be permitted to eat or drink anything during the intervals. P.M.: the patient feels herself somewhat relieved; a gentle perspiration is spread over the whole surface of the body; fever moderate.

Sept. 7th. During the whole night, the patient enjoyed a quiet sleep; and remained in a continued perspiration; fever moderate; no headach.

Sept. 9th. The patient feels herself quite well, but very weak. No fever. Appetite returning.

Sept. 15th. Dismissed cured.

CASE 3. *Febris gastrica*. M. E—, aged twenty-seven, single; with the exception of frequent rheumatic affections, has been generally healthy; suffered, for the last twelve days, with a slight gonorrhœa; fourteen days ago, in consequence of a dietary irregularity, he felt ill. He applied to a physician, who prescribed an emetic, but obtaining no relief, he came into this hospital.

Sept. 4th. The common gastric symptoms—viz., headach, giddiness, depression of the spirits, &c., with strong fever, accompanied by dry skin, and sleeplessness. Administered, *Inf. ipec. cum tinct. rhei*.

Sept. 5th. Same state as yesterday; sleepless night; severe fever. Medicine continued.

Sept. 6th. Same state; fever more severe. At ten A.M., half a phial of Warburg's Tincture; afterwards, every two hours, a teaspoonful of the same.

Sept. 7th. Patient feels himself somewhat better. The night was restless; the fever less severe. Tincture continued. Critical phenomena, such as appeared in the other cases, were not observed.

Sept. 8th. The patient has slept well; no fever; general improvement.

Sept. 9th. Discharged cured.

CASE 4. *Febris interm. quot. larvata*. L. W—, aged thirty-five; married; enjoyed continual good health until about nine months ago, when, while living in a marshy country, he was attacked by tertian fever; which, except during short intervals, he could not get rid of, although all the usual remedies were administered. At last, about three weeks ago, the fever paroxysms ceased; and in their place ensued, at nine every evening, and lasting until late at night, the following symptoms,—restlessness, and absence of sleep; headach of the super-orbital region; with general febrile excitement.

Oct. 3rd. Admitted into the hospital. We observed the recurrence of the headach, which commenced at nine, as usual, and continued, without intermission, in a very severe degree, until midnight. No subsequent perspiration was observed.

Oct. 4th. At six P.M., half a phial of Warburg's Tincture was administered; and the other half at nine o'clock, at which time the headach was already apparent.

Oct. 5th. Although the headach reappeared last night, at the usual hour, it was followed by a copious general perspiration, and the patient experienced a peculiar feeling of comfort.

Oct. 6th. Yesterday evening, instead of the headach recurring at the usual hour, the patient observed merely a slight giddiness, and enjoyed a quiet sleep. Blister to the neck.

Oct. 8th. No return of headach; no febrile symptoms. In consequence of costiveness, *Inf. senna*.

Oct. 11th. Discharged cured.

CASE 5. *Febris interm. tertiana*. Abraham H—, aged twenty-seven, single, was attacked in consequence of a dietetic fault, with fever of the tertian type, five paroxysms of which had occurred when he was admitted to the hospital, on the 26th August. Solvents.

Aug. 27. Day of paroxysm. At two P.M., rigor came on, lasting two and a half hours, with considerable severity. Heat and perspiration succeeded, which lasted until night. Medicine continued.

Aug. 28. Free from all morbid symptoms.

Aug. 29. Day of paroxysm. At ten A.M., administered one half the contents of a phial of *Tinctura Warburgi*, and the other half, at one P.M., at which time the fever made its appearance, that is, an hour earlier than in the preceding attack. The symptoms, however, were all milder, but no critical phenomena were yet observed.

Aug. 31. No trace of fever.

Sept. 2. Patient feels himself quite well.

Sept. 3. Discharged cured.

N.B.—This patient, after the lapse of a fortnight, called at the dispensary. He had remained quite well, and free from relapse.

CASE 6. *Febris interm. tertiana*. Samuel K—, aged forty-two, married, always healthy. In consequence of a gastricism, caught a fever, which reached its fourth paroxysm on the 4th October, when he entered the hospital. On this day the rigor came on, at eight A.M.; the heat and perspiration lasted till five P.M. *Inf. senna*.

Oct. 5. Day of apyrexia.

Oct. 6. At four A.M., one half, and at seven A.M., the other half of a phial of the Fever Tincture was administered. At nine a slight shivering was observed, followed by a moderate access of fever, and a very abundant perspiration, producing great relief to the patient.

Oct. 9. No fever.

Oct. 11. Discharged cured.

CASE 7. *Febris interm. tertiana*. Adolph B—, aged twenty-three, single. Had, up to 6th September, five paroxysms of tertian fever.

Sept. 7. Admitted into the hospital. *Emeticum*.

Sept. 8. At the usual hour, two P.M., the fever appeared. *Inf. senna*.

Sept. 9. Although this was not the usual fever day, a slight paroxysm occurred at eleven A.M.

Sept. 10. Day of paroxysm. Administered, at nine A.M., one half, and at twelve noon, the remainder, of a phial of the Fever Tincture. At two P.M., heat, which lasted for two hours, but without previous rigor.

Sept. 13. Discharged cured.

CASE 8. *Febris interm. tert. duplicata*. Johanna B—, aged thirty-five, married. In consequence of a gastricism, has suffered,

during the last eight days, with daily accesses of fever, viz., one series of paroxysms occurring at four P.M., and the other at ten A.M., of the alternate days, so that the paroxysms corresponded every other day.

Oct. 27. Admitted to the hospital. The paroxysm appeared at four P.M., with rather severe rigor, followed by heat, which lasted until night.

Oct. 28. At ten A.M., the patient received half a phial of Warburg's Tincture, and at one P.M. the remainder. At twelve, without any previous appearance of rigor, slight heat occurred. No perspiration.

Oct. 29. Slight heat.

Oct. 31. No febrile symptoms.

Nov. 1. Well.

Nov. 2. Discharged cured.

CASE 9. *Febris interm. quartana*. Leopold F—, aged eighteen, single, was attacked, nine months ago, at Temeswar, (in Hungary,) with a quartan fever, not a single paroxysm of which could be suppressed, notwithstanding all the remedies applied. He complained also of a constant pain, and a sensation of pressure and weight in the region of the spleen, and suffered great depression of spirits. His complexion, and the general appearance of his skin, were very cachectic, his tongue always thickly coated. Admitted into the hospital September 9th, when he received a mild solvent.

Sept. 10. Day of paroxysm. The access occurring generally at one P.M., the patient received, at nine A.M., and at twelve, a phial of the Fever Tincture. The fever appeared at the usual hour, and, although the attack was severe, the rigor alone lasting for three hours, yet, according to the patient's statement, this paroxysm was much milder than its precursors.

Sept. 11. Last night, ten fecal evacuations.

Sept. 12. Still frequent evacuations. *Mist. oleos. cum opio*.

Sept. 13. Day of paroxysm. Not the slightest symptom of fever; on the contrary, a general feeling of comfort; even the sense of oppression in the region of the stomach and spleen, which had lasted for months, had disappeared.

Sept. 16th. Quite well.

Sept. 18th. Discharged cured.

N.B.—Ten days after his discharge, the patient called at the dispensary. He was perfectly well, had had no relapse.

CASE 10. *Febris interm. quotidiana*. Michael S—, aged twenty-one, single, suffered for the last four months with quotidian fever, in consequence of which his strength is quite prostrated. Admitted to the hospital, Oct. 10th. At twelve, noon, a paroxysm appeared; the rigor lasted two hours, and the heat until late at night. *Inf. senna*.

Oct. 11th. This morning at nine, one half, and at twelve, the other half, of a phial of *Tinctura Warburgi* was administered. At two P.M. a gentle heat, lasting scarcely two hours. Perspiration moderate; no previous rigor.

Oct. 12th. About four P.M. a slight rigor, which lasted only a few minutes. No heat.

Oct. 14th. Feels himself quite well.

Oct. 15th. About two P.M. slight rigor followed by heat, lasting till

towards evening. Patient confessed that, against strict orders, he had eaten green fruit, which accounts for his relapse. Our supply of Warburg's Tincture being exhausted, we gave him a plain bitter solvent.

Oct. 16th. Slight paroxysm. Mixt. continued.

Oct. 18th. Well.

Oct. 20th. No further paroxysm.

The effect of Dr. Warburg's Fever Tincture seems to manifest itself chiefly upon the nervous system, ("colatorien," but most particularly in the increased reaction of the organs of the skin, and the mucous membrane of the intestines.

My patients have not observed the peculiar sensation of heat in the stomach, attributed to this medicine; but having myself taken a phial of the Tincture, I not only remarked a lasting bitter aromatic taste, but also a sense of heat in the epigastrium.

In almost every case, there ensued more or less profuse, exhaling, relieving, and critical perspirations. In some cases, where no diaphoresis occurred, the action of the medicine appeared to be localised on the mucous membrane of the digestive channels, producing copious fecal evacuations.

The pulse, when previously retarded, or, which was more frequently the case, accelerated, was soon restored to its normal condition; and the urine, previously clear, became turbid, and deposited a brickdust-like sediment.

If, therefore, we may be allowed to draw a conclusion from the foregoing cases, we certainly cannot deny the averting power of the Tincture ("*coupirende Heilkraft*") in cases of intermittent and gastric fevers, even when the latter are accompanied with *Nota typhosa*, and where only the dangerous consecutive symptoms remain; but only after the removal of the coarser sordes, by emetics or purgatives, as the purgative power of the Tincture, is not of itself sufficiently strong.

In typhus fevers I made no trials, not conceiving myself justified in neglecting the use of known and approved remedies, in favour of a medicine of which the ingredients are unknown.

But I should have liked to have made some observations on nervous complaints, if I had been sufficiently provided with medicine. (I received altogether only fourteen phials; the Regency having at the time no more to spare.)

As regards intermittent fever, the Tincture has certainly stood the ordeal, a single phial having sufficed in every case, without one relapse having become known to me. Even in the quartan, which had lasted for nine months, and which had resisted treatment by the usual remedies, it was completely successful; but whether it will ultimately dispute the palm with quinine, must be left to future and more extensive experience.

Vienna, October 27th, 1846

DR. WERTHEIM, *Chief Physician*.

No. 21. *Medicin'sche Wochenschrift*. Vienna, May 22, 1847.

Infant Hospital, St. Joseph, at Wieden.

In accordance with the order of the Regency, dated August 14th, No. 43,821, trials have been made in this hospital, with Dr. Warburg's Fever Tincture, in two cases of intermittent, and six of typhus fevers. The following are the results obtained:—

By this remedy, the two slight cases of tertian intermittent fever were quickly and completely cured, thus proving the antifebrile power of the Tincture. But we had no case in this hospital, which might not have been easily cured by the ordinary remedies, the fevers in this part of the country, particularly in infant cases, being generally of a mild nature.

In two of the six typhus cases, the Tincture was administered at the last stage, and in four, at the beginning of the *stadium nervosum*. Four of these patients recovered, one died, and one remains under treatment.

No peculiar effect was apparent from the operation of this medicine, except that in four cases, soon after it was administered, the tongue became clean and moist; the fevers treated with this Tincture showing about the same result as those treated in the ordinary manner.

The undersigned, therefore, draws the following conclusion—viz., that this Tincture has a febrifugal power, in the intermittent fevers of children, but no peculiar specific effect in typhus.

In both diseases, preparations of bark are equally efficacious.

Vienna, October 28th, 1846.

DR. MAYR, *Chief Physician*.

Infant Hospital, near the Schottenfelde.

In accordance with the order of the Regency, Aug. 14th, No. 43,821, trials were made in this hospital, during the months of August, September, and October, with *Tinctura Warburgi*.

At this season of the year, intermittent fevers being of rare occurrence among the children, trials were made of the Tincture in three very severe cases of typhus fever. Two of the patients were cured, one died.

It must be observed that, during this period, there were eight other cases, some of which were also severe, which were treated with chinoline and other usual remedies; some very slight cases merely with *Decoct. salep*, all of which were cured. The conclusion, therefore, is justified, that no specific influence in typhus, can be ascribed to Warburg's Tincture.

Directory of the General Infant Hospital of the Schottenfelde.

Vienna, October 23rd, 1846.

DR. MAUTHNER.

Wieden Free Infant Hospital.

In accordance with the order of the Regency, Aug. 14, 1846, No. 43,821, the undersigned has the honour to report, that two children, suffering under tertian intermittent fever, were completely cured by the administration of one dose of Dr. Warburg's Fever Tincture, without any relapse.

As the time appointed for the trials was short, and no further cases presented themselves at the moment, we were unable to extend the trials.

Vienna, October 21, 1846.

FRANZ S. HUGEL, M.D., *Director of the Hospital.*

No. 22. *Medicinische Wochenschrift.* Vienna, May 29, 1847.

Convent Hospital of Charitable Sisters, Leopoldstadt.

In accordance with the high rescript of the Regency, dated Aug. 14, No. 43,821, trials were made in this hospital, in eight cases of intermittent fever, with the twelve phials of Dr. Warburg's Fever Tincture, which we received with the said order.

CASE 1. Theresa R—, aged twenty, servant, was seized, after eating fat meat, with nausea, vomiting, diarrhoea, and fever, for which she took domestic and other remedies; but not reaping any benefit, she came to the hospital on the 22nd of August, being the fifth day of her illness, when the following symptoms were observed: Great debility and lassitude, hot, dry skin, pulse rather strong and frequent, oppressive pains in the forehead, giddiness, thickly-coated moist tongue, great thirst, loss of appetite, clammy mouth, quickened respiration, dry cough, tympanous abdomen, and constipation for the last two days. Ordered *Decoct. rad. tarax.*, with *murias. ammoniac.* and *Succ. liquirit.* Beverage, water.

Aug. 24th. Fever more severe, the evening exacerbation lasted until midnight, disturbed sleep, delirium; in the morning, abatement of the fever, great lassitude, giddiness, and ringing in the ears; dry tongue, great sensitiveness in the region of the ileo-colicus, small, frequent pulse. *Inf. rad. ipecac. ex gr. sex ad col. unc. sex c. Syr. rub. idai.* The fever had hitherto assumed the remittent type, the adynamic character manifesting itself more clearly every day. On the 26th of August, at a quarter past three, there appeared a very severe rigor, lasting for an hour, after which, heat and a general perspiration ensued. During the night, delirium and sleeplessness, subsequently diarrhoea. Towards morning, the fever slightly diminished; increased debility.

Aug. 27th. At twelve, noon, one half the contents of a phial of *Tinctura Warburgi* was administered, two hours after which, the rigor came on, with increased violence. At three p.m., during the persistence of the rigor, the second dose was given, soon after which, heat, and at ten p.m., a general and copious perspiration ensued. The patient slept quietly, and at the next morning visit was quite cheerful. The head

was relieved, pulse free from fever, abdomen could support pressure without pain; the urine, which had been previously dark and turbid, was now pale and clear; appetite much revived. Five days afterwards, the urine, which up to that time had remained clear, exhibited a heavy, whitish deposit, upwards of an inch in depth, and continued to be voided of the same quality, for three days.

Although the fever had been suppressed since the 21st of August, and the appetite continued good, and the sleep quiet and prolonged, debility still continued, and the patient again complained of headach, giddiness, and pain in the right hypochondrium, and her feet became oedematous. We therefore repeated the *Tinctura Warburgi*, in doses of a teaspoonful every three hours; although we had some difficulty in getting the patient to take it, on account of her dislike to the flavour. The above symptoms, instead of abating, increased daily, and the quantity of urine secreted was much diminished.

Sept. 7th. She received *Dec. tarax* with *Extr. chelidon. major.* and *oxymel scilla.* On the 10th, *Inf. herb. centaur. min.* with *Extr. fel. tauri*, and *Syr. cort. aurant.*, in consequence of which treatment the oedema disappeared, the right hypochondrium was freed from pain, the patient's strength increased, and all the secretions and excretions were restored to their normal state, so that the patient was dismissed cured, on 13th Sept.

CASE 2. Maria S—, aged sixteen, attacked eight days before with intermittent fever, was admitted to the hospital August 20th. From this day to the 24th, she received *Decoct. rad. gram.*, with *Tart. tartaris.* and *Syr. cich. c. rh.* On the 25th and 26th, *Decoct. rad. tarax.* with *Extr. trifol. fibrin.*; after which, the next paroxysm appeared with diminished violence.

August 27th. We gave her the Fever Tincture, upon which a rather severe paroxysm ensued, which, however, proved to be the last. The convalescent patient had an excellent appetite, quiet sleep, and felt herself so much better, that on the 30th of August she was dismissed cured.

CASE 3. Francesca K—, aged nineteen. Eight days prior to her admission, on the 28th of August, was seized with intermittent quotidian fever. On account of decided gastric symptoms, the abdomen being tympanous and the left hypochondrium painful, accompanied by constipation; she was treated with solvents and gentle purgatives until the 2nd Sept., on which day we administered the Fever Tincture, according to prescription. From this day, the patient remained free from fever; prolonged sleep and increased perspiration continued during several days. The urine was turbid and milky, without sediment; appetite voracious; subsequently great debility, the tongue coated, loss of appetite, lassitude, and costiveness. Sept. 8th, *Electuar. lenitiv.*

On account of her weakened digestion, great debility, and irregular action of the bowels, she received on the 10th Sept. and following days, *Inf. acori. c. tinct. rhei. aquos.* and *Syr. cort. aurant.*

Sept. 15th. The patient was dismissed cured.

CASE 4. Anna Z—, aged twenty-four. Suffered for the last six days with intermittent tertian fever; was admitted into the hospital

Sept. 22, when she received an emetic, *Tart. emet.*; after which, until the 25th, solvent medicines.

Sept. 25th. She received the Fever Tincture, which extinguished the fever. The patient having had no fecal evacuation for four days, a clyster of *Electuar. lenit.* was given. The patient complaining of great weakness, loss of appetite, and headach; we gave, on the 29th, a second phial of the Tincture, in doses of a teaspoonful every two hours; under which treatment she regained, by degrees, her former health, and was discharged cured on the 3rd of October.

CASE 5. Margaretha B.—, aged twenty-three. In consequence of a severe cold, was attacked on the 24th Sept. by violent ague, followed by heat and general perspiration. The paroxysm recurring on the 26th, she sought relief at this hospital. No gastric symptoms appearing, and no local suffering or costiveness being complained of, we at once administered the Fever Tincture; after which, one severe paroxysm was observed, but no subsequent return of fever. The patient having completely recovered, left the hospital on October 3.

CASE 6. Leopoldina St.—, aged eighteen, was attacked on the 4th of October, after a fault of regimen, by diarrhoea and severe fever, which assumed the quotidian intermittent type. She was admitted in the hospital on the 8th Sept., and there being no counter-indications, the Fever Tincture was at once administered; after which, only one paroxysm occurred.

The patient complained of weakness during some days, but regained her strength visibly; so that on the 18th of October she left the hospital cured.

CASE 7. Anna F.—, aged thirty. After catching cold, was attacked eight days ago with quotidian intermittent fever, for which she took a purgative. On the 23rd Oct. she was admitted to this hospital. On the 24th she received the Fever Tincture according to prescription, after which a paroxysm ensued of even greater violence than its precursors; nevertheless, after a quiet sleep, the patient felt herself better, and was free from fever the next day.

Debility, diminished appetite, and lassitude still remained, until the 29th Oct., on which day she suffered, at nine A.M., a renewed paroxysm. We then administered another phial of the Tincture, in small doses, and the fever has not reappeared until the present time. On account of the debility of the patient, she will be retained in the hospital a few days longer.

CASE 8. Anna Z.—, aged twenty-four, who had been already treated for tertian fever, (see Case 4.) from September 22 to October 3, and had taken, during that time, two phials of the Fever Tincture; was, without any known cause, attacked again with a severe rigor, which occurred on October 22, and lasted two hours, followed by great heat and general perspiration. On October 23, intermission, headach, and giddiness.

Oct. 24. During the paroxysm she was brought to the hospital. On the 25th she received *Infus. sennæ c. sale amaro et syr. cich. c. rheo.*

Oct. 26. The Fever Tincture was given according to prescription. Half an hour after the second dose, a severe paroxysm occurred, the rigor lasting an hour and a half, followed by heat, from two P.M. till midnight, and ending in profuse perspiration. Long continued sleep, and sedimentous urine. The following days headach and want of appetite, general debility, but no renewal of fever.

Oct. 29. No evacuation having occurred for four days, *Elect. lenitiv.* The patient still suffers from weakness and headach, the tongue whitely furred, bitter taste, little appetite, diminished warmth of the skin. On this day we administered a second phial of *Tinctura Warburgi*, in small doses, and anticipate that the patient will be in a condition to be dismissed, in the course of a few days.

CONCLUSION.

From the above described eight cases, it is shown with certainty, that Dr. Warburg's Fever Tincture is a powerfully efficacious remedy, always—though not invariably at the next paroxysm—suppressing intermittent fever. Also in typhoid fevers, particularly when they exhibit symptoms of periodicity, as in Case 1, it might probably be found of great utility; but it would be an exaggeration to state, that the patient feels perfectly well after the suppression of the fever; that his appetite can hardly be appeased; and that he is guaranteed against any relapse, or abnormal sequela, of such fevers.

Vienna, October 31st, 1846.

DR. LEITNER, *Ordinarius*.

No. 23. *Medicinische Wochenschrift*. Vienna, June 5, 1847.

REPORTS upon the administration of *Dr. Warburg's Vegetable Fever Tincture*, by DR. EFFENBERGER, Imperial Royal Physician to the District of Bruck-on-the-Leytha.

CASE 1. J. N.—, aged twenty-four, Custom-House officer, of strong constitution, never ailing, stationed at a post exposed to inundations, and obliged by day and night, to patrol the swamps of the Leytha. In consequence of this exposure, he was attacked by very severe tertian fever; prior to admission into the hospital, he had suffered four attacks, which recurred an hour earlier at each return of the paroxysm.

Three hours after his reception, a violent rigor came on, accompanied by severe headach, oppression of the chest, and a very quick pulse. He received a cup of warm camomile tea, heat then ensued, which lasted for three hours, and terminated in profuse sweating. The abdominal functions were somewhat inactive, the abdomen soft, not sensitive to pressure, the tongue covered. We then gave a purgative of *Inf. sennæ*, with *Sal. amar.* and light diet. On the third day, four hours before the paroxysm was expected, we administered a half phial of the Fever Tincture, and three hours afterwards the remainder, with strict injunctions that the patient should abstain from eating or drinking. Neither the fever paroxysm, nor any of the accessory inconveniences appeared, and there being no recurrence of the fever up to the fifth day, the patient was dismissed cured.

CASE 2. J. B.—, aged twenty-six, Custom-House officer; athletic. With the exception of a catarrhal fever, which occurred about two years ago, has enjoyed good health. For the last five weeks has suffered repeated attacks of tertian fever, in consequence of which he entered the hospital. As all the symptoms were precisely the same as those in Case 1, the same treatment was adopted, during the course of which we observed only one point of difference, viz., that the expected paroxysm appeared after the administration of the Tincture, but was not repeated. After this paroxysm, the patient felt quite well, and had no relapse.

CASE 3. A. N.—, aged forty-five; of weakly constitution, exhausted by hard labour; mother of eight children; suffered habitually from indigestion, and for the last ten years, has had frequent attacks of intermittent fever. Last year, suffered from swelling of the spleen and liver, and frequent vomiting, for which she was medically treated; since which she has never been in good health. In August last, she joined in a pilgrimage, and in consequence of exposure to continued bad weather, in a swampy district, she caught a severe cold. Shortly afterwards, an attack of fever came on, accompanied with severe pains in the abdomen.

She, at the same time, suffered with painful vomiting, ejecting a blackish fluid, also with diarrhoea. We ordered *Infus. flor. malvae* with laudanum, and warm cataplasms to the abdomen.

The cholic-like pains were somewhat diminished, but in their place appeared, every third night, a very severe attack of intermittent fever. The rigor lasted for three hours, accompanied with severe ague, and disturbance of the mental functions.

The paroxysm ended in a general, almost paralytic weakness and exhaustion. The chief object in this case was to avert ("coupren") the attack. Chinine was rejected. I therefore immediately prescribed two teaspoonfuls of *Tinctura Warburgi*, the dose to be repeated every three hours.

This medicine the stomach retained, and no fresh paroxysm appeared. The pain diminished, the digestion was regulated by a bitter solvent decoction, and the patient has since remained free from fever.

CASE 4. J. K.—, aged twenty-one, strong constitution. Had small-pox in his infancy, since which had enjoyed good health, till, at the end of August, he lost a brother by typhus fever, which affected him so strongly, that he took to his bed. He also caught the typhus, which developed itself with very severe symptoms, and held a very prolonged course.

The tongue dry and covered, chest painful, particularly on sobbing or coughing. The abdomen much distended, and painful when touched. He had also copious diarrhoea. The pulse was very frequent and small, the skin dry and hot. Acidulated beverage, an *Inf. ipec.* and *arnica*; afterwards sulphate of quinine with alum. This treatment was persisted in during twelve days, without avail. The strength gradually diminished, the hands became tremulous, and delirium came on, accompanied by involuntary evacuations. It was observed in this case also, that on every third day an exacerbation occurred, which threatened the greatest danger. I therefore prescribed a teaspoonful of Dr. Warburg's Fever Tincture, to

be taken every three hours. It agreed well with the patient; the cough and fever did not increase; no further paroxysm occurred; by means of a very profuse perspiration the morbid symptoms disappeared, and the patient by degrees recovered entirely.

CASE 5. F. L.—, aged eighteen, of a weakly constitution, and subject to cough; without any assignable cause, fell ill with fever, accompanied by a troublesome cough; for which after seven days, he sought relief at this hospital. In this case also, the typhus showed violent exacerbations on every alternate day. The skin was then very hot and dry, pulse frequent and small, respiration difficult, the cough painful, the belly very susceptible to the touch; these symptoms gradually subsided with a clammy perspiration. *Dt. polygal. seneg.* with *sal. ammon.*, afterwards *arnica* and *chinine*, both which were administered without avail.

Percussion was somewhat tympanitic. By auscultation we recognised an extensive mucous crepitation.

After all the usual remedies had been administered without benefit, during three weeks, we prescribed, as in the foregoing case, a teaspoonful of the Fever Tincture, to be given every three hours. In this case also, the periodical exacerbations were dispelled, and the patient improved.

Unfortunately, however, he succumbed to the progressive phthisis, after lingering two months.

CASE 6. A. M.—, aged twenty-six, of a weakly constitution, suffered frequently with spasms, had overcome a catarrhal fever about two months ago. In the month of August, her house was overflowed. On the 10th Sept. she was suddenly attacked by a severe fever. The abdomen very painful, the extremities stiffened, and the patient vomited almost uninterruptedly.

Outward heat but little increased, sometimes even lower than in the normal state; skin pale, and covered with a clammy sweat; respiration quickened, sighing without pain, pulse small, tense, and frequent. *Inf. ipec. c. laud. liq. Sydenhami* was ordered, besides warm cataplasms, to the painful abdomen; then an enema *ex infus. flor. chamomill.* with oil. After four hours all morbid phenomena ceased, the pulse became quiet, only an extraordinary weakness remained. On the third day, at the usual hour, a still stronger paroxysm occurred, with delirium, accompanied by vomiting and diarrhoea. Sulphate of quinine was rejected by the stomach, and the paroxysm which recurred on the third day subsequently, and which was still more violent, so debilitated the patient, as to justify the apprehension that she could not survive another attack.

I therefore prescribed two teaspoonfuls of *Tinctura Warburgi*, to be given every three hours. She received the medicine with great repugnance, but retained it, and the dreaded paroxysm was fortunately averted.

The vomiting and diarrhoea ceased; the abdomen, formerly tense and painful, became soft, and was no longer sensitive to the touch; appetite returned, headach ceased, and by the use of *Inf. melissæ* and *acori*, with *Tinct. aurant. compos.*, she recovered completely in a fortnight; since which she has suffered no relapse up to the present time.

CASE 7. G. Cl—, aged twenty-seven, strong-built, Custom-House officer, had suffered last year with intermittent tertian fever for five weeks, but had otherwise enjoyed continued good health. During the inundation, which occurred at the end of August, he had been exposed to frequent changes of temperature. In the day he was subjected to the heat of the sun without shelter, and during the night was obliged to spend several hours in the open air, on the marshy and cold ground; in consequence of which he caught a quotidian fever, the paroxysms of which recurred an hour earlier at each attack. For the first fortnight he did not seek medical advice, consequently when he at last came into the hospital, he was much reduced. His digestion was completely deranged, the tongue covered with a thick white slime, the region of the stomach tympanous, both hypochondria distended and painful, the abdomen inactive, the skin of an earthy colour, the pulse, even during the apyrexia, frequent and small. *Inf. sennæ* with *tart. emet.* and *sal. amar.*, and as a beverage, *Rad. caryophyll.* with *Tarax polygal. amara* was ordered. A few stools occurred, but the following attack was as violent as its precursors.

Three hours before the time when the next paroxysm was expected, I prescribed *Tinctura Warburgi*, observing the usual interval between the two doses; immediately after the second dose there occurred a very violent paroxysm, on the termination of which there ensued a feeling of general comfort, which lasted for some days. No further symptoms of fever occurred, the abdomen became soft and of natural size, and there remained no perceptible swelling of the hypochondria. The digestion also became regular, and within ten days his former healthy appearance was so far restored, that he was ordered to return to his post at Sarasdorf; but after having been exposed, during five weeks, to the same climatic influences as before; he was again attacked by quotidian fever, and returned immediately to the hospital. The paroxysms, however, were not so violent, the abdomen somewhat swollen. He asked for the same tincture; my supply, however, being exhausted, he was treated with solvents and chinine; but the cure was effected much more slowly,—derangement of the digestive functions especially, was perceptible for a long time.

CASE 8. R. H—, aged five, son of a magistrate in Hungary, of a delicate and scrofulous constitution, phlegmatic temperament, subject to repeated catarrhs, discharged two years ago a few *Ascarides lumbricoides* by stool, but had no other disease. During the summer he was with his parents at Pesth, where, for five months, with the exception of a few intervals of ten days or a fortnight at a time, he had alternately tertian and quotidian fever. All remedies proving fruitless, the parents sent the boy to their relations at Bruck, hoping to effect a cure more easily through change of climate. Immediately on his arrival, he was attacked by a violent tertian fever. The vital functions were very much impaired, the face pale and bloated, tightness of the chest, distention of the abdomen, the hypochondriac region swollen, hard, and painful on pressure; very little appetite, stools irregular. Each paroxysm lasted above four hours, and left a continually increasing exhaustion. *Tart. emet.* with *Sal. ammon.* and *tarax.*, afterwards *chinine*, also friction with *Linim. rol.* on the abdomen. After eight days the fever was

stopped. *Amar. solcentia* continued. In a fortnight, the fever returned with uncommon severity, and without assignable cause, the strictest regimen in every respect having been observed; the infarctions, however, had disappeared. The fever now manifested itself as *Quotidiana duplicata*, so that a slight attack occurred at one o'clock in the afternoon, which lasted till five; then a much more violent one at ten, p.m., the next day, which continued during the whole night, and terminated at five the following morning, with profuse perspiration and excessive exhaustion, followed by deep sleep. Convulsions accompanied the night attacks, and made us apprehend paralysis of the brain. The feet were already oedematous, and also the eyelids.

Quinine had been used without effect, during three days. I therefore, at six o'clock in the evening, ordered two teaspoonfuls of the Fever Tincture to be given; the dose to be repeated in three hours; after which, one teaspoonful every three hours, in the event of the fever coming on. At ten o'clock, there was, in fact, an equally violent paroxysm, accompanied with convulsions and delirium; the remedy, therefore was continued with regularity. When the fever subsided, sleep ensued, after which the patient cheered up a little. No further paroxysm occurred, no trace of the fever remained, the appetite returned, and the patient became more cheerful; the abdomen had become much softer; it remained, however, somewhat distended. Friction with *Linim. rol.* and *Spir. saponatus* was continued. After a fortnight, a simple tertian fever again occurred, which was cured, after five days' treatment, by quinine and *Inf. calam. aromat.* *Tinct. mart.* and *Ext. tarax.* I believe that in this case no relapse would have occurred, if my supply of the Tincture had enabled me to continue its use a little longer.

CASE 9. T. G—, aged forty-one; a robust muscular man, had never previously been ill. Through a gross dietetic fault, and subsequent exposure in a marshy country, he had caught a violent tertian fever complicated with severe gastric symptoms. *Tarax* with *Tartar. emet.* and *Sal. amar.* or *Sal. ammoniacus*. Then *Chinine* with *Amaris*, was administered without result for a considerable time. The fever was at last stopped, but the patient could not regain his strength, and was attacked periodically with violent pains in the lower extremities, which disabled him from standing. Aromatic frictions, and lotions to the back and legs had no effect; his digestion was very languid. In this state he had continued for eight weeks. I therefore ordered him to take a teaspoonful of the Tincture every three hours, and had the pleasure of witnessing an immediate improvement, and after five days, complete re-convalescence. The pains did not return, he digested well, and he is now able to attend to his work without difficulty.

CASE 10. F. K—, aged twenty-four; of strong constitution, had never been ill. In the month of August he had an attack of tertian fever, which was attributed chiefly to the dampness of his lodging. After suffering a fortnight, he came to the hospital, exhibiting the usual symptoms of intermittent fever. After administering a solvent purgative, *chinine* was given him, and in eight days he was freed from fever. In this case also an indisposition was left. Several times in the course

of the day there appeared dry heat, alternating with headach, and a relieving perspiration; the pulse was somewhat accelerated, and small; the abdomen painless, and soft; great lassitude of the limbs; the feet somewhat swollen; and, although the tongue was clean, he had but little appetite; the chest was free. *Det. polygal. seneg.* with *sal. ammon.* was given alternately with *chinine*, also acidulated drinks; but this treatment produced little improvement. Three weeks having thus passed, he did not wish to be detained any longer, and left the hospital. Six weeks afterwards he returned with complete paralysis of the lower extremities, a weak feverish accelerated pulse, and giddiness. He vomited every description of food as well as medicine.

Strychnine and *chinine* was given in a solution of *Acid. sulph. Aqua laurocer.* &c. &c., was also employed, without avail. Externally, scarifications of the back, and antimonial ointment were fruitlessly employed. These morbid symptoms being consecutive on the tertian fever, I prescribed the Tincture, as in former cases, and was so fortunate as to effect a cure therewith. The medicine was not rejected; the abdomen, which had been previously torpid, resumed its activity; at last a normal digestion supervened, and with it, recovery. As I could only spare one phial of the Tincture, I resorted again to the strychnine, which the stomach of the patient was now able to retain. The mobility of the feet was restored, and the man was dismissed cured after five weeks.

CASES 11 and 12. Two robust men, aged twenty and twenty-three, belonging to the Custom-House service, had suffered for eight days under quotidian fever, without any complications. I prescribed immediately *Tinctura Warburgi*, in two doses; one to be taken three hours after the other. In each case the expected paroxysm occurred rather violently; terminating, however, with a profuse perspiration; the result being a peculiar feeling of comfort, which was not disturbed by any further attack.

Both patients were dismissed cured, after five days.

Never had I occasion to remark any prejudicial symptoms attendant upon the use of this medicine; but it invariably produced a feeling of comfort in the patient, and abundant cutaneous and urinary secretions. Not only the fevers, but their accessory symptoms, (sometimes very severe) were simultaneously removed.

In catarrhal, and other fevers, which yielded to the usual remedies, this medicine was not employed.

Bruck-on-the-Leytha, October 1st, 1846.

EFFENBERGER, M.D., District Physician.

No. 25. *Medicinische Wochenschrift.* Vienna, June 19, 1847.

St. Mary's Hospital at Baden.

The undersigned has tried the Warburg Fever Tincture, sent to him, for that purpose by the Regency, in three cases, with perfect success.

Acting on the principle that the proposed remedy could only be properly tested in severe cases, or in those wherein quinine had been ineffectually administered,—and the epidemic which had prevailed with some severity, being nearly at an end when the trials were ordered, the Tincture was only employed in three cases, detailed as follows.

CASE 1. M. J.—, aged thirty-three, Catholic, single, Police-guard, of robust constitution, generally healthy, had suffered in June last, with tertian fever, and during eight days was treated with quinine in this hospital, whence he was dismissed cured. Up to Sept. 5th, he had suffered three relapses, but had always been freed from fever after taking quinine for several days. These relapses were occasioned by the impossibility of his avoiding irregularity of diet, and exposure to colds while on service.

He was admitted to hospital on the 11th September, when he stated that he had attacks of fever, every day about noon. He exhibited gastric symptoms, inclination to vomit, pains in the region of the spleen, but without enlargement of the spleen or liver, tendency to somnolence, fever. An emetic;—which, however, operated downwards, causing twelve watery stools.

Sept. 12th. In the morning, free from fever, gastric symptoms somewhat diminished. Administered a tablespoonful of *Tinctura Warburgi*; the fever did not appear; the night, however, was restless; a small evacuation.

Sept. 13th. No fever; a better night.

Sept. 14th. At ten a.m., half a tablespoonful of the Tincture; about noon, the pulse fifty-two. A hard stool, good appetite, quiet night. The pain about the spleen had disappeared.

Sept. 15th. No fever, pulse seventy-two, stool hard, urine dark-coloured.

Sept. 16th. At ten, a.m., another half tablespoonful of the Tincture.

Sept. 17th. There being no return of fever, the patient was dismissed cured. He immediately returned to his duty, and up to the present time has been free from fever.

CASE 2. St. A.—, of Jaromirz, in Bohemia, aged twenty-six, Catholic, single, cook, of a delicate constitution; suffering for the past year from blennorrhœa benigna, was admitted on the 3rd September. She had been ill for nine days, and on her admission exhibited all the symptoms of a moderate *Typhus abdominalis*, which however disappeared by the use of *Chlor.* On the 9th September she was seized again with fever, the paroxysms of which recurred daily about noon, commencing with ague, and followed by heat and perspiration, which lasted until midnight *Chinine* one gr. *pro. dos.* every two hours.

This treatment was continued for a week, without any diminution of the paroxysms.

Sept. 18th. Administered Warburg's Tincture at nine and ten A.M. in doses of half a tablespoonful each. At three P.M. the ague appeared, and lasted an hour. No heat followed, but perspiration ensued towards evening. A soft stool.

Sept. 19th. Pulse ninety-six, otherwise felt well; skin moist; no gastric symptoms. The Tincture was repeated; no fever paroxysm; a quiet night.

Sept. 20th. Pulse ninety-six; felt well, appetite increased.

Sept. 21st. Pulse eighty-one; no fever, one stool; convalescence proceeded steadily; and on the 3rd October, she was dismissed cured. There has been no relapse up to the present time. The blennorrhœa, which had diminished during convalescence, has since increased.

CASE 3. W. J.—, from Melichsdorf, in Moravia, Catholic, widower, aged fifty-five, servant, formerly healthy, has suffered during the last six weeks under intermittent fever of an undecided type. After bearing it for a fortnight, he went to the hospital of the Charitable Brothers of Vienna, where he was treated during three weeks for intermittent fever and consecutive *Ascites et anasarca*, and was dismissed partially relieved. He, however, remained free from fever only a few days, and then sustained a fresh attack; on the fifth day of which—viz., on the 22nd Sept., he came to this hospital with *Tumor hepatis et lienis, ascites, et edema pedis*. By auscultation, we found the chest and pericardium in a normal state. He was treated with solvents and diuretics, with no other result than increased diuresis.

Oct. 1st. At six P.M. an attack of fever occurred, with ague, heat, perspiration, and increased fluctuation of the abdomen. The paroxysms recurred daily, but at uncertain times. The diuresis diminished, (one pound in twenty-four hours,) the dropsy increased, the pulse became irregular and weak, the strength sunk.

Oct. 9th. The Fever Tincture was administered in two doses of a tablespoonful each, with an interval of an hour between the doses.

On the 10th, 11th, and 12th, the dose of Fever Tincture was repeated. The fever did not return. Three liquid stools. The diuresis increased, strength and appetite revived, the pulse was raised; and under the use of diuretic and bitter remedies, convalescence began and proceeds steadily. The patient, however, remains in the hospital, as he cannot be discharged at this season of the year until completely recovered.

No very definite conclusions can be drawn from my limited experience. It may, however, be affirmed—

1. That in these three cases, the Fever Tincture has most triumphantly shown its anti-febrile power. In the first and second cases, quinine was ineffective, while a few spoonfuls of the Tincture effected a perfect cure. In the third case, also, quinine was probably given; but this is not certain. The Tincture proved itself in this instance extremely efficacious. In this case also, although complicated with *infarctus hepatis et ascites*, the patient's strength increased rapidly, after the fever had yielded.

2. The retardation of the pulse, which was marked in the first case, was not observed in the other two.

3. In the third case only, was any influence upon the stools manifested.

4. The Tincture always agreed well with the patients, even where gastric symptoms were present. The appetite improved during its use, and the digestive organs were strengthened.

5. Two to three doses sufficed to cure the fevers permanently.

6. The blennorrhœa, in case 2, returned after the dismissal of the patient. It may therefore be concluded, that this Tincture exerts no peculiar action upon the mucous membrane of the vagina and uterus.

The experiments undertaken with Dr. Warburg's Tincture, in the sanitary districts of Vienna and Bruck, have most unquestionably proved its efficacy in intermittent fevers; and the foregoing cases confirm the statement that many patients have been cured by this Tincture, who had been previously treated by quinine, without avail.

Baden, October 30, 1846.

DR. FRANZ HABEL, District Physician.

No. 26. *Medicinische Wochenschrift*. Vienna, June 26, 1847.

Report of the Imperial Royal District Physician of Seitenstetten.

In compliance with orders from the Regency, dated 2nd and 16th September this year, No. 10,935, to make trials with the remedy against intermittent and typhus fever, discovered by Dr. Warburg, and to report the results thereof, the undersigned has the honour to submit the following statement:—

During the short period appointed for observations, the undersigned only met with one case of tertian intermittent fever. A purgative was first administered, which having operated freely, a half phial of the Fever Tincture was given, after which, the impending paroxysm did not appear; but for security's sake, the other half phial was given on the succeeding fever day, three hours before the time at which the paroxysms had usually appeared. There was no recurrence of fever, and the patient has since enjoyed the best health.

A similar observation was made by Dr. Freidinger, at Strenberg, to whom the undersigned had given a phial of the medicine. (See enclosed.)

The undersigned did not meet with any typhus fever during this short period, he therefore tried this remedy only in two cases of gastric pituitous fever of a nervous character; wherein, after having cleansed the *primæ viæ*, Dr. Warburg's Tincture was given to one patient, on the 8th, to the other, on the 21st day of the attack, in doses of fifteen to twenty drops, three times a day. In both cases, considerable improvement took place immediately, and a complete cure was effected within a few days, without any other remedy having been used.

According to these few trials, Dr. Warburg's Fever Tincture has shown, in cases of intermittent and gastric pituitous fevers of a nervous character, a distinguished efficacy which ought to be made generally known.

Seitenstetten, Nov. 16, 1846.

DR. HAAS, District Physician.

(Enclosure to Dr. Haas.)

SIR,—I hasten to inform you of the success of Dr. Warburg's Fever Tincture, which I administered, in strict accordance with his prescription, to a girl aged twenty, of a very delicate constitution, who was attacked with *Febris intermittens quartana*.

On account of decided gastric symptoms, with repeated vomiting, I ordered, in the first place, an emetic of *Tart. emet.*, which produced repeated ejections of a slimy, bilious liquid, after which the tendency to vomiting ceased; but there was no return of appetite, and not the slightest diminution in the intensity of the next paroxysm was observed.

I therefore ordered a half phial of the Tincture to be taken three hours before the expected attack, although the tongue was still covered with a thick slimy matter. Neither ague nor thirst were observed, but immediately an agreeable sensation of warmth was developed, emanating from the stomach, and ending with a profuse perspiration. In the following apyrexia all gastric symptoms disappeared, the patient recovered her appetite, and complained of nothing, except a little weakness in the feet.

To make quite sure of this fortunate result, I prescribed the remaining half phial, to be taken three hours prior to the time of attack, in reference to former paroxysms. Since that time, the patient has remained quite well, and as strong as ever.

I remain, Sir, your very obedient servant,

CARL FREIDINGER,

Strengberg, Oct. 10, 1846.

No. 27. *Medicinische Wochenschrift*. Vienna, July 3, 1847.

Report of the Imperial Royal District Physician of Melk.

Franz J—, aged twenty, heretofore enjoying good health, had, without any known cause, on June 16th, a violent attack of ague, which lasted four hours, and was followed by fever heat, thirst, &c., and finally by perspiration, the attack lasting altogether twelve hours.

June 17th. Little fever.

June 18th. A paroxysm occurred.

June 19th. Entirely free from fever.

June 20th. He received one *gr. Chinin*, two hours before the expected paroxysm, which dose was repeated shortly before the attack, and very much shortened the paroxysm.

June 21st, being the day of apyrexia, three *gran. chinin* was administered during the day, in doses of half grains. During ten days no fever, then a violent paroxysm. *Chinin*, with *Rheum* was administered. No further attack until 16th July, when the paroxysms returned regularly; and to avert them, the patient took a great variety of domestic remedies without any benefit.

Oct. 16th. The undersigned being called in, administered, three

hours before the attack, the first half phial of Warburg's Tincture, afterwards the other half. The paroxysm did not appear. The patient took the remedy without any repugnance, felt heat in the stomach, which gradually diffused itself over the whole body; he then fell asleep, and on awaking, felt much refreshed.

The fever having been of such long standing, I gave him another phial of the Fever Tincture, in doses of a teaspoonful each, every three hours.

He has since been perfectly well, and able to attend to his business.

Joseph M—, aged thirty-eight, architect, had suffered for eight weeks from a gastric bilious fever, which, although somewhat diminished, assumed the tertian intermittent type, with severe paroxysms.

In this state he consulted the undersigned, who prescribed Warburg's Tincture, in full doses. The patient felt immediately much warmer, soon after which perspiration ensued, followed by a four hours sleep; from which he awoke greatly refreshed, and entirely rid of the severe pains which he used to feel between the shoulders. He took a second phial, in doses of a teaspoonful each.

Since the 21st October he has been quite free from fever, and attending to his business.

Julie H—, aged seventy, very fat, much weakened by difficult labours and overwork, afflicted with umbilical and inguinal hernia, and prolapsus uteri; suffered for many years from abdominal obstruction, enlargement of the liver and spleen, and oedema of the feet. In consequence of a fault of diet, was attacked by gastric fever, for which she took, during some time, various domestic remedies, particularly drastic purgatives. The fever, however, became more violent; restless nights, great weakness, digestion quite out of order, frequent vomiting and diarrhoea, the abdomen susceptible. After a fortnight *pleuritis et pericarditis* supervened, in consequence of a cold; which evil however was relieved after five weeks, when the fever diminished, but exacerbated violently every second day.

Two full doses of Warburg's Tincture, given according to prescription before the impending paroxysm, suppressed the fever completely. Sleep, which was previously deficient, was enjoyed for hours at a time; the nausea against every article of food, was converted into a moderate appetite; and she was able to digest light animal food without inconvenience; the stools became normal. After a fortnight, in consequence of having eaten tough game, and having caught a severe cold, the attacks of gastric fever and *pericarditis* returned; which, when the latter evil had been dispelled, assumed the tertian type of intermittent fever, and which was again cured by Warburg's Tincture, given within three hours prior to the attack. No morbid symptoms were left except weakness, which yielded to the use of quinine.

Barbara K—, aged thirty-eight, thin, otherwise healthy, had suffered, since 28th September, under a gastric bilious fever, which degenerated into typhus, on the eleventh day.

On the 16th of October—the eighteenth day of illness—very weak, delirious, tongue dry and much coated, great thirst, abdomen swollen

and painful, stools liquid, palish yellow, very foetid, mixed with hard greyish lumps, pulse very weak, small, and quick, above one hundred pulsations, *decubitus* near the *os sacrum*, the skin hot and dry. The fever exacerbation being very severe, the undersigned administered on the second day, the *Tinctura Warburgi* in full doses, within three hours before the attack. The patient felt a burning in the stomach, which within a short time changed into an agreeable warmth; she then had four hours sleep, during which a profuse perspiration spread over the whole body.

On awaking, the patient felt better; her head, which had been formerly heavy, became free, the tongue cleaner and moist, the abdomen reduced to its normal size, the stools regular, and the pulse slower. She took another phial of the Tincture, in doses of a teaspoonful each, on which the appetite returned, and the fever vanished entirely; only the weakness remained, which also subsided, as in the other typhus fevers, after the use of bark and its preparations.

A young man, aged twenty-two, and another, aged twenty-six, both of strong constitution, having been attacked by typhus, which assumed the tertian intermittent, or rather remittent type, the full dose of Warburg's Tincture was administered; to the former on the 17th, to the latter on the 19th, day of the *stadium nervosum*, within three hours before the paroxysm. The same favourable phenomena occurred as in the preceding cases—namely, quiet sleep, return of appetite, moisture of the tongue, regulated, abundant stools; during sleep, a relieving continued perspiration took place, and the fever was subdued. Although a phial of the Tincture had been used in *dos. refract.*, yet the depressed powers did not regain their strength until after several weeks; bark was therefore used for this purpose, which agreed better with the patients in these four cases, than in the other cases wherein the Tincture had not been used.

From these observations it appears that this Tincture has a specific effect on fever, immediately suppressing the paroxysm; and that without further medical treatment it produces recovery, if the vital functions be not too much depressed. The Tincture promotes digestion, accelerates the peristaltic motion, and the absorption of the stomach and digestive channels; regulates the secretion of bile, induces an improved sanguification, and promotes nutrition. It is preferable to quinquina, because it can be retained by the weakest stomach, and when the digestive functions are completely depressed; but it does not appear to resuscitate the sunken strength so effectually as quinine, which, however, is more easily assimilated if the Tincture be used previously.

It would, therefore, be desirable to ascertain, by further trial, if, by a modified use of this Tincture, the aforesaid strengthening quality of quinine, could not likewise be obtained.

Melk, November 4, 1846.

DR. RAAB, District Physician.

No. 28. *Medicinische Wochenschrift*. Vienna, July 10, 1847.

Imperial Royal District, V.U.M.B.

In accordance with the Decretal order of the Regency, dated Aug. 14th, 1846, No. 43,821, the following report, respecting the efficacy of Dr. Warburg's Fever Tincture, is herewith submitted:—

The epidemic intermittent fever, prevalent last autumn, which appeared in some cases regularly, in others irregularly—assuming the quotidian, tertian, and quartan types; simple, and with complications of a bilious gastric, and gastric nervous character; plain and disguised; with headach, pleurisy, pains in the abdomen, vomiting, &c. &c., afforded sufficient opportunity of testing the efficacy of this Tincture, which was proved in the various types of intermittent fever; and in certain cases of typhus fever, after the gastric complications had been removed.

With regard to the effect of this remedy in dangerous typhus fevers, the following reports are submitted, as the most satisfactory evidence of its extraordinary efficacy:—

CASE 1. Leopold Sch—, aged twenty-seven, a peasant, athletic, has been afflicted with epilepsy since his eleventh year, otherwise enjoyed good health, until October last; when, after suffering several days with headach and repeated agues, he was attacked by typhus, which was then prevailing epidemically at Katzeldorf, where he lived. It commenced with rigor, and developed itself with all the phenomena of the epidemic. The symptoms, during a period of fifteen days, were violent headach, stupor, and heaviness of the head, ringing in the ears, partial deafness, eyes dull, face of an earthy colour, speech drawing, tongue dry, brownish covered, severe thirst, abdomen tympanous, irritability of the iliac region, very foetid diarrhoea, the skin dry and hot, with a rather extensive petechial eruption; finally, a great general lassitude, and a small, soft, accelerated pulse.

In addition to this marked typhus process, unquestionable paroxysms of intermittent fever were perceptible; which passed regularly through their cycles every afternoon, with rigor, heat, headach, and thirst.

In this state, when the putrid typhus fever, and the intermittent, which was present in the same individual, appeared to take their course without influencing each other; the patient was first seen by the undersigned, who viewed him as a fit subject for the administration of *Tinctura Warburgi*. The remedies previously given, consisted of *mixture solvens* in decoct. of salep. with Haller's acid, and a few decoctions of bark. No peculiar gastric symptoms having manifested themselves, after two stools produced by enemas, the trial was made on the 21st day of the disease, with the Tincture sent to me by the authorities of the district V. U. M. B.

At nine o'clock in the morning, during the apyretic state, with regard to the intermittent fever, the patient received the first third of a phial of the Fever Tincture, unmixed; this dose was repeated at half-past twelve. In the afternoon, however, the patient got no medicine. Dr. Ferdinand Petrich, assistant physician, called upon the patient next morning, and

found him, according to his own words, "quite cheerful, and free from fever;" he had slept quietly through the whole night, without heat or perspiration; and in the morning the only complaint he made was of hunger. All phenomena were normal, and convalescence proceeded rapidly without relapse, so that no further dose of this remedy, or any other medicine, was required.

In this case, the curative power of the Tincture was most unquestionably and fully proved. It is also worthy of remark, that this patient, while the typhus attack lasted, did not suffer a single paroxysm of epilepsy, attacks of which ordinarily occurred several times a week, and are now again repeated, although with less frequency, since his illness.

CASE 2. Michael Sch.—, aged twenty-five, brother of the former, also strongly built, but very nervous, when ten years old, had scarlet fever with consecutive dropsy. Otherwise enjoyed good health until October last, when, shortly after his brother was taken ill, he was likewise attacked by the epidemic typhus; which passed through its stages during twenty days, with similar symptoms to those described in Case 1, varying only in manifesting a higher degree of putridity, and being uncomplicated with intermittent fever. Stupor, headach, delirium at night, partial deafness, earth-coloured complexion, dull aspect, the tongue dry, and almost paralyzed, speech unintelligible, repeated inclination to cough, with little but phlegmy expectoration, petechia over the fore part of the body, abdomen tympanous, diarrhoea-like stools of the most fetid odour, small and soft pulse, and great debility. Such were the principal features of the disease manifested in this patient, in common with others who were attacked by the epidemic. The following peculiarities, however, presented themselves; continual delirium, greater disposition to cough, and the appearance of white *Miliaria* on the fourteenth day of illness, which dried up after having lasted a week, and seemed to produce some little relief of all the symptoms; without, however, mitigating the disease, or finishing the typhus process.

The patient having first received an emetic, was subsequently treated with decoctions of saleg and bark, and Haller's acid; but as on the twenty-first day of the disease, all the symptoms above described, were still present, I was induced to administer the Fever Tincture. A higher degree of sensibility in the constitution, however, having manifested itself in this instance, through the delirium and irritation of the chest, half a phial of the Tincture was mixed with a *salep. decoct.*, for the purpose of alleviating the irritation; and this mixture was administered to the patient during the day, in doses of a tablespoonful each.

The report of Dr. Petrich, respecting the state of the patient on the next morning, is subjoined verbatim: "The next morning, when I entered the room, the patient smiled at me; his appearance was altered most surprisingly; the dull aspect had vanished; he had enjoyed a ten hours' sleep during the night, his head and speech were unimpeded, the pulse and stool normal; he has a good appetite, and wishes to leave his bed." Convalescence was complete, without any other remedy having been used.

Although in the last case a critical influence may be attributed to the miliary eruption, which took such a regular course; still these two cures,

performed in Katzeldorf, confirm the mode of operation ascribed to the Tincture, by Dr. Warburg in his treatise. But it is desirable that the efficacy of this medicine should be established by further success, in cases of intermittent and typhus fever.

Gaunersdorf, Jan. 24, 1847.

DR. GUNZ, District Physician.

No. 29. *Medicinische Wochenschrift*. Vienna, July 17, 1847.

Imperial Royal District, V.O.M.B.

The enclosed reports upon the efficacy of Dr. Warburg's Fever Tincture, furnished by the officers of the District Sanitary Department, are herewith submitted to the Regency of Lower Austria; with the remark, that in this sanitary district the Tincture has been employed with complete success, in two cases of intermittent fever.

DR. MORITZ, District Physician.

RESULT of the treatment of a few cases of fever, with Dr. Warburg's Fever Tincture, by the Imperial Royal District Physician, Dr. GRUBER, at Waidhofen, on the Thaya.

The undersigned has administered the Fever Tincture, in accordance with the order of the Regency, to five individuals, four of whom were males and one a female. All the patients had suffered during a period of from four to six weeks, from an anticipating, obstinate, tertian, intermittent fever, attended with great weakness, and enlargement of the liver and spleen. They were treated during the stated period, first with emetics and solvent remedies, and afterwards with *Sulphas chinini* in large doses of from eight to ten *gran.* per diem, without, however, any beneficial effect.

I administered Dr. Warburg's Tincture in strict accordance with his prescription; observed the patients very closely, visiting them four times a day, and continued my visits for a week. In all cases, the fever was cured by the use of a single phial. The effect was exhibited in all in the same manner,—general orgasm of the fluids, speedily followed by general relieving perspiration; the lancinating pains in the liver and spleen ceased, and under the observance of an appropriate diet, and quiet rest in bed for a few days, the patients were cured, without any other remedy having been resorted to.

Waidhofen, Nov. 2, 1846.

DR. GRUBER, District Physician.

RESULT of the Treatment with Dr. Warburg's Fever Tincture, of a Patient suffering under Typhus Fever, by the Imperial Royal District Physician, Dr. SCHWARZ, of Poggstall.

In accordance with the Imperial Royal order of September 3, 1846, No. 8915, the undersigned submits a report, respecting a cure performed with Dr. Warburg's Tincture, administered strictly according to prescrip-

tion, on a patient suffering from severe *Typhus abdominalis*, at the period when that disease was epidemic in the village of Groissbach.

The patient in question, Mathias P—, butcher, in Groissbach, aged fifty-nine, of an ordinary constitution, meagre, had small pox in his youth, but otherwise, until the occurrence of the above disease, always healthy. About the 10th September, and during the prevalent epidemic, he was attacked by a violent gastric bilious fever, which, in spite of the appropriate remedies,—emetics, and gentle purgatives, having been employed in due time,—instead of diminishing, assumed, in a high degree, the character of nervous fever.

On visiting him, on the twentieth day of his illness, I found him suffering severely under the fully developed nervous putrid fever, with the symptoms of general weakness and prostration of the vital powers; complete stupor, violent delirium, partial deafness; his tongue was reddish, very dry, and tremulous, and he had great difficulty in moving it out of his mouth; moderate thirst; respiration quiet, but the breath foetid; considerable meteorism; the abdomen very susceptible; the skin very dry, and imparting an unpleasant sensation of heat (*Calor mordax*); putrid odour of the perspiration; colliquative and very foetid diarrhoea, intermixed frequently with blood; urine dark coloured, without sediment; accelerated, small, and very irregular pulse.

Under strict observance of the directions, Warburg's Tincture was administered to this very exhausted patient, when the second stage (*nervosum*) had commenced, by Surgeon Lathka, of Aggsbach, who was ordered to attend, in the absence of the undersigned; and who, during a period of four hours, watched the result by the patient's bedside. One half phial of the Tincture was given unmixed. During the succeeding two hours, no particular phenomena were observed; and on the expiration of three hours, the other half was administered. Within half an hour, there supervened a quiet and refreshing sleep, which lasted two hours. When the patient awoke, he felt stronger, the head was more free, the eye more lively, the delirium, as also the meteorism, diminished, the tongue moister, the abdomen evinced less sensibility to the touch, the skin in general moderately warm, soft, and evaporating; in addition to this, there was a warm perspiration manifested about the pit of the stomach, and the abdominal region; diarrhoea considerably diminished in frequency, and improved in character; an abundant discharge of pale red urine, which now deposited a plentiful brickdust-like sediment; the pulse stronger, more regular, and quiet; the reddish eruption characteristic of typhus, appeared over the chest, with a considerable diminution of all the morbid symptoms of the disease.

Considering that we had to deal with a complaint which is never decided by perfect crises, but only by lysis; we gave, in order to achieve the cure, a teaspoonful of the Tincture every three hours, during two successive days, and with the desired result; as after a few days, there was not only a visible decrease in the essential symptoms of the disease, but the transition to convalescence also occurred, (although it proceeded slowly,) accompanied with great revival of all the functions; the head becoming free, sleep quiet and refreshing, skin and tongue moist; moderate and relieving perspiration took place, the respiration became free, the abdomen soft, and painless when touched. The urine voided con-

tinued to deposit a reddish sediment; brown-coloured paplike stools occurred twice a day; thirst normal; appetite increasing; pulse soft and regular. To promote digestion, sanguification, and nutrition, and to assist complete restoration to health, recourse was had to bitter aromatic medicines, to light digestible and nourishing food, partly vegetable and partly animal; to wine and wine soups. Proper exercise, in a dry atmosphere, was strongly recommended, and the necessary instructions were given to guard against a relapse.

Poggstall, Nov. 3, 1846.

Dr. SCHWARZ, Imp. Roy. District Physician.

REPORT relative to the administration of *Dr. Warburg's Fever Tincture* by the Imperial Royal District Surgeon, JOSEPH LUNZER, of Krems.

This Tincture was administered, in accordance with the official orders of the Regency, in the following two cases, with the result as stated.

CASE 1. A man, aged thirty-five, resident on the banks of the Danube, in a locality where intermittent fever is frequently fatal, had, during the last five months, undergone ten relapses of tertian intermittent fever. The patient belongs to a class who, avoiding medical assistance, follow the advice of quacks. After suffering several paroxysms, he was in the habit of going to a shopkeeper, from whom he bought eight quinine powders for a florin, w. w., (about a shilling,) and always got rid of the fever, in a cheap or expensive way, whichever you may please to call it, for the cure was never confirmed. Being a wine-dealer, and working hard, especially in cellars, he was consequently much exposed to take cold, and on almost every occasion of cold, a relapse of the fever ensued. I was satisfied that the patient was not an irregular liver, from the circumstance of his appetite not having failed, when he applied to me for assistance, neither was his tongue at all furred. It is true that he had an earth-coloured complexion, and a bloated appearance; but he was neither suffering from disordered liver, nor was he dropsical. Up to this time, he had incurred ten relapses, and had spent nine florins in quack medicine.

After the third paroxysm of the last relapse, he, on the 24th October, 1846, claimed my assistance. I gave him a phial of Warburg's Fever Tincture, with the necessary instructions for using it; and in the reports of this patient, I found an exact confirmation of Dr. Warburg's statement, respecting the mode in which this remedy acts, and its results. The patient looks so healthy to-day (Nov. 9th), that it would be absurd to doubt his being radically cured. He neither took, nor required any other remedy except one dose of the Tincture.

2. The effect in the following case was even more surprising.

On the 27th October last, I was called to visit a female patient, aged fifty, who had been suddenly seized with vomiting and purging of blood. She had ceased to menstruate for about twelve months, had felt unwell three days previously, was faint and dispirited, and suffered from a peculiar painful oppression in the region of the stomach, for which she

could not assign any reason, but attributing it to a gastricism of recent date, had prepared a light *Senna decoct.*, in order to remove the indisposition by a gentle purge; but this had hardly been taken half an hour, when the above described violent reaction occurred.

I was immediately sent for, and attended forthwith; but I found her already in a most desperate state. She had vomited about sixteen ounces of light red blood, and discharged from the bowels at least four times that quantity of dark bloody fecal matter, of very fetid odour. Her strength was exhausted, her face pale, her sunken eyes languid, and drawn convulsively into their orbits and upwards, her lips and tongue pale, the extremities, and the perspiration resting upon them, cold, the pulse trembling, consciousness almost extinct. The patient must have been lost, if she had had a second attack of such a nature, which there was reason to dread, the regions of the stomach and hypochondria being still irritable and swollen.

I therefore ordered immediately, cold vinegar poultices to be placed on those parts, and administered the *Tinctura Warburgi* in two doses, as prescribed. The result was extraordinary. In half an hour after the first dose, I could perceive, from the increasing fulness of the pulse, that the vital functions were returning; shortly afterwards the skin grew warm, and consciousness revived almost simultaneously. An hour after the second dose, a copious stool took place, much discoloured, however, by the black blood which was intermixed; but this evacuation proved a critical one; after which, the patient felt refreshed beyond expression. She then slept without interruption for almost five hours; appeared, upon awaking, much less debilitated than I had feared she would be, and spoke even of appetite. The pulse was still accelerated, and the tongue covered somewhat yellow. I therefore gave her, during a couple of days, a *Solutio salis amari*, and *pro potu Eliz. acid Halleri*, after which the patient recovered quickly and completely.

It is obvious that I had to deal with a Melæna, (black vomit) in this case.

Krems, Nov. 12, 1846.

JOS. LUNZER, Imperial Royal District Surgeon.

No. 30. *Medicinische Wochenschrift*. Vienna, July 24, 1847.

REPORT of a Case of Disguised Intermittent Fever, treated with *Tinctura Warburgi*, by DR. JOHANN UHLEIN, at Hermannsdorf.

F. M., a patient, at Merysch, V.O.M.B., aged fifty-four, married, of strong constitution, of sanguine choleric temperament, always healthy in his youth, has suffered, during seven years, from pain in the right ear, with a discharge. Was treated three times this year, for rheumatic inflammation of the ear, of which he was on each occasion, speedily relieved by antiphlogistic-diaphoretic remedies. Slight relapses, which occasionally appeared, were dispelled by strict regimen, mild diaphoretics, and blisters. The general state of health good; the animal functions performed regularly.

In August, 1846, the patient was again attacked by pain in the ear,

and headach, for which he was treated medically during three weeks, with but little advantage; he subsequently, on the 11th of September, applied to me, when I found him as follows:

The patient complained of extremely severe lancinating pain in the left ear, (formerly the right was always affected,) spreading itself over the left side of the head, with evening exacerbations lasting through the night, and depriving him entirely of sleep. There were also frequent painful attacks during the day, but much less severe in intensity and duration.

The face pale; the features distorted, plainly bespeaking his great suffering; the eyes were somewhat red; respiration through the nostrils unimpeded; tongue foul, covered with a white slimy fur; insipid taste; no appetite; thirst moderate. A serous matter now oozes from the left ear. Chest free; respiration regular; no cough. The abdomen somewhat tympanous, but without pain; frequent rumbling and gaseous eructation; stools infrequent, indolent, and small; urine reddish brown, sometimes accompanied by a reddish sediment. Pulse not accelerated, but weak, small, irregular, and intermittent. Patient complains of great lassitude, and general prostration.

From the above, I diagnosed a catarrhal rheumatic inflammation of the ear, complicated with gastricism. Prescribed six leeches behind the suffering ear, and a gentle purgative, from which the patient experienced relief on the following day. Prescribed blisters to the neck and between the shoulders, *Cataplasmata emoll. cum herba hyoscyami* on the ear, daily injection into the suffering organ, composed of *Decoct. melleæ* with sweet milk, afterwards *Vesicat. perpetuum* on both humeri; sinapisms alternately to the calves of the legs and soles of the feet. Prescribed inwardly, solvents and gentle purgatives, alternately.

The above course of treatment having been persevered in for eight days, the patient felt himself relieved, so far that he had a purer taste, and some appetite; the tongue was less foul, and the day attacks no longer appeared; the night attacks, however, became much more severe.

The intermittent type was now more clearly pronounced, as on the return of every evening, between seven and eight, the pains in the ear and left side of the head, came on with increased severity, lasting through the night until morning, when they gradually subsided, leaving the patient quite exhausted, and in a slumbering state. To observe the patient well, I remained with him during the whole night of the 19th, on which occurred one of the severest attacks. At eight o'clock the pains came on with severity, and arrived at their climax at midnight, the patient groaning piteously, raving and raging, ("jammerte fürchterlich, raste und tobte,") dashing his head against the wall, and could by no other means be quieted but by severe compression of his head, which appeared somewhat to relieve him. This state continued till seven in the morning, when the symptoms abated by degrees, and the patient fell into a slumber. During this attack no change was observed in the pulse, which was small, weak, and intermittent. The patient complained, after the attack, of great weakness of body, which was also observed in all other functions, so that the worst result was to be dreaded.

Under these unfavourable symptoms, the case being desperate, I was induced to solicit the kind advice of Protomedicus Dr. Knolz, who happened to be in the neighbourhood. After having detailed the case and pre-

vicious treatment, I was recommended by Dr. Knolz to administer *Tinctura Warburgi* to the patient, and he was kind enough to supply me with two phials of the Tincture for that purpose.

Sept. 20th. At five P.M. I gave to the patient the first special dose of the Tincture, and three hours afterwards the second dose. I remained at his bedside till ten o'clock, for the purpose of better observing the action of the medicine. Soon after the incorporation of the first dose, the patient experienced a feeling of warmth in the stomach, and a rumbling in the abdomen. After the second dose, the warmth became diffused over the whole body, followed by a relieving, very copious perspiration; repeated abdominal rumbling, accompanied with gaseous discharge; urine voided more frequently, and in greater quantity. The patient expressed himself as entirely relieved, from having no longer any pains in the head, and feeling otherwise quite comfortable. The pulse, previously small, weak, and intermittent, was now raised, and less irregular. Patient exhibited strong disposition to sleep, which followed of so favourable a character, that I left him at ten, without any further apprehension.

Sept. 21st. Patient has slept soundly and quietly, throughout the night: this was the first good night's rest since four weeks. The severe pains in the head have entirely vanished; patient feels himself altogether stronger. He has become cheerful; says he knows not how to express his pleasure and thankfulness; his appetite is good. One evacuation during the night; the urine deposited much sediment of a reddish colour; pulse stronger and regular. To guard against a possible relapse, I administered the second phial of Warburg's Tincture, in doses of a teaspoonful every three hours.

From this time the patient had no further attack; he enjoys quiet nights, undisturbed sleep, appetite very good, tongue quite clean, stools normal. I continued to observe him, as a convalescent, for eight days, during which he improved uninterruptedly; after the lapse of this time, I found him so much recovered, as to be able to superintend his business in-doors, all functions being normally reinstated; and he complained of nothing but an occasional serous discharge from the ear, formerly so painful, which he will most likely soon get rid of.

In this case *Tinctura Warburgi* has shown itself very efficacious, and exceedingly quick in its operation.

Harmannsdorf, October 18th, 1846.

DR. JOHANN UHLEIN.

AUTHENTICATION OF DOCUMENTS RELATIVE TO THE

EMPLOYMENT OF

TINCTURA WARBURGI

IN 130 CASES,

AT THE MILITARY HOSPITAL OF COMORN,

DURING THE EPIDEMIC FEVER OF 1846.

By the Directory-General of the Medical Department of the Imperial Royal Army, the authenticity of the documents hereto annexed under seal of this office, which were communicated to Dr. Carl Warburg in due legal form, is hereby certified.

Vienna, May 31, 1848.

L. S.

DR. IGN. RUDOLPH BISCHOFF,
Imperial Royal Aulic Councillor, Director-General of the
Medical Department of the Imperial Royal Army.

That the above attestation is signed by the Imperial Royal Aulic Councillor, and Director-General of the Medical Department of the Imperial Royal Army, Dr. Ignace Rudolph Bischoff von Altenstern, with his own hand, and that the above certificate is duly registered, is hereby certified by the Imperial Royal *Judicium delegatum Mil. Mixt.*

Vienna, June 9, 1848.

L. S.

LINHARDT,
Auditor-General.

The genuineness of the above signature of the Imperial Royal Auditor-General Linhardt, is hereby confirmed from the office of the Commander-in-Chief of the Army.

Vienna, June 10, 1848.

L. S.

G. VON AUERSPERG,
Lieut. Field Marshal.

The genuineness of the above signature of the Royal Imperial Lieut. Field Marshal Count von Auersperg, Commander-in-Chief of the Army of Lower and Upper Austria, is hereby officially certified by the Imperial Royal Ministry of War.

Vienna, June 13, 1848.

L. S.

COUNT LATOUR,
Minister of War.

- F. *Order of the High Council of War, for the selection of a Physician to superintend trials of the Fever Tincture, in the Epidemic then raging among the garrison at Comorn; notified to Dr. Warburg by Dr. I. R. Bischoff, Acting Director General of the Medical Department.*

No. 2254.

The Directory-General of the Medical Department of the Imperial Royal Army, acknowledges the receipt of your communication of the 2nd instant, offering to supply gratuitously, a quantity of your Fever Tincture, to be placed at the disposal of the Directory-General, for the purpose of testing its efficacy, in the epidemic now raging among the garrison of Comorn.

Your communication having been submitted to his Excellency the President of the High Council of War, Count Ignace von Hardegg, he has directed the undersigned, to select a duly qualified physician from this garrison, with instructions to proceed forthwith to that fortress.

The undersigned has consequently selected for this object, the chief physician of the corps of Pioneers, Dr. Augustus Willerding, and herein intimates to you, that the said physician will leave Vienna on the 7th instant, with one hundred phials of your Fever Tincture, together with the necessary instructions from you, regarding the administration of the medicine.

Vienna, Sept. 5, 1846.

L. S.
To Carl Warburg, M.D.

I. R. BISCHOFF,
Acting Director-General, &c.

- G. *From the Office of the Directory-General of the Med. Dep. Imp. Roy. Army, notifying the perfectly satisfactory result of the employment of the Fever Tincture at Comorn, in 75 cases, and requesting a further supply of the medicine.*

No. 2360.

The Official Reports from Comorn of the 15th instant, just received at this office, having shown that your Fever Tincture had been employed in seventy-five cases of the prevalent epidemic fever, with perfectly satisfactory results; you are hereby requested, in accordance with your promise, to furnish the Directory-General with a further supply of the said medicine, to be forwarded to Comorn without loss of time, in order that the trials may be continued.

L. S.
To Carl Warburg, M.D.

Vienna, Sept. 19, 1846.
I. R. BISCHOFF,
Acting Director-General, &c.

- II. *From the Directory-General of the Medical Department of the Imperial Royal Army, acknowledging receipt of a second hundred phials of Fever Tincture, for Comorn.*

No. 2394.

The Directory-General of the Medical Department of the Imperial Royal Army acknowledges, with thanks, the receipt of a second hundred phials of your Fever Tincture.

L. S.

Vienna, Sept. 23, 1846.

I. R. BISCHOFF, Acting Director-General, &c.
To Carl Warburg, M.D.

- I. *From ut supra, promising an early report on the result of the Trials at Comorn.*

No. 3082.

In reply to your communication of the 29th instant, the Directory-General of the Medical Department of the Imperial Royal Army, hereby intimates to you, that the results obtained from the trials made with your Fever Tincture in Comorn, could not hitherto be forwarded to the Aulic High Council of War, on account of the absence of some details necessary for the completion of the protocol, which had not yet arrived from Comorn.

These details having now reached this office, no time will be lost in submitting the reports to head-quarters; but to communicate to you immediately, the results of the trials in detail, is impracticable at present; the protocol alone containing sixteen sheets, which the office is now occupied in transcribing for the Aulic High Council of War.

L. S.

Vienna, Nov. 30, 1846.

I. R. BISCHOFF, Acting Director-General, &c.
To Carl Warburg, M.D.

- J. *From ut supra, with an official copy of the Hospital Reports, detailing the particulars of 130 cases of Epidemic Fever, treated with Tinctura Warburgi, at Comorn.*

No. 3222.

The Directory-General of the Medical Department of the Imperial Royal Army, in accordance with its last communication to you, dated November 30, 1846, No. 3082, herewith forwards to you the annexed copy of the Protocol, containing the detailed results obtained from the trials of your Tincture in Comorn, conducted by Dr. Augustus Willerding, chief physician of the corps of Pioneers.

L. S.

Vienna, March 24, 1847.

I. R. BISCHOFF, Acting Director-General, &c.
To Carl Warburg, M.D.

To the foregoing communication is annexed an official copy of the Hospital Reports, detailing the particulars of 130 cases of Epidemic Fever; but as these details occupy 60 pages of closely-written foolscap, and the results exhibit no essential difference from those obtained in the Hospitals of Lower Austria, it is considered unnecessary to report them here. Their general purport may be judged of by document G., and by the following Decree of High Chancery, (K.,) and Note to the Imperial Royal Ministry of War. In order, however, to indicate more particularly the severity and the complications of the cases which were selected for trial, the subjoined table has been compiled from the columnar headings designating the respective cases, in the official Report deposited with MR. PARKER.

Tabular Summary of Epidemic Cases at Comorn.

Febris quotidiana simplex	32
cum physconia lienis et hepatis	7
cum " " et hydropi	9
cum " " et oedemati pedum	5
cum " " hydropi et scorbuti	1
cum " " et oedemati pulmonum	1
cum hydropi	5
cum " " et oedemati pedum	1
cum " " universali et scorbuti	2
cum oedema pedum	5
biliosa	1
" comatosa	1
" cum physconia lienis	1 — 71
Febris tertiana simplex	29
cum physconia lienis et hepatis	7
cum " " et hydropi	4
cum " " et scorbuti	2
biliosa	1
duplicata	1
" cum physconia lienis	1
catarrho pulmonum	1
nervosa cum physconia lienis	1
cum tuberculosi pulmonum	1 — 50
Febris quartana	1
Febris irregularis	1
cum physconia lienis et hepatis	1
cum " " et hydropi	1
cum " " " et scorbuti	1
nervosa larvata	1 — 5
Hydrops universalis cum scorbuti	1
Oedema pedum	1
Vomitibus biliosis	1
Total of Cases	130

AUTHENTICATION OF DOCUMENTS.

That the annexed Supreme Resolution of January 30, 1847, intimated through the Decree of the Court of High Chancery of Feb. 2, 1847, No. 3747, with the ordinance of the Regency of Lower Austria, dated Feb. 10, 1847, No. 7201, as also the annexed directions for procuring and administering Dr. Warburg's Fever Tincture, were printed at the Imperial Royal State printing-office; and that copies thereof were forwarded to all subordinate authorities and sanitary officers for their guidance; and lastly, that the article in the *Wiener Zeitung*,* No. 97, April 8, 1847, relative to the trials with this remedy, instituted in the hospitals of Lower Austria, contains a true statement of the facts, and was drawn up and published by order of the Government: is herewith certified under the annexed seal of the Regency.

Vienna, April 29, 1848.

L. S. JOSEPH JOHANN KNOLZ,
Councillor to the Imperial Royal Regency of Lower Austria,
Sanitary Referee, and Protomedicus.

(The signature of Protomedicus Dr. Knolz is authenticated in the same manner as on page 9, and by the same authorities.)

K. Decree of High Chancery, adopting *Tinctura Warburgi* in the *Materia Medica of the Austrian Empire*—stipulating the conditions upon which the Imperial sanction is granted to Dr. Warburg, to prepare and issue his medicine;—and authorising its use, in endemic and epidemic cases, at the expense of the Government.

AUSTRIAN MEDICAL JOURNAL (*Medicinische Wochenschrift*), as supplemental to the Yearly Medical Report Books, (*Medicinische Jahrbücher*), for the Imperial Royal Austrian States. Edited by Dr. A. Edler v. Rosas, under the surveillance of Dr. J. N. von Raimann, First Physician to His Imperial Royal Apostolic Majesty, Aulic Councillor, &c. &c. &c.

* The document herein referred to, appears at page 9.—Tr.

No. 10. *Medicinische Wochenschrift*. Vienna, March 6, 1847.

OFFICIAL COMMUNICATION.

Decree of the Imperial Royal United Aulic High Chancery, to the several Regencies, under date February 2, 1847, ³⁴⁴ relative to the production and issue of Warburg's Fever Tincture.

His Imperial Royal Majesty, has, by Supreme Resolution of 30th ultimo, intimated, through the Decree of High Chancery of the 2nd instant, his gracious permission to Carl Warburg, Doctor of Medicine, now residing at Vienna, for himself personally, but not for his heirs or successors, to prepare and issue the Tincture which he has discovered against intermittent and typhus fevers, in the Imperial and Royal States of Austria, under the observance of the following stipulations:—

1. Dr. Warburg shall establish in Vienna, a laboratory for the purpose of preparing his medicine, where he must constantly keep a supply of the ingredients, adequate to the requirements of the whole empire.

2. That this Tincture shall be prepared solely under his own immediate inspection and superintendence, of equal good quality to that hitherto supplied to the public hospitals, and that he shall use no admixture whatever of a deleterious nature.

3. That the Tincture be put into the phials adopted by him for that purpose, well corked, and sealed with his family seal; and, to prevent adulteration, such phials shall be labelled with the peculiar stamped label registered by him.

4. The price of two florins and thirty kreutzers c. m. z.* per phial, is fixed as a general basis, and must not, therefore, be exceeded.

5. Dr. Warburg shall establish in Vienna, or its immediate vicinity, a general depôt, the locality of which, he shall communicate hereafter to the Regency; whence physicians and surgeons, and all persons authorized to deal in medicine, may at all times obtain a supply of the said Tincture, of genuine quality.

6. This Tincture shall only be sold under the denomination of "Warburg's Fever Tincture," (*Tinctura Warburgi*.) public apothecaries, those who are authorized to keep dispensaries, physicians and surgeons, being alone permitted, by the existing medical laws, to dispense it. Apothecaries may only dispense this Tincture in the same manner as all other remedies marked with a cross, (†) in the Austrian Medical Tax Ordinance of the year 1836, under the prescription of duly qualified physicians and surgeons.

7. An exception is made in favour of this Tincture, permitting it to be sold by druggists wholesale, but only to apothecaries and

* Five shillings English.—Tr.

to such physicians and surgeons in the country districts, as are authorized to keep private dispensaries. The strict observance of this regulation, is confided to the supervision of the Board of Health.

8. The prohibited direct sale to patients, or to persons not legally authorised to deal in medicine, whether on the part of the discoverer, from his depôt, or of druggists, shall be punished according to provisions 109 and 110 of the Statute Book, vol. 2; and the dispensation of this medicine on the part of an apothecary, without the prescription of a duly qualified physician, will be treated as a heavy police transgression, according to Section 13 of the Medical Tax Ordinance of 1836, to which is prefixed a circular from the Regency of Lower Austria, dated February 26th, 1836.

9. Every proved falsification of this medicine shall be punished according to the existing laws, that is, as the section 104, vol. 2, of the Statute Book, prescribes against falsification and badly-prepared medicines.

10. All public medical officers are authorized to use this Tincture, in the same manner as all other official preparations, in appropriate cases; and, in epidemic and endemic diseases, to prescribe the said medicine at the expense of the public funds. But in this case, without the usual deduction of per centage.

The foregoing Decree is hereby communicated to the Regency of Lower Austria.

Note to the Imperial Royal Ministry of War, ddo. &c. ut supra.

In reference to the esteemed note of the Imperial Royal Ministry of War, dated December 29th of last year, No. 4273, the Imperial Royal United Aulic High Chancery has the honour to communicate the annexed supreme resolution of His Imperial Royal Majesty, of December 23rd, relative to the trials and results of the medicine against intermittent and typhus fevers, discovered by Dr. Warburg; and relating to the preparation and issue of the said medicine, under observance of the regulations of the Board of Health. The Imperial Royal Ministry of War is desired to return this document, through the High Chanceries of Hungary and Siebenbürgen.

It is further intimated, that this Supreme Resolution has been severally communicated to all the regencies.

A true copy.

BIHLER.

Vienna, February 6, 1847.

L. From the Imperial Royal Austrian Government, Regency of Lower Austria. (enclosing M.)

No. 25,151.

In reference to your Memorial of the 8th of April, of the current year, notifying the establishment of your principal dépôt for the sale of your Fever Tincture; you are hereby informed, that copies of the enclosed printed directions for use of the said Tincture, have been already forwarded to all the authorities concerned, as well as to all the Hospitals of this Regency.

A supply of copies of the said directions, has also been forwarded to the High Chancery, by whom they will be transmitted to the several Regencies.

L. S.

Vienna, May 11, 1847.
PRINCE PALM.
RUBUNA.

To Carl Warburg, M.D.

M. Circular Order of the Regency to Apothecaries, Physicians, and Surgeons, announcing the adoption of *Tinctura Warburgi* as an officinal preparation, and ordaining that a supply of it shall be kept in every public pharmacy;—also embodying Dr. Warburg's description of his medicine, and instructions for its proper administration.

The Imperial Royal Decree of February 10, 1847, No. 7201, having intimated to the subordinate authorities, to the sanitary officers, apothecaries, &c., the stipulations under which his Imperial Royal Majesty had been graciously pleased, by Supreme Resolution of January 30, 1847, to grant to Dr. Carl Warburg, permission to prepare and dispose of his Fever Tincture, in the Imperial Royal Austrian States; the following information, as to the mode of supplying themselves with, and administering this Tincture, is now communicated to all authorized druggists, to apothecaries entitled to dispense, and especially to physicians and surgeons prescribing this medicine.

A. INSTRUCTIONS FOR PROCURING DR. WARBURG'S
FEVER TINCTURE.

The chief dépôt, whence all persons who are authorized to deal in Medicaments, can be supplied with Dr. Warburg's Fever Tincture, is, for the present, established at the warehouse of I. M. Miller, and Co., in the city of Vienna, Spiegelgasse, No. 1111; and in accordance with the 6th clause of the stipulations prescribed by His Majesty, in the above-mentioned decree; the sale of this Tincture to the sick, is prohibited to all except to duly

licensed apothecaries, and to physicians and surgeons who are authorised to keep dispensaries; and the public apothecaries are only permitted to dispense it, when prescribed by a duly qualified physician or surgeon, in the same manner as other pharmaceutical preparations, indicated by the mark $\ddagger$, in the Austrian Medical Tax Ordinance.

All public apothecaries, to whom an abatement of twenty kreutzers on the price of this Medicine is allowed, are directed to provide their pharmacies, with a supply of the Tincture from the general dépôt, corresponding to the public requirement. The subordinate authorities, and especially the Physicians of Towns and Districts, holding their appointments from the Government, are charged to attend particularly to this point, and to the strict performance of the regulations of the Imperial Royal Decree of February 10, 1847, No. 7201.*

B. DIRECTIONS FOR THE USE OF DR. WARBURG'S FEVER
TINCTURE.

(a.) In Intermittent Diseases.

First. Prior to administering the Tincture, it is desirable that all gastric impurities should, as far as possible, be removed from the *primæ viæ*; either by an *emetic*, or a *gentle solvent purgative*, according to the circumstances: if the latter, from half an ounce to an ounce of castor oil is recommended.

Secondly. For an adult patient, *one half* the quantity contained in a phial, should be given, UNMIXED, a little before, or at the first appearance of, the next returning paroxysm of a *manifest, concealed, or disguised* intermittent fever; the *other half*, also UNMIXED, after a lapse of three hours.

This second dose should never be omitted.

Thirdly. During the interval between the first and second doses, and also for a full hour after the second dose, the patient must abstain entirely from food and drink.

Fourthly. The phial contains five drachms of the Tincture, which are the two *special* doses for adults. For infants of ten or twelve months, half a scruple (twenty drops) will suffice, as the special dose; for young persons, this quantity must be increased, according to age and circumstances, up to the full dose.

Fifthly. Immediately after taking the first dose, the patient should retire to bed. The perspiration induced by the Tincture, should on no account be checked, but sustained and promoted, as far as possible, by quietness in bed, additional warmth of covering, and avoidance of draught.

Sixthly. In severe cases, where prompt action is particularly indicated, this Tincture may be taken at any stage of the fever,

* See page 81.—Tr.

without the *previous* use of emetic or purgative medicine; but the bowels should always be freely opened, as soon afterwards as circumstances will admit.

Seventhly. The two doses contained in a phial are, in ordinary cases, sufficient to remove completely the paroxysms of intermittent disorders, and to preserve the patient from relapse. But in *malignant, endemic, and disguised intermittent* fevers, wherein physicians ordinarily prescribe quinquina, and its alkaloids, in double and triple doses, it is necessary to administer, during the day following the cessation of the fever, a second phial of the Tincture, in doses of a teaspoonful, every three hours; and that a strict regimen should be observed.

Eighthly. In cases of intermittent fever, complicated with enlargement of the liver and spleen, with jaundice, or dropsy, it is required, for the radical cure of the fever, and to dispel the accessory complaints, that the Tincture should be used as prescribed in the foregoing clause, (No. 7,) for a shorter or longer period, at the discretion of the physician; according to the degree and duration of the complications, and to the prevalent endemic and atmospheric influences.

It is of the highest importance, that the foregoing directions relative to *abstinence from food and drink, the maintenance of perspiration, and the avoidance of exposure to cold*, should be STRICTLY observed.

In order to preserve the full strength of the Tincture after the phial has been once opened, it is necessary that it should be immediately and carefully re-corked.

(b.) *In continued and continued-remittent diseases.*

In *continued and continued-remittent* nervous and typhus fevers, the period of remission should, if possible, be selected for the employment of the Tincture.

The administration is, in other respects, the same as in intermittent fevers.

Half the quantity of the Tincture contained in the phial, is to be given *unmixed*, and the other half to be administered, *also unmixed*, after the lapse of *three hours*. The effects peculiar to the operation of this remedy are, generally, an increased activity of the cutaneous function, empyreumatic odorous perspiration, a greater vivification of all functions, cessation of delirium and headach, a moist tongue, a full, soft, and quiet pulse, free respiration, diminished thirst, refreshing sleep lasting some hours, dark brown fecal stools, and brickdust-like sediment in the urine. When these phenomena have manifested themselves, a considerable diminution of the morbid symptoms will be observed.

But as the above-mentioned continued and continued-remittent

fevers are not cured so much by decided crises, as by repeated minor crises, ("prothirte lysen,") one bottle is seldom sufficient to cut short ("coupiren") the paroxysm; and the further use of the Tincture, in doses of a teaspoonful every three hours, during some days, is requisite in such cases, according to their severity.

Although the special indications in the treatment of nervous and typhus fevers, are not yet definitely settled, this remedy should be chiefly administered when the *stadium nervosum* has already appeared; and when it becomes our duty to resuscitate the depressed vital powers, promptly and effectually, with volatile irritants and tonic remedies, to counteract the specific dyscrasy of the blood, and to guide the disease to a happy crisis.

Inflammation of the inner vital organs,—fever of decided inflammatory character,—active irritation of the stomach and the intestines,—a state of congestion,—organic disease of the heart,—the process of suppuration,—&c., are to be considered as important contra-indications.

* The marks of the packages and of the bottles, by which the genuineness of this medicine may be recognised, are as follows:—

On the outside.—Each long, four-sided phial, containing five drachms, is furnished with a lilac outer label, pasted lengthwise over two sides; the centre, which bears the family seal of the discoverer, being placed over the top of the phial. The division to the left hand of the seal bears the Imperial Royal Austrian arms, and the inscription, "Dr. Warburg's Fever Tincture, *Tinctura Warburgi*." That on the right hand is inscribed as follows:—"Authorized by His Imperial Royal Majesty's Supreme Resolution, dated January 30, 1847, intimated by decree of the High Chancery, No. 3747. Regency Ordinance, No. 7201, as a pharmaceutical preparation for the use of physicians throughout the Austrian Empire."

On the inside.—On the removal of the outer label, there next appears a wrapper of white paper, containing the printed instructions for use, at the foot of which is seen the impression of the family seal, and the *fac-simile* of the signature of the discoverer, "Carl Warburg, M.D." which signature and seal, perfectly resemble the seal and signature, upon the inner label affixed to the phial itself.

The label affixed immediately to the phial, covering the seal and two sides, and printed by a particular machine, contains along the edges, on a red scroll, the following words, printed white, in the German, French, English, Italian, and Spanish languages, "Dr. Warburg's Fever Tincture." In the centre of this label, which passes over the cork, is an impression of his family seal, and on the

left hand of the seal, on a blue ground, are the words, "Dr. Warburg's Vegetable Fever Tincture," in white German letters, and on the opposite side, "Carl Warburg, M.D.," written in *fac-simile*, also in white, on a blue ground.

On the four square sides of the bottle are these words, impressed lengthwise, in alto relievo, "Dr. Warburg's Vegetable Fever Tincture, Tinctura Warburgi." The bottle itself is of white glass, well corked, the cork impressed, in black sealing-wax, with the family seal of the discoverer.

AUTHENTICATION OF DOCUMENTS.

We hereby certify that the Documents hereunto annexed, under the Seal of the Imperial Royal Military Medical Commissariat, were in due legal form communicated to Dr. Carl Warburg.

Vienna, June 3, 1848.

JOSEPH WEBER,
Imp. Royal Councillor and Directing Provisor.

L. S.

FERD. REITTERER,
Directing Provisor.

That the above attestation is signed by the Imperial Royal Councillor and Directing Provisor of the Imperial Royal Military Medical Commissariat, Joseph Weber, and by the Directing Provisor, Ferd. Reitterer, with their own hands, and that the above Certificate is duly registered, is hereby certified by the Imperial Royal Judicium Delegatum Mil. Mixt.

Vienna, June 9, 1848.

L. S.

LINHARDT,
Auditor-General.

The genuineness of the above Signature of the Imperial Royal Auditor-General Linhardt, is hereby confirmed, from the office of the Commander-in-Chief of the Army.

Vienna, June 10, 1848.

L. S.

GRAF V. AUERSPERG,
Lieutenant Field Marshal.

The genuineness of the above Signature of the Imperial Royal Lieutenant Field Marshal Count von Auersperg, Commander-in-Chief of the Army of Lower and Upper Austria, is hereby officially certified, by the Imperial Royal Ministry of War.

Vienna, June 13, 1848.

L. S.

COUNT LATOUR,
Minister of War.

N. Order from the Imperial Royal Military Medical Commissariat.
No. 2207.

EX OFFICIO.—TO DR. WARBURG, M.D., OF THIS CITY.

In accordance with the rescript of the Imperial Royal Ministry of War, No. 2675, dated 17th instant, and of the Directory of the Academy of Saint Joseph, intimated the 25th instant, No. 2320, the Imperial Royal Aulic Council of War hereby orders 600

(say six hundred) phials of Dr. Warburg's Fever Tincture (*Tinctura Warburgi*).

In compliance with the above, you will, without delay, forward to the principal depôt of the Imperial Royal Military Medical Commissariat, the 600 phials, and at the same time to signify by letter to the Commissariat, what discount upon the fixed price, you are disposed to allow upon larger transactions with the Government.

From the Directory of the Imperial Royal Military Medical Commissariat.

August 27th, 1847.

L. S.

JOSEPH WEBER,
Imperial Royal Councillor, Directing Provisor.

O. Order from the Imperial Royal Military Medical Commissariat.

No. 2416.

EX OFFICIO. TO DR. CARL WARBURG, OF THIS CITY.

By command of the Presidium of the Aulic High Council of War, and by a note from the Directory General of the Imperial Royal Medical Department of the Army, of Sept. 17th, 1847, No. 2600, you will be pleased to deliver to the office of the Directory of the Imperial Royal Military Medical Commissariat, one hundred and fifty phials of your Tincture, if possible, in the course of to-day, or at latest between eight and nine o'clock to-morrow morning, as it is required to be forwarded at ten A.M.

From the Direction of the Imperial Royal Military Medical Commissariat.

September 17th, 1847.

L. S.

JOSEPH WEBER,
Imperial Royal Councillor, Directing Provisor.
FERD. REITTERER,
Directing Provisor.

P. Order from the Imperial Royal Military Medical Commissariat.

No. 2698.

EX OFFICIO. TO DR. WARBURG, OF THIS CITY.

In conformity with a Report of the Directory-General of the Imperial Royal Medical Department of the Army, to the Imperial Royal Aulic High Council of War, this High Office has ordered by endorsement of said Report, No. 3494, that you should supply fifty phials of your Fever Tincture. In accordance with this order,

you will be pleased, without delay, to deliver the said medicine to the principal depôt of this Commissariat.

Directory of the Imperial Royal Military Medical Commissariat.

Vienna, October 16th, 1847.

JOSEPH WEBER,

Imperial Royal Councillor, Directing Provisor.

L. S.

FERD. REITTERER,
Directing Provisor.

No. 1858.

Q. From the Directory of the Imperial Royal Military Medical Commissariat at Vienna.

EX OFFICIO. TO DR. WARBURG, M.D., OF THIS CITY.

In accordance with a verbal instruction of his Excellency the Minister of War, with reference to the rescript No. 2569, dated 20th instant, from the Directory General of the Medical Department of the Imperial Royal Army, you are desired to deliver immediately, at the Office of the above-named Directory, five hundred phials of your Fever Tincture, at the price of 1fl. 30 kr. per phial.

Vienna, July 21, 1848.

JOSEPH WEBER,

Imperial Royal Councillor, Directing Provisor.

L. S.

FERD. REITTERER,
Directing Provisor.

R. From the Directory of the Imperial Royal Military Medical Commissariat at Vienna.

No. 1900.

EX OFFICIO. TO DR. CARL WARBURG, M.D.

In accordance with the *videndum* of the High Ministry of War, Dr. Warburg will again and immediately furnish the Imperial Royal Military Medical Commissariat Depôt, with five hundred phials of *Tinctura Warburgi*.

The High Ministry of War has ordered this Directory to ascertain, whether Dr. Warburg is disposed to make any further reduction on the price, to which he has lately voluntarily reduced his medicine, in his transactions with the Government.

Vienna, July 25, 1848.

JOSEPH WEBER,

Imperial Royal Councillor, Directing Provisor.

L. S.

FERD. REITTERER,
Directing Provisor.

S.

REQUISITION FROM THE DIRECTORY GENERAL

OF THE MEDICAL DEPARTMENT OF THE
IMPERIAL ROYAL ARMY,FOR A SUPPLY OF THE FEVER TINCTURE, TO BE USED IN CASES
OF CHOLERA.

No. 3372.

IN accordance with your offer to the Ministry of War, to supply the Directory General of the Medical Department of the Imperial Royal Army, with your Tincture, to be employed in cholera cases, in the Imperial Royal Army, and which Tincture you would gratuitously furnish, in such quantities as might from time to time be required; the said Directory, as also that of the Academy of Saint Joseph, are directed by rescript of the Minister of War, dated 28th ultimo, No. 2718, to express the well deserved thanks of that office, for your timely offer, and to notify its acceptance of your liberality, to the extent of one hundred and fifty phials.

The Directory General of the medical department of the army, as well as that of the Academy of Saint Joseph, having thus acquitted themselves of the commission of the Minister of War, now request you to forward to the Imperial Royal Military Medical Commissariat, the said one hundred and fifty phials, together with the necessary instructions for its use, which will be immediately forwarded to Siebenburgen and Galicia for the above-mentioned purposes.

Vienna, Sept. 1, 1848.

I. R. BISCHOFF,
Aulic Councillor, &c.L. S.
To Carl Warburg, M.D.T. Acknowledgment of Receipt of 200 Phials of Tincture by the
Imperial Royal Military Medical Commissariat.

It is hereby officially acknowledged that Dr. Warburg of this city, has delivered gratuitously two hundred phials of his Fever Tincture,

(Tinctura Warburgi) to the chief depôt of the Imperial Royal Military Medical Commissariat.

From the Directory of the Imperial Royal Military Medical Commissariat.

Vienna, Aug. 31, 1848.

L. S.

FERD. REITTERER, *Directing Provisor.*

JOSEPH WEBER,

To Carl Warburg, M.D.

*Imp. Roy. Councillor and Directing Provisor.*U. Acknowledgment by the Directory General, of the additional supply
of Medicine to the Imperial Royal Military Medical Com-
missariat.

No. 3386.

The Directory of the Imperial Royal Military Medical Commissariat, having notified that you have delivered, at the principal depôt of this department, instead of 150 phials, (as specified in the requisition,) the increased quantity of 200 phials of your Fever Tincture; the Directory General feel it incumbent on them to add to its note of the 1st instant, 3372, its renewed thanks for the additional quantity received.

Vienna, Sept. 2, 1848.

L. S.

I. R. BISCHOFF,
Aulic Councillor, &c.

To Carl Warburg, M.D.

V. Translation from the "*Wiener Zeitung*," (the Official Gazette
of Austria.) No. 239. Vienna, Saturday, Sept. 2, 1848.

"PATRIOTIC DONATION.

"Dr. Carl Warburg has offered to the Imperial Royal Ministry of War, to supply that Department gratuitously with his known Tincture,—"*Tinctura Warburgi*"—to be used in such cases of cholera, as may occur in the Imperial Royal Army, and in such quantities as may be from time to time required.

"The Imperial Royal Ministry of War hereby publicly acknowledges its thanks, for this well-timed and generous offer."

With the author's compliments



POISONING IN INDIA.

By SIR J. FAYRER, K.C.S.I., M.D., F.R.S.

ONE of the most memorable acts of Lord William Bentinck's administration in India was the abolition of Thuggee. In carrying out the suppression of this remarkable organisation of fanatical and hereditary assassins, he was mainly assisted by the late Sir William—then Captain—Sleeman, who, by his extraordinary energy and intelligence, constructed and maintained a department which succeeded in ultimately tracing out and hunting down the gangs of murderers so completely, that the practice of Thuggee is now virtually extinct, the last conviction for this crime in the North-West Provinces having taken place about the year 1852.

This remarkable brotherhood of murderers and robbers is reported to have sprung into existence under the first Mahomedan dynasties, and has prevailed throughout India ever since, up to about 1860. In Akbar's reign as many as five hundred were caught and executed; but it is said to have been really of much more ancient origin, and that the evil doings of Thugs are represented in the bas-reliefs of the Temples of Ellora.

It seems to have become prominently known to the British, after the fall of Seringapatam in 1799, and until hunted down and exterminated by Sir W. Sleeman and the able officers who assisted and succeeded him, it was practised throughout India. By about the year 1860 it had become practically exterminated. The Thugs had been tracked, caught, convicted, and hanged or imprisoned. Some were kept as approvers, their lives being spared on condition of their giving information which enabled the authorities to detect and convict others. They were kept in confinement in depôts (Goinda-Khanas) in Jubbulpore,

LONDON:

SAVILL AND EDWARDS, PRINTERS, 4, CHANDOS STREET,
COVENT GARDEN.

Lucknow, Lahore, and other places; and contributed largely to the identification of their ancient comrades and fellow miscreants.

Thugs were of all castes of Hindus as well as Mahomedans, united, despite the difference in their creeds, in the worship of Kali; whilst after each murder a solemn sacrifice was made to the destructive deity by Hindus and Mahomedans alike. Their mode of destroying life was by strangulation; the victim was inveigled into their company, and when they sat down to eat, at a given signal one of the band, specially trained for the duty, passed a handkerchief (roomal) rapidly round the neck from behind, and by a firm and rapid twist strangled the unsuspecting victim, who was then buried on or near the spot. His companions, if he had any, were also destroyed and their property taken and distributed, something being set apart for religious purposes and votive offerings. "They travelled in bands, disguised as merchants or pilgrims, and were bound to the association by an oath based on the rites of the bloody goddess Kali." A fanatical association of murderers, they practised their fearful occupation in accordance with a religion founded on robbery and murder, and worshipped the pickaxe with which they dug the graves of their victims. They had signs and a vocabulary by which they recognised each other, and by which also they gave the signal of death.

In nine years, Dr. Balfour tells us, more than 2,000 were arrested; 1,467 were convicted of the murder of 947 persons; of these, 382 were hanged, 919 transported, 77 imprisoned for life, 92 for varying periods, 20 acquitted or escaped, 31 died whilst under trial, 250 were admitted as king's evidence. Some of them confessed with pride to over two hundred murders. Of those captured, the Bhutote or actual strangler was always hanged.

These strangling Thugs, called Phansigars (noose men) were distributed over India from the Himalayas to Cape Cormorin, and scarcely any part of the peninsula was exempt from their operations. They abstained, as a rule, from the murder of women, carriers of Ganges water, low caste persons, musicians, dancers, fakeers and Sikhs, but these too would be sacrificed if they witnessed the crime, and thus became a source of danger.

This widespread system of murder and theft has, through the determined and persistent action of the British Govern-

ment, aided by a band of well-qualified officers—among whom may be specially named as most conspicuous the Sleemans, Hervey Meadows Taylor, and Gould Weston—been now suppressed as far as the strangling Thugs are concerned; but the destructive instinct is still active where unrestrained by fear of penalties, and numbers of lives still fall victims to poisoning, not only ordinary individuals who are murdered for revenge or robbery or other reasons, or those who commit suicide, but others, destroyed by another variety or sect of Thugs, who, from using the datura plant as a lethal agent, have received the name of Daturiahs, and who pursue their nefarious trade of robbing and often murder of travellers or others on the roads or in towns and villages.

It would appear that since the suppression of Thuggee by strangulation, poisoning has become more frequent, though this also, under the active and vigorous administration of the British Government, is diminishing.

Chevers, writing in 1856, and again in 1870, says the crime, which appears to have become more prevalent since the check given to Thuggee by strangulation, is common throughout the three Presidencies of India. It is pursued systematically as a trade, and in great probability those who practise it are Thugs in the commonly received acceptance of the term; but he adds there is no positive evidence identifying the Meetawalla of Bengal and the up-country Daturiahs with the true Thugs or Phansigars. The term Meetawalla (sweetmeat man) was given to a class of robbers and poisoners who administered the poison concealed in sweetmeats, of which natives are so fond. The poison was not, however, always given for the purpose of destroying life, but with the intention of stupefying, and thus facilitating robbery or other crime against the person.

In 1844 Colonel Sleeman wrote that the impunity with which this crime was everywhere perpetrated was among the greatest evils with which the country at that time was afflicted. These poisoners were then as numerous over the Madras and Bombay Presidencies as in Bengal. No road was free from them, and he believed that throughout India there must be many hundreds who gained their subsistence by that trade alone.

There is good reason for believing that poisoning is not by any means confined to these professional murderers or Thugs, but that it is a common form of crime arising out

of the mental constitution of a timid race who, except when roused into a state of frantic excitement, are apt to prefer treachery to violence in the commission of crime; and that the profusion of lethal agents furnished by the variety of deadly plants, and the unrestricted freedom with which the most potent kinds of poison, whether mineral or organic, can be obtained in the bazaars, together with their familiarity with the use of hemp or opium, sufficiently accounts for the prevalence of the crime of secret poisoning.

No one who has lived long in India can have failed to observe the vigilance and perseverance with which the police authorities, aided by the scientific knowledge of the medical officers, are battling with this important element in its criminal records; and there is good reason for believing that their labours are not without success, and that not only the crime, but the demoralisation which prompts it, is on the wane.

The valuable works of Waring, O'Shaughnessy, Chevers, Lyon, K. L. Dey, Dymock, and many others have made us acquainted with the various mineral and vegetable substances which have made the crime so easy; and have taught the methods of detection so well that the ever vigilant police are enabled to trace out and procure conviction in a large number of cases, and thus to render the risk to the malefactors so great as to deter from much crime which otherwise would be but too certainly committed.

In a brief notice of this kind it is not possible to do more than glance at even the most important of these poisons—even to name them all would exceed available space.

Among vegetable poisons one much in use for criminal purposes is the datura (*Datura fastuosa*). This plant is common in India, and the natives are very familiar with its effects as an intoxicant and death-dealing drug; so common has been its use for criminal purposes that it has given its name to the class who use it—the Daturiahs are regarded as the successors of the Phansigars or stranglers; and, indeed, though no direct connection has been traced in their relations to each other, it is very probable that as the strangling was suppressed, murder for the purposes of robbery and fanaticism was relegated to the datura, and the infamous occupation carried on with this less easily detectable agent. But this drug also, no doubt, has long been in use for the more vulgar and commonplace robbery where the intention was not that of destroying life, but of

hocussing, so as to enable theft to be more easily committed, the victim being left in a state of stupor or unconsciousness, to recover or die as the case might be, death no doubt being frequently accelerated, if not caused, by exposure to the sun's rays and vicissitudes of weather.

The datura has three species: *D. fastuosa*, a purple flower; *D. alba*, a white flower; *D. stramonium*. The first is the one in most common use, and is perhaps the most active; it is given in various ways, the seed being the usual form in which it is administered for poisoning purposes. A box containing some preparations taken from a professional poisoner contained: 1, datura seeds; 2, powdered seeds fit to mix with food; 3, distilled essence of datura used with sugar, tobacco, flour; 4, flour mixed with datura flour. This poison, no doubt, is used frequently for the purpose of drugging only, and not with the intention of destroying life. Dr. Burton Brown, of Lahore, records 20 deaths in 92 cases, Harvey 20 deaths in 123 cases, Bombay Analyser 24 in 138 cases of datura poisoning.

But though datura has attained such an evil reputation as being the drug used by a class of road poisoners, it is not by any means so frequent a cause of death as some other drugs. The two poisons most commonly used being opium and arsenic; next to these probably may be placed datura; but, as before stated, it is more used for the purposes of drugging and theft than for murder, though it frequently proves fatal. Lyon tells us that in the year 1884 over 90 per cent. of the deaths from poison reported to the chemical examiner were due to either opium or arsenic; and during the ten years ending in 1884, these poisons caused over 72 per cent. of the cases, and more than 87 per cent. of the deaths from poison reported to the Bombay chemical examiner. Arsenious oxide is used both for homicidal and suicidal purposes, and largely also as a cattle poison. Here it may be remarked that the jequirity or *abrus precatorius* is not infrequently used as cattle poison. Except for infanticide and suicide, opium is not so much used homicidally.

Other vegetable poisons are aconite, oleander, nuxvomica, and various euphorbias. The seeds of *cerbera thetiva* are sometimes used as a cattle poison, whilst the euphorbias and the *plumbago rosea* are used, sometimes with fatal consequences, as local irritants to produce abortion, but there are several others known to and used by

the natives for the purpose of poisoning for revenge, for causing abortion, or even for suicide, but those previously mentioned are the most commonly resorted to. Again, among mineral poisons well known to and procurable in the bazaars, are compounds of copper, cases of poisoning frequently occurring accidentally from contamination of food by the copper cooking vessels.

The cyanides and other poisons known to science cause occasional deaths, but they are not those in common use, and are not specially characteristic of poisoning in India. The chemical examiners' reports for 1884 give the following statement for ten years ending 1884, in Bombay.

Arsenic ...	507
Opium ...	151
Datura ...	74
Copper ...	50
Mercury ...	29
Lead ...	19
Other metals ...	5
Pounded glass ...	31
Strychnine ...	17
Oleander ...	8
Aconite ...	6
Alcohol ...	6
Plumbago ...	6
Cucurbitaceous tubers ...	5
Oxalic acid ...	4
Acid and alkaline corrosives ...	3
Cyanides ...	3
Other poisons ...	23

947

Lead poisoning is comparatively rare in India; preparations of mercury are not infrequently the cause of poisoning in the forms of calomel and corrosive sublimate; but as before stated, arsenious acid is the mineral poison best known and most used.

Deaths from Poison, shown in the Chemical Examiners' Reports for the Year 1884.

	Arsenic.	Opium.	Datura.	Other.	Total.
Bengal ...	22	53	—	8	83
Madras ...	19	4	—	8	31
Bombay ...	22	9	1	3	35
Punjab ...	45	18	1	1	65
N.W. Provinces	29	17	1	1	48

In the Bombay Presidency in ten years ending 1884, the chemical analyser reports:

	Poisoned.	Deaths.
Arsenic ...	652	305
Opium ...	142	131
Datura ...	146	22
Other poisons ...	155	42*
	1,095	500

* Eight of these from strychnine and four from oxalic acid.

Cattle Poisoning in India in 1884, reported by Chemical Examiners.

Bengal ...	41
Madras ...	38
Bombay ...	51
Punjab ...	147
N. W. Provinces ...	11
	288

Cattle Poisoning in Bombay Presidency detected in Ten Years ending in 1884.

Arsenious oxide ...	696
Arsenious oxide with sulphides ...	9
Arsenious oxides with oxides of lead ...	9
Sulphides of arsenic only ...	11
Oxides of lead only ...	6
Sulphate of copper ...	6
Nux vomica ...	1
Cocculus indicus ...	3
Mercury ...	1
Sulphate of iron ...	1

743

Altogether 677 animals died from poison in ten years.

The statistics are not at present accessible by which could be shown the mortality from poisoning, intentional for homicide, drugging and robbery, suicidal, accidental; but sufficient has been said to show that it is considerable; and if to this be added the deaths from snake bite, which at the lowest estimate are over 20,000 a year for all India, it is plain that the mortality from various forms of poisoning is very considerable.

The subject in all its aspects is well known to the authorities, and it may be confidently asserted that whatever is possible by the vigilance of police and the science of medicine is being done to abate the evil, and there is good reason to believe that it is being gradually mitigated.

*For the Greeley Library
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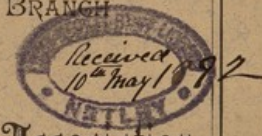
VOL. I. JANUARY, 1892. PART II.

TRANSLATION OF

THE BURMA BRANCH

OF THE

British Medical Association.



CONTENTS

ADDRESS BY

Deputy Surgeon-General

C. SIBTHORPE, I.M.S.,

PRESIDENT OF THE BRANCH.

Rangoon:

PRINTED AT THE HANTHAWADDY PRESS,
1892.

JOHN BALE & SONS, Printers, 87-89, Great Titchfield Street, Oxford Street, W.



Address by Deputy Surgeon-General C. Sibthorpe, I.M.S.,
President of the Burma Branch, delivered on the
5th February 1892.

GENTLEMEN,—Your selection at the Annual Meeting of the Branch in January has placed me again in the position of your President, an honour, for which, I have now much pleasure in thanking you. I hope that next year's work will be even more successful than that of the past one. You will remember that our first meeting to inaugurate this Branch was held in October 1890. The Branch was recognised by the Council of the Association on the 30th March 1891. Since then we have held six meetings at which six papers of professional interest were read, and several patients and morbid specimens exhibited. At most of these meetings we had pleasant discussions which I hope has enlarged some of our ideas.

We began our first year with only eleven members, and now we have thirty-two. We have had no losses during the year.

I now wish to bring to your notice some notes I have made on the sickness and mortality amongst the troops, British and Native, on Field Service in Burma from 1885 to 1888 during the annexation and occupation of Upper Burma.

Allow me first to call your attention to some information which I have been able to compile regarding the sickness and mortality in former wars in Burma.

First Burmese War.—You will find in the *British Burma Gazetteer** the following statements regarding the first Burmese War of 1824 and 1825. "The number of lives sacrificed was, considering the few who were killed in action, almost incredible. Major Alexander Tullock in his report on the sickness and mortality amongst Her Majesty's troops serving in the Burmese Empire, which was presented to both Houses of Parliament in 1841 says:—the whole number of British troops that landed in Rangoon in the first instance, comprising the 13th, 34th, 41st, 45th, 49th, and 87th, Regiments, was, exclusive of officers, 3,586. The number of reinforcements does not appear, but that of the deaths was 3,115, of which not more than 150 occurred in action or from wounds. Of about 150 officers 16 were killed in action, or died in consequence of their wounds, and 45 died

* Vol. I, page 342.

of disease. In Arakan the loss in action was none, but of the average strength of the two regiments the 44th and 54th, amounting to 1,004 men, 595 died in the country in the course of eight months, and of those that quitted it, not more than half were alive at the end of twelve months.*

Sir R. Martin says that 5,500 British and native troops serving in Arakan in 1825-26 were struck down by the malignant fever of the country, and that every one who was not dead was in hospital. He draws especial attention to the fact that scorbutic dysentery was by far the most fatal and prevalent disease amongst the European portion of the expeditionary force in 1824-25, and that 48 per cent. perished in six months.*

Laurie† attributes the sickness which nearly decimated the regiments, in Burma to malaria and inaction the result of the heavy periodical rains flooding the land, and to difficulties in getting supplies. It appears from a return drawn up by Lieut. Colonel Kelly, the Deputy Adjutant General, that during the first year $3\frac{1}{2}$ per cent. of the troops were killed in action, while 45 per cent. perished from disease. In the ensuing year the mortality from the same causes had decreased one-half, but the total loss during the war amounted to $72\frac{1}{2}$ per cent. of the troops engaged. There were present at Rangoon on the 1st January 1825, officers included :—

Artillery, including rocket troops	...	1,071
European Infantry...	...	4,146
Native Infantry, &c.	...	7,628
Total	...	12,845 men.

At Arakan and the S. E. frontier, on the 1st February 1825, there were 9,937; and at Prome, on the 11th August of the same year, 12,110. The loss from the commencement to the close of the war was :—

	Killed.	Deceased.	Total.
British Officers	24	41	65
Native do.	6	28	34
British Non-Com. O's			
rank and file	105	3,029	3,134
Native do.	90	1,305	1,395
Extra, killed, deceased and missing	...	...	450
Total	...	...	5,078
According to Dy. Adj. Genl.'s return	...	...	5,080

* Prevention of Disease in Tropical Campaigns, Duncan, pages 113, 132 and 169.

† The Second Burmese War page 15 and 16.

What were the causes of all this sickness and mortality? Laurie,* quoting from reports published at the time, states that the privations and sufferings of the troops at Rangoon towards the end of November 1824 were painfully aggravated. The constant use of salt provisions had added to the disease which preyed on them before—scurvy. The heavy rains were ended in October. Ships took four months in the voyage to Calcutta and back bringing succour. Sheep and poultry were sold at rates incredibly exorbitant and could only be bought by the half-famished officers. Pineapples, limes and citrons were eaten unripe by hungry soldiers and proved fatal to hundreds of dysenteric sufferers. Bread was only supplied in the hospitals. Rice, salted beef, pork and biscuits, (seldom fresh, generally mouldy and full of insects) formed the food of the British troops. Medicines were not abundant or well assorted. Medical comforts were very scarce. Milk was not obtainable.

Dropsy, dyspepsia and acute hepatitis were very common. Dysentery and diarrhoea produced fearful ravages. For dysenteric, hepatic, dyspeptic and scorbutic patients there was neither milk, vegetables, farinaceous food nor nutritious broths.

Second Burmese War.—Regarding the statistics of this war I have found it very difficult to get any reliable information. In Laurie's† book he states that the force engaged in the taking of Rangoon on the 11th 12th and 14th April 1852, consisted of;—European troops 2,727, and Native 3,040, total 5,767. Of these 17 were killed and 132 wounded :—

	Killed.	Wounded.
British Officers	2	14
" Non-Com. Officers rank & file.	7	89
Native " " "	8	29
Total	17	132

He says that on the 11th May the 18th Royal Irish had only 70 men in hospital, while the 49th B. N. I. had upwards of 300. H. M.'s 51st had, up to that time, lost 50 men by disease. The Wing of H. M. 80th and the Artillery were tolerably healthy. The rains commenced on the 12th May. Towards the end of June and during July the troops were on the whole healthy. On the 21st June H. M.'s 18th R. I. had 97 men, the 80th Regt.

* Second Burmese War page 256.

† Second Burmese War page 104.

46 men, the 40th N. I. 103 men, and the 67th N. I. 84 men in hospital. The deaths amongst the Bengal troops from the middle of May to the middle of June had been nearly as follows :—

	Men.	Deaths.
H. M. 18th R. I. ...	805	8
H. M. 80th Wing ...	425	7
40th N. I. ...	1,080	6
67th N. I. ...	990	1

The deaths were principally from cholera but dysentery afterwards prevailed.

Third War in Burma.—The table I lay before you gives what statistics I have been able to compile regarding the sickness and mortality of the troops British and Native from November 1885 to the end of March 1888.

You will first note that I have been unable to get the average strength of the troops at all correctly ; secondly that no attempt appears to have been made to deal with the sickness and mortality amongst followers.

During the first period the troops proceeded, comfortably housed in good river steamers and their flats, to the occupation of Mandalay, they were well fed, the hospitals were well manned, equipped and located on a separate fine steamer with at first two and afterwards three flats. The only fight worth mentioning was the assault of the fort at Minhla.

The total admissions were only 195, of these 22 died, four of these deaths occurred during the fight at Minhla from wounds and fifteen were due to cholera, one was due to dysentery, one to diarrhoea, and one followed a gunshot wound of the thigh in a native non-commissioned officer. The only deaths amongst the British Troops were three and these were due to cholera. Of the 195 admissions 48 were due to cholera, 29 to wounds, 118 to other disease with the small mortality of two.

The second set of figures includes the first, and deals with all the sickness and mortality up to the end of January 1886 when the expeditionary force was broken up and during which period the men were in camps in river stations on the banks of the Irrawaddy or housed in Mandalay. They did not suffer from exposure, want of food or good hospital arrangements. The admissions were, British Troops 885, Native Troops 1,118, followers 730 ; of these 19 died. Of the admissions 271 were due to cholera of which 154 died. Of the

in Burma from 1885 to 1888.

	Remarks.	Authority.
	3 deaths amongst British Troops from Cholera	G. O. Military Department, Madras No. 1299 of 1st March 1886.

Table showing Sickness and Mortality amongst Troops on Field Service in Burma from 1885 to 1888.

Dates and formation of Forces.	Strength of Troops and Followers.	Total sick.	Died.	Invalided.	Wounded and died.	Cholera and died.	Principal diseases.	Cause of death.	Remarks.	Authority.
Burma Field Force during river expedition till occupation of Mandalay 1st November 1885.	Estimated 10,000 troops. 1/3 British Troops. 2/3 Native Troops. Naval Brigade 41 officers, 423 men. 2/1 R.A. 5 " 89 " 9/1 Crinque Forts, R.A. 6 officers, 117 men. 3/1 9th Scottish, R. A. 6 officers, 117 men. 4/1 North Irish, R. A. 6 officers, 115 men. 2nd Kings Liverpool Rgt. 21 officers, 702 men. 1st Royal Welsh Fusiliers 19 officers, 774 men. 2nd Hampshire Regiment 21 officers, 747 men. Staff and Departments 35 officers, 28 men. Medical Staff 25 officers, 12 Warrant officers. 1 Coy. Bengal Sappers. 3 Coys. Q. O. " 2nd Bengal N.I. 11th " " N.I. 1st Madras Pioneers. 3rd P. L. I. Madras. 12th Madras N. I. 21st Madras N. I. 23rd W. L. I. Madras. 25th Madras N. I.	195	22	None.	4 in action, 29 cases 1 died in Hospital Gun-shot of thigh Native Havildar.	48 cases 15 died	118 cases with 2 deaths.	1 Dysentery 1 Diarrhoea	3 deaths amongst British Troops from Cholera	G. O. Military Department, Madras No. 1299 of 1st March 1886.
Burma Field Force from 1st week in Novr. 1885 till 31st January 1886 under Lieut. General Sir H. W. D. Prendergast, K.C.B.	Same strength as above.	2,732 B. Troops 885 Native 1118 Followers 730.	190	Only 23 sent to Base Hospi- tals at Thayetmyo.	6 Deaths in action. Wounds and inju- ries 51, 5 died.	271 cases. 154 deaths.	Fever 67 (including 3 enteric). Syphilis 357. Rheumatism 57. Nervous diseases. 10. Diseases of the respi- ratory system 59. Dysentery 56.	Dysentery 15. Diarrhoea 3. Bronchitis 2. Pneumonia 4. Debility 1. Elephantiasis 1. Disease of heart 1. Remittent Fever 3. Enteric " 1. Total 31.		G. O. Military Dept. Madras No. 5018 dated 19th August 1886.
Burma Field Force from 1st March to 1st August 1886, under Major-General Sir G. B. White, K.C.B.	British Troops. Somersetshire Regiment. Liverpool Regiment. Royal Welsh Fusiliers. Hampshire Regiment. 2 Garrison R.A. Batteries 2 Mountain Batteries. 3 Companies Saps. & Min. 2nd, 11th & 18th B.N.I. 26th, 27th, & 28th P.I. 43rd Assam L.I. 1st, 3rd, 12th, 21st, 23rd and 25th M.I. 1st, 5th and 25th L. I. Bombay. 2nd Madras Lancers. 4,000 Military Police.	No Records.	B. Troops 139 3 being officers, Native Troops 98	455 B. Troops, 29 officers, 470 Native Troops.	39 killed in action in- cluding 3 officers, 148 cases 4 being of- fers with 29 deaths in hospital 2 being officers.	Not recorded : only sporadic cases. Epidemics amongst 5th Bombay L.I. and 49th Assam L.I.	Malarial fevers Bowel complaints Venereal amongst Eu- ropeans	Principally dysentery and diarrhoea		Surgeon Major Mackinnon, D.S.O., Re- port published in Madras 1887.
Burma Field Force from 1st March '86 to 31st March 1888 under Maj.-General Sir G. B. White, K.C.B., Lieut.-Gen. Sir H. Macpherson, V.C., K.C.B., C.-in-C., Sir Frederick Roberts, V.C., C.-in-C., and again under Sir G. B. White, K.C.B.	Average strength 4,840 British Troops. 15,744 Native Troops at times reached 20,000 troops or 6,000 British 5,620 Bengal 7,800 Madras 2,300 Bombay 195 British Officers	21,219 67,116	614 1,013	2,454 - 27 p. ct. due to ague. 5,547	81 cases, 21 deaths. 79 killed in action or died of their wounds. 13 Wounded. 5 Killed in action or died of their wounds.	299 deaths 216 admissions 114 deaths	British Troops. Fever, Dysentery, Diarrhoea, Vene- real diseases, Malarial Cachexia, Enteric, Cholera and Liver affections. Native Troops. Fever, Diarrhoea & Dysentery form 73 p. ct. of the admis- sions, 50 cases of Be- ri ber, 15 being fatal Fever the chief causes 7 enteric, 4 cholera 35 dysentery and di- arrhoea 13 wounded.	111 fevers 20 drowning 46 per cent. due to fever dysentery and diarrhoea 3,049 admissions venereal 117 enteric 49 admissions sunstroke 2 scurvy 2 Medical staff officers died of cholera 2 ague with fever 2 enteric 3 cholera 1 concussion of brain	9,860 admissions or nearly half (46 per cent.) for ague remittent and continued fever 12,756 admissions from diarrhoea and dysentery. 3,049 admissions venereal 117 enteric 49 admissions sunstroke 2 scurvy 2 Medical staff officers died of cholera	Medical History Field Operations Burma from 1st March 1886 to 31st March 1888 by Deputy Surgeon-General Far- rell, C.B.—W. Ball and Co., Lahore.

2,462 admissions from other diseases, which includes wounds and injuries, only 36 proved fatal. Of these 36 deaths, 5 were due to wounds and injuries, 15 to dysentery, 3 to diarrhoea, 2 to bronchitis, 4 to pneumonia, 1 to debility, 1 to elephantiasis, 1 to disease of the heart, 3 to remittent fever, 1 to enteric fever. There were also six deaths in action due to wounds.

The third set of figures deals with the sickness and mortality during what was a much more trying period for the troops, viz. from the 1st of March to the end of July 1886, when they suffered much from exposure during the hot weather and rains (the most unhealthy period of the year in Upper Burma) on field operations carried out with a view of suppressing the outbreaks of armed resistance and dacoity which set in. During these expeditions which were chiefly in the valley of the Irrawaddy there was often great difficulties about food and transport, and the medical arrangements were weak and inadequate even in the stations from which the troops were sent out and to which they brought back their sick and wounded.

The following information is principally taken from the report of Surgeon-Major Mackinnon, D. S. O. Numerous posts were occupied either by a few Native Troops or by mixed forces consisting of from 3 to 400 men. There were generally about 3,000 troops in Mandalay. During this period about 250 columns of varying strength and composition as regards troops were sent out from the different posts, principally from Mandalay, to suppress the insurgents. These were attended with varying success, generally a few of the enemy had been killed, one or two of our own men killed and a few wounded, while the main body returned to their posts exhausted from fatigue and exposure. The diseases they suffered from were principally malarious fevers and bowel complaints. There was much venereal amongst the British Troops. The wounded throve fairly well, and very good results were attained by conservative surgery and the aseptic treatment of wounds. Intractable diarrhoea merging into dysentery caused much sickness: acute hæmorrhagic dysentery was common. There were only a few cases of pure enteric fever recorded but the so-called typo-malarial was common amongst Europeans. Only a few isolated cases of cholera appeared in nearly all the posts though it prevailed throughout the province amongst the inhabitants. An outbreak occurred at Myinmu where the 5th Bombay L. I. lost several men and an Hospital Assistant. The 43rd Assam L. I. (Ghurkhas) suffered from a severe epidemic on their way up to the river and were ordered

into a sanitary camp at Yeanangyoung. After a second change to an island near Pagan the epidemic passed away but not until 55 men had died.

Causes of the Sickness. According to Mackinnon many of the posts were established on long used ground and without regard to elementary hygienic rules: he instances Mansi which was situated in a swamp where, after the rains set in late in May, the troops commenced to sicken and the hospitals were over-crowded with as many as 400 sepoys out of a force of 1,100, and 100 British troops out of 350 men.

Bhamo is also described as being situated partly on a swamp with small hillocks on which the huts were erected; the ground was infected with ordure and the stench was most unpleasant.

Katha was situated on the river with a large swamp behind it, the sanitary conditions were much the same as at Bhamo, fevers and bowel complaints became very prevalent.

Mogaung was also found very unhealthy and had to be evacuated. The stations on high ground such as Shwebo, Kyaukse, Pagan and others were fairly healthy. The heavy duties caused severe strains on all ranks. He says, "after the Kat-roon expedition from Bhamo the troops returned much depressed in *morale* and sensitive to disease, they had passed four nights and days in constant rain on a mountain and returned heart-broken and bedraggled."

As regards food he states that the rations for European troops were very fair, the beef was good but the bread was sometimes of indifferent quality. Amongst the Native troops meat was the great desideratum. The Bengal troops who were meat eaters could not thrive on the rice and dhall ration; the price in the market of meat was prohibitive. After due representation meat was issued bi-weekly, also opportunity was given to the men to buy meat at moderate prices. Goats were imported in large numbers and all the native troops appear to have improved in health after this indulgence which was really only conducing to the efficiency of the force as a fighting machine.

Casualties.—These, though not excessive, had been severe owing to the guerilla mode of warfare adopted by the insurgents. An ambuscade was carefully prepared across the track of our troops in an advantageous position, two volleys were poured in when the head of the column appeared, by the time the troops had extended and carried the position, the enemy had disappeared to the next point of vantage where the same

manœuvre was repeated. Between the first of March and the 31st of July, 3 officers and 36 men had been killed in action, 2 officers and 27 men died of wounds, and 4 officers and 144 men survived their wounds. Some of the wounds were most severe in character. Some have been serious owing to the eccentric courses taken by split bullets, slugs and other projectiles.

The fourth set of figures includes those of the third and deals with the sickness and mortality of the troops during the prolonged operations which ended in the pacification of Upper Burma. It deals with a period in which the troops were much exposed and large numbers of them constantly on the war path where it was often difficult and even impossible to feed or house them properly or make adequate hospital arrangements on account of the difficulties of transport.

Deputy Surgeon General Farrell, C. B. says there was an average of about 4,840 British and 15,744 Native Troops employed; at times, however, the strength of all ranks reached 26,000 men, of whom 6,000 were British, 5,600 Native Troops Bengal army, 7,800 Madras army, and 2,300 Bombay army. The principal reinforcements arrived during the early part of the cold weathers of both 1886 and 1887, the relieved troops leaving Burma after the cold weather operations were completed.

The principal military operations were carried on during the cold weathers (December to March) of both years though a good deal of exposure of troops had to go on during the more unhealthy time of the year (May to November) in a climate which Dr. Farrell describes as "relaxing and enervating without recuperative power. Heat, moisture, extensive floods, with jungle and decaying vegetation combined to produce a highly malarious climate and one inimical to the health both of Europeans and natives of India."

He describes the main features of the operations in the following words "This guerilla warfare was of necessity a great strain on the troops, small bodies of which were constantly employed in the pursuit of dacoits in all weathers, at the shortest notice, and for indefinite periods; during those operations they were exposed oftentimes in the unhealthiest localities to all the privations inseparable from active service in a highly malarious climate."

Sickness and mortality.—British officers:—the average strength is given as 195, there were 376 admissions, 13 died and 86 were invalided. British Troops.—Average strength 4,840, admissions 21,219: 614 died and 2,454 were invalided.

Native Troops.—Average strength 15,744, admissions 67,116, died 1,013, invalided 5,547.

The deaths from wounds received in action, British officers 5, British Troops 21, Native Troops 79.

The chief forms of disease were the various types of malarial fevers and cachexia, dysentery, diarrhoea, cholera, enteric fever (117) cases, venereal (3,049 cases) and hepatic affections amongst British Troops.

He considers the malarial fevers of Burma "appear to possess a distinctive type, the patient seems to become quickly saturated with the fever poison, inducing a condition of malarial cachexia manifested by a peculiar discoloration of the skin, paleness of the gums, sunken eyes with a leaden hue of conjunctiva and extreme debility."

Fevers, diarrhoea and dysentery caused amongst Native Troops 73 per cent. of all the admissions.

There were only fifty cases of beriberi amongst Native Troops, of which 15 proved fatal.

Two regiments, the 14th and 17th M. I. had to be sent back to India owing to the broken health of the men. The 14th M. I. arrived in Burma in May 1887 and garrisoned Kawnlin. In nine months there were 6,790 admissions 544 transfers from sickness and 197 deaths per thousand of strength.

He ascribes the sickness to exposure and hardships in a highly malarious climate and, in the case of the Native Troops, to inadequate and unsuitable food and home sickness. There was great difficulty in obtaining the same diet for the Native Troops in Burma to which they were accustomed to in India. The rations supplied were sometimes inferior in quality and the flour (attah) often deteriorated owing to exposure to climatic influences so as to become nearly useless as an article of food.

It was often quite impossible for the men to obtain sufficient supplies of meat, fresh vegetables or fruits. The British troops were, as a rule, well looked after as regards their food supplies.

During the period from October 1886 to June 1888, two General Hospitals were opened in Rangoon to deal with the men invalided from Upper Burma.*

The one for British Troops was open from the 20th October 1886 to the 18th November 1887; the one for Native Troops and followers from the 1st October 1886 to the 30th June 1888.

* See G. O. Madras No. 6,020 dated 2nd September 1889.

General Hospital, British Troops.—105 officers; 1,349 warrant officers, non-commissioned officers, rank and file were admitted. Officers, 18 were discharged to duty, 2 transferred, 2 died, and 83 were invalided. Of the others 120 were discharged to duty, 21 died, and 1,053 were invalided.

Deputy Surgeon General Donnelly ascribes the fact that so few returned to duty to their having contracted diseases due to climatic causes and that the climate of Rangoon was not conducive to the recovery of their health. It was recognised that no good end could be attained by detaining sick in Burma where so few showed any signs of wishing to recover, and return to their duty and the privations and fatigues of the field. The principal diseases were enteric fever 24, ague 401, remittent fever 55, malarial cachexia 4, debility 174, venereal diseases 79, dysentery 141, diarrhoea 61, diseases of the liver including abscess 86, gunshot wounds 14, other diseases 20. No cases of scurvy are noted.

Deaths.—The total numbers were, officers two, one from apoplexy and one from abscess of the liver, men 21, two from enteric fever, three from dysentery, two from remittent fever, three from tubercle of the lung, one from acute ascending paralysis, one from epilepsy, one from pneumonia, one from pneumonia phthisis, three from hepatitis and four from abscess of the liver.

General Hospital Native Troops and followers.—Dr. Donnelly says, "close on 6,000 persons passed through its portals, only 400 recovered to return to their duties in the field."

The causes which combined to produce this result he describes as complex and numerous, firstly, came the debilitated condition of the sick on admission and secondly, the peculiar character of the climate of Rangoon, which, though salubrious enough for those in good health, is well known to be highly inimical to the recovery of that health when destroyed by any cause whatever. The sick had acquired their diseases during the hardships and privations incidental to campaigning in a highly malarious climate and in a country where food supplies were difficult if not impossible to obtain. All that could be hoped for in Rangoon was to restore them to convalescence so as to fit them to travel to their native countries. He describes the condition of the transfers on arrival at Rangoon as being deplorable. They were emaciated sometimes to the last degree, and this was not altogether owing to malaria or actual disease, but was, in a great measure, produced by a want in

the field of food suitable for persons no longer in robust health. Amongst those whose condition were most pitiable on arrival few could help noticing the followers. Their work had been heavy, many had been badly selected and were quite unfit physically to cope with the climate and privations; they were only fit to be sent to their own homes for discharge when they became fit to travel.

Principal diseases.—Malarial diseases or their sequelæ 2,099, debility and anæmia 1,043, dysentery and diarrhœa 904, diseases of the lungs 250, rheumatism 244, venereal affections 210 (of which only 71 were sepoys), ulcers 192, insanity and nervous affections 72, beriberi 22, other diseases 412. The total number of wounds and injuries was only 177.

Deaths.—Total 236, native troops 150, followers 50, dysentery and diarrhœa 100, malarial diseases 46, debility 34, syphilis, diseases of the lungs 20, beriberi 4, cholera 3, scurvy 2, ulcers 3, gunshot wounds 1, other diseases 20.

Invalided.—There were 4,963 invalided, 3,352 native troops and 1,601 followers.

There are many points of interest to military men and particularly to medical men in these figures. Note first the success of the expeditionary force, about 10,000 men with a sick list of only 118 cases with two deaths from ordinary disease during the month of November 1885. Cholera caused 48 admissions and 15 deaths.

Look next at the contrast of the sickness and mortality during the first Burmese War, where practically, if there has been no reinforcements, the troops would all have disappeared from sickness alone.

Under the better hygienic rules as regards food, clothing, &c. that existed in 1886 to 1887, out of an average strength of about 4,840 British Troops and 15,744 Native Troops there were only 614 deaths on service and 21 in the General Hospital amongst the British Troops; 1,013 deaths on service and 150 in the General Hospital amongst the Native Troops. Others of course died after their transfer to India but nothing like the proportions in 1824 and 1825.

The third point that strikes one is the fact that so little scurvy was noted; amongst the British Troops no cases were diagnosed as such, and only two deaths from it were recorded amongst the Native Troops. This also is a great contrast to the experience in the first Burmese War where most of the deaths were caused by scorbutic dysentery.

The fourth point of interest is the prevalence of malarial fevers and their sequelæ and the numbers of cases of dysentery and diarrhœa treated. Taking the figures roughly, these three diseases caused about 73 per cent. of the sickness and mortality.

The fifth point is the few cases of fatal gun shot wounds there were, the figures given in the available returns are most confusing but still show that the number killed, or who died of their wounds was relatively very small; the total deaths from wounds as recorded in these returns was only 116 including 8 British officers.

A very interesting question presents itself to us as Military Medical officers, and this is "*How would it have been possible to reduce the great suffering and consequent loss of efficiency caused by the diseases due to malaria, dysentery and diarrhœa?*"

We have, as military medical officers, been accused by a very high military authority of not thoroughly realizing due responsibilities as laid down in regulations either as regards the sick or as regards sanitary matters.*

Our duties regarding both are clearly enough laid down in regulations and let me remind you that, as regards sanitary matters,† "Medical officers are charged, not only with the medical care of the sick, but with the *duty* of recommending to commanding officers, verbally or in writing, whatever precautionary measures as to barracks, encampments, garisons, stations, hospitals, transport, diet, dress (as authorized by regulations), drills and duties, as may, in their opinion, conduce to the preservation of the health of the troops, or to the mitigation or prevention of disease in the army."

They are also directed to put into writing any representations which have not been complied with and to send a copy of it for the information of the administrative medical officers.

The duties of officers commanding are also clearly laid down, if they do not comply with such representations they are bound to send them on, with their own reasons for not doing so, for the orders of higher military authorities.

Regarding the prevention of the important diseases, malarial fevers and their results, dysentery and diarrhœa, let me remind you of some of the most important steps

* Answers 1,551 and 1,534, of Major General Sir R. D. Buller, K.C.B., K.C.M.S.V.C., to the committee appointed to enquire into the pay, status and conditions of service of the medical officers of the army in 1889.

† See Army Regulations India, Vol. VI Medical, Section XIX, and particularly para 1554.

which should be taken to avoid or prevent them, for we know that, to a great extent, they are preventable even on active service.

Before proceeding any further let me recommend to the notice of those who are not acquainted with it, the valuable prize essay of Surgeon Major A. Duncan, M.D., of the Indian Medical Service, Bengal Establishment, on the "Prevention of Diseases in Tropical and Sub-Tropical Campaigns." It is a work which I consider should be in the hands of every medical officer in the army and to which I am indebted for many of the points I now bring before you.

Prevention of diseases due to malaria.—I need not in this place discuss the specific origin of diseases due to malaria but let me remind you of the three conditions of life under which the poison is known to flourish:—

- (a) A temperature not lower than 20 C.
- (b) A moderate degree of permanent humidity in the soil.
- (c) The direct action of the oxygen of the air on the strata of the soil which contains the ferment.

Selection of Men.—It is well known that one attack of malarial fever confers no immunity. On the other hand it leaves the subject more liable to attacks and less able to resist them. As regards age it is well recognised that young men suffer most. As regards race I am convinced that the flesh eaters and good feeders resist the action of malaria far better than pure grain eaters or vegetarians.

Season of the Year.—We have seen the influence of heat and moisture and these are always at their worst during the season of drying up. In Burma generally the end of the hot weather, when good water is scanty, and the whole of the rainy season are most unhealthy. The heavy fogs in December and the earlier part of January also conduce to the development of this poison and bring out paroxysms of fever by causing chills.

Transport of Troops.—Avoid overcrowding which reduces the standard of men's health and makes them more liable to the effects of the poison.

Clothing.—The advantages of wearing good woollen and serge clothing is well recognised in the preventive of chills.

Period of Marching.—It is well known that chills are more liable to be felt in the early morning before the rising of the sun or in the evening at sun down. These chills appear to assist in developing the paroxysms of malarial fevers. The only way to avoid them is by wearing good woollen clothing and by insisting on the men having a warm meal before starting. The use of tobacco also appears to conduce to keep off the evil effects. There should be a change of dry clothes at the end of the march and men should not be allowed to lie down, or still less, sleep in their damp clothes.

Camps both temporary and permanent.—The importance of selecting elevated and well drained ground cannot be too much insisted upon. Camps should never if possible be fixed on low-lying damp ground, in or near swamps, on the banks of sluggish rivers, in the beds of dried up river courses, or on ground surrounded by low thick jungle. Marshes are particularly dangerous during the season they dry up. The slope of a hill over a marsh or a site where the prevailing wind blows over a marsh or blows up a ravine from over a marsh should be carefully avoided. Sites at the foot of hills in the tropics are known to be dangerous. Ravines where vegetation is rank are nearly always malarious in the tropics. If such sites have to be used as a temporary measure, fires should be lighted and kept lit to the windward, all doors of huts or tents should open away from the prevailing wind, no men should, if possible, be allowed to sleep on the ground and certainly never without a water-proof sheet. Where trees exist they may be used as a screen from the dangerous wind. Where sites have to be used on which there was jungle, they should not be used until the jungle had been cut down dried and burnt on the surface. The surface of the ground should be disturbed as little as possible.

Permanent Camps.—The above rules are still of greater importance in the selection of sites for camps which are to be used for some time.

In such sites, if trees exist, there must not be too many of them, but some are useful as a shade. If there are too many trees they should be cut down to let the sun get at the soil and dry it. The drainage should be well looked to in order that the strata of the soil containing decaying vegetable matter may be rendered as dry as possible. The soil under all tents and huts should be well rammed to prevent moisture rising and the sun stimulating fermentation. The huts should be good and the floors wooden to keep off

the exhalations at night. Where possible it is better to have the men sleeping on cots, charpoys, or platforms raised along the walls of the huts. All decaying wood and rank vegetation should be cleared away from the vicinity of the camps as far as possible. Some occupation should be found for the men to keep them from suffering from lowness of spirits which tends to increase all sickness. Gardens and especially the growing of vegetables should be strongly encouraged. In this country farm yards with cattle, sheep, goats and fowls would help the native soldier and followers to better food and would give some of them work to do.

Food.—The importance of this cannot be overrated; without good, varied, sufficient and suitable food, men soon become preys to malaria. The food must be suitable to the feeding habits of the men and of good quality, or soon we have indigestion, dyspepsia and diarrhoea leading to malnutrition and general ill-health. In the absence of vegetables or fruit, scurvy, the form of it known as land scurvy, soon appears and the men rapidly break down. Careful attention ought to be paid to the quality of the rations; in a climate like that of Burma such articles as flour (attah) deteriorate rapidly. The men who are in the habit of eating fresh meat of any kind should certainly be provided with it. When fruits or vegetables are not to be obtained there should be an issue of lime juice and sugar.

Water.—If the water is suspicious it should not be drunk unless it has been filtered and boiled. The men should be encouraged to drink tea or coffee. Water from properly conserved wells is as a rule most usable; when it has to be taken from a stream or river, it is most likely to be purer if taken from the middle of the stream. Alum is very useful in assisting to get silt deposited from muddy water.

Regarding the use of rum as a ration for native troops and followers, there is considerable diversity of opinion; Parkes considers spirits generally useless and sometimes harmful. My friend Brigade Surgeon J. Berry-White, who served for a long time in the malarious climate of Assam, considers it valuable; my own experience is that if men are accustomed to its use they are the better for a little.

Men on night duty in a malarious country should be specially looked after, the number of nights in bed on these occasions should never fall below four, each man, should be kept dry, and not be allowed to sleep in damp clothes; they

should be provided with food to be taken during the night before going on, and after coming off guard.

The present regulations allow the issue of an antiperiodic ration with the sanction of the administrative medical officer; quinine, or even better still, arsenious acid in solution has been tried with advantage.

Prevention of bowel complaints.—Regarding this important class of diseases, I will leave out enteric fever which principally effects Europeans, but would warn you to look carefully after all cases of mild fever attended with diarrhoea, even in natives. True epidemic dysentery such as our predecessors described has fortunately disappeared but might at any time re-appear under the old insanitary conditions. The diarrhoea and dysentery we meet now is intimately connected with bad or indifferent food as already alluded to under the prevention of malarial fevers but they are both well known to be aggravated by foulness of the camps and general want of sanitary care. They may include simple catarrhal, follicular or true diphtheritic inflammation of the mucous membrane of the large bowel: the last, is as a rule very rapid in its course and fatal. They are both aggravated by the effects of the malarial poison.

Prevention.—Selection of troops. Young, unseasoned soldiers are most liable, old sufferers from dysentery or diarrhoea are unsafe; as a rule men should be selected from races who lived in a climate similar to the one the service is to be in. The period of the year for the operation should be attended to as in the case of malaria. Hot days and cold nights are most dangerous especially when the men leave their huts or tents at night for purposes of nature. Warm dry woollen clothing is most important to keep off the effects of chill. Cholera belts, if properly and continuously used, are useful. Marches should not be too long or fatiguing, the men should be made to change their clothes, if damp or wet, after the march.

Camps.—The same rules as regards the selection of camps for the prevention of malaria hold good in this case. Old camping grounds impregnated with refuse and excreta of men and animals, or camping on the field of battle are particularly dangerous.

Water Supply.—Water, particularly if contaminated with the excreta of men or animals, if full of silt or mud, if

stagnant, if it contains decomposing vegetable or animal matter, if icy cold or if brackish, will conduce to the prevalence of bowel complaints. Water unless very good should always be filtered and boiled.

Food.—The same rules about food as already noted hold good regarding the prevention of bowel complaints. These complaints are particularly aggravated by bad or undigestible food or a monotonous diet, want of antiscorbutics, of fresh meat, by the use of too much salt or putrid meat. Tinned preserved foods, if long used, tend to produce dyspepsia and diarrhoea. Insufficient cooking especially of the dry grains, as dhall, produce the same effects. The preserved compressed vegetables if not thoroughly soaked and cooked are very indigestible. Fruits should always be sound and the men should only eat those which the natives of the country consume.

Huts and tents.—I have already alluded to the importance of good covering especially at nights. The heavy fogs and dews are very conducive to bowel complaints if the men are exposed to them. Chills due to any cause have the same effect.

There are certain camp rules which should be observed.

- 1st. The site of a camp should be changed as often as possible, especially if bowel complaints have been prevalent.
- 2nd. There should be plenty of space and no more over crowding than military exigencies render absolutely necessary.
- 3rd. The drainage should be attended to by taking advantage of all natural slopes, all chances of stagnation and putrefaction should be avoided.
- 4th. The cleanliness of the camp should be absolute, refuse should all be burnt, cheap simple cinerators should be erected of bricks or stones and mud. The "trench" system of conservancy should be carried out to the leeward of the camp, no excreta should be allowed to remain in the camp to contaminate the ground.
- 5th. Excessive fatigue should be avoided and the duties and hours of work should be properly settled. When men have to work in either water or damp places their hours of labor should be curtailed.

- 6th. Great care should be taken to prevent the contamination of the drinking water for men and animals. The sources should be properly marked for drinking water for men, animals and for bathing and washing. Sentries should be posted over these to see the water is not used for other purposes than have been ordered.

A few words on the care of the sick. It must be taken for granted that the medical officer has seen that he is provided with all the medicines, medical comforts, and hospital equipment he is allowed by regulations.

In dealing with the diseases due to the malarial poison and bowel complaints, it is absolutely necessary that men should be encouraged to seek early advice and that they should be kept under treatment in hospital till they have quite recovered from the attack or are invalided. I am sure much of the mortality is due to the fact that men are not kept under observation until they have become quite unfit for duty. It is not fair to the men, and it is contrary to regulations to send them to duty when they have not completely recovered. Men suffering from feeling "out of sorts in the stomach" or constipation should be encouraged to apply for treatment.

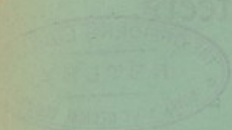
Hospitals.—See they are properly equipped, avoid overcrowding, especially with cases of diarrhoea or dysentery.

Segregate cases of dysentery. Apply for more tents, barracks or huts to avoid over-crowding. Do not allow the hospital attendants to eat or drink in the wards. Disinfect all the dysenteric stools (a solution in 500 of corrosive sublimate is best,) all excreta should be at once removed from the wards. All clothing and bedding used by patients suffering from dysentery should be boiled and exposed to the sun for some hours. Your *personnel* should not be overworked or patients will suffer.

I have to thank you for the kind attention you have given to my paper and I hope the information collected in it may be useful to some of you.

MACHINE
RIFLE BATTERIES

For Volunteers



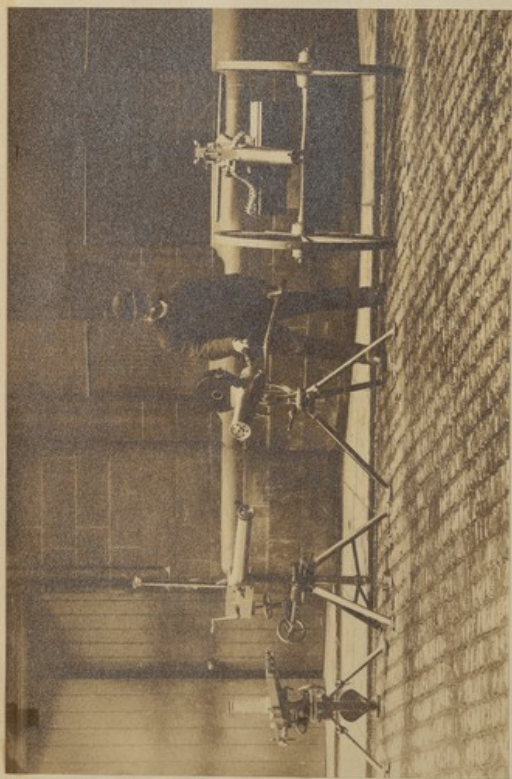
LIEUT. GOLDWELL E. ROGERS, F.R.S., &c.

Colonel and Captain of the 1st
Battalion of the 1st Regiment of
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MACHINE RIFLE-BATTERIES FOR VOLUNTEERS.



BY
LIEUTENANT-COLONEL E. ROGERS, F.R.G.S., S.O.P.

*Author of "Mitrailleuses," "The Gatling Gun: Its Place in Tactics,"
"Machine Guns: Their Status in Warfare," "Campaigning
in Western Africa," "A Modern Sphinx,"
"Madeline's Mystery," &c., &c."*

JOHN HEYWOOD,
DEANSWATE AND RIDGEFIELD, MANCHESTER;
1, PATERNOSTER BUILDINGS,
LONDON.
1889.

TO
GENERAL VISCOUNT WOLSELEY, K.P.,
G.C.B., G.C.M.G., &c.,
ADJUTANT-GENERAL TO THE FORCES,

THIS VOLUME IS, WITH PERMISSION, INSCRIBED

BY

THE AUTHOR.

MACHINE RIFLE-BATTERIES FOR VOLUNTEERS.

AT the outset, it may be well to explain how it comes to pass that I occupy the position and undertake the task I do to-night. Whisper it not in Manchester, publish it not in the streets of London—for to official ears in Pall Mall the news would be “nuts” indeed—it was at a *banquet* given by the Captain of a Manchester Volunteer Regiment to his company, and to meet whom a goodly number of representative men assembled as guests, that this lecture was conceived. In the course of a post-prandial speech, Captain Rose (you see, murder will out, I have named the culprit!) expressed his intention to present the best machine gun extant to his company, “and this, men,” he went on to say, “is the *Maxim automatic machine gun*.” I dissented. “Perhaps,” said Captain Rose, “my friend on the right knows more about it, and will tell us which is the best.” I made a few remarks at the time, but it occurred to me next day that the opportunity for once more taking up my cudgel in defence of a favourite subject had come, and could not be overlooked. Thereupon I wrote to Colonel Bridgeford, as representative of the Volunteer Officers’ Rifle Association, who at once entered into the project; and this is the result. But let me at once assure you that in the remarks I am about to make I disclaim the intention to foist my fixed personal opinions on this meeting. I have no interest, pecuniary or otherwise, in one or other of the rival types of machine rifle-batteries which you see before you. I cannot altogether hide my predilections, but I shall endeavour, so far as

possible, to place the subject before you without fear, favour, or affection, mindful of the fact that we are not here to enter into the relative merits of these weapons, so much as to sift the general question, and, if possible, deduce conclusions favourable to their employment by the volunteer forces of this country. The world is wide enough and bellicose enough in all conscience to reward each inventor in turn. Let them fight it out between them, like the famous Kilkenny cats. With these preliminary observations, let me now address myself to the matter in hand.

Mr. Nordenfelt delivered a lecture on his gun at the Royal United Service Institution, in June, 1880, and I well remember opening the ensuing interesting discussion in the following terms: "I must say that I am astonished that this question of the Mitrailleuse has not yet been definitely settled. It takes my mind back to the year 1875, when I gave a lecture here on the same subject. Then I go back to 1872, when we heard in this theatre a paper from our late lamented friend, Colonel Fletcher, upon which occasion some very eminent officers of both services gave us the benefit of their experience; and yet nothing came of it." It is indeed remarkable, if not incredible, what a length of time it takes to prove that two and two make four. To quote an apposite paragraph, which recently appeared in the *Broad Arrow*, "To invent the gun, to settle the plan for its mounting, to get it experimentally made, then tested once more, improved, re-tested, and ultimately ordered to be supplied, runs into—it is really no exaggeration—a quarter of a century; for even while the guns and carriages are under manufacture, new proposals are made and alterations introduced, during the discussion of which, and generally for months beyond, the work is at a standstill."

It was in the year 1869, that the question of machine guns was first mooted. Major G. V. Fosbery, V.C., then wrote a paper on "Mitrailleurs and their place in the wars of the future," which was published in the 13th volume of the *Journal of the Royal United Service Institution*, that admirable repository of military knowledge. In it he gave an interesting sketch of the rise and

progress of machine guns from a date, which after all is not very ancient, to some of us, at all events. He tells us, that Colonel Martin, of the 4th King's Own, in 1860, invented a "war truck" and "battery," fitted with a number of independent barrels. Again, in 1862, General Vandenberg, of the American army, lectured in the United Service Institution on a new system of artillery for projecting a group or cluster of shot. With his gun, the details of which were very carefully worked out, loose powder was used, and in the method of ignition it bore a strong family resemblance to both the *Montigny* and *French* mitrailleurs. The guns which Major Fosbery treated of in his paper were the *Agar*, the *Claxton*, the *French*, the *Gatling*, and lastly the *Montigny*, which was his special pet. Upon his description of these several types I need not dilate; but it may be interesting to note what he says about the French mitrailleuse. "I can fairly state," he says, "that the weapon is a most formidable one, it is admirably constructed and equipped for service, and will, I doubt not, produce, if brought into action, effects almost as astonishing as those of the breech-loader. Their mitrailleuse batteries are, I believe, already numerous, and consist of eight guns each. Each gun is served by three men chosen from the *sous-officiers* of the Horse Artillery of the Imperial Guard, and with this complement it should throw about 300 shots per minute, for five or six consecutive minutes to very considerable ranges, and with an admirable trajectory." With one other quotation we will pass away from Major Fosbery's suggestive essay. He is comparing the effects of fire of machine guns with that of Horse Artillery 9lb. or 12lb. guns, taking into consideration their relative weight and equipment. He writes: "Superior as our artillery is acknowledged to be, we can scarcely wonder, knowing what we know of its performances, at the failure of either the Austrian or Prussian rifled field services, to influence largely the fate of the battles where both were so freely and ably made use of. Neither succeeded in any instance, as far as I am aware, in stopping the advance of infantry, or even in greatly impeding

the operations of cavalry in the field." "If, however," he goes on to argue, "it chanced that instead of six 12lb. guns, with their fifty destructive pieces per gun per minute, the advance took place on a point occupied by a battery of mitrailleurs, would the case be different? I will grant that there would be no bursting of shell, and perhaps, till their power became known and acknowledged, comparatively little of that moral effect which attends a concentrated and sustained fire of artillery; but, as regards the destruction occasioned by them, I cannot help feeling certain that it would exceed, up to certain ranges, that producible by any engine of war hitherto made use of which at all approaches them in handiness and portability, or which requires so little previous education for its management." With this last remark of Colonel Fosbery I can by no means concur. But, as regards the presence of the French mitrailleur in the field, surely the Colonel's observations received ample corroboration in the desolating war of 1870, and this notwithstanding the initiatory dramatic but useless display of its powers at Saarbrück. Who has forgotten that opening scene, the prologue to the tragedy, when this mysterious demon of destruction was vauntingly displayed to the expectant army, and the many-mouthed monster was turned threateningly towards the devoted column of Prussians crossing the bridge? Mark the hushed attention to its first effects. See Napoleon peering with straining eye-balls through his field-glass—and then a flash, a snarling report, and the air is filled with a leaden hail, carrying wounds and death into the ranks of the retreating invader. But how unequal the result to the anticipation! Not even can the Emperor's exaggerated statement account for the indifferent practice made by that opening discharge. The French mitrailleur, I may tell you, was composed of 25 large-bore encased barrels, and when mounted and horsed it must have presented a rather large object for the kindly attention of an adversary's artillery; and yet Colonel Reilly, R.A., witnessed on one occasion one of these six-horsed mitrailleurs standing in the open, exposed for $4\frac{1}{2}$ hours to the much-vaunted fire of the Prussian artillery, unscathed and defiant.

In 1872, Colonel Fletcher, Scots Fusilier Guards, delivered a lecture at the R.U.S.I. on "The employment of mitrailleurs during the recent war, and their use in future wars." As infantry member of the Special Committee under the presidency of Colonel Wray, R.A., which then sat to experimentalise with the Gatling, Colonel Fletcher had exceptional opportunities in preparing his paper, and it is really exhaustive of the subject, for his arguments are still frequently put forward by plagiarists. He did me the honour to quote from a short article published in *Once a Week*, entitled "The Gun of the Age," in which I suggested that Gatlings might be usefully employed in our colonies. I therefore felt bound to open the very interesting discussion that followed, and in which Captain, now General Henry Brackenbury, R.A., General Adye, R.A., Captain Beaumish, R.N., Colonel Wray, R.A., and Colonel Eardly Wilmot took part; General Shute of the 4th Dragoon Guards, also contributed a memorandum to the proceedings, urging the utility of Gatlings being attached to mounted corps. One remark I made on the occasion which I will venture to reproduce: "Most of our future wars will be on a comparatively small scale. We cannot, if we would, muster the big battalions that marched majestically over the desolated plains of France; consequently our future fighting operations will be more or less connected with those 'who go down to the sea in ships, and have their occupation on the great waters;' and in such hastily-organised expeditions as *distance* will impose upon us, can any gun be more admirably adapted to the work than the Gatling?" As regards the action of the mitrailleuse in the Franco-Prussian war, Colonel Fletcher not only referred to official reports, but we had the benefit of hearing Captain Henry Brackenbury relate his personal experiences. He said, "On the heights, close to Floing, near Sedan, there was placed a battery of mitrailleurs. There is opposite a round hill, with wood on the top, and out of this wood and from behind this hill came the Prussian columns. As they came out they were swept down by these mitrailleuses, and they did not succeed; they could not make any progress, they

were obliged to go back again, and go round on the reverse slope of the hill, checked by the mitrailleuses. There is another example I might give, when the mitrailleuse did remarkable work, that is in the defence of the railway bridge at Bazeilles. The Bavarian columns came down and endeavoured to cross that railway bridge, of course preceded by their skirmishers. Two mitrailleuses only, I believe, were placed behind a garden wall, and they simply swept that bridge, so that the Bavarians could not pass it." "At St. Privat," he goes on to say, "the Guard attacked in two bodies, on the right of the road and on the left of the road. On the right of the road, as they came up, there were the mitrailleuses of Ladmirault's corps; on the left of the road there were no mitrailleuses in Canrobert's corps. The columns on the right of the road suffered much more than the columns on the left of the road; I do not say entirely owing to the mitrailleuses, but I give you that as a fact."

Now, gentlemen, are you aware or do you remember how many Prussian soldiers fell in that immortal fight? The Duke of Wurtemberg thus describes it: "During a preliminary action Prince Hohenlohe, commanding the artillery of the Guard, had collected eighty-four guns opposite St. Privat, and cannonaded the French position with great effect. About five o'clock the Commander of the Guard considered the enemy to be sufficiently shaken for him to risk an assault across the open and gently-ascending ground. The Fourth Brigade of the Guard first moved forward from Habonville, in the direction of St. Privat, in line of columns in two lines, with skirmishers thrown out in front; and a quarter of an hour later the advance of the First Division of the Guard commenced in the same formation from St. Marie-aux-Châties, distant about 2,640 paces from the main French position. Habonville is about 3,960 paces; therefore, the three brigades came about the same time within the effective reach of the enemy's fire. The front of attack included little more than 2,000 paces, so that there were ten men to the pace. This was, however, the closest formation of attack employed by the Prussians in the

campaign. The effect of the enemy's fire, even at a distance of 1,500 paces, was so murderous that, according to accounts received, nearly 6,000 men fell in ten minutes, and, "adds the Duke with grim quaintness, "the advance had to be immediately discontinued."

But the battle of Mars-la-tour affords a still more shocking instance of the effect of machine guns, effects which I hope to God we will never have to witness on our own shores!

"A Prussian Infantry Brigade," says the official account, "supported by the second heavy battery, advanced against Grenier's division. All five battalions at length came within 30 paces of the French line. A withering volley is poured in, but the brave battalions are forced to fall back into the valley beneath, and the fire of the adversary from mitrailleuses advancing to the crest, increases the losses almost to annihilation! Cavalry were then pushed forward by the Prussians to protect the shattered remnant, but on account of the violent mitrailleuse fire, the leader was unable to deliver home his attack. The five battalions, which went into action with 95 officers and 4,546 men, sustained a loss of 72 officers and 2,542 men." Now, as this account was written by Von Moltke himself, he is not likely to have exaggerated the effects of machine guns.

When I was training as an instructor at the school of musketry, Hythe, in 1858, we youngsters used to be greatly exercised by the rather grandiloquent exordium to one of the horrible eight lectures we had to learn off by heart. Colonel Eardley Wilmot, the lecturer in question, thus began: "The Utopian may shrink from the contemplation of so painful a subject as war; the moralist may raise his voice against the justice of it, but the practical philosopher can see very little chance of its cessation, and, actuated by the very best intentions, will endeavour to render war as terrible as possible, well knowing that so soon as certain death awaits two rival armies princes must fight their own battles or wars must cease. Therefore, however paradoxical it may appear at first sight, whoever increases the power of destruction is engaged in the cause of

humanity" (save the mark!). I suppose *I am now*, and that you all regard me as a philanthropist, or at least, a practical philosopher! And yet when we contemplate the subject from another point of view, is it not equally true that the march of intellect in the study and improvement of instruments designed to make war as terrible as possible advances *pari passu* with the increased desire for war? May we not reasonably ascribe to the invention of the mitrailleuse the bloodiest war that ever disgraced Christendom and stultified through all time the humanising effects of civilisation? So much for the Utopian theory. Dr. Gatling, at all events, has improved the occasion since 1862, when he first conceived the idea of a type of weapon which, whether it be the Gatling, the Gardner, the Nordenfolt, or the Maxim, has still in its infantile progress won for itself unfading renown on the battlefields of Europe, Asia, Africa, and America, and bids fair to rival, if not to surpass, in excellence of killing powers, the most infernal of mechanical contrivances for the deprivation of human life! Dr. Gatling, I say, has improved his opportunities, but so have others done for him, and his children are not unlikely to oust their father—or will try to do so. What an age is this wherein we live! Scarcely has an invention come to be recognised as practical than it is multiplied, manipulated into a thousand shapes, pirated, mischievously handled, and finally improved out of all resemblance. But in reviewing the past efforts of civilisation to accomplish its sad ends, is it not remarkable to note how tardy has been the advance, how wide the gaps, in the gradual development of lethal weapons. Not to retrace the vestiges of primitive warfare in the wake of hosts armed with bows and slings—let us descend to comparatively modern times, and we will find that although personal courage gradually waned and became of less account in inverse ratio to the multiplied requirements of war, when waged on the grandest scale, the weapons themselves were of a very simple and harmless description except to the pair of combatants actually engaged, and that, in fact, the art of wholesale slaughter, by the employment of artificial agencies and

arms of precision, was reserved for the more enlightened intelligence of our own day; with how little gain to the cause of humanity may surely be admitted. Far be it from me to say that the inventors of the several machine guns now before you are ostracised, and outside the pale of civilisation. If so, you must place me in the same category, for I shall stand or fall by them.

At all events, in compliance with the advice of Colonel Wray's Committee, the Gatling was tentatively introduced into our service in two calibres, one of .45, or rifle calibre, for field service, and the other, .65 calibre, with special ammunition, to be used on board ships of war. In fact, both calibres were given to the navy. It is strange to note the change of public sentiment in the progress of any important matter or measure, and the best way to gauge this gradual metamorphosis in men's minds is, I think, to read the speeches of the same man then and now. It is funny how few there are who have the courage of their opinions on such points. I can only suppose that they argue like the lunatic who "is in the asylum now," "The whole world thinks me mad; now, I think the whole world mad, but they're the stronger party, and that's why I'm here." There are many such men in both services, but chiefly in the artillery branch of the army, who have "rounded" as to the utility of machine guns, and as warmly advocate their use now as then they deprecated them. But I am glad to think that in the other scientific department of our army there was a more healthy, because more generous, appreciation of the merits of these weapons.

I have in my mind the remarks of a distinguished engineer officer, who has since become an authority on most questions of the day in relation to the services. Major (now Colonel) Lonsdale Hale, said: "Then comes the question, who is to make use of the Gatling gun? The artillery like it and do not like it. They think they must take it and yet do not like to take it. The cavalry, they have nibbled at it, but I think most of us are of opinion that it is hardly a cavalry weapon. The infantry I do not think they very

much care about it, for the great feature of infantry is mobility. I ask whether such a weapon will make a battalion particularly mobile in the field? The lecturer has recommended the formation of a fourth arm of the service to take charge of the Gatlings, but there is already a fourth arm of the service, called the Engineers, and if nobody else will take the Gatlings, why not try whether they can take charge of them, rather than let the weapons be lost for want of some one to father them? The Engineers are specially defensive. They have got a train already; it is their duty directly a position is taken up to occupy a village, or the strong points in the position—why not give a couple of Gatlings to the Engineer train? Why not, when a company of sappers or a German pioneer company is thrown into a village for defence, or are told to occupy a wood, why not let them have their couple of Gatlings by them, and put them under cover in the best possible position for defence?"

The occasion of these remarks was a momentous one for me, as it was during the discussion that followed a lecture I delivered in 1875 at the R. U. S. Institution on "The Gatling Gun: its Place in Tactics." A few of the arguments I adduced then are, I hope, still applicable, and, without being egotistic, I will not hesitate to repeat them here; and bear in mind that though I harp on the Gatling in these quotations, it is because that at the time in question that was the adopted machine-gun of this country, but the very same arguments *nomine mutato* are applicable to each and all of the machine guns which have since arisen to dispute the palm of excellence. "War has become so terrible from the increasing powers and accuracy of fire-arms that a proportionately keener interest is manifested in movements, technically termed tactics, which tend to secure a certain degree of safety in the field, whilst inflicting the utmost amount of injury on the foe, in the shortest possible space of time; for the ancient conditions of fighting are reversed, and instead of movements leading up to some grand and supreme effort whereby the enemy, gradually intimidated, was finally crushed by an overwhelming advance in compact columns, modern tactics seem to court immediate contact in the loosest formations—and the sooner the better.

"Now, as the Gatling, like all mechanical contrivances, seeks to supersede manual by self-acting labour, or, in other words, to economise the human life that must be sacrificed at the outset of a battle or campaign, carried on by an enterprising general desirous of sudden success, the question of tactics is for it of paramount importance, and demands special consideration, inasmuch as I venture to contend that by a judicious employment of this means to the end, the hitherto awful loss of men in primary actions will be brought within a minimum compass on the side of the combatants availing themselves of such retaliating substitutes. . . .

"In addition to a large number supplied, as I have said, to their navy, for boat and shore service, 50 short-barrelled Gatlings have been issued for service with the United States cavalry. Each gun is mounted on a light two-wheeled cart, so constructed as to answer the double purpose of an ammunition waggon. The cartridge boxes on either side of the gun contain together 40 feed cases, each holding 40 rounds, or 1,600 cartridges in all. Space is also reserved in front of the axle for two boxes of cartridges, containing 1,000 rounds each, so that the carriage can take with it a large supply of ammunition, as well as the gun and a few necessary tools. In the autumn of last year two Gatlings were reported to have done 'splendid service' in frequent encounters with the Redskins on the Western Frontier.* . . .

"But as regards the use of Gatlings in European warfare, what are the points to be urged in their favour? Should they be disseminated among field batteries to act as far-ranging case-guns, or should they be applied as a collection of small-arms to the intensifying of infantry fire at critical moments? In other words, ought the Gatling be served exclusively as a field-piece or as a regimental automaton? When, where, and how can they be employed to the best advantage as multiple guns? Can they be used in attack, or must they be confined to defence? Should they be invariably entrenched and masked, awaiting the opportunity that may never arise, or should they risk exposure to be efficient? These are the

* I am talking, remember, of the year 1875.

questions that naturally occur at the outset, but which could be answered far more easily from a negative point of view—that is, it would be less difficult to show what is beyond their capabilities. That Gatlings of small-arm calibre are exceptional, in their employment, must be allowed; they are of no avail against entrenched lines nor thick cover of any sort. They possess no incendiary powers, nor can they blow up magazines or smash waggons, nor do anything that the bullet from the best rifle cannot do. The Gatling is, in short, merely a life-exterminating weapon, and should be devoted to that object. Colonel Fielding puts it in a clear, though scarcely forcible enough, light, when he says: 'The Gatling represents a certain number of infantry, for which there is not room on the ground, suddenly placed forward at the proper moment at a decisive point, to bring a crushing fire on the enemy.'

"It has been remarked that machine guns seem to require an escort more constantly than field guns to protect them from flank and rear assaults. If this be so, why, to meet the difficulty, could not a fourth arm of service, in its strictest sense, be organised? It might, in fact, consist of a judicious combination of Gatlings with a corps of mounted riflemen, such as proposed by Colonel Wood last year in this theatre. These riflemen, an especially trained and picked force, should not only act as escort to the guns, but as instructed Gatlingiers (a term I suggest as an obvious substitute for gunners), ready, on occasion, to fill up the casualties that may occur among the Gatling detachment. Combine, at times, a large force of cavalry with Gatling batteries escorted by riflemen mounted on horseback, or carried on long cars, as described by Colonel Wood, and it will prove to be a very compact, self-contained, mobile, and effective little army for sudden and distant enterprises. On the other hand, a proposal has been made to attach Gatling batteries exclusively to cavalry. In a memorandum to Colonel Fletcher's lecture on the 'Employment of Mitrailleurs,' to be found in the sixteenth volume of our journal, General Shute, C.B., points out the advantages of the arrangement. The alternatives as to whether Gatlings should

be attached to infantry or form a portion of the artillery service are disposed of briefly in the negative; and he goes on to fortify his argument by the consideration that, in his corps, the required farriers, drivers, reserve of horses, and, in fine, the establishment of a battery are already to hand; whilst he thinks that cavalry officers who have obtained certificates from the School of Musketry would be competent (as no doubt they would) to command the battery on special service. . . .

"Mitrailleurs and range finders are imperatively demanded by modern requirements," observes Major Brackenbury. 'We have the only good mitrailleur—the only range finder at all; both of them should be issued and tried at the manoeuvres.' But it is not alone at the autumn manoeuvres, but at private exercises, over rough ground, under every condition of attack and defence, that Gatling batteries can be prepared for the exigencies of service on occasions pronounced favourable to their effective use, bearing in mind that at distances proportionate to the size of the weapon employed (for Gatlings are of all calibres up to one-inch bore) they are capable of a more certain and continuous fire than any field gun. Among these capabilities may be enumerated the acknowledged power of the Gatling for the defence of entrenched positions and villages; for commanding roads, defiles, and bridges; for covering the embarkation and disembarkation of troops, and for the protection of a column moving towards its destination by railway; for silencing field-batteries or batteries of position, for increasing the fire of infantry at critical moments, and, finally, for supporting field-batteries and protecting them against cavalry or infantry charges.

"The commander of a Gatling battery should know from habitual experience how best and most judiciously to give effect to the general directions he may receive for his guidance, but he should endeavour to keep out of fire until the moment for action is evident to his trained senses. Finally, he must, while seeking all immunity from the fire of artillery, in reality so despise it as never to be diverted from the main object of his presence on the field of battle, namely, the prompt slaughter of men and horses. . . .

"If cavalry move in front of an army and meet infantry, they are compelled to fall back for protection, whereas, if associated with a Gatling battery, and its attendant mounted-rifleman escort, as suggested, important positions could not only be seized, but retained. If, from the closeness of the country, a body of infantry forms the advance guard, it, too, would frequently require the friendly aid of a Gatling battery to strengthen its fire at critical points, and in either case two or more Gatlings would prove efficient auxiliaries to the field batteries usually so employed, on the acknowledged principle that with advanced guards the most reliable gun is that which is most effective against troops, and which can carry most ammunition; for it has to go into action first and remain there longest. . . .

"Again, it not unfrequently happens that the first assault of a position fails, or the enemy has only made a pretence of maintaining the defensive so as to put an end to attack by a vigorous counterstroke; confusion and perhaps retirement follow. This, then, would be the opportunity for a well-posted Gatling battery, and its timely aid might turn defeat into victory—for a sudden and well-sustained cannonade from an unexpected quarter will often change the fate of an engagement. Finally, in the pursuit of the demoralised foe, the Gatling battery might, in conjunction with horse artillery, convert the retreat into a complete rout. . . .

"It is, therefore, in the spirit of the foregoing considerations, that I venture to ask, would not Gatlings, under exceptional circumstances, contribute very powerfully to offensive tactics? Inseparably connected with the employment of Gatlings in the open, must ever be kept in view the conjoint use of tools for extemporising cover. In the Russian Service a few fascines are, I believe, carried on the limber, which may be readily arranged to mask their Gatling guns.* If a wall or building be available, the Gatling can be worked behind a loop-hole, and thus a few men would be enabled to keep a host at bay. In close country, such as surrounds the metropolis, interspersed with villages, parks, farm buildings, &c., there would be

* The Russian Government had at this time 400 Gatlings in their service.—E. R.

numberless opportunities for the right employment of Gatlings in this manner. . . .

"There is yet another mode of utilising to the utmost the powers of the Gatling gun. I have before now proposed that some regiments of our artillery auxiliary forces should be trained to their use for interior field operations, as well as for coast defence; and I venture on this occasion to renew the suggestion, not because I think Gatlings are weapons simple in manipulation, for they are not so, nor yet because they are likely to afford moral and material support (which is stated to have been the motive of the Austro-Hungarian Government for supplying mitrailleurs to their regiments of militia), but because Gatlings require the utmost intelligence, the most skilful handling, the readiest resource, the highest courage, and the best tactical genius that can be drawn to their service. . . .

"And now as to their organisation and administration. Distribute Gatlings permanently among divisional field-batteries, and they will often be committed to engagements at ranges beyond their powers, and their very existence may be forgotten on occasions most favourable to their small-arms rifle character. Attach Gatlings exclusively to cavalry, and they will sink into an inferior class of horse artillery, again losing distinctive characteristics. Finally, post Gatlings in fractional sections to infantry, and, in addition to difficulties of organisation and administration, they will become a stumbling-block and, perhaps, a snare, for they may come to be regarded either too dependently or not at all. Depend upon it, if an hermaphrodite position be assigned to these weapons, if the pieces be dispersed capriciously as described, the Gatling will become not an auxiliary-arm, but the scapegoat of the services. On the other hand, if distinct organisation and latitude of action be allowed to them, so, also, as I have endeavoured to point out, should the military education and tactical training of Gatlingeers reach the highest possible mark. Yet even then it is to be feared that this application of the science of tactics, however varied and habitual, will fall far

short of that practical experience and indefinable mastery of situations as they arise, only to be gained amid the smoke and carnage of the battle-field."

The following officers took part in the discussion which followed my lecture, but for obvious reasons I cannot attempt to reproduce their remarks *in extenso*. Captain Owen, Royal Artillery; Major Nolan, M.P., Royal Artillery; Major Lonsdale Hale, Royal Engineers; General Sir Percy Douglas; Admiral Sir Henry Codrington, K.C.B., who commanded at the Battle of Navarino; and Colonel Fletcher, Scots Fusilier Guards. The Secretary, Captain Burgess, also read the following memorandum: "Captain Tulloch, of the Royal Military College, who is unable to be present, has sent in a note on the Gatling gun. He says—'The Gatling gun is peculiarly adapted for the use of Volunteers on account of the expense of horsing field batteries and the amount of drill required before Volunteers can efficiently man them. The Gatling is well suited for defensive positions, such as would be held by Volunteers in the event of invasion. At that time the Royal Artillery would be required elsewhere.'"

In 1880, a paper, by the late Mr. Hotchkiss, was read by Mr. Koerner to the members the United Service Institution, on the Hotchkiss Revolving Gun of large bore, and which was, in fact, a reproduction of the Gatling. Lieut. Armit, R.N., said of it: "I can scarcely see any difference between the Hotchkiss and Gatling gun, and the systems appear to be exactly the same. We know the history of new inventions is very curious in many cases. Here we have, so to speak, a Gatling gun with a large bore. It is perfectly competent to the inventor of the Gatling gun to give us a weapon of any calibre." As so it is, the only consideration being one of weight of metal and equipment. But as I am not dealing with the subject of large-bore machine guns, I would not have alluded to the matter at all if it were not for the fact that Dr. Gatling was present and took part in the discussion. He said: "In 1862, I first conceived the idea of the machine gun, and I think I may say with safety, I was the first who ever made

a gun that loaded metallic cartridges automatically into the chambers of the barrels, and fired them continuously, as you are aware the Gatling gun does. I see in the gun before me, as has been observed by several speakers, the very striking features of the Gatling gun, though it is not a Gatling in all its details; it is also a gun of larger calibre than the Gatling guns made heretofore.

Machine guns may be of different calibres. A light gun that you could pick up and move about quickly to any position, and place it anywhere, is what is much desired. For instance, I have a little Gatling gun, weighing 105lb, that I would fire against any gun that Mr. Hotchkiss can produce, at 1,000 or 1,200 yards ranges, and beat him in the number of hits."

On June the 28th, of this self-same year, 1880, Mr. Nordenfelt arrived on the field of action, for on the evening of that day he delivered a most instructive lecture on his system of machine-guns. He began with the usual arguments we machine-gun enthusiasts are wont to apply—how that the appearance of the first ironclad on American waters was the signal for wooden navies to depart. "The Wooden-walls of Old England," he said, "are no more to be trusted; they have, indeed, become relics of the past, with a glorious history, but without a future." "I look upon machine-guns," he went on, "as mechanical contrivances for economising human labour and human life in war. They are, to the art of war, what Arkwright's spinning-jenny was to weaving. He enabled a few people to produce as much yarn in an hour as scores employing the 'turn,' with its single spindle, could make in a day. "The question of expense, for a country like England, is also relative, for if machine-guns can shorten a war by a week, or can prevent the blockade of a single colonial port, the possible expense for extra supply of ammunition must be repaid tenfold." Quite so, but, as a matter of fact, our present Minister of War has solved the difficult question of finance, inasmuch as he has given you Volunteers leave to purchase machine-guns for yourselves, and to work them to the advantage of and for the protection of the community. I don't think it is even laid down that you must be "efficient." So much for patriotism.

As to military and naval arguments in its favour, Mr. Nordenfelt, like the modest man he is, contented himself with a summary which speaks for itself. "And now," he asks in conclusion, "what is the outcome of all this so far as the British Army and Navy are concerned? It is hard to suppose that England will ever be engaged in offensive operations, except as a diversion in favour of defence at some other point of her vast territory; and it is more especially for defence that these machine guns are most suitable, economising the lives of British soldiers and sailors, who are dear, not only in a patriotic but also in a pecuniary sense, and whose brains and energies are sufficient, if well armed, to hold their own even against the large odds of all comers." There was a great deal in Mr. Nordenfelt's admirable lecture in which I thoroughly concurred, but there was an undercurrent of personal antagonism to other systems, and especially to the Gatling, that I felt bound to resent. I had asked the Secretary not to allow the Chairman (Admiral Sir W. E. Nicolson, Bart., C.B.) to call upon me at once, as I wished to hear the opinions of others, but no member seemed willing to open the discussion, and the Chairman was about to move the usual vote of thanks to the lecturer, when I stood up, and I may at once add, a most interesting discussion ensued. "Oh! *you're* there," exclaimed my friend Nordenfelt, when I stood up to address the meeting. "Yes," I replied, "I am here to confute some of your remarks affecting the Gatling," and then I went on to assure the meeting (as I have you to-night), that "I disclaim any intention to draw invidious comparisons between the Gatling gun and the Nordenfelt. This institution is not for the purpose of entering into any detailed criticism of that nature. I look upon it rather as a sort of intermediate tribunal where the inventor comes to air his theories, and where, perhaps, he is to some extent criticised; but eventually he has to be handed over to the merciless grasp of the Select Committee at Shoeburyness; for there, and there only, will the question between the Gatling gun and the Nordenfelt be determined." I will have occasion to refer to this

hereafter, for I was present and reported upon the trials at Shoebury;* but I may indicate here what I have already softly insinuated, namely, my predilection for the Gatling system, or "nature," as it is technically called; as to which, in the course of my remarks on the Nordenfelt paper, I went on to say "The Gatling gun has never had a proper opportunity of being tried, either in peace or in war. It was sent out during the Ashantee war, but it was mounted upon a narrow gauge carriage, which was no doubt suitable to go through a woodland country; but it was top-heavy, upsets were frequent, and, consequently, the gun could not be taken to the front. It was left by Sir Garnet Wolseley to command the bridge-head at the Prah, and, as you may remember, it was fired into that river for the edification and amusement of an Ashantee warrior, who, when he saw the effect of it, shook his head gravely, raised his hands to heaven, went home and hanged himself!" At the battle of Ulundi 3,000 rounds only were fired from the Gatling, but the slaughter caused by them was declared by eye-witnesses to be very great indeed. "The Gatling," I went on, "has had, I contend, no chance of showing its power in war. With regard to peace, the trials hitherto made, particularly at Shoeburyness, have been carried out with a bad cartridge. The trials made there the other day proved nothing but that the Boxer cartridge is utterly worthless as ammunition for automatic firearms. The trials later on will, I hope, be conducted with a better class of ammunition."

And here I may be permitted to interpolate an anecdote. When stationed in Chester I obtained from Sir Wm. Armstrong a Gatling for experimental purposes, and I even drilled the artillery volunteers there to its use. As part of this drill I planned a day's practice to be carried out exactly as if on service. At daylight one morning the alarm was sounded and the gun detachment assembled at the shed to mount the Gatling, fill the limber with full feed-cases, and harness the pair of horses. Then we drove off at a sharp trot,

* I reported to the *Times*, as I did also on the occasion of trials of the Gatling on board H.M.S. "Excellent" later on, upon which occasion I myself fired 656 rounds from the Gatling in one minute, and I am not an expert.—R.R.

twelve miles, to Bagilt, and as I sat on a springless vehicle for the first time, I can assure you it was no joke jolting over rough roads and bridges. On the mud flat at Bagilt a friend had prepared a range and target, and on arrival I immediately gave the word, "Gatling, action front," and handled the crank myself for fear of any mishap. A crowd of friends and foes, who had received us with cheers, were standing about attracted by this novel display, and all was hushed expectation, but, like Napoleon at Saarbruck, they were doomed to disappointment. I turned the handle gingerly at first, for trial, or range-finding shots (although I knew the range was about 1,000 yards), and a few rounds were in this way discharged. "Stand by with the feed-cases," I ordered, as I prepared to fire 1,000 rounds continuously. I turned the handle briskly, and rattle went a few rounds, and then—jammed! I withdrew that feed-case and the defective cartridge, inserted another case, and turned the handle confidently—but no, jam after jam occurred, and amid the jeers of foes and the muttered sympathy of friends I limbered-up and returned dejectedly to Chester! Of course I complained bitterly to the firm in London from whom I had received the cartridges. Their reply came promptly by wire, "Regret mistake of clerk sorting ammunition, throw remaining cartridges into River Dee—they were intended for Chinese Government!" To continue, I need not trouble you with the arguments I used in the discussion on Mr. Nordenfeldt's excellent paper, but I may just mention that when he stood up to reply, he pointed at me and said, "As regards the remarks made by Major Gatling—I beg his pardon, Major Rogers—but everyone knows he goes by that name in Chester, &c." Thus, he took the wind out of my sail, and discounted my deductions—but, I shall have my revenge now.

In an Essay on the "Maxim Gun," recently published by Capt. Stone, R.A., he gives two reasons for inaccuracy of fire in other machine guns—(1) "The external impulse given to the gun from the force applied to work the crank or lever; (2) Heating of the barrels." Now as to this first cause of inaccuracy, I would have been truly gleeful to be able in his presence of giving you a very

apt Nordenfeldt "straight tip." For you would then have seen for yourselves what a splendid fellow he is in physique—how handsome, how strong—how omnipotent! There is no one in Europe (much less the world) who, in homely phraseology, could hold a candle to him in the manipulation of his adopted son. And here, by the way, I feel bound to tell you that my friend (whose absence to-night I deplore), is not the inventor of the gun which bears his honoured name, for a Swede named Palmcrantz was the vicious producer of this vile production! At all events Mr. Nordenfeldt determined to appear in person and work his gun before the Select Committee which was assembled at Shoeburyness in 1881, to determine the machine gun question (and which, I believe, is as far as ever from being settled). Dr. Gatling and I went together to the London Bridge Station for the early train, and on the platform I soon espied the Achilles form of Mr. Nordenfeldt, and addressed him. "Now," I asked, "may I introduce you to my friend and your rival, Dr. Gatling? And I did so. I may at once tell you that the friendship then formed with the renowned inventor of the submarine torpedo-boat will never, I hope, be broken, not even in consequence of the snappish remarks I am about to make.

The day was bleak, and the cold east wind on the parapet at Shoebury was of the very shiveriest description. All parties were, in fact, unanimous to get through the day's programme. So many rounds had to be fired for accuracy, so many for continuity, so many for celerity. It happened that Mr. Nordenfeldt was called upon to show how many rounds he could fire in two minutes at the alleged rate of 1,000 rounds a minute; and he sat down on his gun to perform the feat with his accustomed vigour. But just as he levered off the first ten rounds, the splash of the bullets on the retiring wave-covered sands suggested "rats" to an importunate terrier, and the dog went madly for the vermin. "Stop! stop!" thundered the Commandant, and, I think, the Committee (for the terrier was a favourite in the garrison). "No, no!" yelled Nordenfeldt. "I am firing for speed, and nothing will stop me!" But

as each volley fled rapidly from the ten barrels of the gun at the powerful push of the excited expert, there was a corresponding tendency to elevation at every discharge, and each splash of the bullets in the sand was a few yards further than the last; whilst after each bounded the frantic terrier, no doubt wondering proverbially how quick the rats were in clearing out. At last those two heart-rending minutes came to an end. We had stood open-mouthed, silently and sympathetically, expecting the fatal result. But it came not; for the favourite terrier came out of that bullet-storm unscathed and unruffled! "Mr. Nordenfelt," said I, gently patting him on the back, "take your gun home; you cannot even kill a dog!" But, gentlemen, I am not really of that opinion. On the contrary, I am free to admit that next to the Gatling the Nordenfelt is the most soldier-like weapon of the kind, and the one with the likeliest future. I will go further, and say, that if nations will as heretofore continue to adopt such abominable devices for the wiping out of its manhood, then I say and express the fervent hope that my friend Mr. Nordenfelt will be vastly benefitted. And now it is time I should allude to the other machine guns before you. The barrel of the Maxim is as you see surrounded by a water jacket, which heats at 22° Fahrenheit. The water boils in the jacket after 600 rounds, and subsequently evaporates at the rate of 1½ pints for every 1,000 rounds, so that it requires replenishing by hand during the firing. I don't know how this would answer, say in a surrounded square such as Aboo Klea. But I forbear to go into disputable details. On this occasion, I desire to be impartial, and to quote *all* evidence in favour of *all* machine rifle batteries. Capt. Stone, R.A., to whose paper I have already alluded, says: "The occasions when it would be necessary to fire at the rate of 600 rounds per minute from one gun for a space of over three minutes must be rare indeed, and it appears that adverse critics have made a most unnecessary point of the difficulty of keeping up a water supply." Capt. Stone advocates the formation of troops or batteries of four guns each. He proposes that to each infantry division 16 guns

of .45 calibre should be allotted, four to each cavalry brigade, four to the cavalry division, and 24.5 Maxims of a larger calibre to the army corps. This would give a total for an army corps of 76 guns or 19 troops of four machine guns each. As regards carriages, Capt. Stone proposes to retain the pair-horse limber with the addition of a pin tail, and add to it a gun carriage with shield, carrying 12 boxes of ammunition, drawn by four horses, and the weight behind the team being, roundly speaking, with 8,000 rounds 20 cwt., made up as follows:—

Gun Carriage.....	500lb.
12 Boxes of Cartridges.....	562lb.
.45 Gun.....	65lb.
Shield.....	70lb.
Limber	504lb.
12 Boxes of Ammunition.....	552lb.
	2,253lb.

The personnel of each sub-division (*i.e.*, one gun) to consist of one non-commission officer mounted, two gunners on the limber, two drivers riding the near horses, and, in addition, a captain, subaltern, sergeant, quartermaster-sergeant, and a farrier or shoeing smith per troop—or, a total of 25 officers and men, 9 riding horses, and 76 draught horses per troop. This organisation appears to be well and carefully considered, and as it is equally applicable to any of the other machine guns I have given it *in extenso*.

Captain Stone describes an imaginary battle opened at a range of upwards of 3,000 yards with the usual artillery duel. "Let us now," he says, "watch the attack up to the point where the infantry has arrived within 800 yards of the enemy's position. The fire of the massed batteries must shortly cease, and it will be evident whether the defenders are really silenced, or whether they have only been drawn temporarily out of action. The divisional artillery must seek fresh positions in order to support the infantry to the last, and the divisional machine guns must advance *pari passu* with the infantry in order to maintain their fire without danger to their own friends. . . . Reversed shrapnel, percus-

sion shrapnel, and case shot are no match for the deadly fire of a Maxim gun, delivering 600 shots per minute; and if the defender has recourse to common shell with the object of destroying the gun, he at once sacrifices to a great extent the man-killing power of his weapon. Successful counter-attack in the face of such fire appears impossible, and the immediate occupation of the position, when carried, appears certain to be successful." If all this be the result of a machine gun firing 600 rounds a minute, what would happen with a gun firing at double that rate?

As to the claimed simplicity of the Maxim over its fellows as one of its principal recommendations, let that be made clear by the experts present. Captain Stone alleges that 11,500 rounds were fired from the same gun on one occasion, at Spezia, without mishap. The same has been said of the Gatling, for six times that number of rounds fired in one day. Indeed, it is on record that 100,000 rounds were fired on one occasion, and of this number 63,000 were fired without stopping to wipe out or clean the barrels. The official report by Commander Marvin, U.S. Navy, says: "The working of the gun throughout this severe trial was eminently satisfactory." Then, again, as to its durability, Captain Stone writes: "The gun has been mounted in various ways to suit different conditions, but in any case—whether on a tripod or travelling carriage—the principle is much the same, the weapon being pivoted above the centre of gravity on a universal joint, capable of motion in any direction, and having a traversing angle of 40°. The one-horse limber carries 8 boxes of ammunition of 333 rounds each, made up in a tape ready for use. The gun-carriage is provided with a steel shield weighing 70lb., and carries 4 boxes of ammunition. The total weight of the four-wheel carriage is lowt. 44lb., or (to go into particulars)—

Limber.....	364lb.	} Total, 12cwt., or thereabouts.
8 ammunition boxes, at 46lb....	368lb.	
Carriage	225lb.	
Gun, of .45	65lb.	
4 ammunition boxes, at 46lb....	184lb.	
Steel shield.....	70lb.	

The one-horse limber is driven from the box, with one man on the seat, and altogether the carriage, with limber, can carry 4,000 rounds of ammunition. The especial and noteworthy feature of the Maxim is its automatic power of feeding and firing. As to this I may mention that in 1872, a friend of mine, who held the Whitworth Prize at the Cambridge University on condition that he would annually produce an essay on a scientific subject, came to me in despair, saying, "I am at my wits' end for a subject of interest this year—everything scientific is pumped out." "Not the Gatlings," I remarked. Then I went on to advise, "Why not write an essay on Gatlings, and suggest an endless band for loading cartridges." He did so, scientifically, of course, and thus saved his reputation and his prize for that year. But no doubt his essay, like most happy thoughts, was shoved into the waste-paper basket, for I never heard of any results.

The two-horse Maxim carriage consists of a limber of similar construction to the one alluded to, but of heavier build, carrying twelve boxes of ammunition. "There is no hand carriage," says Captain Stone, "in this case to limber up and form a four-wheel system; the fore carriage or limber being complete in itself and weighing 12cwt." This, in fact, is very much the same as the galloping carriage I described before as used by the United States cavalry.

Now, it may occur to you to wonder how it came to pass that with such an adoration for the Gatling as possesses me, I have never seen one in action against an enemy. Well, it was my misfortune, not my fault. In 1873, I volunteered to take a few Gatlings out to the Gold Coast, but at the last moment the negotiations fell through. Again, in 1879, immediately on the receipt of the news of the Isandula disaster, I asked to be sent out in charge of a battery of Gatlings, and my offer was on the point of acceptance, when General Radcliffe, Assistant Adjutant-General of Artillery, intervened with the remark to me, "How can I recommend you, an infantry officer, to go out in charge of guns, while I have 1,500 scientific officers of my own corps to choose from. What would the public say?" I had nothing to retort, for public opinion was

at that time simply a reflex of the opinions of scientific officers. It is not so now, for science and common sense have united to proclaim the utility and indispensableness of machine guns. But to make a long story short, I did not go to South Africa. A few Gatlings were, however, shortly afterwards sent out in the transport "Camel" which was wrecked on the West Coast of Africa, and to lighten the ship, when she was making too much water, the first thing done was to throw the Gatlings overboard. On the day this intelligence reached London, I met General Radcliffe in Pall Mall, and he chaffingly observed, "Well, Rogers, what would you have done under the circumstances?" "I would have gone overboard after them," was my prompt response.

My friend, Major Owen, R.A., was appointed Gatlingeer in Zululand, but he had only, I believe, two Gatlings of an obsolete pattern, which were taken out of store from the Mauritius, and although they did occasional good service, they jammed at times incontinently. General Lord Chelmsford has more than once expressed his admiration of the effects produced by the Gatling on important occasions in that campaign. "In South Africa," said his lordship (in a discussion at the United Service Institution on "Machine-guns, and how to use them," by Mr. Gardner), we had the Gatling, but I do not think it is fair to condemn machine-guns because this pattern rather failed in the time of trial. In the first place, it had ammunition which was not the same as the infantry ammunition; and in the next place, they were very much given to jam, and they did so at Ulundi. At the same time, in the battle of Gingilhovo, when I was marching to the relief of Etchowe, it is only fair to say that the Gatling gun, under the charge of the Naval Brigade, did very good service indeed, as was shown afterwards by the number of dead Zulus found on the ground, which had been exposed to its fire. . . I can safely say, at all events, in such wars as we have to carry on in South Africa, that machine-guns attached to infantry, if they are of a simple and reliable nature, carrying the same ammunition as the infantry arm, would be of inestimable value. Small detachments

have repeatedly to be left in charge of posts on the line of communication, and in such positions I am satisfied that these machine guns would give very great confidence indeed to the detachment in charge of the post, and in case of its being attacked might be used with very great success. Of course, with regard to its tactical application in European warfare, that is a very much wider subject, and one that I hardly feel able to grapple with, but at the same time, with our army, numerically small as it is, if this machine gun can be made, as Mr. Gardner says that his gun can be, so light as to be carried on a single mule, together with 1,000 rounds of ammunition, I do not see any reason why it should not be employed in certain proportions with infantry. The infantry ammunition has to be carried upon mules into action, and there is no reason then, I can see, why infantry should not be trained so as to use a machine-gun of a light and useful size such as Mr. Gardner describes. It would supplement the deficiency in numbers, which we must always have to encounter when we take the field, and might be usefully employed when attacking an enemy in position, where we do not intend to make more than a feint in front, to hold him there with a small force of infantry, whilst the rest of the force made its attack on the flank." I need make no apology for this rather lengthy quotation, and indeed I desire to add to it something further on the subject which was uttered by Lord Chelmsford on another similar occasion. He said: "With regard to the employment of Gatling guns with infantry, they might be of immense value, assuming that they can be brought into action without undue fatigue to those who have charge of them. I see no reason why one of these guns should not be drawn by a single animal, supplemented, of course, by drag ropes when occasion requires it. They might be of immense value to infantry both in defence and in attack. In defence they would be invaluable at the last stage of attack, when artillery fire is, comparatively speaking, of little use. These machine guns would, in fact, take the place of case-shot, and at that critical moment, when the enemy has advanced within charging distance, a certain

number of machine guns placed along the line would materially increase the difficulty of that last stage of the attack. As regards the employment of machine guns in an attack, I have just pointed out that the critical moment is when the infantry must cease firing and endeavour to charge home. Any assistance which the defence can get at such a time would be absolutely invaluable. I do not see any reason why these machine guns should not be able to give that assistance, if their vertical fire *at a very high angle of elevation* is of such an effective character as has been stated by Major Rogers. If this be really correct, then a certain number of machine guns, at a distance we will say of 1,000 or 800 yards, in a position where they would be practically sheltered from artillery fire, would be able to fire without any fear of hurting the infantry, and drop their bullets in enormous numbers into the enemy's front line of defence, and thus materially assist the attacking lines at the critical stage."

What I had said on this subject, and to which Lord Chelmsford alluded, was as follows: "The difference between the old and the new Gatling is chiefly this: that in the new gun the feed is what is technically termed 'positive,' that is, the ammunition is under control of the mechanism from the moment it is placed in the feed until the cartridge is fired and the case extracted. The gun, therefore, can be fired at all angles of elevation or depression." "As regards machine guns being given to volunteers," I went on to say, "I am quite sure this would be a most popular movement. A few years ago, I had the pleasure of instructing some artillery volunteers at Chester in Gatling gun drill, and the interest shown by them on that occasion proved to me that if a couple of guns were issued to each administrative battalion of volunteers, such a movement would be most popular. Among volunteers there are many skilled mechanics, and let people say what they will, I think it would be a great advantage to employ skilled men to manipulate these somewhat delicate weapons."

The occasion upon which Lord Chelmsford made the above apposite remarks was during the discussion on a lecture, his

second paper on the subject, delivered by that hero of heroes—the nation's darling, the "well-done Coudor man," Lord Charles Beresford, than whom on this question of machine guns no officer in either service is a more practical and competent authority. I hoped to see him here to-night, and, in fact, I asked him to preside, but he wrote: "Dear Colonel Rogers,—I wish I could come and assist you at your lecture in the manner you desire, but I am afraid it is quite impossible, much as I should like it. I have for years fought a battle to get the machine guns into both services, and have succeeded beyond my expectations. When first I lectured on the matter we had not one single machine or quick-firing gun in the whole Navy firing shell, while the French had 840 Hotchkiss guns throwing the one-pound shell.—Yours very truly,

"CHARLES BERESFORD."

I had previously tried, without success, to induce the Adjutant-General to come down on this occasion, but Lord Wolsley, much as he, too, is in favour of machine guns, expressed his regret that he was unable to spare the time, and reiterated his regret that he was unable to accept the proposed compliment of taking the chair. But as regards Lord C. Beresford, I have his leave, in writing, to quote, from a speech he made about machine guns, remarks which are most noticeable as coming from a naval officer of his standing and experience. He presided in the United Service Institution on January 22nd, 1886, at a lecture delivered by Captain Armit, R.N., adjutant of the 22nd Middlesex Rifle Volunteers (Central London Rangers), and in which corps, commanded by Colonel Alt, as is well known, exists a Nordenfolt battery. Lord Beresford made many most interesting statements on this occasion, and we might with profit reproduce them, but it is to one sentence chiefly I wish to advert, and it is in these terms: "I have such a firm belief in these guns myself that I have used all the energy I have to try and get them forward, and my efforts have been very well backed by many very distinguished men in the sister service. The artillery, I am very glad to see, are coming forward, and as to the cavalry we have a colonel with us to-night who says that he will

try his best. Lord Wolseley also has given them a very great immediate future. I have heard him say myself that any European army that will have these guns, *with thoroughly-drilled men and with smokeless powder*, is CERTAIN to win the victory in the next war. That is a very strong opinion from a very eminent man. *I can only say, as far as I am personally concerned, I have such faith in them that I would to-morrow rather command six batteries of these guns on shore than I would the finest ironclad in the Navy with the chance of a brilliant action.*" How I should like to be alongside such an enthusiast in action! Now on this occasion Lord Charles, as chairman defined the machine-gun in words which I think deserve consideration. He said, "I notice in the paper the lecturer says that there is rather an uncertainty as to the meaning of the term 'machine-gun.' I do not agree with him there, because I think a machine-gun is a gun without recoil, that when once you get your sights on you can keep on firing at your enemy as long as it is kept charged. That is the meaning of a machine-gun. Some are rifle-calibre machine-guns, and some are shell guns, but that is the actual meaning of the words 'machine-gun.'" He then goes on to speak about the machine-gun, rifle-calibre, mounted as a field-piece with a limber. "Captain Wilson, who gained the Victoria Cross in the Soudan, devised a method of mounting the gun on two wheels in very much the same manner as that shown by Col. Alt. When we went up the Nile the other day we asked Captain Wilson's permission to mount our two guns in the same way. We left the limbers at Cairo; we took our guns on two wheels. There was a light pole across the trail which Nos. 3 and 4 carried, and when we were near the enemy the muzzle was always to the front—that is to say, at the word "action" 3 and 4 dropped the trail the gun was immediately in action, and the feed was on the gun with the cartridges in it. As the arc of fire, or the points within which a rifle-calibre gun is useful, is only the range of infantry fire, it ought always to be in action at any moment. Therefore the question of unlimbering,

shifting your carriage, and getting the machine rifle-calibre gun into action, the same as you have to do with a field-piece, to my mind do away with a great deal of its efficiency. I am delighted to hear, from the branch of the service represented by Colonel Liddell (10th Hussars), that they are going to take up the machine-gun and try to use it on a galloping carriage. Some years ago Mr. Nordenfelt assisted me to mount the gun on a galloping carriage, so that the gun would train over the wheels perfectly clear; in other words, so that it was always in action, and I compared that gun very much to what a torpedo boat is to us at sea. You may try to get it into position, and you may lose its detachment, but you will only lose five men and you only lose the gun. But look at the enormous amount of mischief which it can do, and how efficient it can be if once you get it into position! It is the same with the torpedo boat. The probability is it will not succeed, but if it does it will make it very uncomfortable for that ship." A galloping carriage, such as described, was on view later on, in July, 1885, in Whitehall Yard, and Lord Charles took me out to see it. It was neatly horsed—but quite unnecessarily so—by four horses of the Horse Artillery, with a smart gun detachment in full uniform, as usual with a field-piece. Lord Charles's brother was standing by. "Let us get on the limber and drive down Rotten Row," he suggested; but the idea was abandoned, lest the sensation caused would be fantastical. For we, *who are engaged in the cause of humanity*, cannot afford to be merry. We cannot even cart Buffalo Bill up and down 'the Row' without provoking unfavourable comment! Lord Charles Beresford went on to say: "The question comes, after all, to this—How are we to mount these guns? Col. Alt has has mounted his gun in a most excellent way, and other mounts have been proposed. That is the real point we have to think about. I should like to tell you how we carried our guns in the Soudan. We carried them on four camels, each camel and each gun numbered, and each camel had so many men told off to it, all numbered and named. The blue jackets called them different names, natur-

ally, but they went by numbers in the book. No. 1 carried the barrels; No. 2 carried the tramping and elevating gear, the feed-plate and other wheels; No. 3 carried the trail, which was very heavy, and No. 4 carried four boxes of hoppers full of ammunition. Of course we only got to Korti, say on the Monday, and had to start on Wednesday morning. We had not much time to drill, but whenever we halted we had a little drill, say for ten minutes every night [ten minutes! why, ten days would be insufficient for the purpose.] "We found that after the order 'Halt,' we had to get our camels down—it took some time for the men to get accustomed to the camel and the camel to the men; but from the order 'halt, mount the gun,' we used to be able to form the order of march under three minutes, which was very quick, considering we had to connect the elevating and training gear. I am not going to be impertinent enough with so many soldiers present to refer to what the tactical position of these guns should be, whether they should be attached to the cavalry, the artillery, or the infantry; but I do most earnestly hope that all the branches of the service will give them a thorough fair trial. If I might suggest how I might work them if I was on shore, which I might be some day, I think I would divide them into batteries of four guns, for the simple reason that the battery of four is more distinctly under control than the battery of six. You would have a leader to each sub-division, and would always instruct them to work independently as skirmishers, and never in line either ahead or abreast. Sir Redvers Buller says that these guns are useful in defence but not in attack. I think they would be useful in attack, particularly as an adjunct to the cavalry, mounted on a galloping carriage. However, I am sure that nobody here will think me egotistical in referring to a fight that we had on a steamer in the Soudan. That was a distinct attack. We were in a steamer that could only go two knots against the stream. The range of the guns in the fort that we attacked was about 3,000 yards. It was a low fort, very difficult to hit, but fortunately it had embrasures.

We had our two guns mounted in échelon, so that they would fire both broadsides clear. We went up to that fort, and although there were hundreds of riflemen on the bank, and the natural thing for the men to do would have been to fire at the riflemen, what we instructed them to do was to keep *pumping lead into the fort*, and the consequence was that they could not hit us with their shot. *The hail of lead prevented them hitting the seamen.* We passed within eighty yards of those three guns and they could not fire at us. As you know perfectly well, it was a sort of penny boat really, very thin, worn out, like one of the boats on the Thames here. The proof of what I am saying is this, that there was a moment when the two machine guns would not bear, and at that particular moment, only some 200 yards after we had passed the fort when we were giving three cheers, thinking we had done a very fine thing, and when the machine guns would not bear, they hit us two or three times, and one shot went into the boiler. It was therefore a distinct case of attack, and it is to the attack of those two machine guns, in my opinion, that we owe our lives, and not only ours, but those of Sir Charles Wilson and his party. I think if we had had only one machine-gun we could not have played on the fort with the same effect that we did. I do not think any of us would have come back; in fact, I may say, I am certain that neither Sir Charles Wilson, nor any of his men, nor ours, would ever have got back. I mention this to show what I myself think of the machine-gun for attack. Sir Charles Wilson might have marched down the bank, but he had three very strongly fortified villages to pass, and he had only 30 English soldiers. He had also 200 of those men who really wished to get back to Khartoum which they had left."

I have given you Lord Charles's description of that weird fight on the Nile—but here are his *ipseissima verba* in a note dictated by him to me lately: "No other weapons than machine guns could have enabled the *Safia* on the Nile, old and worn out as she was, at two knots an hour speed against stream (which was the utmost procurable in shallow water) to pass within eighty yards of the

enemy's battery of four heavy guns, with many hundreds of riflemen about; but it was the fact of having these two machine guns (Gardner's), protected by steel shields, pumping lead into the embrasures, that prevented the shore guns doing us any damage, for directly the machine guns were unable to bear (being angled when we passed the fort) the shot was sent through the boiler which disabled us until it was repaired." You are perhaps not aware that the artificer who did this work under fire was not awarded the Victoria Cross, and Lord Charles Beresford was only complimented.

To one other lecturer on this subject I feel bound to advert, because I think that though also by an artillery officer, the paper I allude to is one of the best on record. I may here confess that until the morning of Good Friday I had not put pen to paper on this enthralling subject, but it seems to grow into proportions quite beyond the scale I originally intended. However it is intended by Messrs. Heywood, of this city, to publish this lecture in book shape very shortly at a very small charge, and to make it more interesting, an appendix will be added, giving full technical descriptions of the gun, with photographs. Of course I have had to skip a great deal of the matter I wished to put before you, particularly quotations from writers who are unquestionably authorities on this subject, and I only wish that Lord Wolseley, Lord Charles Beresford, and other naval and military officers of the largest experience were present to endorse, as I am sure they would, much of what I have so crudely yet conscientiously composed for your edification.

Lieutenant Benson, R.A., delivered his lecture on "machine guns; their tactics and equipment," on November 18th, 1887, General Goodenough, Inspector General of Artillery, being in the chair, and among the speakers in the discussion that followed, were Colonel the Hon. R. Talbot, 1st Life Guards, Major Smith, R.A., Captain Stone, R.A., Lord Chelmsford, Mr. Maxim, Lieutenant Colonel Alt, Mr. F. Lowe, Colonel Talbot Coke, Captain James, R.E., Mr. Nordenfelt, General Arbuthnot, R.A., Captain Baden

Powell, 13th Hussars, Captain Palliser, and last, not least, Lord Charles Beresford; so that both paper and discussion were of the highest possible importance, and to those of you who are interested in machine guns, I would strongly recommend its perusal. I cannot now more than briefly run through the arguments put forward on the occasion, highly suggestive and convincing though they be.

Lieut. Benson said: "I think the great power of machine guns is too universally recognised to require any further illustrations by me, and I will therefore simply state that in practice with a ten and five barrelled Nordenfelt, carried on at Bangalore, in August and September, 1884, before Sir Frederick Roberts, the following results were obtained:—The ten-barrelled gun was found to fire double the amount of ammunition in a given time (two minutes), and obtain about the same number of hits as 50 marksmen and first class shots at 1,200 yards range. The ten and five-barrelled guns firing together for two minutes at 2,450 yards, gave 192 hits on a horizontal target, out of 855 rounds, while two nine pounder Horse Artillery guns, which fired shrapnel for nine minutes, gave 394 hits. . . . The two great questions on machine guns are these.—(1) What should be their means of transport? And (2) To which arm of the service are they to be attached? The answers to these two questions are dependent on each other. If they are to be attached to the mounted branches they must be able to get over the ground quickly enough to accompany them on service. For this purpose pack transport appears unsuitable, as it entails men marching on foot to lead the animals. . . . In my opinion, one of the most important considerations in deciding on the method of transport of machine guns is the carriage of ammunition. Some men have urged that it is a mistake to imagine that such a large supply is required with machine guns, as they never have to fire rapidly for a long period, and in support of this theory it is pointed out that in the recent operations in the Soudan a comparatively small amount was

expended. But it is forgotten that the most important fights when they have been used seldom lasted more than half an hour, which is very different from the duration of a battle between two civilised powers." Lieut. Benson then proposes the organisation of machine guns into troops of four guns. He goes on to speak of the various mountings now used: "Another system, which is now being tried in several cavalry regiments, is to mount the gun on a two-wheel limber with the ammunition under the gun. It is intended to be fired, without unhooking the horses, by two men on the limber. I think a good many will agree with me in urging the following objections to it:—(1) That sufficient ammunition cannot be carried; (2) The breathing and motion of the horses would impair the accuracy of the fire; (3) Supposing the horses were hit, the gun would be put out of action till the horse was extricated; (4) The gun cannot be detached from the limber to be run into a position, either where horses cannot go on account of rough ground, or where it is desired to run the gun up the reverse slope of a hill. (5) Difficulty in getting cover for the gun thus mounted. Now if we put the gun on an ordinary light gun carriage, with a trail, hooking on a limber, the above objections disappear. . . . Without again going into detail I will point out the following characteristics of machine-gun fire: (1) The great power of concentration and rapidity of fire, which enables them to do a great deal of damage at a given point in the shortest possible time. (2) Power of turning the stream of fire at will in any direction required during the actual firing. (3) Continuity. (4) The great control of fire, owing to the whole of the firing in each gun being done by one man. . . . There is still another point about these weapons which I think is worth noting; it is the difficulty of distinguishing their position at long ranges when infantry are firing alongside them. If smokeless gunpowder could be introduced it is evident that the position of machine-guns would be still more undistinguishable. . . . The fact that they can keep up an effective fire when the front is obscured by smoke or darkness, provided they have been previously laid, has

already been noted. . . . If these weapons were drawn by infantry on light carriages, rapid changes of position would be quite impossible, and their sphere of action would, therefore, be very limited. Amid the dust and smoke of a battlefield these movements would not readily be noticed until a stream of bullets would suddenly appear from an unexpected quarter, and once the range is found, a few minutes' fire from these weapons means annihilation. . . . Proposals have frequently been made for making machine-guns actually part of an infantry and cavalry regiment . . . but we have never yet heard any sound scheme for their use in action when so attached. They cannot possibly accompany the shooting line of the attackers in action, as they cannot lie down and fire as infantry do. If carried on mules, and the mules be shot, the gun would be practically useless. . . . On the other hand, if placed to a flank, about 1,000 to 1,500 yards from the enemy, to perform its functions as long-range infantry fire, covering the advance, it would be a long way from the battalion it belongs to, and therefore completely out of the control of the officer commanding the battalion. This idea is simply a revival of the old battalion gun system, which was proved long ago to be entirely vicious. . . . Much the same kind of reasoning applies to the case of their being attached to regiments of cavalry, if they are to be used with cavalry, as I saw the gun of the 10th Hussars used the other day at the Agricultural Hall, viz., to fire on the enemy's cavalry from a flank just before the charge of the two hostile bodies. Why should not horse artillery be so attached? And yet, if such a thing were proposed, it would be received with ridicule. Imagine a cavalry regiment sent off on reconnoitering duty over very rough country, which, though passable for horses, was so in a much less degree for wheeled carriages; or ordered on any duty where machine guns were not required. What would the regiment do with its machine guns? . . . It was once proposed to attach them to batteries of artillery, but I believe this project has long ago been given up. In fact, it was most probably this

very proposal which led gunners in the first place to set their faces against these weapons. [What a confession is there, my countrymen!] "Captain Lloyd, R.A.," he goes on to say, "organized a troop of four Gardner guns on the mountain battery principle during the recent operations in Burmah, and in a paper to the R. A. Institution, he points out the great value of the machine gun fire for searching out the position of the dacoits in the jungle, and for playing on their line of retreat when driven from their stockades or villages, and I have General Sir J. White's word for it that these weapons did good service when called upon." In conclusion, he says, "I would point out that it is of little use our writing and talking about machine guns and making proposals for their equipment and tactical use, unless we take measures to have these proposals tested by experiment as far as can be done in time of peace. It is also of little value trying one gun here and another there without any attempt at making them work together. What we want is to try their combined effect under service conditions, and at targets representing such objects as would be fired at on service."

I quite agree with him; and now, also, in conclusion, may I ask you here present, what do you think of it at all? Are you, as volunteers, prepared to receive these machine-rifles as part and parcel of your equipment? Are you prepared to be drilled to their use by companies, and to have them attached to your regiments in batteries? If so, my advice to you is, before you finally settle upon the best machine-gun extant for the work, arrange some preliminary tests. There are three regiments of volunteers in Manchester, and one in Salford. Let each regiment take one of these types of guns on trial. Draw lots, if need be, as to which special nature of machine you are individually to have for the time being; and every three months or so exchange your guns between you, so as to understand the peculiarities of each. In this way you will arrive at the safest conclusions. Perhaps each corps will prefer a different type, but this will not matter in the least; it might, in fact, lead to generous emulation, for they are all, as you

know, of the same rifle calibre. Take another piece of advice—do not allow these several types of machine rifle-batteries to go out of the city. Buy them up at once. Then afterwards you can, by conference or otherwise, determine on the organisation best fitted to develop their undoubted powers.

You have heard what Lieutenant Benson had to say about the folly of reverting to the vicious system of a battalion gun; but as to this there are numerous as good or better authorities who think otherwise. Lieutenant Benson gives his opinion from an artillery point of view. He even grudges the title of batteries to these weapons. Why? Because every gunner thinks and believes he can batter everything and everybody into smithereens! Listen for one moment to what Lieutenant-Colonel Alt says on the subject: "The paper we have heard read is, I consider, an excellent and exhaustive one; but I cannot concur in the conclusion the lecturer arrives at. Being an artillery officer, he naturally thinks on horse-back, and considers that machine guns are not capable of being worked with advantage by infantry, but should be mounted on horse carriages, organised in troops of four guns each, and be attached to each division of an army corps. He gives his reasons against their use by infantry, to which I propose briefly to reply. With regard to the enormous labour of dragging these guns in a campaign, I can only point to what the men of my own battalion (the Central London Rangers) have done regularly with the Easter marching column, and at the Aldershot drills for several years past.

"The five-barrel Nordenfelt guns, mounted on our magazine carriage, have been dragged from Petersfield to Portsmouth, from Canterbury to Dover, from East Grinstead to Brighton, from Aldershot to Perbriant, and back on a bee line across the Fox hills; and the Long Valley, with its ruts and dust, is as familiar to our gun detachments as Oxford Street to a London cab driver; no high roads, by roads, country paths, hills or downs encountered on the way have checked their march. Our men never complained except at the indignity of its being proposed to relieve them, and only accepted

assistance when breasting a slippery slope, *impracticable for artillery*, or a steep incline on a heavy or newly metalled country road. . . . "I should be pleased to see machine guns, he adds, attached to each branch of the service, but I contend that as they are but clusters of rifles their proper place is with the infantry."

You have also heard my own proposition as to erecting these weapons into a separate or fourth arm of service in connection with a force of mounted riflemen. But whatever is done, the question of organisation must be weighed carefully with reference to administrative success, and depend upon it, there would be less friction and more latitude of action with a separate organisation than with any other whatever. One thing is quite certain, that an army on the defensive, such as our own, provided with machine rifle batteries would possess inestimable advantages, which appear to be lost sight of by those who affect to contemplate an invasion of our shores. Let us for the sake of argument, suppose an enemy, having run the gauntlet of our first line of defence—the silver streak of sea, torpedoes and all—and successfully evaded our guns of position on the coast, still to have the temerity to advance against our capital, sending forward clouds of skirmishers supported by the distant fire of his artillery in rear. What happens? Every village, every copse, every stream, every hollow road, every hedge-row, becomes a shelter-trench for the nonce, whence Gatlings, Gardners, Nordenfelts, and Maxims would belch a continuous fire, disputing point by point in gradual retirement, and the game of wearying retreat would be played, until on a chosen spot a halt would be succeeded by a vigorous counter-attack which should crush the impudent invader! Do I exaggerate the case? Must we bethink ourselves of the fate of Paris as pointing to a probable opposite result? The French possessed these desolating weapons, and of what avail were they to them? Did they retard the advance of their relentless foe even for an hour? Did they add one iota to their numerical strength? Did they encourage and promote a courageous resistance? Alas! that such reflections

tend rather to damp our ardour for the proof, and induce us to marvel much whether a nation's pluck is not a destructible material, liable to fritter away into nothing when allowed to degenerate, and whether it may not be a matter of doubtful political expediency, to disuse and emasculate a people's energies by entrusting the fate of a great country to the sole guardianship of any mechanical contrivance whatsoever.



APPENDIX.

THE foregoing lecture was delivered in the Mayor's Parlour, Town Hall, Manchester, on Tuesday evening, the 30th April. The chair was taken by His Worship the Mayor (Alderman Batty), who said he had never greater pleasure in placing the room at the disposal of a meeting than on the present occasion, when he saw assembled so influential a body of gentlemen as the Lancashire Volunteer Officers' Association, who had come to hear a paper read by Colonel Rogers, descriptive of the machine guns they saw before them. "But," concluded the Mayor, "I must express the hope that such awful weapons will be regarded in time with horror, and that nations will cease to slay each other with them. However, it is quite as well that you Volunteers should know all about them, and I am only sorry that I cannot myself stay and listen to the lecture, as I have another meeting to attend, and I must now vacate the chair in favour of Colonel Bridgford."

Colonel Bridgford, C.B., President of the Volunteer Officers' Association then took the chair, and called upon Colonel Haworth to read the following notes of apology for unavoidable absence:—

"Cavalry Barracks, York, April 28.

"Dear Sir,—In reply to your letter of the 26th, informing us of 'Machine Gun lecture' at the Town Hall, on Tuesday, I am desired by Lieut.-Col. Lord Downe to write and inform you that he regrets that no officers of the regiment will be able to be present at it, in consequence of a field-day early Wednesday morning, at which Prince Albert Victor has also to be present.—Yours very truly,

(Signed) "J. BRNO,

"Lieut. and Adjutant, 10 Royal Hussars."

"York, 30th April.

"Dear Colonel Rogers,—I am sorry to say that I find at the last moment I cannot have the pleasure of hearing your lecture, as I have to have an interview with a gentleman on important business, who can only be here between 3 and 6 this afternoon. A notice of your lecture will no doubt appear in a local paper, and I should think it very kind of you if you would send me a copy.—Yours truly,

(Signed) "S. V. HAMMICK,
"Asstnt. Adjutant-General."

"April 24, 1889,

"100, Eaton Square, S.W.

"Dear Sir,—Lord Charles Beresford is away at Wilton all this week . . . There is not the slightest chance of his being at your lecture, as the annual meeting of the Beresford Club, in East Marylebone, is fixed for that evening, and he must attend it, if at all able. . . . Yours truly,

(Signed) "B. WARHURST."

General Daniell, C.B., desired Colonel Rogers to express to the meeting how much he regretted his unavoidable absence, owing to the fact that on that very day (30th April) he vacated his command of the Northern District.

The following are extracts from letters to Colonel Rogers from Dr. Gatling, the inventor:—

"Hartford, U.S.A., March 10th, 1889.

"My dear Friend,—You must pardon my long silence. . . . I must confess that I should have written you, letter or no letter, ere this. I can only promise you, my good friend, that I will be more prompt in writing to you in future. Surely I do not wish our correspondence to stop. No, no! I think of you, my dear Colonel, and love you, and I shall never forget how you have stood by me and my gun, through evil and good report. . . . During the past year I have made two inventions, which I think will prove of much value. One is a new and improved method of casting heavy guns from steel, and the other a new torpedo boat, which I think will be more effective and certain in its action than any invention of its kind."

"Office of the Gatling Gun Company,

"Hartford, United States, March 19th, 1889.

"My dear Colonel Rogers,—I am in receipt of your kind letter of the 8th inst., and I am glad to learn that you are still strong in the faith that the Gatling is all right—that it is the best and most effective machine-gun extant, and that you are going to deliver a lecture in which the interest of the Gatling will not suffer in your hands. You need not, my dear friend, be afraid to speak of the merits of the Gatling, for my opinion is, as I have often told you heretofore, that you will never have cause to be ashamed of your good opinion of the Gatling gun. . . . Believe me, ever your true and sincere friend,

(Signed) "R. J. GATLING."

As Dr. Gatling was born in the year 1818, he is now 71 years of age, and yet his ever-active brain seems to be as inventive as ever. It may not be known that previous to his taking up guns and other engines of war he was the inventor of numberless agricultural implements, &c.

Colonel Bridgford then introduced the lecturer, who thereupon invited the experts present to explain the mechanism of the Maxim and Gatling machine rifle-batteries, as being types of the latest and oldest weapons of the kind. It may be here mentioned that the Gatling exhibited was a short six-barrelled so-called "Police Gatling," used in America for clearing away mobs from streets, for revolts in penitentiaries, or for the protection of buildings containing valuable property, &c.

Captain Ackland (late Royal Artillery, and now Secretary of the Nordenfolt-Maxim Company), and Mr. George Accles (Manager of the Gatling Gun Company, Birmingham, and inventor of the "Accles Positive Feed"), briefly explained the working of the guns; which done, Colonel Rogers proceeded to deliver his address.

Colonel Bridgford opened the discussion that followed, by saying that, speaking on behalf of the Manchester Volunteer Regiments, he might say they would be glad to receive one of these guns each, but he was afraid they would have to be presented to them.

Major-General Arbuthnot (late Royal Artillery, and superintendent of the small-arms factory, Enfield, but now belonging to the firm of Kynoch and Co., Birmingham), next addressed the meeting, and said, in his opinion, the whole nation was indebted to Mr. Nordenfolt for his efforts to get the machine gun introduced into the land service of this country. He pointed out that the Cavalry had adopted a machine gun (the Nordenfolt), and that a galloping gun carriage was in the hands of some Cavalry regiments. Speaking of the different types of machine guns, he said there was only one which was really automatic, and that he indicated was the Maxim, and he strongly urged the representatives of Volunteer regiments present not to adopt the Gatling, but to choose either the Maxim, the 3-barrel Nordenfolt, or the 2-barrel Gardner. The Gatling had been tried in competition with the other machine guns, and had been thoroughly beaten out of the field. As an Artillery officer, he was in favour of the machine gun being attached to Cavalry and Infantry, but not to Artillery, because it was not an Artillery weapon. To arrive at the full power of the machine gun it would be necessary to fire it with smokeless powder, which he thought one of the first considerations of the present time. England, he added, was far in advance of other nations in the matter of machine guns.

Captain Ackland, while acknowledging he had an interest in one particular gun, said that, speaking not commercially, but as one who had assisted at a vast number of experiments conducted scientifically, he considered the Maxim the best. The talk about speed was nonsense. Accuracy was everything, and for accuracy nothing could touch the Maxim. In answer to a question from Mr. Cobden Phillips, he said that after firing 600 rounds the Maxim, with smokeless powder, produced steam, but this need not affect accurate firing, as the vent for the steam could be placed anywhere, and not necessarily in front.

Mr. George Accles said that, with regard to too great speed in firing, there might and would be occasions in warfare when rapid firing became desirable. It was the fact that the power of firing

1,000 or 1,200 rounds a minute resided in the Gatling, that proved its efficiency for war. The Gatling was quite as automatic as the Maxim, because the operations of loading, firing, and extracting were under complete control. The improved Gatling was accurate as well as automatic, and was the only gun that could be used at all angles of elevation and depression. It had not been beaten out of the field, as stated, and he challenged all rivals. He would be happy to put one of his guns at the disposal of the Manchester Volunteers.

Captain Holmes-Poulton, and other Volunteer officers, made some remarks, and questioned the experts very closely, thus evincing their interest in the subject; and the proceedings were concluded with the usual vote of thanks to the lecturer, proposed by Colonel Rocca, 5th V.B., and seconded by Major Heap, 2nd V.B., Manchester Regiment.

Colonel Rogers, in reply, expressed his pleasure in addressing the Lancashire Volunteer Officers' Association on so important a subject. There was no manner of doubt but that it was one of the questions of the day, and demanded serious consideration. He knew, by the silence which prevailed in the room, how attentively he had been listened to, and he was grateful for it. As regards the remarks made by General Arbuthnot, he might say that this officer had been invited to be present, "yet," observed Colonel Rogers, good humouredly, "I asked him to come and bless me, and, behold! he has cursed me."* But far and beyond personalities lay the great question of the expediency, nay, the urgency of the machine-gun question, and this, he hoped, would receive an impetus from the lecture he had had the pleasure to deliver, and much more from the discussion, and the publicity of their proceedings. He was much obliged to the proposer and seconder for their vote of thanks to him and their kindly remarks, as also to the audience for the reception of it, and their sympathy throughout.

* A letter from General Arbuthnot on this subject is appended.

On the following morning the four Machine Rifle-Batteries were photographed by Mr. Baum, in the yard of the Town Hall, where the guns had been housed by the kind permission of Mr. Malcolm Wood, Chief Constable of Manchester.

Technical descriptions of the Gatling, Gardner, Nordenfolt, and Maxim systems are as follows:—

THE GATLING.

The following is a technical description of the improved Gatling gun*: "The guns have six, eight, and ten barrels, each barrel having its corresponding lock. The barrels and locks revolve together, inside the outer stationary case. But in addition to this action, the locks have a forward and backward motion of their own. The forward motion places the cartridges in the chambers of the barrels and closes the breach at each discharge, while the backward motion extracts the empty cartridge case after firing. The cartridges are supplied to the gun by magazines consisting of a circular drum of a width slightly greater than the length of the cartridges. On the two circular plates which form the ends of the drum are spiral grooves, running from the centre to the outer edge, in which the ends of the cartridges are supported and guided in and out of the magazine. In the centre of the magazine, between the two aforesaid grooved plates, are two other circular plates which revolve round the centre shaft, having a number of slots radiating from the centre and joined near the outer edge by pins. These two plates when revolved, forces the cartridges along the aforesaid grooves in the end plates, out of the magazine into the receiver of the gun, and in front of the locks. The centre plates of the magazine are revolved by projections on the receiver, which engage with pins that join the centre plates in the form of gear. The magazine is held in its place over the receiver by flanges

(From the *Naval and Military Gazette*, February 3rd and 10th, 1886: "The Improved Gatling." A paper, contributed to by Col. E. Rogers.)

on each side of the hopper with two under-cut slots, in which two projections on the magazine fit so as to lock it in its place. The slots are of unequal size, so that the magazine cannot be wrongly inserted. On the left-hand side of the hopper are two wedge-shaped points that are let down into the receiver, which eject the empty shell from the receiver when extracted from the chambers by backward motion of the lock. The extractor is so formed that its hook remains always in front of the cartridge head, and is rendered stronger by making it double its former width circumferentially. It has no spring, and does not lift the lock by springing over the cartridge head. The cartridge is, therefore, always struck centrally instead of at the side. The extractor is so arranged that after each discharge it holds back the firing pin, so that its point does not project in front of the lock face until released by the cocking ring, making it impossible for a premature explosion of the cartridge to take place by the forward motion of the lock coming in contact with the cartridge heads. In firing at high elevations, the cartridges are prevented from sliding back into the mechanism through the orifice in the front lock flange, either when the locks are in or out of the gun, by flanging the openings and making the lock to correspond. The gun has been fired in a vertical position with as much ease and perfection as when horizontal. The rear position of the lock is supported by a T-way at the centre instead of at the bottom, in order to prevent all possibility of jamming by dust or sand. The gun is mounted on trunnions two inches below the centre, and is elevated and depressed by means of a circular elevating arc connected at both extremities with the gun, and actuated by gearing so arranged that elevation and depression are indicated in degrees and minutes. A horizontal limb for direction is graduated in the same way. Both kinds of gear are so arranged that they can be instantly thrown out, allowing the gun to move rapidly in all directions by means of a long lever. The automatic oscillator is dispensed with, the effect being produced by hand movement of the rear lever. An adjustment of lateral training is obtained by means of stops on the turn-

table of the carriage, which can be set to any required number of degrees. The gun can be elevated to 74 degrees and depressed to 78 degrees. It is provided with two sights, viz., one on each side. A device is added to serve the purpose of throwing the cocking ring out of action at will, and prevents the cocking of the firing-pins. This is of advantage during drill, and allows firing-motion to take place without snapping and thereby injuring the firing-pins. The barrels are locked into the rear flange plate, instead of being screwed as heretofore. In case of accident to lock or barrel, the lock can be instantly removed, and the firing continued with the remaining locks.

The gun can be fired with the crank at the rear or side. When at the side, the gun fires at each turn of the crank about one-half the number of shots to the number of barrels in the gun; when at the rear, it fires at each turn of the crank as many shots as there are barrels in the gun. The feed magazines hold from 65 to 104 cartridges each, and weigh from 10lb. to 24½lb. when full of cartridges. The musket calibre guns weigh 100lb. to 237lb. each, according to the number and length of the barrels.

The following are the dimensions and weight of the light improved Gatling mounted on a tripod stand: Calibres, 0.42in.; number of barrels, 6; length of barrels, 30in.; total length of gun, 43in.; height above ground, 35in.; elevation and depression, 55°; angle of oscillation, 0° to 50°; weight of gun, complete, 107lb.; weight of tripod and mount, 47lb.; weight of feeders, each, full, 14lb.; number of cartridges in each feeder, 64; time taken to fire one feed (crank at rear), 2 2-10sec.; number of shots fired in one minute, 768; number of feeds to each gun, 12.

The gun is fitted with the Accles positive feed rebounding firing pins, positive (not spring) extractors, automatic sight and pointing lever, safety cam, and oscillating fixture. The gun can be fired at any elevation or depression; the man who fires the gun points it at the same time. The gun as an all-round fire without moving the tripod stand. It can be set in a moment at any position to oscillate from 0° to 50°. It can also be given a vertical

oscillation at any angle of elevation or depression. The locks in this gun are supported at all positions. They cannot move to the rear except when drawn back by the cam, as the crank is turned. The cartridges are received from the magazine at the top of the gun, and fired at the bottom; in case of an accident with a defective cartridge, the fire or gas cannot reach the live cartridges in the magazine, and thus cause an explosion; both these points render the gun so safe that it is impossible, under any circumstance, for an accident to happen to the men working the gun. Damage to one or more barrels or locks will not stop the working of the gun. No tools are required to take the gun and feeds to pieces.

This gun can also be remounted on a galloping carriage, drawn by drag ropes, for service with cavalry or infantry. The third wheel is detachable, and then the gun carriage can be hooked on to a limber for long journeys. But as to the question of mounting machine guns (which is one of paramount importance), we will have something more to say in our next issue. Suffice it to say, that a self-contained galloping-carriage is an essential equipment for machine guns.

THE NORDENFELT.

GENERAL DESCRIPTION.

The types of Nordenfelt machine guns remaining to be described are:

No. 12, Three-barrel Rifle Calibre Gun (Figs. 33 to 36); and No. 13, Two-barrel Rifle Calibre Gun. They weigh respectively 55lb. and 40lb., and fire at the rate of 400 and 300 rounds per minute.

For naval service they are not used at present, because the five-barrel Nordenfelt is quite light enough for all naval purposes, but for land service they are very useful, in consequence of their lightness and simplicity. The three-barrel gun does not weigh more

than the Gardner one-barrel, and the Nordenfelt three-barrel gun consists of thirty-five pieces, compared to thirty-three pieces in the Gardner one-barrel. All these light Nordenfelt guns are, like those of larger calibres, made almost entirely of best wrought steel, instead of the gun-metal so freely used in some other types of machine guns.

In order not to be exposed to rust, these light Nordenfelt steel guns are covered over in a galvanic bath with a coating of copper, which protects the guns as well as all the parts of the mechanism except the actual wearing surfaces.

These types are designed especially for the following purposes:

1st. For cavalry (Fig. 33). The gun is so light and so convenient in shape that it can be carried on a led horse. One led horse would, then, be required for the gun and implements, one led horse for the stand from which it is to be fired when the gun is dismounted, and one led horse for the cartridge hoppers or feed-cases filled with ammunition. Other horses or baggage wagons would carry the extra supply of ammunition.

2nd. For mountain service. A gun mule which can carry 20wt., including saddle, would carry the gun and stand; a second mule would carry the wheels, axle, and cartridge hoppers, filled; and other mules would carry the extra supply of ammunition wanted for the guns.

3rd. For infantry (Fig. 34). Six of these guns, with their stands, wheels, and hoppers, can be stowed away in one baggage wagon, or extra ammunition wagon, and follow the ammunition train which is nearest to the front. Whenever a comparatively small force of infantry is hard pressed, or if it has to protect a threatened point, a laager, cantonment, or temporary entrenchment, the six guns can be lifted off the wagons and be ready to commence firing in a few minutes. Two men can drag each gun on its wheels for considerable distances; and one man can carry the gun, with two men carrying the stand (Figs. 35 and 36), if such difficult ground is met with that such a light gun cannot conveniently be dragged over it on its wheels.

THE MAXIM RIFLE CALIBRE GUN

GENERAL DESCRIPTION.

The guns consist of two parts, viz., the recoiling and non-recoiling.

Recoiling
portion.

The recoiling portion is the barrel and its extension to the rear, which latter contains the lock and the gear connected therewith. The barrel is an ordinary rifle barrel with a breech sleeve screwed on, to which is dovetailed the extension of the barrel; this extension is of steel, and consists of two vertical plates and a connecting end piece. The lock is secured by a divided screw to the connecting rod of a crank, the shaft of which passes through the plates; there is also a handle to the shaft on the right of the gun outside, marked F on Fig. 1, and a curved arm to the crank marked B on the same Fig. The lock does not differ materially from that of an ordinary pistol. In Fig 3, the position of the lock is shown, where B is the connecting rod and E the crank. Figs 4, 5, and 6 also show the lock in various positions, and it will be observed that it has a vertically sliding piece on the fore end marked D in the Figs., and designated the carrier. The use of this latter will be illustrated hereafter.

Lock,
crank, and
crank arm.

Carrier.

Trigger
and main-
spring.

In Figs. 3, 4, 5, and 6, the trigger, marked F, is shown, also the rod which actuates it; this rod is operated upon by a lever in the rear of the gun, shown in Fig. 2, on the upper end of which is a double button; a pressure being applied to this button draws back the rod and releases the hammer and firing-pin. In the rear of the gun is a catch (see Fig. 2), which, when down, prevents the lever being pressed forward. The main-spring and the manner in which it acts on the trigger and striker is clearly shown in the Figs. referred to.

Non-
recoiling
portion.

The non-recoiling position of the gun consists of the gun case and the water jacket, which are dovetailed together. On the right side of the gun case is a solidly-attached resistance piece, marked C in Fig. 1.

It will be observed that when the breech is closed, as in Fig. 1, the curved arm of the crank is some small distance from the resistance piece; the reason of this will be explained when the action of the mechanism is treated on.

Resistance
piece.

On the left side of the gun case, there is a strong spiral spring, the rear end of which is connected by a chain and fusee with the crank shaft, and the fore end is attached to the gun case by means of the spring case; the use of this spring, as will be seen hereafter, is to bring back the barrel after the recoil and to work the crank; the working strength of the spring can be adjusted by means of a screw on the fore end.

Spiral
spring and
fusee.

The water jacket is of gun metal and surrounds the barrel. It is fitted with three openings, one for receiving the water, one for drawing off the water, and the third for letting out the steam; the first two openings are closed by screw plugs, the third is always open and is connected to a system of tubes (one sliding and one stationary) which permits the steam to escape, but not the water, whether the gun is elevated or depressed. Both ends of the water jacket are fitted with stuffing boxes and glands; these guide the barrel and prevent the water escaping.

Water
jacket.

The gun is supplied with cartridges from a belt which passes through the feed box, on the top of the gun, from right to left. (See Figs. 7 and 8.) In the feed box are two movable panels and two stationary ones. The movable panels are connected by a lever to the barrel, and are adjusted in such a manner that the barrel on recoiling moves them from left to right. By means of a spring they engage behind the next cartridge in the belt, and thus the cartridges move on automatically towards the chamber; when the barrel returns after the recoil, the panels place the cartridge still in the belt immediately above the chamber.

Feeding the
gun with
cartridges.

GARDNER MACHINE GUN.

DESCRIPTION.

The barrels (the axes of which lie in a horizontal plane, and are parallel to each other) are fixed in a gun-metal casing. The fore

E

end or barrel casing (A) is tubular, and the rear end or breech casing (B) is rectangular. The top of the casing is closed in by the cover (C), which is pivoted to the fore end of the breech casing, and is locked down by means of the caseable screw (D).

In the breech casing are the locks, which carry the mechanism for igniting the cartridges and extracting the empty cartridge cases. The locks are driven backward and forward by means of a crank disc, worked by the handle (F). At the forward motion the cartridges are pushed into the barrel chambers, and there held during the time of discharge, whilst during the backward motion the empty cases are withdrawn.

The gun is fed from the vertical cartridge feeder (G), which is attached to the cover behind an opening, through which the cartridges fall from the feeder to the cartridge carrier.

The cartridge carrier, which is to the rear of the breech ends of the barrels, has a transverse motion, for the purpose of bringing the cartridges from the opening in the cover and delivering them opposite the right and left barrels alternately, where they are in line with the lock plungers.

The cartridge feeder (G) holds 30 cartridges, and is itself supplied from wooden cartridge holders, each holder containing 20 cartridges.

Sighting. The gun is furnished with two sights—the fore sight (I), which is attached to the barrel casing, and the tangent sight (J), which slides in a bracket (K) attached to the breech casing.

Action. Supposing the right-hand barrel to be just fired, the continued rotation of the handle (F) and crank (Q) causes the right-hand hammer to be turned upon its axis, drawing back the firing-pin and compressing the lock springs at the same time. The cartridge carrier moves over to the left, and the ejector, which has passed under the lock, rises to the left of it, forming a trough under the opening in the cover, and into this trough a cartridge falls, ready for conveyance to the barrel chamber. The crank-pin now comes in contact with the butt of the lock and forces it backward, extracting the empty cartridge case. The lock being fully back, the cartridge

carrier moves to the right, bringing the cartridge from under the opening in the cover to a position in line with the barrel chamber, and with its rim or head between the face of the plunger and the hook of the extractor; at the same time the empty case has been thrown out at an opening in the side of the casing. The lock now moves forward, pushing the cartridge into the chamber and forcing down the ejector that it may duly pass under the lock. The lock now being fully forward, supports the cartridge in the barrel chamber, whilst the hammer being released, the firing-pin flies forward and ignites the cartridge. The right and left hand barrels are fired alternately, the right lock advancing as the left is being withdrawn, and *vice versa*. The cartridge carrier (H), which is actuated by a cam (8) upon the crank disc, obtains its supply of cartridges from the cartridge feeder.

—
“Sutton Coldfield, Birmingham, May 5, 1889.

“Dear Colonel Rogers,—I am afraid the few remarks I made last Tuesday were very disjointed, and did not add to the interest of your lecture, but it was difficult to know exactly what to say without having thought of it previously. But I hope you did not think I was in any way antagonistic to you. I entirely agree with you in your estimate of the importance of machine guns; but I could not conscientiously advise the Volunteers to get any machine gun not in the service. If they want to be in tune with regulars they should be armed with service weapons, and not with fancy weapons of their own choosing; and it was for this reason only that I recommended them to get either the 2-barrel Gardner, or the 3-barrel Nordenfolt, or the Maxim, and not to go in for the improved Gatling, which has not been adopted by our Government. It was very kind of you to ask me to your lecture, and I hope that nothing I said has detracted from its interest. If there is any good account of the night's proceedings in any of the local papers I should be much obliged if you would send me a copy.—Believe me, yours very truly,

“H. T. ARBUTHNOT.”

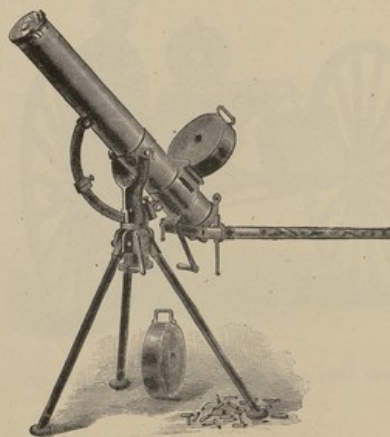
CONCLUSION.

So ends the proceedings connected with the delivery of my lecture on this burning topic, a subject which fairly bristles with doubts and difficulties, with paradoxes and antagonistic principles, but at the same time one of urgent, present, and future interest. Following Mark Twain's advice, I need only predict what I know that time will tell what these awful weapons of warfare will effect; if nothing else, they will, according to Lord Wolseley, bring about a change of tactics. All history has its consolations, and so with the history of machine guns. They may have been despised and regarded as toys once; but when the most eminent soldiers of the age advocate their employment, can it be right that the wealthiest nation should also be the least provident in procuring such retaliating weapons for use by the Volunteer forces of this kingdom? I may, however, conclude by expressing the hope, uttered by the Mayor at the beginning, that a time may come when there will be peace on earth and good-will towards men.

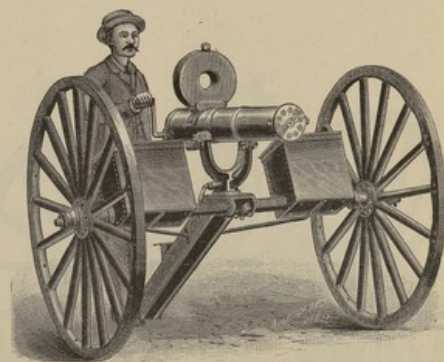
I may add that I was present at Captain Rose's garden-party, on Saturday, 18th May, when his wife presented a "Maxim" to the 4th V.B. Manchester Volunteers.

E. ROGERS

Gatling House, Manchester, May 21st, 1889.



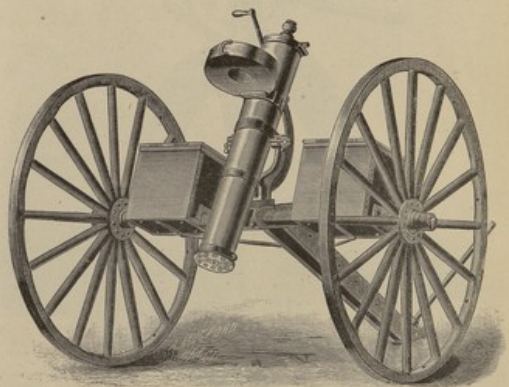
THE TEN-BARREL GATLING, WITH ACCLES, POSITIVE FEED.



THE TEN-BARREL GATLING, MOUNTED FOR FIELD SERVICE.



FIGURE 1. GATLING GUN, WITH THE OPERATOR.



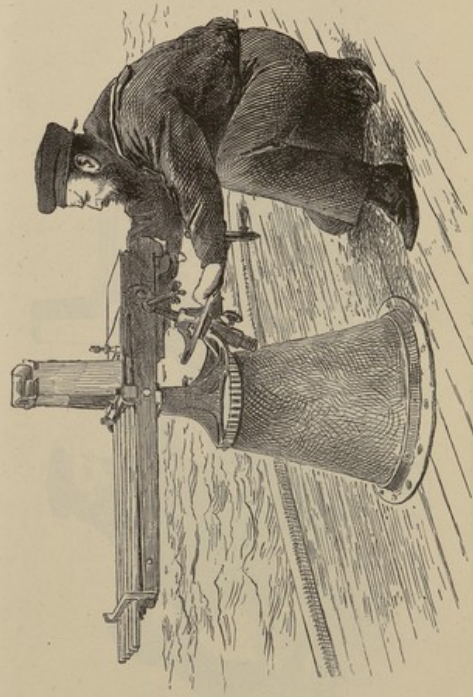
SHOWING POSSIBLE ARC OF DEPRESSION OF THE GATLING.



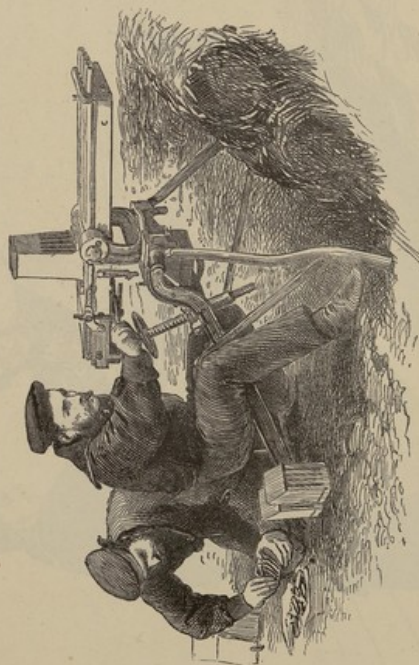
THE "PISTOL" GATLING, SIX BARRELS, WEIGHT 78LB.; CAPABLE OF
FIRING 900 SHOTS A MINUTE.



THE "FIVE-BARREL" NORDENFELT, FOR NAVAL SERVICE.



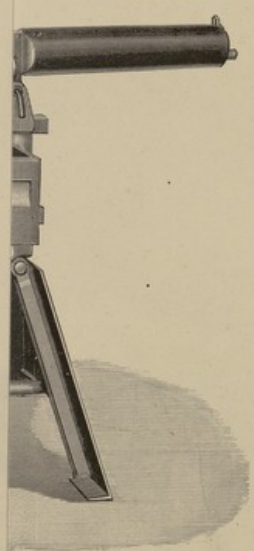
THE "FIVE-BARREL" NORDENFELT, FOR NAVAL SERVICE.

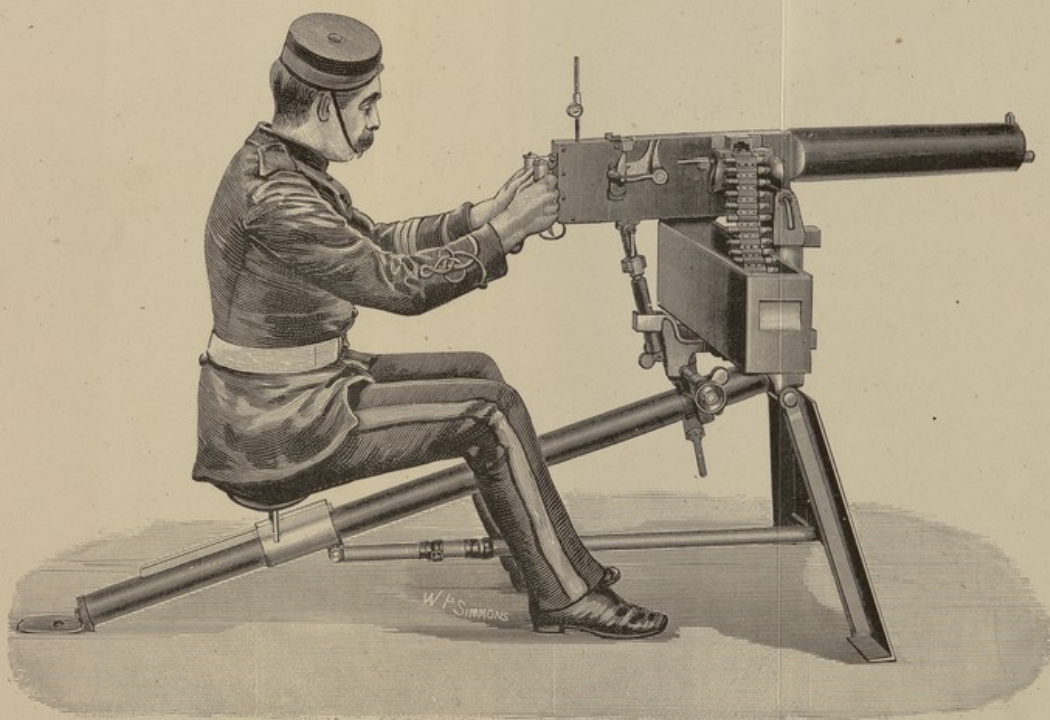


THE FIVE-BARREL NORDENFELT, FOR SERVICE ASHORE

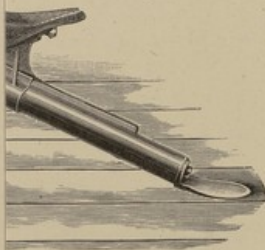


THE NORDENFELT, FOR BOAT SERVICE.

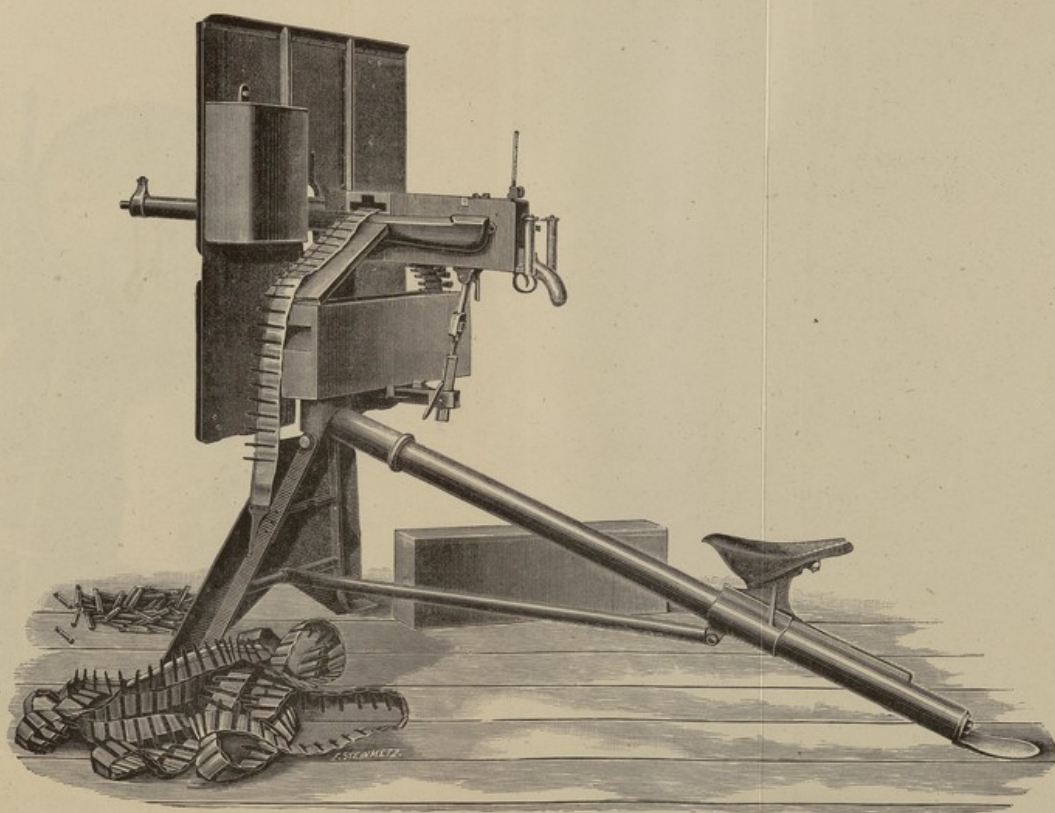




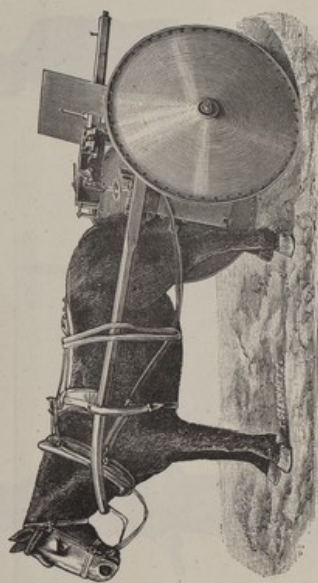
THE MAXIM ONE-BARREL, FOR FIELD SERVICE.



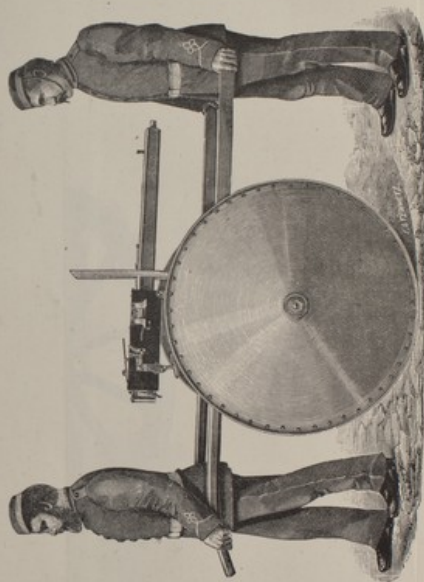
IN A FORT.



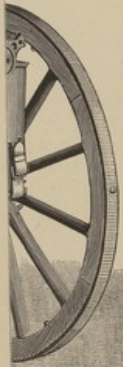
THE MAXIM, WITH STEEL SHIELD, FOR SERVICE ON BOARD SHIP OR IN A FORT.



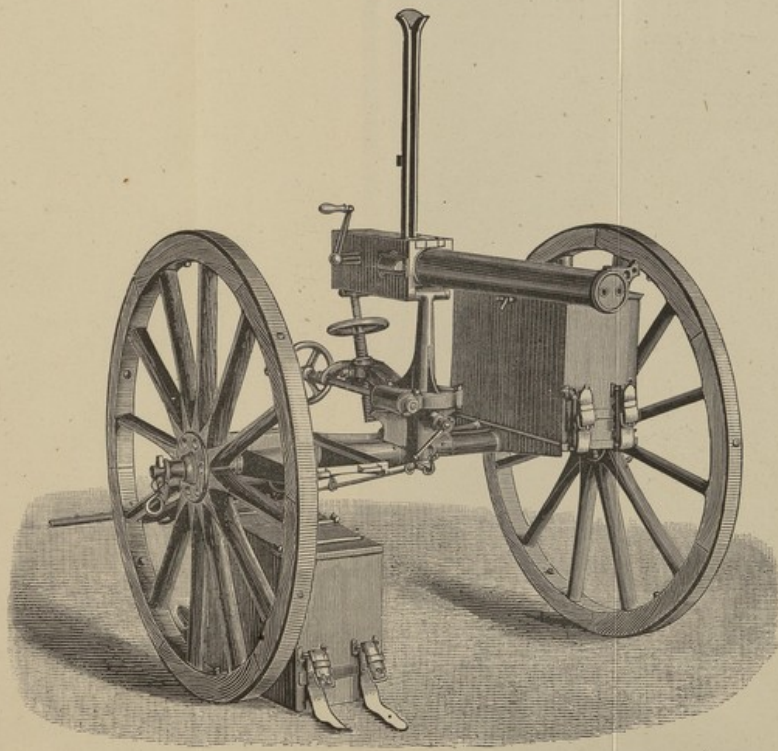
THE MAXIM, ON FOREIGN SERVICE.



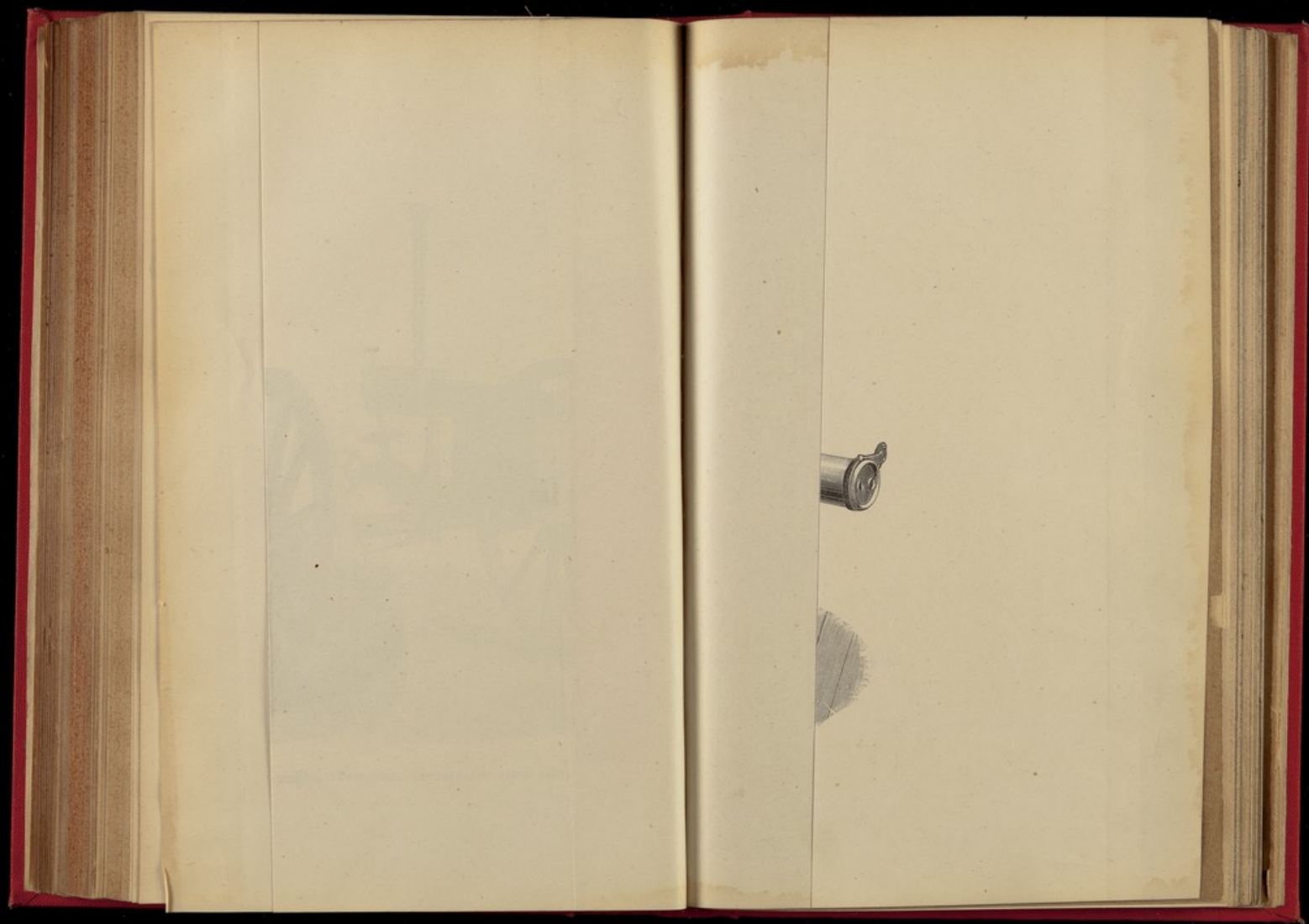
THE MAXIM, FOR WHEELED TRANSPORT.

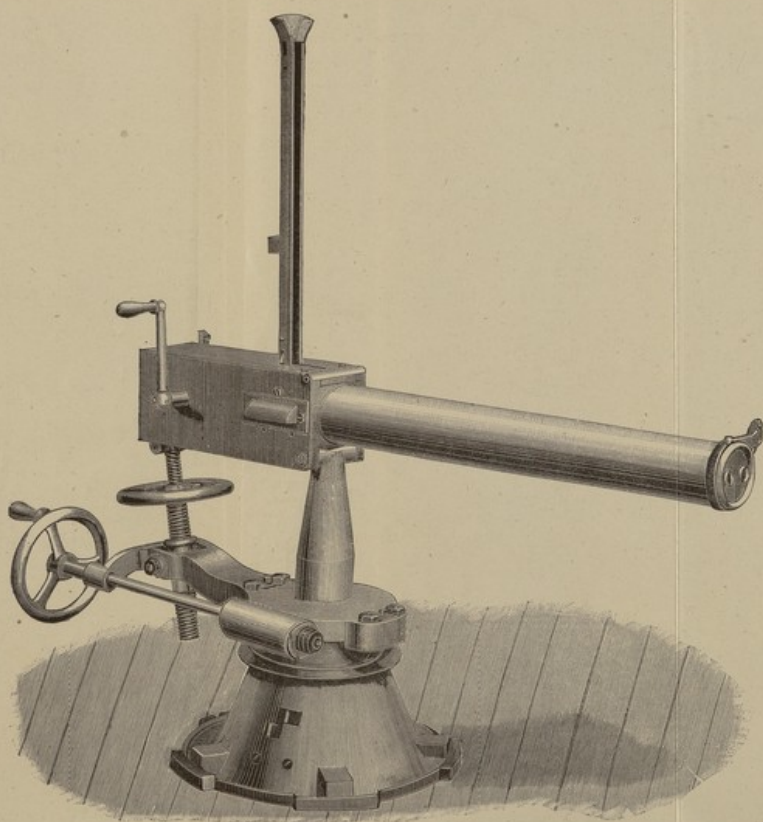


E.



THE GARDNER TWO-BARREL, MOUNTED FOR FIELD SERVICE.





THE GARDNER TWO-BARREL, FOR SERVICE ON BOARD SHIP.

AN ADDRESS

DELIVERED AT THE

ROYAL VICTORIA HOSPITAL, NETLEY

INTRODUCTORY TO THE 32nd SESSION OF

The Army Medical School

OCTOBER 1886



BY

SURGEON-GENERAL SIR T. LONGMORE, C.B.

PROFESSOR OF MILITARY SURGERY
ETC. ETC.



Printed by

SPOTTISWOODE & CO., NEW STREET SQUARE, LONDON
1888



GENTLENESS IN SURGICAL PRACTICE.

WELCOME to Surgeons on Probation—Death of Dr. Lewis—Subject of address—Some effects of the change from a depressing treatment of disease, to a mild and supporting treatment, as shown by the change in treatment of Ophthalmia—Personal experience of variations in treatment of ocular inflammation—Mercury in the treatment of Eye disorders—Example—Ophthalmia in the British Army in Egypt in 1801 and in 1882—History of the epidemic in 1801, with an account of the treatment of the ophthalmic patients on that occasion—The epidemic in the French Army in 1801 near Alexandria—Special Medical Board on Ophthalmia in England in 1810—Treatment of Ophthalmia in 1838—Treatment in 1882—Changes of treatment in other diseased conditions.*

SURGEONS ON PROBATION:

As this is the first formal address of the present session, I bid you welcome to Netley in my own name and in the name of my colleagues. As you know, you have come here to go through certain courses of special study with a view to increase your fitness for undertaking the duties of surgeons in Her Majesty's military service in the various parts of the world under British rule, and I will only now say in regard to this topic that, while the purpose of your coming must be always kept steadily in view, it is the desire of everyone concerned in promoting that purpose so to arrange the work of the session that your time at Netley shall be passed no less pleasantly than usefully. You will shortly have

* Limit of time compelled some of the illustrative examples which are here printed to be omitted on the occasion of the delivery of the Address.

full opportunities of hearing what the different departments of study are, their particular objects, and how they are conducted, and I do not propose to allude further to these matters now.

Before I enter upon the particular topic to which I am about to invite your attention, I feel it incumbent on me to say a few words respecting one of our staff who has recently passed away from among us—the late Dr. Lewis, whose co-operation we who have been his colleagues shall greatly miss, and whose valuable services you will unfortunately lose, during the ensuing session. Although you may have been strangers to Dr. Lewis personally, you must have all heard of him as the discoverer of that remarkable disease in which the blood of the patient teems with myriads of living worms—the *Filaria Sanguinis Hominis*—but to myself, and to others who are here, he was known from the beginning to the close of his career in the public service. To us he was known as a thoughtful physician, open-hearted cheerful companion, and true friend, while such were his powers of investigation, depth of knowledge, earnestness, and perseverance, that we regarded him as destined to achieve successes in the department of science to which he had devoted himself of still higher value than those he had already accomplished. Now, so far as we who were his friends and admirers are concerned, there remain only the recollections of past association, a sense of satisfaction in his worth and work, and sorrowful regrets at the abrupt termination of his useful life; but to you who are only at the beginning of your course in the public service, Lewis's life furnishes some lessons that, properly appreciated, may be of the utmost advantage to your own. To some of you his history may afford encouragement and support, to others act as a stimulus to increased devotion to scientific work, to all it may well furnish an example for imitation. Have

any of you not had the pecuniary resources which some of your fellow-students have had, not the help of relatives and friends which others have enjoyed, or still enjoy, to smooth the way in your professional progress? Take encouragement from the fact that Lewis possessed none of these advantages at his start in life; but nevertheless, by his own independent exertions and determination of character, he succeeded in attaining all the qualities of an educated gentleman, and the status in the medical profession at which he had aimed. He was not satisfied with simply getting an established footing in our profession, but, from the first, he sought distinction in it. When he determined to compete for an army commission, his ambition led him to try for the first place in the competition; and having obtained that, when he came to Netley, his efforts were all directed to maintain the same leading position here, and they were again followed by the result he desired. Perhaps some may think it questionable, since only one in a class of competitors can gain the first place, whether this solitary chance is worth the labour of the struggle. If such a question were put to me, my reply would be that the exertion, if honestly made, will certainly meet with adequate reward, and here we have an instance in proof of it. It is something to avoid the disheartening consciousness of not having done one's best, but, beyond that, exertion of the kind soon assumes the nature of a habit, and the habit, whatever else it may lead to, will almost certainly attract the notice of some who may have the power to help you on your way in the future. In Lewis's case, his habits of real work convinced those about him that he had the necessary qualities for high professional trust, and hence it was that the professors of the school addressed the Government, through the School Senate, on the benefits that might accrue to science and the public service if, after

some further preparation in Germany, Dr. Lewis were entrusted with an important mission in India concerning the causation of cholera—a subject which, in consequence of certain theories of the time regarding it, was then attracting particular attention. The Government sanctioned the expense entailed in the suggested course of scientific investigation and study in Germany, and also acceded to the exceptional employment which had been asked for Dr. Lewis in India. The large amount of useful work accomplished by Dr. Lewis in India was a complete justification of the decision at which the Government had arrived, and the value of that work has been further stamped by the fact that a short time before Dr. Lewis's premature death he was chosen by the Council of the Royal Society to receive the honour of its Fellowship. Dr. Lewis's writings are to be collected and arranged by a committee of his friends, and they will be preceded by a sketch of his life which has been written by his friend, Professor Aitken.* When they are thus rendered available for reference, I hope you will take an opportunity of making yourselves acquainted with them; you will find they contain an ample justification of the advice I have given you to follow their author as a guide in shaping the course of your own professional work in the future.

I will now turn to the subject I have selected for present consideration, viz., the influence of certain changes in professional practice on the results of disease. The particular alteration of treatment which is uppermost in my thoughts is that from what, relatively speaking, may be said to have been violence to one of gentleness in surgical practice. By violent treatment I understand one in which the measures employed are such as act powerfully in depressing a

* This has since been done.

patient's constitution; by gentle treatment, one in which the vital powers and physical endowments are carefully guarded, while the remedies used to combat the disease are not of a nature to lower, or otherwise injuriously affect, the patient for any lengthened period. I might select several of the numerous disorders that figure in the list of our army medical returns to illustrate this text, but I have chosen Ophthalmia as a serviceable one for my purpose. Some surgeons attach little regard to the effects of the changes in the treatment of ophthalmia, but attribute the diminution in the severity of its symptoms and in the proportions of loss of sight consequent on it, as illustrated in the last Egyptian campaign of 1882, exclusively to sanitary improvements. But the improvements in treatment have also been most remarkable, and the beneficial results of these changes cannot wisely be disregarded. It will probably be found, on full and impartial inquiry, that bad treatment has been no less powerful for harm than bad sanitation, and better treatment no less beneficial than improved sanitation, so far as regards their respective effects on ophthalmia. Personally, I have a strong conviction that the violent treatment formerly in vogue had a greater share in producing the severe and unmanageable symptoms, and frequent instances of ocular disorganisation and blindness, which attended the ophthalmia of old days, than even bad hygiene. But the relative amount of mischief due to these two causes is not a subject on which I feel inclined to dogmatise, although knowing the effects on myself, and from having observed the effects on others, of various kinds of treatment for ocular inflammation without any change at the same time in conditions of sanitation, I am not without some justification for the opinions I hold on the subject.

I will first take an illustration of the effects of a

change from rough to gentle treatment of inflammation of the eye from experience in my own person, and afterwards consider it on a larger and more important scale in army practice. During the second winter of the Crimean campaign I occupied a small but compact stone hut, originally constructed for an officer who was mortally wounded at the final assault of Sebastopol. It was a luxuriously comfortable residence by comparison with the much worn and threadbare bell-tent in which I had passed the first winter, yet while I came out of the first period, in spite of the exposure to very cold and severe weather, and of many privations, without any rheumatic affection, though, like others, with a certain amount of scorbutic taint, and much weakened in constitution, I became saturated with rheumatism and suffered severely from sciatica toward the close of the second winter. Shortly after my return to England, in 1856, I was with my regiment in camp at Aldershot, where I had allotted to me two quarters of limited dimensions in a wooden hut. The leading features of an Aldershot quarter are well known to everyone who was familiar with the camp at that time: how that the occupier could open the window, shut the door, or stir the fire, without moving from his bed wherever he might place it in the apartment, but by no means could avoid being constantly in a draught of air. It was under these circumstances, and not having yet recovered my normal amount of strength, that I became the subject of ocular inflammation: firstly, acute conjunctivitis, then scleritis, and finally cyclitis, including iritis. A medical Board recommended my speedy removal from the camp, and I accordingly left and placed myself under the directions of a friend who at the time was ophthalmic surgeon of one of the largest hospitals in London. He at once adopted the orthodox treatment of the day. I was brought as quickly as possible under the constitu-

tional influence of calomel as evinced by salivation, and at the same time subjected to various other depressing measures, the object in view being to reduce by their agency the local inflammatory action and to alter the conditions which favoured it. In spite of these active measures, however, as they were called, the inflammation did not subside; on the contrary, I had numerous repeated exacerbations of it while I was under the treatment. These were said to be due to the obstinate character of the disorder, which was then described as 'recurrent iritis,' as if the recurrence were characteristic of some special form of the inflammation. The general result was that I was kept for a period of about six months on fish diet, and all the while under the continued influence of what was regarded as a moderate employment of mercury—'given as an alternative and just enough to keep the gums tender.' Fortunately for me, it was considered that I had become too weak in constitution from exposure in the Crimea and long-continued illness for the employment of general venesection, and the blood-letting in my instance was limited to the occasional application of a few leeches. I eventually came out of the ordeal without any permanent impairment of central vision, though, owing to adhesions being established between the iris and lens capsule in each eye, my power of accommodation became interfered with, and I was left with the minor inconvenience that attends deficient power of pupillary expansion on going suddenly from a place that is fully lighted into one that is relatively dim. At the beginning of the year 1857 I was ordered with my regiment to India where the Sepoy mutiny was still in progress. At the time the order was received my eyes were free from all acute inflammation, but the sclerotics were chronically more or less injected and tender, and slight irritation sufficed to redden the conjunctivæ.

I doubted what might be the effect of the free currents of air on board ship, and especially of the long-continued glare of tropical light and the dazzle of the sun's rays reflected from the sea, for we had to sail round the Cape and up the Bay of Bengal to Calcutta, but so far from any harm resulting from the exposure, the omission of the medicines I had been previously taking, and the use of the ordinary diet of the ship, I landed in India with my eyes free from congestion, and stronger than they had been since the onset of the attack. Nor had I any return of inflammation in either eye during the time—about two years and a half—that I remained in that country.

On subsequently reflecting upon these occurrences, the conviction fixed itself strongly in my mind—so slight had been some of the causes that had sufficed to bring on sudden accessions of inflammation while I was under the mercurial treatment—that these accessions had been less due to the external causes to which they had been then attributed than they were to the poisoned and debilitated condition of the structures upon which the causes acted. On one occasion, when I had been taking a vapour bath, in going from the door of the house to the closed cab which was waiting for me—although none of the usual precautions were neglected—a stabbing pain darted through one of my eyes, a pain which still returns vividly in imagination when I think of the occurrence, and this brief and apparently trifling exposure was the origin of a fresh severe attack, and, with it, a fresh accession of the mercurial treatment which I now look back upon as having been more hurtful than the disorder itself.

I have lengthened notes of the case of a relative, who was subject to attacks of iritis for many years. The first, very severe and prolonged, was in the year 1845, when he was thirty-five years of age, and this

was followed by other attacks at intervals of a few months for twenty-four years subsequently. He was under the care of successive oculists, the most eminent in London, during this period. All administered mercury—not only while the attack was in progress, but also afterwards to remove its effects—to clear the vision. On each occasion he was confined to the house for several weeks, and each attack left him deteriorated in health. About the year 1869 he was advised by Mr. Alexander, the oculist, whom he consulted when suffering from an attack, to omit the use of mercury, and though he had various attacks afterwards down to the year 1883, they were all got rid of in a few days, without any resulting injury to health, under such gentle treatment as exclusion of light from the inflamed eye by moistened spongiopiline pads, temporary abstinence from animal food, and saline medicines. No attack has occurred since 1883.

Mercurial salivation is not wholly abandoned as a panacea in eye disorders. About two years ago a workman came to me from the shipbuilding works at Woolstone, and begged me to do something to relieve him from the pain in one of his eyes that had become blind and was torturing him beyond endurance. While he was speaking to me he had to keep a handkerchief to his mouth on account of the profuse flow of saliva. The history he gave me was briefly this—A week before he had been struck and badly bruised in the eye by a piece of iron. There was no cut. For the first three days he could see a little—only dimly—as if he were looking at things in a fog through a piece of red glass. Then even this amount of sight left him, and now all was completely dark to the damaged eye. Immediately after the accident he had taken the advice of a medical practitioner, who had ordered him a course of mercurial pills. When I looked at the eye, I saw it was filled

with pus and completely disorganised. The pain he was enduring was the pain of an abscess pent up in dense, unyielding structures. I think you will feel the same difficulty that occurred to myself in this case—the difficulty of comprehending how benefit could be expected to result from such a rude method of treatment; and perhaps also you will be inclined to join with me in doubting whether, if perfect rest of the organ had been secured by the exclusion of all light from the eye in its injured condition, cooling dressings applied to it, suitable regimen enforced, and the general health regulated by ordinary medicines of the simplest kind, vision might not have been saved and at the same time great suffering and loss prevented.

I will just add one or two more observations from my own case. I remained free from eye attacks for about ten years, when, in February 1868, I had rather a severe one, and after that I had several others, the last being in November 1871. Since that date I have not had any attack worth notice. For two or three years I remained liable occasionally to isolated patches of conjunctival and sclerotic congestion, and localised tenderness, after some unusual exposure, but they never caused me more than very temporary inconvenience, and for the last ten or fifteen years I have been free even from these slight attacks.

The attacks between 1868 and 1871 taught me several practical lessons, which it is not likely I should have learned so thoroughly had it not been for my personal experience. The severe attack of February 1868 originated in an accidental blow, rather a violent one, on my left eye, followed by exposure on the following day to a prolonged storm of cold wind and rain for several hours while I was superintending the landing of a large party of invalids at the Netley pier. Although the experience I had already gained made me

avoid all mercurial medicines, I believe that the treatment adopted was still needlessly depressing, especially as regarded the amount of blood removed locally by leeches, and that the relapses that followed were partly due to general weakness caused by this loss of blood, and partly to unwariness in some matters, the power of which for evil was not sufficiently estimated by me at the time. It is to a better appreciation of such things that I attribute my entire freedom from ocular inflammation of late years, and the ease with which for some time previously I had got rid of the indications of an approaching attack whenever any signs of one accidentally appeared.

My attack in 1868 was certainly prolonged by impatiently exposing the eye to light, and trying to use it before it had sufficiently recovered from the deteriorating effects of the injury and the inflammation it had undergone. I have known better since that time, that the total duration of ocular incapacity is shortened by a due prolongation of abstinence from early exertion; by not exposing the eye that has been inflamed to the stimulus of light, or to visual exercise, or to sudden reduction of temperature, until it is well and strong enough to bear with impunity the strain which such exposures entail. Experience has taught me that a comparatively slight abuse of the weakened eye in any of the directions I have named can easily become the starting point of what may prove to be a severe relapse of disorder; at the same time I am well aware it is not easy for those who have not had a similar experience to appreciate this fact to the full extent it deserves.

Another lesson my experience taught me, and one which it seems worth impressing on others, is the wonderfully small amount of injudicious interference, or apparently small amount, which will suffice to induce a considerable increase of the existing mischief in disorders of

the eye. During the period of occasional eye attacks from which I suffered between the years 1868 and 1871, probably nothing excited more dread in my mind than the prospect of a close examination of the inflamed eye by some surgical friend. Persons, from not themselves feeling it unpleasantly, are apt to forget the amount of muscular power that may be exerted by the pressure of a finger, or between the thumb and forefinger, but those who have happened to undergo pressure of the kind when the parts subjected to it have been in a disordered and abnormally sensitive condition, are soon made painfully conscious of the fact that a very considerable amount of force may be thus brought into action. I learned more than this—I learned what mischief may be done to an inflamed eye, not only by rough handling, but by any fingering at all, however gentle. Occasionally, when some of the vessels of the sclerotic were visibly injected, the mere application of a finger accompanying the inquiry—Is it tender there?—has been followed by aching for hours, and has sufficed to aggravate the attack and extend its duration. My personal experience in this respect has made me very chary of exerting digital pressure on an eye inflamed in any part, and has led me to examine tender eyes, when the touch is necessary, with an amount of caution that I know has often appeared fanciful to bystanders. I sometimes meet with surgeons who do not seem to consider pain inflicted in this way as being of any moment. They regard the shrinking from the approaching touch as a mere act of exaggerated sensitiveness or timidity on the part of the patient that does not deserve attention. Might it not be regarded, however, with more justice as an instinctive act of defence against threatened injury? I am convinced that you cannot inflict any degree of pain by pressure or by any other means in the examination of an inflamed eye—perhaps

I may say on any part of the body in a state of inflammatory disturbance—without adding to the existing mischief; the addition being in direct relation to the amount of pressure exerted, and sufficiently indicated by the amount and persistence of the pain resulting from it.

I will now bring to your notice, as far as time will allow, the effects of ocular inflammation as they have been presented on a large scale at two different periods in army practice. A British force was engaged in military operations in Egypt at the beginning of the present century, and again four years ago. In both British expeditions an epidemic of ophthalmia prevailed to a large extent among the troops, but in the first expedition the ophthalmia assumed symptoms of such intense severity, and led so frequently to destruction of the eyes and loss of sight, that it was regarded by many English surgeons as a specially malignant inflammation, and was designated 'Egyptian Ophthalmia,' while in the second expedition the inflammation did not assume any such intractable character, and most happily was not followed by loss of sight in a single instance. On the first occasion, as will be shown more particularly presently, the disease became highly contagious, and was widely diffused in consequence. Its communicability from person to person led to its transmission from older to younger soldiers, and from regiment to regiment, and so it happened that it was only after many years had elapsed that the ophthalmia was eradicated from the regiments of the British army in which it had prevailed. On the second occasion the epidemic of ophthalmia quickly subsided, and the disease disappeared shortly after the campaign was concluded.

The published records of the first campaign do not show that there were any differences between the climatic and sanitary conditions then met with locally

in Egypt and those experienced in the second campaign in 1882. It is very improbable that there was really any greater virulence in the ophthalmia itself which the troops contracted in Egypt in 1801, than there was in that with which the troops subsequently became affected in 1882, and the question naturally occurs, when the contrast between its effects on the two occasions is noted, whether some difference in the mode of treatment might not have influenced the different course which the inflammation followed, and produced the difference in its results. Even admitting that the troops sent to Egypt in 1882 were less susceptible to the disease, which is probably true, owing to the more hygienic conditions under which they had been previously living than those who were sent to Egypt at the beginning of the century, this will surely not satisfactorily explain the different consequences of the inflammation when once the men had been attacked by it in that country.

When, however, we sift the question of treatment, we find that the contrast between the symptoms developed in the course of the inflammatory action in the two expeditions is not more remarkable than is the difference between the modes in which the ophthalmia was dealt with on the two occasions, and, further, when the probable effects of these different kinds of treatment are fully considered, the differences in the course followed by the disease subjected to them, and in its results, will, I think, be in a great degree explained.

The second experience of the British army in Egypt with respect to ophthalmia enables us to explain with more confidence various points which were subjects of doubt and of frequent deliberation by military surgeons, and civil ophthalmic surgeons also, at the beginning of the present century and for many years subsequently. The complete lesson taught by the two outbreaks is

somewhat analogous in its nature to the instruction afforded in another direction by the experience of the Crimean war, in which two armies, placed side by side, subjected to the same influences of soil and climate, engaged in a similar service, yet presented diametrically opposite conditions with respect to sickness and mortality, each army in turn being in a high state of health and efficiency at the very time when the other with which it was allied was laid prostrate by debility and disease.

It is not likely that many of you have heard much about the first of the two outbreaks of ophthalmia to which I have alluded, and yet its history is of enduring interest in surgical science whether we regard the occurrence simply as an historical event, or consider the value of the instruction that may be derived from it. As the severe treatment which prevailed at the time seems to me to have been the most active agent in causing the special characters of the ophthalmia, the violence of its symptoms, and the loss of sight which attended it, the outbreak, from its extensive nature and striking features, will well answer by way of contrast the object I have in view, of impressing upon your attention the importance and value of what I have ventured to call 'gentleness in surgical practice.' I will, therefore, invite your attention to a rapid sketch of some of the most salient facts connected with this early outbreak of ophthalmia, and the manner in which it was dealt with.

In the spring of the year 1801 a British army, under the command of General Sir Ralph Abercromby, fought a memorable battle against the French at Alexandria. At the same time a force was brought from India to Egypt, just as was done again in 1882, to co-operate with the troops sent from England. The Indian force was under the command of General Baird,

and Dr. McGrigor, Surgeon of the 88th Regiment, subsequently Sir J. McGrigor, Director-General of the Army Medical Department, whose admirable portrait, painted by Sir D. Wilkie, may be seen in the messroom, was appointed its medical chief. He subsequently, in 1804, published a volume entitled 'Medical Sketches of the Expedition to Egypt from India,' and in this work he gives an account, though only a brief one, of the ophthalmia which prevailed among the troops. His words regarding the ophthalmia are that it was 'next to the plague in importance,' and he describes it as being 'though less fatal, a more distressing malady.' Of the Indian contingent, which was under his own medical direction, he mentions 'fifty were sent home invalids from blindness; most of them from the 10th and 88th Regiments' (*op. cit.*, p. 147). Assistant Surgeon Dr. Power of the 23rd Regiment who served in the campaign published a work (Lond. 1803) entitled 'An Attempt to Investigate the Cause of the Egyptian Ophthalmia,' and he describes it as 'one of the most dreadful diseases that has ever visited mankind.' Many similar remarks might be quoted, but these will suffice to show how little control the English surgeons of that day had over the disease. The suffering that accompanied it is described as being terrible. That it must have been so can be readily understood, for it is mentioned in the reports of the time that the ophthalmia usually became purulent; that, in spite of the treatment adopted, the inflammation in many instances did not remain limited to the conjunctiva and superficial parts of the eye, but spread to the whole organ; and that the ophthalmitis thus established went on until the attack ended in suppuration of the globe, disorganisation of the eye, and, of course, total destruction of sight.

In the same year (1801) that ophthalmia was producing such disastrous results in the British army, the

disease was also very prevalent among the troops of the French army. We have an account of this epidemic related by Baron Larrey, who was Surgeon-in-Chief of the expeditionary forces under Bonaparte.* He describes the French army marching from Cairo to repulse the English who had landed at Aboukir, and relates that after the battle of March 21, 1801, the heat by day, the heavy work of the entrenchments, and the coldness of the nights, increased by the mists from the lake Mareotis, on the borders of which the troops were encamped, soon caused ophthalmia to appear among them. In the space of two months and a half upwards of three thousand ophthalmic patients were treated in the hospitals, and so successfully that not one single man lost his sight out of the whole number ('il en est résulté que, sur trois mille et quelques ophthalmiques, il n'y en a pas eu un seul qui ait perdu la vue'). It is noteworthy that Larrey mentions only local bleeding was employed, and that to the slightest amount, being limited to superficial scarifications of the skin (*mouchetures*) of the temples and eyelids. He expressly states that general bleeding was not suitable, 'la saignée générale ne convenait point' (*op. cit.*, p. 218). There is not the least ground for supposing that the French troops were in a more sanitary condition than the British at this time. On the contrary, knowing that they had already been nearly three years in Egypt, that many of them had previously suffered from ophthalmia on the Nile and at Cairo, we may be sure that there would have been few eyes among them, if they had been examined, that would not have presented the hypertrophied conjunctival papillæ and follicular granulations to which so much attention has been given of late years by all observers of ophthalmia, and that, in fact, the men of the French army must have been

* *Campagne d'Egypte, Mémoires, &c.*, i. 217.

quite as susceptible of the disease, and of the disease in its worst forms, as the men of the British army could have been at that time. We are thus forced to the conclusion, on considering the different results of the ophthalmia on the two armies in 1801, placed almost side by side as they were in the same climate and in the same part of Egypt, that it must have been mainly to differences in treatment that the difference in the course and results of the disease was due.

But the distressing, and almost intolerable, symptoms which accompanied the ophthalmia of the British army in 1801, and the blindness which in numerous instances resulted from it, calamitous as these results were, do not constitute the worst features in the history of the visitation. As the ocular discharges had acquired an infectious character, the regiments of the expeditionary army in which the ophthalmia had been prevalent became so many nurseries, as it were, of the disease. Even after the army was broken up, the ophthalmia remained rooted in these regiments, notwithstanding their removals to other stations, and to different climates, and the disease was communicated by them to other regiments who had not been exposed to its exciting causes in Egypt, and in which it had been previously unknown as a prevailing disorder. The unsanitary conditions under which troops lived in those days, and the drinking habits of the time, favoured the spread of the disease and the maintenance of its virulent character. Ophthalmia thus became endemic in the British army.

There was no such prevalence of ophthalmia among the French troops after they left Egypt, notwithstanding that they had served for a longer period in the country than the British, had suffered from much more exposure and fatigue, and that they had been subjected to the depressing circumstances of defeat. This immunity from the disease after the French returned to Europe

was attributed by some English surgeons of the period to the active service in which the French became engaged on the Continent—proceeding from conquest to conquest, bivouacking in the field, or quartered on the inhabitants whom they subdued—so that dissemination of infection among them was prevented. Looking back as we can now do, it is certainly questionable whether the milder treatment employed by the French had not also an important influence in the result referred to.

In the British army, on the contrary, the disease became so widely disseminated, and the cases in some regiments were so numerous, that a suspicion arose, and in some of the newspapers of the time it was even asserted as a fact, that an extensive conspiracy had been formed among the soldiers of the army to malingering. A belief prevailed that the men produced the ophthalmia by artificial means in order to get themselves discharged from military service. We meet also with traces of another and different notion in the writings of the time, viz., that the men contracted the disease accidentally, but afterwards tampered with their eyes, not so much to avoid military duty as to escape from the confinement and depressing conditions to which they were subjected while under treatment in the hospitals. Those who held this view founded it on a belief that, owing to the numerous instances of blindness which occurred among their comrades in misfortune, the men, despairing of their own recovery of sight, did not hesitate to adopt measures for producing the very end which they dreaded but regarded as inevitable, so bringing their disease to its conclusion by a short and rapid, instead of a prolonged, course of suffering. I have arrived at the conclusion, after perusing many published writings on the subject, that both surmises were baseless, and that there was no general malingering.

ing or tampering at all. This view has been strongly expressed by Staff-Surgeon Farrell, who, referring to the opinion entertained by many military and medical officers that the soldiers wilfully produced the ophthalmia in order to render themselves unfit for service, remarks: 'I have now had under my care some thousands of ophthalmic patients, and I must confess that, although I have used a vigilance sharpened by a bias towards that opinion, I have not as yet been able to make out clearly a case in which the soldier produced the disease in himself by improper means, or even intentionally aggravated its violence' ('Observations on Ophthalmia, &c.,' Lond. 1811, p. 13). As I have already indicated, more extended experience seems to show that the virulent characters and blinding effects of the disease which led to the notion that the patients were tampering with themselves were really due to causes not at all suspected at the time by anyone, and certainly least of all by those in whose views of the treatment necessary for the cure of the disease they had their origin.

It seems not improbable that among other sources of aggravation of the condition of the patients who were attacked by ophthalmia some amount was traceable to the administrative arrangement by which they were congregated in special ophthalmic hospitals. These hospitals were established solely for the reception of ophthalmic patients, whether suffering from the disease in its acute or chronic stages. The convalescents from the disorder were also kept in them. Dr. Vetch* mentions that the ophthalmia dépôt for the exclusive reception of ophthalmic patients, under his superintendence, in the year 1808 contained 900 cases belonging to upwards of forty different corps (p. 184). It must be remembered that the ophthalmic hospitals were not at all analogous to the civil eye hospitals of

* *Diseases of the Eye*, by J. Vetch, Phys. to the Forces. &c., Lond. 1820.

the present time, in which the large majority of the cases treated do not consist of cases of superficial inflammations of the eye accompanied with purulent discharges. These, however, were just the kind of cases which were collected in the military ophthalmic hospitals of that day. The plan of segregating the men labouring under ophthalmia was adopted owing to the general belief in the contagious nature of the disease, and with the well-intentioned object of preventing its spreading among patients of other descriptions. It is only fair to mention that some of the officers, under whose advice these special hospitals were instituted, have recorded that they had the effect of diminishing the number of men attacked, and that the favourable results derived from them far exceeded their most sanguine expectations. This may have been strictly true, but, as regards the patients themselves who were treated in these special hospitals, there is evidence enough to show how greatly the close confinement, and the monotony of the existence in them from the very nature of their maladies, added to their misery. It can readily be imagined what deleterious effects, moral and physical, would probably result from herding together patients under the circumstances in which they were placed. The scenes in the wards, the severe sufferings of the patients in the acute stages of the disease, the depressing effects of witnessing their comrades deprived of sight in one or both eyes, together with the nauseating and lowering remedies employed, the frequent bleedings, the spare diet, &c. must have caused even a short stay in them to be trying enough; a prolonged confinement in them must have made men almost desperate. No wonder that Staff-Surgeon Farrell should have experienced the difficulties he describes in preventing the patients from breaking out at night and occasionally getting intoxi-

ating drinks, when referring to the 'hospitals for ophthalmic patients solely, usually containing from 100 to 150 patients or more' which had been under his care in Egypt and Sicily.

The ophthalmia, originated and propagated as described, did not lose its severe character as time went on, even in the temperate climate and under the clouded skies of England. Dr. Vetch, Assistant-Surgeon of the 2nd Battalion 52nd Regiment, which was not formed until November 1804, and therefore not exposed to the disease in Egypt, mentions that in the period of a year, between August 1805 and August 1806, there were 636 cases of ophthalmia admitted into the regimental hospital, and that of this number fifty were discharged with the loss of both eyes, and forty with the loss of one eye. The regiment was then quartered at Hythe, in Kent, and its strength was 691 men.

Now let us look at the mode of treatment in vogue. Mr. Peach, surgeon of this regiment, has recorded the treatment followed for the cure of the disease, in a paper in the 'Edin. Med. and Surg. Journ.' of 1807, vol. iii. p. 54. He writes:—'It is not sufficient to abstract twenty or thirty ounces of blood. I have taken sixty ounces very frequently; enjoining perfect rest; avoiding the smallest portion of animal food; and putting in practice every other part of the antiphlogistic treatment. . . . The greatest reliance is to be placed on the strictest antiphlogistic regimen, and very liberal venesection.' And Sir J. McGrigor, then principal medical officer at Portsmouth, adds the remark to Mr. Peach's paper, that the practice so successfully had recourse to by Mr. Peach and Dr. Vetch in the 52nd Regiment had, to his knowledge, been carried out with success in the 89th Regiment, and in the 8th Veteran Battalion. Notice what was regarded as success in treatment at that time. Dr. Edmondston, who served

in Egypt in 1801, and who wrote a treatise on ophthalmia in 1806, also referring to the same battalion of the 52nd Regiment, reports that, 'although it has been removed to Maidstone, the Egyptian Ophthalmia continues to rage in it to a terrible degree.' In the year 1810 the number of soldiers on the pension list for blindness occasioned by the disease was so excessive, —2,317 is the number given for December 1, 1810, by Dr. Vetch—and purulent ophthalmia was still so rife in the army, that the Commander-in-Chief caused a special Medical Board to be assembled to take the subject into consideration. The most eminent civil physicians and surgeons of the day were associated with military surgeons on this committee, and the report made by them was embodied in a general order, and circulated for the information of the commanding officers of regiments, and for the guidance of all medical officers belonging to the army. As the treatment to be pursued in the disease formed part of the subject of the report, the document is still of importance as it remains a source of authoritative information on this point.

Independently of this source, however, the records of the treatment which was employed for the cure of ophthalmia in those days are very ample. The disease seems to have been regarded as an intense form of inflammation that had to be instantly reduced, and that could only be overcome by lowering all the vital powers of the patient. Hence copious abstraction of blood from the general circulation, salivation by mercury resorted to as an alterative (a term which, from a therapeutic point of view, seems to have had about as much meaning in it as amaurosis had before the discovery of the ophthalmoscope), nauseating medicines like antimony, very spare diet, local depletion by cupping and leeching, abscission of portions of the tumefied conjunctiva, repeated scarifications of conjunc-

tival vessels, and counter-irritation by blistering, constituted the chief remedial measures adopted for the arrest and cure of the disease. To change the character of the local inflammation powerful collyria of sulphate of copper, acetate of lead, and nitrate of silver were applied to the eyes. The mixed civil and military Medical Board to which I just now referred divided their report into two parts, one on the means of preventing the spread of the disease, the other on the methods of cure. With respect to the prevention, the Board did not omit hygienic matters; they specially recommended isolation, cleanliness, use of separate bedding, basins, towels, &c.; in fact, much the same hygienic measures as are inculcated and practised in our own day. With respect to the treatment, the first point noted was 'on the necessity of taking blood'; and under this heading the Board gave the following instructions:—'When this disorder attacks persons who are strong and plethoric, there cannot be any doubt relative to the propriety of taking away a large quantity of blood. When the disorder attacks those who are weakly, if the inflammation be accompanied with great tumefaction of the conjunctiva, and a profuse purulent discharge, with much pain in the head and eyes, the necessity of taking away blood also appears to be so strong, that the Board does not think it can be postponed without imminent danger to the patient's sight, but the quantity to be taken away need not be so great in this as in the former instance.' The modes of bleeding mentioned are—opening a vein in one or both arms, opening the temporal artery, cupping on the temples or nape of the neck, and leeches. 'Sometimes,' the Board remarks, 'after taking away blood from the arm, it becomes necessary to repeat the operation more than once, and occasionally to apply leeches many times in succession.' As regards diet,

the Board states:—'A total abstinence from animal food and fermented liquors, and a very low diet in every respect, are absolutely required, so long as the violence of the inflammation continues.' Mr. Ware, an oculist of great repute at that time, wrote with regard to the local blood-letting, as quoted by Dr. Edmondston:—'Opening the temporal artery is on all hands allowed to be a mode of bleeding the most effectual as well as speedy for the purpose.'

The extent to which this mode of abstracting blood from the neighbourhood of an inflamed eye was carried by some surgeons may be inferred from a remark by Dr. Farrell on the use of it in his own practice. He is answering the objections raised by some surgeons who had found it impossible to obtain a sufficiently large quantity of blood by opening the temporal artery (*op. cit.* pp. 69–71). Dr. Farrell writes: 'My assistants and myself have now opened each some hundreds of temporal arteries, without failing, I may safely say, in half-a-dozen instances, to procure fully as much blood as was required. Nay, we have performed the operation on the same persons three or four times, or even more, and have uniformly obtained as much blood each time as we wanted. I have been obliged, in about one case in a hundred, to relinquish the first incision, on account of not getting blood enough from it and to make a second incision, sometimes in the other branch of the artery, and at other times lower down in the same branch. I have uniformly succeeded in the second attempt,' &c. It is very difficult for us who are under the influence of such different doctrines to understand the immense importance attached to such copious abstraction of blood by our predecessors of the early days of the present century. Nowhere in the writings of the leading surgeons of that time have I met with any expression of doubt as to the necessity of taking blood away largely from

the general circulation as well as locally; the only questions discussed with reference to it seem to have been the most effectual modes of abstracting it.

The remarks I have last quoted on the practice followed in the treatment of ophthalmia have had reference to comparatively a short time after the disease was first contracted in Egypt. But much the same practice appears to have been followed for many years subsequently. In 1838, for example, when Sir G. Ballingall published the second edition of his '*Outlines of Military Surgery*,' the principles laid down by him for the treatment of ophthalmia were these: 'In so far as general remedies are concerned, the practice I would urge in the acute stage of ophthalmia, as it occurs among young and otherwise healthy soldiers, consists essentially in bleeding and low diet.' He mentions thirty to forty ounces as the average quantity of blood to be taken, and refers to the case of a young soldier affected with ophthalmia from whom 'fifty-two ounces were withdrawn, while the patient stood erect with a vein opened in each arm.' The topical applications were also similar. Sir G. Ballingall recommends the undiluted liquor plumbi acetatis, and solutions of nitrate of silver, the application of which he states (p. 401) has long been in general use, and 'is particularly urged by some of those whose experience has been acquired in the extensive field which the army has unfortunately presented for the treatment of this disease.'

Contrast the treatment I have described with that employed for the ophthalmia in the last campaign of 1882—you will find the latter recorded in recent volumes of the *Army Medical Reports*—and I think you will have no difficulty in accounting for the absence of the severe symptoms, at the latter date, that marked the advance from bad to worse of the cases of the disease during the earlier Egyptian campaign, without

coming to the conclusion the ophthalmia contracted at the two periods were diseases of different types. In 1882 no bleeding, no mercury or antimony, no incisions or abscissions of conjunctiva, no famine diet, no powerful collyria, but, on the contrary, the simplest antiseptic applications, or mild astringent lotions, careful protection of the eyes against excess of light and avoidance of all other sources of ocular irritation, with the simplest constitutional treatment, and due attention to the preservation of general health and strength. A very large number of patients invalided for ophthalmia from Egypt were admitted into this hospital (Netley), with the disease subsided into a partly chronic stage, and no trouble was experienced in gradually bringing back the eyes to a normal condition of health under very mild applications and without any reduction of general strength.

At the time of the first outbreak in 1801 the prevailing conviction that ophthalmia of a violent character was especially associated with a vigorous state of constitution led to the logical conclusion, which was carried out in practice, that the general strength ought to be lowered in order to lessen the severity of the disease. The force of the inflammation and the physical force of the patient appear to have been regarded as in some way mutually interdependent.* The Medical Board of 1810 mentions in one part of its report, as a circumstance worthy of remark, that 'some patients, who had been weakened by previous

* 'In the army, where the disorder has been more prevalent than in any other class of people, it has been found indispensably necessary to draw off a large quantity of blood from the general system. The quantity taken away was seldom less than sixteen ounces, and it has been extended with advantage to thirty, forty, and even sixty ounces. When so large a quantity is drawn off, it should be recollected that the object in doing it is not merely to diminish the action of the inflamed vessels, but the power of the constitution to carry it on.'—*Remarks on the Purulent Ophthalmia*, by J. Ware, Surgeon, F.R.S. London, 1808, p. 24.

indisposition, had had the inflammation and the purulence more severely than others who, previous to the attack of the disorder, were in high health and strength.' How strange it now appears to us that it should have been regarded as remarkable for the inflammation in some instances to have been more severe, and more unhealthy in character, when it fell upon men whose strength had been reduced by previous indisposition than when it attacked men whose health and strength had been well preserved! The fact is familiar enough to most of us that when epidemics of ophthalmia have occurred in schools, it has always been the weakly children who have most suffered, and whose cases have been the most difficult to deal with. We see the same thing in practice among hospital out-patients. Consider an attack of ophthalmia occurring in a man whose constitution has been reduced by dissipation, want, insufficient or unwholesome food, neglect, and fatigue, or in a sickly and enfeebled child, and remember the apparent virulence and obstinacy of the symptoms presented by it, the difficulty of controlling them, and the many risks attending the attack with respect to the ultimate preservation of sight. How different the character and course of the symptoms, and the readiness with which, in the majority of instances, they yield to ordinary measures of treatment when the attack occurs in a relatively well cared for and healthy subject. May we not trace in the different features and risks presented by an attack of the disease in two such classes of patients an analogy between the different characters and results of the two Egyptian epidemics in the armies of 1801 and 1882?

The great amount of loss of blood, the spare diet, and the lowering remedies to which the patients in the campaign of 1801 were forced to submit, must have degraded their frames physically almost to as low an

ebb of vitality as that presented by the infirm and vitiated constitutions of the exhausted pauper patient or ill-conditioned strumous child; and when the violent irritants to which the deteriorated ocular structures were subjected, the powerful collyria and the conjunctival scarifications and abscissions, no doubt performed in many instances with surgically impure instruments, are remembered, can wonder exist at the downward course the disease too often took, or at the loss of sight which so often followed? I have known an instance in which an eye of a sickly clerk, which was only affected at the onset with a simple attack of superficial inflammation, passed, under poulticing and other injudicious treatment, into general ophthalmitis, suppuration, and escape of contents by a spontaneously formed opening, all within the short space of a week!

More enlightened methods of treatment, better precautionary measures, and modern hygienic conditions, have practically banished ophthalmia from the British army; but, however excellent the sanitary state of a body of men may be, their good health at starting would avail them little if under special circumstances they should become victims to ophthalmia, and the treatment dealt out to them were the same as the treatment of the ophthalmic patients of the army in 1801. Such treatment, in fact, would place them in much the same position as if their sanitary state had been just the reverse of the healthy one supposed. One of the most marked general effects of unhygienic surroundings and a vitiated atmosphere is the decrease in the vital powers of the persons subjected to them. They readily fall victims to any disease that may be introduced among them, while the disease itself is enabled to spread with the utmost facility, just as the least spark serves to ignite and as the fire spreads in a piece of tinder. Had the men of the army who contracted ophthalmia

in Egypt in 1882 been bled and weakened, dosed with mercury and antimony, deprived of their normal amount of nutriment, and if, at the same time, their inflamed eyes had been subjected to powerful irritants of various kinds, the disease would have led to much the same results as if the patients had been exposed to the effects of prolonged unsanitary, instead of sanitary, surroundings before they happened to be attacked by it. The more the two army epidemics of ophthalmia are studied and compared, the more manifest becomes the potency for good of the relatively gentle treatment practised in the second of the two outbreaks, and equally the more obvious appears the mischief done by the rough and depressing treatment pursued in the first campaign.

A further confirmation of the correctness of the view I have taken may be drawn from the evidence afforded on the subject by the experience of the French army in Egypt before the year 1801, when the British troops had to contend with ophthalmia in that country. As already quoted from the writings of Larrey, although upwards of 3,000 ophthalmic patients passed through the French hospitals, near Alexandria, in less than three months of that year, sight was not lost in a single instance, and he expressly states that no general bleeding was then employed. But the French army had suffered from ophthalmia in previous years in 1798 and 1799, and at that time bleeding was employed. Larrey mentions that in those two years the ophthalmia was followed by complete blindness in rather a large number of individuals ('*Chez un assez grand nombre d'individus la cécité complète.*'—Tome i. p. 203). He describes the treatment then followed to have been general bleeding from the veins of the neck, arm, and foot, repeated according to the intensity of the inflammation, together with leeches to the temples.

The contrast between the different results of a rough and ill-judged treatment of disease on the one hand, and of a more rational and gentler treatment on the other, could hardly, I think, be more forcibly illustrated than it is in the histories of the two epidemics I have just brought to your notice. Many other surgical affections and their treatment might have been chosen to illustrate my text. I might have described the revolution in results which has attended the change from the surgically rough modes of dressing wounds of former days to the comparatively painless and gentle modes of treating them since the introduction of antiseptic dressings by Professor Lister. A still more striking illustration might have been furnished by the very great changes that have taken place in the ratios of mortality attending internal diseases, especially the diseases of tropical countries, contemporaneously with changes from violent to gentle treatment of them. This is a subject which has been largely, however, dwelt upon by my late colleague, Professor Maclean, whose earnest teaching for many years past of the vast advantages, the vital importance of the relatively gentle treatment now generally employed must have exerted a great influence for good on many army surgeons at starting in their military career, who have since carried out the improved modes of treatment with such great benefits to their patients and also with such immense advantage to the State, as the figures in the statistical returns of the Army Medical Department sufficiently show. While I was looking through Sir J. McGrigor's sketches of the expedition to Egypt from India for information on the outbreak of ophthalmia among the troops under his medical charge in 1801, I met with the following passage respecting the treatment of tropical dysentery: 'It will not be necessary,' he writes, 'to say much on the treatment of tropical dysentery. Mercury is now the remedy

relied on everywhere.' What a picture this brief summary of the treatment of tropical dysentery raises in the mind! Sanitary science has wonderfully lessened the amount of dysentery, as it has of other diseases in the army, by removing, or neutralising, its causes; but, as we know, cases of dysentery still occur in large numbers in India, and let them be treated by the mercury and extreme depletion of former days instead of the mild measures which are now employed, and notwithstanding the improved hygienic surroundings of the men, how long would the present low rates of mortality remain?

Let me hope that some of the observations I have brought to your notice may linger in your minds, and lead you not merely to maintain the gentler and more rational methods of treatment that have been already achieved, but also induce you to try and extend the principles on which these methods are based to all parts of your future practice in the treatment of diseases and injuries in the army. Let improvements in treatment and improvements in hygiene advance *pari passu*, and with these improvements combined, the mitigation of suffering and the safety of your patients will then be most thoroughly ensured.

PRINTED BY
STOTTISWOODE AND CO., NEW-STREET SQUARE
LONDON

Medical Staff Library
J. de Chaumont
CONGRESS AT YORK, 1886.



ADDRESS TO SECTION I.
SANITARY SCIENCE & PREVENTIVE MEDICINE.

BY
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[Excerpt from Vol. VIII. of the Transactions of the Sanitary
Institute of Great Britain.]

Sanitary Institute of Great Britain.

Congress at York.

ADDRESS TO SECTION I.

SANITARY SCIENCE & PREVENTIVE MEDICINE.

BY PROF. F. DE CHAUMONT, M.D., F.R.S.

LADIES AND GENTLEMEN,—

It has been the custom, since our first Congress, and following older precedents of other societies, for the Chairman of each section to deliver a short address. I say advisedly a *short* address, for it is abundantly manifest that if he is to air his own eloquence and erudition in a long one, it can only be at the expense of others who have given much time to the preparation of papers, which they naturally are desirous of hearing properly if not exhaustively discussed. The time at our disposal is all too short for the work undertaken, and we are within measurable distance of a change in our arrangements, by which we must have the different sections sitting simultaneously throughout the entire duration of the meeting. This is what is done at the British Association, the British Medical Association, and other kindred institutions. The question of the utility of such addresses has been much discussed, and opinions thereon are divided. When the address is bad in matter and tedious in delivery, then it is an unmixed evil. But to suppose such a thing possible would be to pay but a poor compliment to the Council of this Institute, in whose hands the selection of the Officers of the Congress lies. And this reminds me of a duty which I have to discharge, namely, to thank the Council for the honour they have done me in placing me in this position, an honour which I feel all the more keenly that it is the second time it has been conferred upon me, the former occasion being at the Exeter Congress in 1880. I am quite sure that I was most successful on that occasion, at least in so far as brevity went, for I verily believe I gave the shortest address on record. This I trust will inspire you with

hope that I am not likely to inflict all my tediousness upon you. Before going further let me take the opportunity of welcoming you to this section, and of expressing a hope that we may have good and thorough discussions on the excellent papers about to come before us. Let me also point out that we do not expect silence from our lady friends; on the contrary, we hope they will take an active part in the proceedings,—for there are many points which are best understood and best explained by them, and we men, although naturally arrogant, are not always above taking a hint from the opposite sex.

The title of our section is that of "Preventive Medicine," or rather "Hygiene and Preventive Medicine." It may, perhaps, be well to consider what these terms mean, and what we are expected to do or to concern ourselves with. The meaning of Hygiene is now pretty well known as the art of preserving Health, although the origin of the term is rather obscure, few perhaps having cared to trace it beyond the fabled daughter of Esculapius, by which myth I feel pleased to think that a compliment is being paid to Medicine by making Health its daughter. It certainly has not always been thus in more senses than one, for health is very far from favouring those who are continually consuming drugs, whilst medicine has not infrequently been deprived of what it has been justly entitled to, namely, credit for the efforts its votaries have made for the preservation of health and the checking of disease, even when against their own material interests. But what, you may ask, is the meaning of "Preventive Medicine"? Is it preventing disease by physicking people? or, is it to prevent the doctors from physicking people? Both of these proceedings might have their advantages, but they do not really explain our meaning. In the good old times, when the smuggler was a more common and (at this distance of time, at least) a more picturesque object around our coasts, the Preventive Service was in every one's mouth, and its duties were well known. Those duties consisted in preventing the introduction of contraband material into the country, material which it was believed would undermine the financial constitution of the country. So it is with our Preventive Medicine: it is a service the duty of which is to prevent the introduction, the slipping in (*einschleppung*) of contraband material into our bodies and undermining their constitution. Its functions are as old as, nay older than, history itself, although its development into systematic usefulness is a thing of yesterday; but so rapid has been its development that we even take upon ourselves to talk of the science of Preventive Medicine, hurrying up the question a little in our pardonable eagerness to progress. It must be

admitted that a science, rightly so-called, is a very serious thing; it means a state of knowledge of causes and effects, precedents and succedents, antecedents and consequences, such that we may, with given data, confidently predict a result that shall never fail us. Tested in this way, how much true science have we got? Of pure sciences we have only Logic and Mathematics; and of these probably the first is the only one that we can call absolutely true, in the sense that propositions may be stated so that there may be no loophole of fallacy or ambiguity—the quantification of the predicate has settled that. But in Mathematics, which are more concrete than Logic, we find here and there certain ambiguities, certain irregularities of result, not indeed of any practical importance, but sufficient to show that we have not got to the root of the matter yet. Certain formulae, which are sound for nearly the whole of a series, fail perhaps in one number, say the second, and are good for all others. Take again a case familiar, at least in name, to everybody, viz., the squaring of the circle. Very few people, not mathematicians, have probably any idea of the meaning of the expression. It means ascertaining the exact ratio that the circumference bears to the diameter so as to be able to determine the area with rigid accuracy. Of course we can get sufficiently near for all practical purposes, but the absolutely accurate determination is impossible. Professor de Morgan, in his amusing "Budget of Paradoxes," mentions that he was visited by a clergyman once, who remonstrated with him for taking up valuable time in discussing a subject that was so simple. "You want to square the circle," he said, producing from his pocket a piece of string with the ends tied together; "here you are, here's a circle, and," pulling the string into four corners, "there's a square; what more do you want?" But even more remarkable is what Pascal recounts of the Chevalier de Méré, who was the first to solve a problem in Probabilities. Pascal says of him: "if he had only known a little geometry he would have been perfect," but he never could be brought to understand the fundamental axiom that a line was that which had length without breadth. We talk of an all-round man, as expressed in Latin, "*Totus, teres, rotundus*," a character which in its highest perfection would be represented by a perfect sphere. But such perfection is ideal, and in all human spheres there are rifts and flaws, the existence of which, however, does not invalidate the abstract idea. We may, therefore, feel assured that in spite of all shortcomings on our part, partly arising out of inability to appreciate the essential points, but largely from actual ignorance of facts, we are entitled to speak of a science as existing, even although we may be most imperfectly acquainted

with its laws. This imperfection becomes all the greater when we have to deal with subjects which are more and more removed from abstract principles, and are consequently more and more complicated in their action. And when we come to consider a subject like Preventive Medicine, whose existence depends upon the previous existence of other sciences, themselves confessedly imperfect, the difficulty becomes greatly enhanced, and the effective working on sound scientific principles seriously hampered. It must be quite obvious that progress in this direction is governed by our previous knowledge of the nature and the causes of disease, and that while these remain obscure, their prevention must be obscure too, and at best be reached in an empirical and haphazard way.

People are inclined sometimes to reproach the medical profession for not knowing more on these subjects than they do; but this reproach is not very just. In the first place, the profession as a whole consists of men who work hard for their living, and have little or no time for scientific inquiry, although it may still be said to their credit that even some of the hardest worked have found time to add valuable contributions to the sum of medical knowledge. In the second place, the inquiries themselves are exceedingly laborious and difficult, such that no one man or set of men could possibly carry out; and it not infrequently happens that it is only after a long series of observations, which had apparently but little individual significance, that the truth is perceived at last, and some clear-headed worker steps into the inheritance and enjoys the renown which is the outcome of the conjoint work of a former host of obscure but earnest labourers. Often, too, the eye of genius can penetrate the future and see, as in a vision, what can be proved and reduced to concrete fact only by long years, if not generations, of work, requiring for its carrying out methods and appliances utterly undreamt of when the idea was first shadowed forth. It is thus that we can trace a perception of the principles of modern pathology and practice in the writings and speculations of men of former ages, whose genius seemed capable for a moment of lifting a corner of the veil which concealed the future from the common eye.

The germ theory of disease and the principles of antiseptic treatment, now so successfully applied in surgical practice, were floating in the minds of men long before Sir Joseph Lister so happily reduced the theory to concrete fact and was the means of revolutionizing surgical practice and rendering it possible to extend to suffering humanity, not only relief, but means of cure, which we had hardly dared hope for no long time ago. Again, with regard to the germ theory of disease, which seems

now to hold out fair promise, the recognition of its possibility was present to the minds of many, not only long before the days of Koch, but before the means of carrying out the investigation existed. We owe the discovery of the first microbes (as it is now the fashion to call them, the name meaning merely "minute life") to the genius of Leuwenhoek, in the 17th century; but it was not until well on in the present century that the improvements in the construction of the microscope permitted the inquiry to enter upon the vast field that seems now to lie open. Those who have followed the development of the question during late years know what extraordinary strides have been made, and yet we are as it were merely hovering about the gate, and have barely entered the field at all. Some who have got within the gate astonish us with their account, more or less confused, of the wonders to be found within, whilst others still stand outside on the beaten track, crying out that there is nothing in the field and that all is vanity.

There is no doubt that we are bound to receive with all caution statements on so important a subject as the causation of disease, but to take up a position, as some have done, and deny the possibility of such and such a phenomenon, or group of phenomena, being concerned with disease causation, is to assume an attitude of infallibility, not only ridiculous in itself, but antagonistic to true progress. Thus, although it is not yet possible to admit, as proved to demonstration, the connection between certain microbes and certain diseases in the way of cause and effect, yet the connection is so remarkable, in some cases at least, as to lend an air of verisimilitude to the view.

In 1879, at the International Medical Congress at Amsterdam, there was a discussion in the Hygienic section on the subject of the examination of drinking water. I maintained the necessity of supplementing the chemical by a microscopical examination in every case, in the hopes of obtaining in that direction information which chemistry seemed incapable of furnishing. Considerable experience had taught me what chemistry, in its existing condition as a science, could and could not tell us, and I felt that, whilst chemistry helped us a good deal, it was in all probability the microscope that would ultimately reveal to us, somehow or other, the germs of disease. I was interrupted by the author of the paper under discussion with the question: "A-t-on jamais vu un germe?" I was obliged to confess that I did not think any one ever had, or recognised it as such if he had seen one.

Now, as a test of progress in the seven years that have elapsed since then, it may be asked, "would my answer be the same to-day as it was then?" The same, yes, but with a difference. It is true

that we have the Bacillus of Anthrax and the Bacillus of Tuberculosis, the connection of which with these diseases is undoubted, but it still remains to be *proved* that each is "teterrima causa morbi." On the other hand the Cholera Bacillus and some others less generally known are by no means in the same position, for much has to be done and proved before they can be invested even with the comparatively established status of the two first named. Thus my answer would have to be something like this: "We cannot positively affirm even now that a germ has been actually seen, but certain microbes have been recognised as being constant in certain forms of malady. Our methods of observation have also been vastly extended and there is every reason for hope for the future." Since that time a powerful aid has come to the microscope, in the method of cultivations of minute organisms, "Reinculturen," as the Germans, who have done so much in this direction, have called them. By these means much information has been obtained, which neither chemistry nor the microscope unaided was capable of yielding, teaching us something of the life history of those remarkable organisms and their relations to each other, as well as to the more highly organised beings upon which they seem to prey. On account of the failure of the highest powers of the microscope to detect any signs of life in liquids, which later on gave undoubted proof of containing organisms, it was surmised that spores might be present, either so minute or with refraction differing so little from the media they existed in, that it was impossible to see them. Cultivation in nutrient media, aided by improved manipulation and methods of preparation and staining, has revealed quite a new world of living things. It has also shown that in this mikrokosm there is a reign of law as there is in the communities of our makrokosm, an antagonism of races as there is among men themselves, for some organisms which grow and flourish when cultivated alone, decay and perish in the presence of others, just as one race of men or animals seems to fade before the encroachments of another.

Taking advantage of this, attempts have been made, crudely and somewhat prematurely, to play off, as it were, one microbe against another, as in the proposal to fight the Bacillus of Tubercle by regulated inhalations of Bacterium Termo, the common microbe of putrefaction. These attempts have, up to the present time, resulted in failure, and this need not surprise us, for we do not know all the question yet, and we must creep before we walk. There seems, however, good reason to think that there is some foundation for the notion, and that the method may yield fruit hereafter. But these researches in this new branch of Bacteriology have led to still further considera-

tions, for they have shown that most of the activity of Nature is dependent on those minute organisms. This has long been known to be the case in ordinary fermentation and putrefaction, whilst the resemblance between the action of disease-poison and the process of fermentation gave rise to the term "zymotic" (from ζύμη, a ferment), as applied to diseases which seemed to proceed with a quasi-fermentative process. It was also reasoning from those more familiar cases that led Pasteur and others to the investigations which have brought out such surprising results. There seems every probability that processes which were formerly looked upon as purely chemical, such as nitrification, are brought about by bacterial agency, and indeed this has been positively proved in the case of nitrification by the exhaustive experiments of Schützenberger and Warington. But even in the case of our own bodies, it is probable that all the changes, physiological as well as pathological, are dependent upon those minute workers, so that the terms "vital action," "vital force," used by older writers, were not such misnomers, after all, even allowing that those who used them had very little notion of how the said actions or forces worked or were evolved. We must thus look upon this Bacterial or Microbial underworld not as an utter enemy, but as a mighty agency for good or evil, as the case may be: we see that we could not exist without it, nor can we in some cases continue to exist in company with all of it. Our cue would seem to be to help the friendly microbes, and to fight those that are our foes. A good general rule, but how is it to be carried out? Clearly the first thing to do is to learn to recognise friends from foes, a process that can only be the outcome of long and careful experiment, such as is now being carried out both abroad and at home, in spite of much opposition and difficulty.

But comes another crux: we know by experiment that by certain treatment a malign microbe may be converted into a benign or, at least, innocuous one; but, on the other hand, we also know that he is capable of relapsing, and further, that those ordinarily looked upon as benign may, under certain conditions, assume malignant qualities. It is therefore not enough to recognize the individual, but we must also know his habits and ways, his comings and goings, and the conditions which may alter his natural constitution for better or worse. We are also not yet sure that the recognized individual species are really completely differentiated. One form may pass into another, for all we know, or it may be a spore or larva of another form, to use expressions somewhat vague and doubtfully admissible.

Much has been said lately about the doctrine of evolution as

applied to disease, and my learned colleague, Professor Aitken, has lately published a most suggestive essay on this difficult but fascinating subject. Certain observed phenomena, which seem to point to possible hybridism in disease, have also an important bearing on the question. I do not wish to suggest that one form of disease may breed another form, now considered different, although, if we admit the possibility of certain changes in microbial development, it does not seem devoid of all possibility. On the other hand, we may rest pretty well assured of one thing, namely, that there is no such thing as spontaneous generation of disease. All attempts have failed to show a tittle of evidence that anything organised can arise from anything but a previous organism, and if organic life ever had a beginning no such fresh point of departure can be looked for in the existing dispensation. At the same time we may come from time to time upon strange and unexpected sources of disease, such as scarlet fever from the cow, as there seems strong reason to believe, since Mr. Power's elaborate inquiry. This is, however, a very different thing from a spontaneous origin,—it is merely an unexpected and hitherto unrecognised habitat of the particular pathogenic organism. We must be prepared to meet with the unexpected in this way, and it is only by such careful observation and inquiry that the weak points of our defence can be found out and strengthened.

The methods of enquiry by the cultivation of organisms, as regards drinking water at least, have not yet produced much practical result, although sufficient evidence has been obtained to show that we are likely to obtain important information in that direction. But until we can go further in the recognition and detection of different organisms, and establish their connection with particular forms of disease, we are working pretty much in the dark. In addition to the work being done in continental laboratories, I may refer to the paper by Mr. Percy Frankland, in the proceedings of the Royal Society, and to Mr. G. Bischof's paper read before the Society of Medical Officers of Health. The former is much the more sanguine paper, written by a young and rising observer, whilst the latter is from one of long and tried experience, who had hoped much from the method, but found that hope, for the present at least, somewhat disappointed. But, as they say in German, "*verschoben ist nicht aufgehoben*"; and we may hope that further experience will give us more knowledge and more confidence. It is a fortunate thing, however, that we are less dependent upon this knowledge for the carrying out of prophylactic measures than might be supposed, for, even if we possessed it, it would not materially alter at present our course of action.

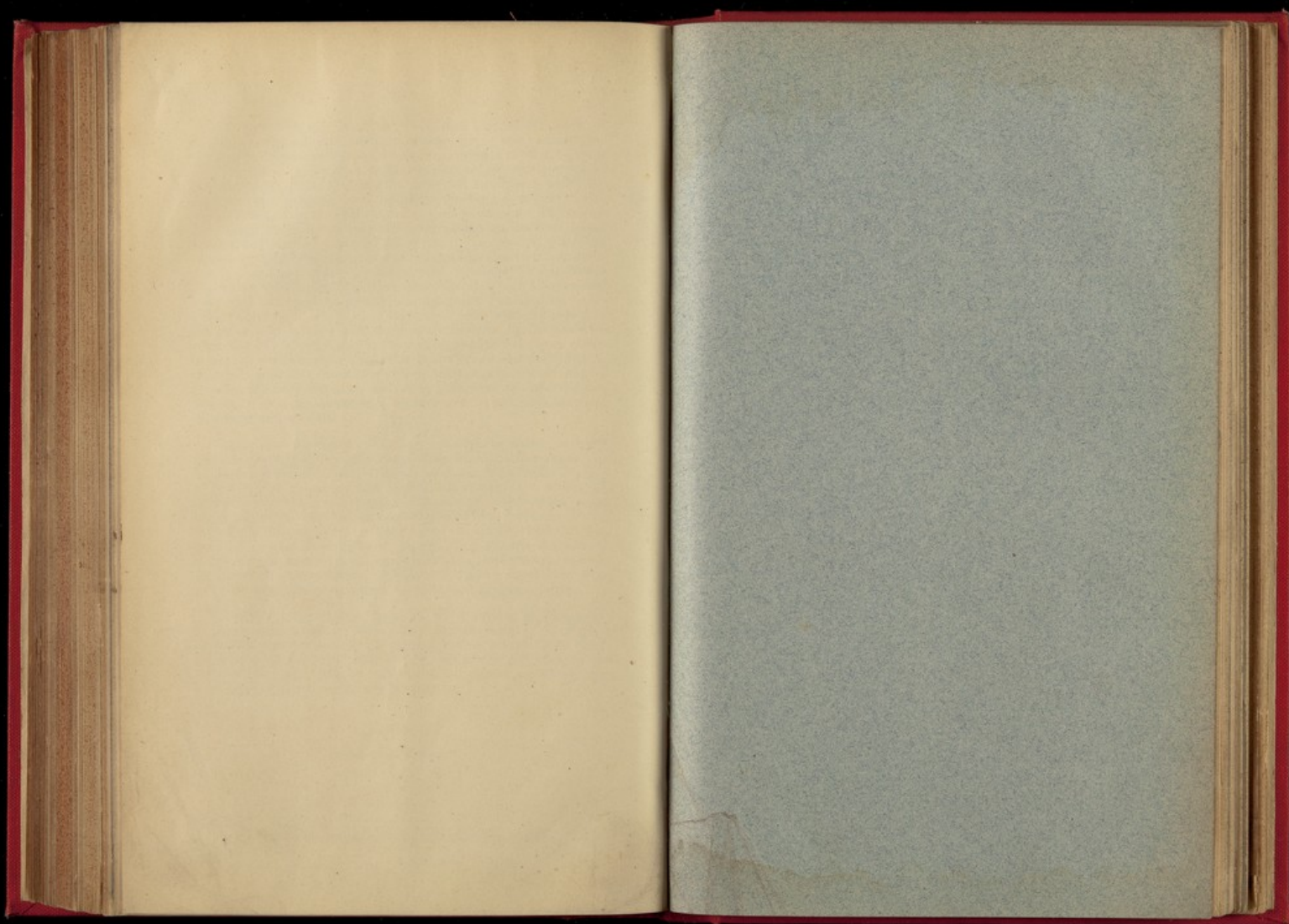
It is shown that pathogenic bacteria (or what are believed to be so) propagate best under unhygienic conditions, light, fresh air, and pure water being inimical to them. It is also admitted, even by those who pooh-poo the germ theory, or indeed any specific disease cause, that unhygienic conditions demand to be remedied, and that pure air, pure water, wholesome food, and the other conditions which make the sum of hygiene, are imperative if man or animal is to be maintained in health. The Committee at the India Office, which was assembled to consider the question of the Comma Bacillus and the report of Drs. Klein and Heneage-Gibbes, came to the conclusion that Dr. Koch had not proved the absolute connection of the Bacillus with cholera as an efficient cause, but at the same time they said that even if the contrary had been the case it would not in the meantime have altered things, in so far as to compel the authorities to make any material change of procedure in the measures taken for prevention. Quarantine of all kinds was condemned as useless, and not only useless, but as in every way pernicious. There remains for Preventive Medicine, until we have far more extended knowledge of pathology and etiology, the steady path that is being already trod in the direction of providing for the purity of all articles of food and drink, of dwellings, of clothing, of persons; the supply of fresh air, and the immediate and complete removal of all refuse and effete matter. If to this we add a proper mode of life, both physically and morally, we may practically snap our fingers at both Bacterium and Bacillus. In the meantime, there are diseases among us which those measures seem as yet powerless to prevent, such as small-pox and hydrophobia. Under these circumstances, we should be foolish not to accept such help as vaccination, for instance, affords, although it might be difficult, even if it were considered necessary, to induce the public to be inoculated with hydrophobic matter, except under the terror produced by having been actually bitten. These measures, however, are the adjuncts of Hygiene, which aims at operations on a wider scale, by so sterilizing the soil on which the malignant microbe seeks to flourish, that he shall no longer consider suffering humanity to be his rightful heritage.

SIR SPENCER WELLS (London), President of the Congress, brought to the notice of the Meeting that it was not customary to discuss the addresses of Presidents of the Sections, and called upon the Very Rev. the Dean of York to move the customary complimentary vote of thanks to Professor De Chaumont.

The Very Rev. the DEAN OF YORK said that in the spirit of obedience which animated all there, he was sure, he rose to move that the thanks of the meeting should be given to Professor de Chaumont for his able address. The Dean remarked that he could only speak of the address they had listened to from the standpoint which he occupied as an ecclesiastic, and he did not presume to address a body of scientific men as of equal rank with them in science. There were two things which struck him as an ecclesiastic on listening to the address, and observing how it was received. In the first place, the matters brought before them in that address appeared to him to show that the more they studied science the more what was revealed showed the infinite wisdom and illimitable power of the Great Creator, and every step they took in scientific investigation displayed the marvellous wonders of His glory. The second point was with regard to the manner in which the statements are received by the scientific mind, the way in which they are examined, and the reluctance shown to jump to conclusions before the statements were established as facts, made him wish that in his own calling there was a greater spirit of investigation of statements, and more toleration of others' views displayed, for then, he was sure, there would be far more harmony than at present existed.

Captain DOUGLAS GALTON (London) seconded the motion, and said that this most interesting address was replete with practical suggestions for the promotion of sanitary science, and it was undoubtedly the fact, as Professor de Chaumont had shown, that it was quite within our power to resist the encroachments of insanitary evils by taking sanitary precautions. This, indeed, had been shown from the earliest times,—from the time, at least, of Moses,—and compliance with the laws of health, such as the adoption of prophylactic discoveries, the removal of refuse from the midst of the population, the purification of the air, and care in the water-supply, together with leading moral lives, were necessary to protect people from the attacks of epidemic disease.

The vote was carried by acclamation, and Professor de Chaumont, in acknowledging it, said that as the Institute endeavoured to bring all classes together in these congresses, he was compelled to frame his address for a popular audience, but that it was difficult to do so without using many technical names and expressions, for which there were no equivalents in ordinary language.



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ADDRESS

DELIVERED AT THE ANNUAL MEETING
OF THE
Southern Branch of the British Medical Association

HELD AT NETLEY

ON THE 16TH JUNE 1887

THE PRESIDENT

SIR THOMAS LONGMORE, C.B.

PROFESSOR OF MILITARY SURGERY IN THE ARMY MEDICAL SCHOOL

PRINTED BY REQUEST

LONDON

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ADDRESS.

GENTLEMEN,—

I must, in the first place, express my obligations to the members of the Southern Branch of the British Medical Association for the honour they have conferred on me in selecting me as their President at this the Annual Meeting of the Branch. The friendly assistance of the Principal Medical Officer, Surgeon-General Fraser, and the officers of the Medical Staff quartered at Netley, in placing their mess and ante-room at our disposal for the Meeting, and the ready help afforded by Surgeon-Major Beattie, President, and by the members of the Mess Committee, in carrying out the necessary arrangements for our accommodation, have removed the greater part of the difficulties I should otherwise have experienced in conducting and carrying out the objects of the Meeting in a worthy and satisfactory manner. It is the hope of all the staff of the establishment that objects of sufficient interest and instruction may be found at Netley and in its neighbourhood to enable you to pass the few hours of your stay here agreeably, and, at the same time, not altogether unprofitably.

As one of the duties of your President is to give an address of some sort, it has occurred to me that it might be more appropriate to the occasion, rather than to add to the list of purely professional topics, to take a hasty view of the probable influence of the development of sanitary science and practice on the work and position of medical practitioners in the future—practitioners whose particular province it is to neutralise and overcome the effects of disease and injury, and whose occupation and incomes consequently depend on there being disease and injury to treat and cure.

A casual remark recently uttered by a professional acquaintance in the course of conversation, 'that officers of health and those who adopt preventive medicine as a profession, are getting such an ascendancy that there will be shortly nothing left for us general practitioners to do,' made me think it might be worth occupying a few minutes in considering how much truth there was in the observation.

Not many years ago there was talk of a new city being built in England, to be called the city of Hygeia, in which the sanitary arrangements were to be so scientifically correct—the water so pure, cleanliness so thorough, drainage so complete, the dwellings and their appurtenances so hygienically perfect, and the people so temperate—that no disease was to get a footing in it, and all the inhabitants were to live lives of perfect health and enjoyment. There may be such a city in some other planet, but none of us

have yet had the opportunity of visiting a city answering the description, either in England or anywhere else, on the planet to which we are confined. Will our descendants ever have the opportunity of doing so? And if they are fortunate enough to have such an opportunity, and if they find it as free from sanitary defects as described, will they also find it as free from the need of medical practitioners as some have seemed to expect?

It is only a little more than seven years ago since Dr. B. W. Richardson, at the Congress of the Sanitary Institute of Great Britain, gave a description, not of a mere town or city, such as it was contemplated Hygeia would be, but of an extensive country with numerous towns and cities, by name Salutland, where the death-rate is reduced to 8 per 1,000 per annum, and where the people have an ordinary tenure of 100 years of life, and a prospective term of 120 years. The country Dr. Richardson described is a very remarkable one in many respects—it is a country where epidemics from pollution of air, water, or food have been rendered impossible; where the hereditary tendencies to disease have been lost altogether, or so nearly eradicated as to be practically removed; where the diseases incident to poverty, intemperance, luxury, injurious occupations, and worry have been stamped out by the removal of their causes; where all that are left for the Salutlanders to contend against in respect to health are the natural elements—the heat of the sun, the flash of lightning, the changes of

atmosphere—which, however, rarely produce fatal results; so that, with the fewest accidental exceptions, the death-rate of the inhabitants has become normal and constant at the rate stated, viz. 8 per 1,000 per annum.

There is, beyond doubt, very good ground for the general rule that has been laid down with regard to the relation between the maturity and the natural length of life of animals—that if we know the date of the completion of the development of an animal—the age when in the mammalia, for example, the bones of the skeleton are perfected by the complete unification of their terminal parts and shafts—then the multiplication of that age by five will give the natural term of existence of the animal. The rule certainly holds good in many of what are called commonly ‘the lower animals’ among us. And in man, if the period of maturity be taken at twenty years, then, by the rule mentioned, his life duration becomes fixed at 100 years. However, to explain the still longer duration of life in Salutland, it is held by the mental traveller who has described the country and its inhabitants that, although the period of maturity in man has its boundary mark at about twenty years, there is beyond that limit a certain period of improved nutrition and development, though not of actual growth; and that hence the Salutlanders, by living as civilised men ought to live, are able not only to reach the ordinary natural term of life of 100 years, but are able to enjoy a fair prospect of attaining the age of 120 years.

In Salutland there are no medical practitioners earning a livelihood by the practice of their profession. There is no need of them. Death, with very few accidental exceptions, comes in a natural way—like sleep after labour—and then all the Salutlanders are so fully educated, and understand so thoroughly the laws of health, that there is no opening for physicians or surgeons among them.

The account of Salutland is not a romance—not a mere tale of the imagination, like one of Jules Verne's tales—but professes to be a condition of things that can be attained by any people who will live and conduct their affairs after certain methods, and who will submit to the administrative regulations, moral and physical, that are described as governing the Republic of Salutland. It is not only supposed that the condition of things in Salutland is capable of realisation, but it is anticipated that it will certainly be realised about two hundred years hence, when sanitary and political science will have become sufficiently advanced, and people generally sufficiently enlightened. It is, therefore, quite in accord with the design of the describer of Salutland that his description should be regarded from a practical point of view, so far as existing things will allow us to do so.

We are at present in the precincts of the principal invaliding hospital of the British Army; and may not the experience of that establishment, and the experience derived from Army Medical service in general, be utilised to some extent for arriving at a

solution of certain among the points I have just brought to notice? It seems to me that they may be.

You all probably know that Army medical officers are in their sphere of duty first and foremost health officers—*officiers de santé*. The study of the best means of preserving health is the foremost specialty of the Army Medical School. The officers and soldiers of the Army are all picked men—selected carefully out of the civil population of the country—the soldiers especially. Taking the last year—1884—of which complete returns have been published, out of every 1,000 men who sought for service in the Army during the year, 417 were medically rejected on inspection, only 583 were admitted, so that the 39,000 recruits accepted that year out of 66,882 applicants, were all men whose good health had been carefully established before acceptance; and so with all previous years. The function of the medical officers is to keep, as far as possible, these men in at least as good a condition of health as they were on their enlistment; at the same time, it is hoped that the change which occurs in numerous instances among recruits from a state of poverty to one of comparative comfort and competence, from unhygienic to hygienic surroundings, may bring them into a more robust frame of body than that which they had when they were enlisted.

A residence in the Army is not yet what it is described to be in the great province of Salutland, but it is very much what it was anticipated a resi-

dence in the town of Hygeia would be, as compared with a residence in the best existing towns and cities of the kingdom. The soldier lives, at any rate in England, in buildings where he gets a large amount of air space—buildings in which, as soon as any sanitary defects can be discovered, they are speedily remedied by skilled officers maintained for the purpose. No overcrowding is permitted. Excess of work is carefully guarded against. The soldier is well clothed. He is regularly fed—his food being critically examined as to its wholesomeness; and, altogether, he has little to trouble his mind about—to create worry or anxiety—so far as physical wants are concerned. Looking, then, at the soldier's life and surroundings, he may fairly be regarded as an inhabitant of Hygeia, and it might, not unreasonably perhaps, be anticipated he would remain free from most of the ailments that persons are subject to who live in towns under opposite conditions—towns in which all sorts of sanitary defects abound, where overcrowding in dwellings is prevalent, where articles of food are often impure or adulterated, and where want and anxiety are unhappily very largely predominant.

But what are the facts as to ill-health in Army life? As regards the hospital by our side, over 2,000 men on the average—irrespective of time of war—pass through it annually as invalids; that is, men from this City of Hygeia, of which we have just heard, who have become so broken down in health

that they have become incapacitated for earning a livelihood by ordinary military duty, and who have therefore been sent away at great expense, from their stations abroad, to Netley, either to be repaired, if possible, for further service, or to be discharged altogether if the repair should be found impracticable.

Much of the sickness among these invalids may, however, not unjustly be ascribed to the effects of climates to which the men have not been habituated in the former periods of their lives. Let us look, then, how far soldiers remain free from the need of hospital care and treatment in their native climate of Great Britain. The health report of the Army, published in June of last year (1886), shows that the average strength of the troops serving in Great Britain during the year under notice in the volume amounted to 83,135, and that, so far from there being no sickness in the military Hygeia, there were no less than 72,344 cases of sickness admitted into the hospitals (870 per 1,000). The death-rate was not so high as it was given for Salutland—being only in the ratio of 5.33 per 1,000 instead of 8 per 1,000; but then there were not the same liabilities—the men of the Army were all in what is called the 'prime of life.' No deaths from the diseases of infancy, or those of advanced years, or natural deaths from old age are included in the Army ratio I have just named.

The returns show that, out of the 72,344 ailments which caused soldiers in the United Kingdom to become patients in hospital, 2,579 belonged to the

febrile group of general diseases. Perhaps it is within the range of practical accomplishment that sanitary precautions may become so perfect, and everyone so enlightened, that all the eruptive fevers may be exterminated, and the soil so drained and cultivated that those of the malarial type may disappear; but can it be reasonably anticipated that continued fevers will no longer maintain their ground among our descendants, if they eat, drink, move, and enter into the various pursuits and pleasures that men and women now do?

Unfortunately, in the Army a large number of hospital admissions are due to constitutional syphilis in its primary and secondary forms; in the year I have referred to they amounted to nearly 13,000 admissions. Thanks to the exertions, in my opinion misdirected, of certain enthusiasts, such admissions have been on the increase of late years. There were also 9,592 admissions for gonorrhœa and its sequels. These will not be found in any military returns from Salutland, because two hundred years hence, when Salutland will be flourishing, all the nations of the earth will be on such friendly terms with one another that there will be no armies and no soldiers. But even in Salutland itself two hundred years hence, is it not too much to expect—supposing the Salutlander men and women to be what men and women are now, subject to the same passions, and surrounded by conditions and circumstances analogous to those which now prevail—is it not too much to expect that these diseases will not be found among the civil inhabitants of its towns and cities?

Of diseases of the various special systems and functional parts of the body the medical officers of the Army had to treat upwards of 32,000 cases in Great Britain during the year; while of injuries from accidental falls, collisions, and other casual sources of hurt, there were more than 9,000 instances which necessitated admission into hospital. I cannot, of course, speak of these casualties and ailments in any detail, nor even refer to the separate groups of them, in which they are classified in the hospital tables—the time at our disposal does not admit of any such reference to them; but on a general consideration of them I see no reason why corresponding injuries and ailments should not occur in large numbers even in Salutland, notwithstanding its sanitary perfection, supposing its inhabitants to be subject to the same physical laws as those to which the inhabitants of the earth are now subject. And if these are to be found in Salutland, we may be sure, in spite of any prediction to the contrary, surgeons and physicians will be found there also.

Will not the increase of population in Salutland become a serious source of difficulty? Will not this increase give rise to disease—perhaps, under the altered state of things, with some new features, but still disease. Dr. Richardson does not anticipate any great advance in the rate of increase of mankind under the improved sanitary arrangements of Salutland; but remembering the increased years of existence of mankind, the increased health and strength

that is foreshadowed by Dr. Richardson, together with the absence of wars, epidemics of disease, and other scourges, can there be otherwise than a multiplication of the population in a constantly increasing ratio? Even in the bygone days of the earth, when little or no heed was given to matters of sanitation, with its high rates of mortality from disease and injury, all recorded history seems to show that wars, epidemics, and catastrophes of various kinds have formed part of the regular means for preventing overpopulation of the earth; what will the condition of things become when all these sources of reduction of population are extinguished?

A few years ago I was a guest at a dinner given by Sir Henry Acland, where there was a rather large gathering of members of the British Medical Council, and also a few distinguished politicians and members of Parliament. Prominent among the latter was Mr. Gladstone, then leader of the House of Commons. During the evening, on the toast of Mr. Gladstone's health being proposed, Mr. Gladstone, in the course of his reply, drew a comparison, which he developed with wonderful eloquence, between medical and political science. The gist of his remarks was that, as future years advance, politics as a power and influence in the country must wane, while medicine as a power and influence must inevitably increase. Mr. Gladstone argued that while in former days the brilliant genius and political abilities of Pitt, Chatham, Fox, Burke, and others were all-important in the

direction of the affairs of the country, in these latter days, when everyone is a politician, and the Press has become one of the ruling powers in the State, and still less in the future, there can be no place for such political luminaries of the first order as they were; while from the increase of population, and the social difficulties arising from the continued aggregation of people on the one hand, and the relatively limited means of supply and accommodation on the other, the science of preserving health, and of safely treating the numerous phases of disease which must spring from such conditions, will necessarily give to members of the medical profession the highest place of importance in the social system. In the course of his speech Mr. Gladstone adduced a number of illustrations, all tending to prove that the interests and happiness of people in the future will depend far more largely on the technical knowledge and influence of the leaders in medical science than on the views of any of the advocates for particular systems of political administration. However much the observations of the great orator may have been uttered with a view to gratify the class of auditors to whom he was chiefly addressing his remarks, the prospect of the future sketched in them seems to me far less visionary than the view presented in the picture of *Salutland*.

Let officers of health ply their vocation—the more the better—and let medical practitioners join them in their efforts to promote hygienic improvement; every advance they make in sanitation will

be beneficial to the community; life under better sanitary conditions will have more capacity for enjoyment; disease may assume milder forms, and may be, in larger proportion, more amenable to treatment; premature deaths will be lessened in frequency; but let it not be imagined that, whatever the advances in sanitation, other conditions, not conducive to health, will not advance too. Depend upon it, there will still remain plenty of scope for the labours of medical practitioners. Our professional vocation will never become a sinecure so long as the planet on which we have to live, and the atmosphere which surrounds it, are what they are, and men and women are mentally subject to the same impressions and passions, and bodily are subject to the operations of the same physical laws and telluric influences to which they are at present exposed. The vocation of the medical practitioner, instead of becoming lighter, is more likely to become graver; his preparation for it, in order adequately to discharge its functions, to become more and more laborious; his time and attention to become more severely taxed, so that, as people increase, he may be able to fight against the effects of indigence on the one hand, and of luxury on the other, and may be able to maintain a guiding hand through the intricacies of disease. And with the greater necessity for members of the medical profession, and for their higher professional cultivation, must there be all the greater need for professional associations, such as the great British Medical

Association which has brought us together to-day, so that the material interests of medical practitioners may be watched and protected, the honour of the profession maintained, the scientific pursuits of its members encouraged, information mutually imparted, and the best methods of overcoming the professional difficulties, whatever they may be, which our successors will have to face in the future as the stream of time pursues its onward course, may be duly weighed and discussed.

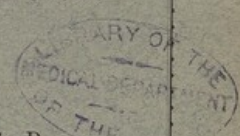
The pleasant and easy life of Salutland, with its freedom from sickness and care and from need of medical help, is a splendid vision—a dream in the dark hours of the night; the struggle for existence, and the expenditure of thought and labour for lessening its pains and penalties, are the actual realities of daylight, and, as far as we are permitted to see, will be as truly so two centuries hence as they are in this year of Her Majesty's Jubilee, 1887.

A Lecture

ON

VACCINATION AGAINST CHOLERA.

*Delivered in the Examination Hall of the Conjoint Board of the Royal
Colleges of Physicians of London and Surgeons of England,
December 18th, 1895.*



BY
W. M. HAFKINE, Sc.D

LONDON:

PRINTED AT THE OFFICE OF THE BRITISH MEDICAL ASSOCIATION,
429, STRAND, W.C.

1895.

Reprinted for the Author from the BRITISH MEDICAL JOURNAL
December 21st, 1895.



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THE PRINCIPLES OF PREVENTIVE INOCULATION.

BEFORE dealing with my work in India allow me to recapitulate here the chief circumstances connected with the problem of preventive inoculation. After experimental medicine had been inaugurated the efforts of bacteriologists remained for a long time concentrated on that classical form of infectious disease, splenic fever, in connection with which the fundamental laws of the new science have been elucidated. It was reserved to Dr. Koch to discover in the formation of spores the means by which the microbe of this disease, when outside the animal body, protected itself against the external world. Shortly after this it has been found that the spores not only preserved the life, but also all specific properties of the microbe, and that it is owing to this circumstance that the bacillus of anthrax is one of the most constant species of schizomycetes known. On the other hand, a great mutability of properties has been discovered in all microbial virus not possessing spores, or in which sporification is arrested for a certain period. On the bacillus of chicken cholera Pasteur observed for the first time the loss of virulence in a microbe of a high infectious power. Since then it has been found that the virus of every disease, although it remains constant in the nature of the affection it produces, varies without limit in virulence; that in one and the same specimen this property can be diminished or strengthened by special proceedings, and that in this we have the greatest part of the explanation of the variability of disease in individuals and communities.

This variation in virulence was familiar to all observers, and from time immemorial has been turned to advantage by the peoples of the East. It is known that the practice of inoculation against small-pox was originated from the observation that there are mild and severe epidemics of the disease, and that people affected in mild years remained immune in severe years. At the appearance of a non-fatal epidemic every one wished to get through the disease, and not only did not avoid infected people, but sought their presence and a close contact with them. A practice thus

arose in Asia to take artificially the infectious stuff from mild cases and to communicate it to healthy people. Unfortunately, very often in a resistant patient a mild semblance of disease conceals an infectious agent of unexpected virulence, and such virus, on being transferred to a less resistant subject, produces a terrible attack, not infrequently leading to a fatal epidemic in the community. In view of this dangerous character the religious laws of the Hindus, by special regulations, restrict the practice, and the Government from time to time find themselves under the necessity of instituting legal proceedings against those who apply the method. As soon as Jenner discovered an attenuated virus, and showed the method of keeping it in the desired strength by passage through the calf, the practice became immediately safe and certain, and the Eastern method has been abandoned in the whole civilised world.

In the case of small-pox, however, as in the case of rabies or syphilis, the disease is communicated from individual to individual, and the morbid virus is cultivated exclusively in the animal body, under conditions varying little in their character. The modifying influences become infinitely greater when a virus can grow in a saprophytic form and is exposed, in the interval between visiting animal bodies, to the vicissitudes of nourishment, oxidation, light, temperature, which are to be found in the external world. Even microbes, like that of anthrax or tetanus, provided with protective spores do not escape this law, and one finds in Nature their specimens presenting a very large scale of modifications; but there appears to be no limit to variability in infectious virus leading a saprophytic life and deprived of the sporulating faculty. The microbe of cholera is one of the most striking examples of this phenomenon.

VARIABILITY OF THE CHOLERA MICROBE.

When the cholera bacillus was first discovered, eleven years ago, its properties were described with great precision, which helped in concentrating for a long time all studies on well-defined and carefully-chosen specimens. Little by little, as the field of investigation grew larger, a number of varieties have been found with characteristics differing so largely as to annihilate almost completely the original description. When we open the intestines of deceased cholera patients and investigate the microbes there, the adopted methods will bring to the surface vibrios in which the external form, instead of the characteristic comma or spirillum, will vary between a coccus and a straight thread; the number and disposition of the cilia, the secretion of acids, the form of growth in broth, will vary; instead of giving in gelatine a discrete and well-defined figure of liquefaction, the variation will extend from the complete loss of this property to a rapid dissolution of the whole of the medium; there will be varieties which grow luxuriantly in given media, and others which do not grow there at all; some will be phosphorescent in the dark, and others not; some will give the indol reaction, and others will be deprived of this property, and so on. The first thing to be done is carefully to select amongst these the most typical specimens, rejecting the others, and then we try their pathogenic power. We shall find such a divergence in strength that the extreme forms will not be believed to be of the cholera species. There will be commas deprived of any

virulence demonstrable on animals, and others which kill the most resistant species. Some will be fatal to a guinea-pig at a dose of $\frac{1}{10}$ of a culture tube, and others harmless in doses 500 times stronger. The average comma dies out when introduced under the skin to an adult animal; others will spread in the system and give a fatal septicæmia. The ordinary comma will be without effect on birds; but several specimens have been isolated, and believed to be typical, which easily killed pigeons by hypodermic or intramuscular injection. I believe to be of great value the method worked out by Pfeiffer for comparing all such varieties with one selected as typical, and which he employed for the preparation of an antitoxic serum. This method will be found of efficient help in distinguishing specimens of the greatest affinity with the average cholera comma. But once such specimens are selected and their particular properties studied, they begin to change from the first day they are introduced into the laboratory, and no calculation based on these studies is possible. In a case quoted by M. Metchnikoff, the proportion of initial power of the microbe, and the strength it showed at a later trial, was of 75 to 1, the microbe having gradually sunk to $\frac{1}{4}$ of its initial virulence. If, for producing a certain infectious, or preventive, or curative effect, we had to use, in the first days, 1 c.cm. of this culture, later on a dose smaller than 75 c.cm. would be without effect, and the changes of the microbe would certainly continue still further.

THE SYSTEM FOLLOWED IN INDIA.

In all operations on men done in India we used exclusively living cholera virus, for the reason that sterilised cultures or products of cultures, as a rule, produce an effect of a far shorter duration than living microbes. The symptoms in anticholera vaccination consist in localised swelling and pain in the side, at the seat of injection, and in an attack of fever. The pain is felt only on pressure, and its amount is such as to prevent a soldier from putting on his belt for a couple of days, and a coolie worker from doing work involving bending the body or stretching otherwise the interested tissues. But the intensity of the symptoms and their duration vary in direct proportion with the virulence of the cultures and the doses administered. On the other hand, in all forms of preventive treatment the amount of protection depends on the intensity of reaction produced in the subject. A small dose of a given virus, or else the same dose of a weakened virus, will produce less reaction and afford less protection; a higher dose of the same virus, or the same dose of a stronger virus, produces more reaction and affords a higher and, probably, more lasting protection.

In the first period of my work in India I adopted $\frac{1}{2}$ of a standard culture, of a given strength, as a dose for an adult person. The reduction of this dose by a small fraction is sufficient not to produce in the subject any noticeable reaction at all. Later on, after the first series of observations was collected, I was induced to apply a treatment by increased doses of a stronger vaccine. A series of experiments and observations, for which I am especially indebted to Dr. Arthur Powell in Cachár, have been instituted with this object. It has been

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found that with the increase of the doses the amount of local pain, and especially that of general discomfort, was proportionately increasing, the fever was of a more severe type, and lasted longer, disabling the men for work for four, five, and more days. In Dr. Powell's mind there remained no room for doubt that with the increase of the doses the operation would become fatal to man. The limit of the doses adopted for the strength of the vaccines we used was between $\frac{1}{4}$ and $\frac{1}{2}$ of a culture.

From this it will be seen that it is a matter of vital importance, *a sine qua non*, in order not to exceed or fall below the intended reaction, to have a method of fixing the properties of this modifiable microbial virus, to keep it at the same degree of activity, and to know exactly the amount of power contained in a given dose.

The general method worked out for that purpose consists in finding out an animal susceptible to the given virus, and discovering the conditions in which the virus can be transplanted from animal to animal without interruption and without having recourse to artificial media. Jenner's method in its essential features remains intact, and our proceedings correspond exactly to the cultivation of vaccinia from calf to calf, or from vaccinated man to man. The particular difficulties which were connected with the diseases for which vaccines have been worked out, have been treated in the technical literature, and I believe there is no room for dealing with the matter in the present lecture. The terms virus and vaccine are still used in the same sense as they were used in regard to small-pox. The infectious substance from a subject who naturally fell ill from a disease—a small-pox patient, a rabid dog, a person affected by cholera—is a virus; the Eastern practice of inoculating small-pox virus against small-pox is variolisation. On the other hand, the substance cultivated under conditions intended to keep the morbid agent at a given and fixed state of virulence, permitting the use of it with safety and sure measurement, such as Jenner's calf lymph, or Pasteur's rabies emulsions, is a vaccine, and the application of such substances for preventive treatment is called—following the suggestion of Pasteur and in honour of Jenner who first used the term—vaccination.

The method which I worked out for the preparation of two cholera vaccines, one weakened and a second one strengthened, has been described in my previous lecture delivered in this hall three years ago.

It is the difference between vaccination and variolisation that distinguishes the method which I have applied in India from that tried in Spain by Dr. Jaime Ferran in 1885. Ferran's operations consisted in inoculating vibrios collected from cholera patients. The method employed in India consists in inoculating a vaccine worked out following the proceedings of Jenner and Pasteur.

The difference between the two operations is such that Jenner's method has survived criticism and the test of a century's daily application, and has been vastly generalised; the other method, imitating the inoculation of small-pox virus against small-pox, had to be abandoned on every occasion where attempts to apply it were made. At present there is not a single practice, in therapeutics or in preventive medicine, where the use of living virus taken directly from infectious persons, is allowed, whether on individual

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subjects, or, still less, in application to whole populations. The attempts made by Toussaint, previously to Pasteur's operations, of inoculating anthrax virus against anthrax, died out without the slightest possibility of practical application. In the treatment against anthrax by Pasteur's method, an excessive attenuation of the first anthrax vaccine, which was permitted to fall below the desired amount of virulence, caused on some occasions serious accidents. The neglect to make strict distinction between vaccine and virus was responsible for a disaster which occurred in the inoculation of sheep against anthrax in the south of Russia. The misadventure led to a prolonged suspension of all anthrax inoculations in that country, and partly in Austria-Hungary, and Italy; but one shudders to think of any similar accident occurring, instead of a flock of sheep, in a regiment of men. The attempts at inoculating cholera virus against cholera by Ferran had to be stopped by the Spanish Government, and was disapproved by all commissions sent out to investigate these operations by the Governments of Spain, Great Britain, France, Russia, Belgium, a result which was used as one of the arguments, seven years later, by the Government Committee in Russia, in refusing to admit the trial of my method of protection against cholera. On the other hand, vaccination against rabies has been going on these ten years with a marvellous precision, and has been already applied to about 15,000 people in France alone; innumerable flocks of domestic animals are vaccinated yearly in different parts of the world, against anthrax and pig-measles. And now we come to record the results of upwards of 70,000 injections of living bacteria, performed on 42,179 people, without having to record a single instance of mishap or accident of any description produced by our vaccines.

INDIAN EXPERIENCES.

My actual work in India lasted twenty-nine months, between the beginning of April, 1893, and the end of July, 1895. During this period the anticholera vaccination has been applied to 294 British officers, 3,206 British soldiers, 6,629 native soldiers, 899 civil Europeans, 125 Eurasians, and 31,056 natives of India. The inoculated people belonged to 98 localities in the North-West Provinces and Oudh, in the Punjab, in Lower Bengal and Behar, in the Brahmaputra valley and in Lower Assam. No official pressure has been brought on the population, and only those have been vaccinated who could be induced to do so by free persuasion. In every locality efforts were made to apply the operation on parts of large bodies of people living together, under identical conditions, in order to compare their resistance in outbreaks of cholera with that of not-inoculated people belonging to the same unit of population. This object has been obtained in 64 British and native regiments, in 9 gaoles, in 45 tea estates, in the fixed agricultural population of the villages parallel to Hardwar pilgrim road, in the *bustees* of Calcutta, in a certain number of boarding schools where the parents agreed to the inoculation of their children, in orphanages, etc. The vast majority of inoculated people lived thus under direct observation of the sanitary and medical authorities of India. Cholera broke out in the inoculated localities from 1 to 459 days after the operation, and careful statistics of occurrences were immediately collected by the corresponding civil and

military and medical authorities, as well as by myself. The whole number of observations made, as they were at the time when I left India, may be grouped in three categories: (I) the first, containing unsuccessful results, or such in which no conclusion was possible; (II) the second, with results slightly favourable to the method; and (III) the third with results satisfactory.

I. To the first category belong observations made on a series of tea estates in Assam. The coolie workers on these plantations live in well-defined isolated bodies, distant from the villages, and not mixed with outside population. The inoculated individuals were scattered among the non-inoculated, and shared with them food, water supply, and all other conditions of life. In all instances belonging to this category the people had undergone only one part of the preventive treatment—namely, were inoculated with first attenuated anti-cholera vaccine given in maximal doses; the second inoculation, with the final vaccine, was applied after the cholera season had ceased. The disease occurred from one to six months after the first inoculation with the following results.

ADAM TILA.
657 non-vaccinated had no cases.
318 vaccinated had 2 cases (0.63 per cent.) with 1 death (0.31 per cent.).
KALACHERRA.
520 non-vaccinated had 4 cases (0.77 per cent.) with 3 deaths (0.58 per cent.)
211 vaccinated had 1 case (0.47 per cent.) with 1 death (0.47 per cent.)
CHABGOLA.
1,007 non-vaccinated had 3 cases (0.30 per cent.) with 1 death (0.10 per cent.).
291 vaccinated had no cases.
PALLASBUND.
1,170 non-vaccinated had 2 cases (0.17 per cent.) with 2 deaths (0.17 per cent.).
481 vaccinated had no cases.
LUNOLA.
2,050 non-vaccinated had 3 cases (0.15 per cent.) with 3 deaths (0.15 per cent.).
421 inoculated had no cases.
BURNIE-BRAES, LOORACHERRA, KALACHERRA, AND SANDHURA.
Number of non-vaccinated not stated; had 11 cases with 5 deaths
677 vaccinated had no cases.

II. To the second category, with results slightly favourable, belong (a) two observations made on people inoculated with maximal doses of the first vaccine only, cholera occurring a short time after the inoculation, and (b) two observations on people inoculated with weak doses of both vaccines, cholera occurring thirteen to fifteen months after vaccination had been applied.

(a) The 2nd Battalion Manchester Regiment at Dinapore 2 to 6 days after injection of first vaccine only:
729 non-inoculated had 6 cases (0.82 per cent.) with 3 deaths (0.41 per cent.).
103 inoculated, no cases.
Degubber Tea Estate, 3 months after inoculation of first vaccine only:
228 non-inoculated had 2 cases (0.88 per cent.) with 1 death (0.44 per cent.).
387 inoculated, no cases.
(b) The British troops in Cawnpore, 13 months after inoculation with small doses of both vaccines:
797 non-inoculated had 19 cases (2.38 per cent.) with 13 deaths (1.63 per cent.).
75 inoculated, no cases.
The East Lancashire Regiment in Lucknow, 14 to 15 months after inoculation with small doses of both vaccines:
640 non-vaccinated had 120 cases (18.75 p. ct.) with 79 deaths (12.37 p. ct.)
133 vaccinated had 18 cases (13.53 p. ct.) with 15 deaths (9.77 p. ct.)

III. To the third category, with results satisfactory, belong (a) observations on maximal doses of first (mild) vaccine made

on the Karkurie and Kalain Tea Estates, one to three months after inoculation; (b) observations on small doses of both vaccines, made on the prisoners of the Gaya Gaol inoculated during an epidemic; (c) observations on middle doses of one and of both vaccines in the *bustees* in Calcutta, collected during a period of 459 days, and finally, (d) the observation made quite lately on the Kassia Hill coolies, from the survey party of the Assam-Burmah Railway.

(a) Karkurie Tea Estate, 2 to 3 months after inoculation with strong doses of first vaccine only:
263 non-inoculated had 5 cases (2.66 per cent.) with 2 deaths (0.76 per cent.).
709 inoculated had 1 doubtful case (0.34 per cent.) with 1 death (0.24 per cent.).

Kalain Tea Estate, 1 to 3 months after inoculation with strong doses of first vaccine only:
1,375 non-inoculated had 23 cases (1.67 per cent.) with 11 deaths (0.8 per cent.).
641 inoculated had 2 cases (0.29 per cent.) with 1 death (0.15 per cent.).

(b) In the Gaya Gaol the inoculations were for the first time applied in a prevalent epidemic, and very weak doses of relatively weak vaccines have been used. The gaol contained over 400 inmates. After 6 cases with 5 deaths had occurred, a half of the prisoners, including aged and young people, women, children, patients from the hospital, and people affected with premonitory diarrhoea, was inoculated; the other half, of an exactly similar composition, was left uninoculated. The result was a gradual disappearance of cases and deaths among the inoculated, the difference in susceptibility having gradually increased during the period of 10 days necessary for the two vaccines to produce their full effect.

During the first period of 5 days necessary for the 1st inoculation:
210 non-vaccinated had 7 cases (3.33 per cent.) with 3 deaths (1.43 per cent.)
212 vaccinated had 5 cases (2.36 per cent.) with 4 deaths (1.89 per cent.)
During the second period of 5 days necessary for the 2nd inoculation:
197 non-vaccinated had 9 cases (4.57 per cent.) with 7 deaths (3.55 per cent.)
296 vaccinated had 3 cases (1.01 per cent.) with 1 death (0.34 per cent.)
During the last 4 days of the epidemic:
192 non-vaccinated had 3 cases (1.56 per cent.) with 1 death (0.52 per cent.).
201 vaccinated had no cases.

The total results are as follows:
The non-vaccinated half had (3.90 p. ct.) of cases with (4.95 p. ct.) of deaths.
The vaccinated half had (2.86 p. ct.) of cases with (2.41 p. ct.) of deaths.

The treated prisoners showed a reduction of 2.56 times of cases, and of 2.05 times of deaths. I wish to call your attention to the fact that the inoculations had been applied in this instance not before the epidemic, but a week after it had actually broken out, in order to arrest it, and to cure, so to say, the community from the disease. The reduction of deaths by one half will therefore justify the application of the method in all similar conditions, there being up to now no other method known in medicine by which such an effect could be obtained. We shall see directly an instance of the same kind when far higher results have been obtained by an application of stronger doses.

(c) In the *bustees* situated round the tanks in Calcutta, where cholera exists in a permanent state, the disease occurred in 36 houses with inoculated people. In each of these houses there was one part of the family inoculated and another not. The observations were continued for 459 days, with the following results:

During the first period of 5 days subsequent to the inoculation with first vaccine cholera occurred in 8 houses:
 75 non-inoculated had 5 cases (6.66 per cent.), with 3 deaths (4 per cent.).
 82 inoculated had 3 cases (3.77 per cent.), with 3 deaths (3.77 per cent.).
 During the second period of 5 days subsequent to the second inoculation cholera occurred in 2 houses:
 8 non-inoculated had 2 cases (25 per cent.), with 2 deaths (25 per cent.).
 17 inoculated, no cases.
 After the 10 days necessary for the preventive treatment had expired, and up to the 45th day, the disease visited 26 houses, with the following results:
 263 non-inoculated had 35 cases (14.45 per cent.), with 34 deaths (12.93 per cent.).
 157 inoculated had 1 case (0.75 per cent.), with 1 death (0.75 per cent.), in a child that had not been brought up for the second inoculation.

Thus, after the expiration of the first 10 days, the inoculated members of the affected houses had 17.24 times fewer deaths and 19.37 times fewer cases than the non-inoculated inhabitants of the same houses, and this proportion was maintained up to the 45th day after vaccination.

(d) The last observation comes from the Brahmaputra valley, where Surgeon-Captain Hare, of the Indian Medical Service, my co-worker during the last eight months of my stay in India, is continuing now the work of inoculation for the Assam Government. Dr. Hare's full account of this observation has not yet reached me, but from a communication of the Health Officer of Calcutta, and from the Indian papers, it appears that 350 Khaasia Hill coolies had been collected for the survey party of the Assam-Burmah Railway and put under the escort of a detachment of Goorkhas, when cholera broke out amongst them. The largest part of the coolies immediately submitted to the preventive inoculation, the rest remained uninoculated. The result was that among the not inoculated minority there were 34 cases, with 30 deaths; whereas the inoculated had 4 fatal cases. In this instance, also, the inoculation appears to be applied not as a preventive but as a curative for an existing epidemic, and the result, if the information is complete, has been the reduction of the mortality of more than seven times.

SUMMARY.

The following seems to be a summary of the results observed up to now:

1. In all those instances where cholera has made a large number of victims, that is to say, where it had spread sufficiently to make it probable that the whole population, inoculated and uninoculated, were equally exposed to the infection, in all those places the results appeared invariably favourable to inoculation.

2. The treatment applied after an epidemic actually breaks out tends to reduce the mortality even during the time which is claimed for producing the full effect of the operation. In the Gaya Gaol, where weak doses of a relatively weak vaccine had been applied, this reduction was to half of the number of deaths; in the coolies of the Assam-Burmah survey party, where, as far as I can gather from my preliminary information, strong doses have been applied, the number of deaths was reduced to one-seventh. This fact would justify the application of the method independently of the question as to the exact length of time during which the effect of this vaccination lasts.

3. In Lucknow, where the experiment was made on small doses of weak vaccines, a difference in cases and deaths was

still noticeable in favour of the inoculated fourteen to fifteen months after vaccination, in an epidemic of exceptional virulence. This makes it probable that a protective effect could be obtained even for long periods of time if stronger doses of a stronger vaccine are used.

4. The best results seem to be obtained from application of middle doses of both anticholera vaccines, the second one being kept at the highest degree of virulence obtainable.

5. The most prolonged observations on the effect of such middle doses were made in Calcutta, where the mortality from the 11th up to the 45th day after vaccination was, among the inoculated, 17.24 times smaller, and the number of cases 19.27 times smaller than among the not inoculated.

RESULTS OF ANTICHOLOERA INOCULATION.

The evidence accumulated up to now is decidedly in favour of the anticholera vaccination, and my own conviction in the matter is more and more strengthened. The special responsibility, however, which lies on me in this subject forces me to point out that the number of observations is not yet very large, and that it is most desirable that the results obtained should be further confirmed by new and more ample information. At the same time, you will find it, I hope, pardonable on my part if, before finishing the review of the results, I cite the opinion expressed on the subject by the scientist who himself accomplished the first and the most difficult part of the cholera problem, and whose discovery was the starting point of the whole of the modern researches on cholera.

When recapitulating with Professor Koch the data of my report to the Government of India, I said that, in my idea, the results tend to prove the efficacy of the method, but that I feel necessary to do all in my power in order to confirm them by new observations, I was most happy to learn that, for Professor Koch, the demonstration was already complete; that he believes the protective power of the method to be established finally by the observations collected in India up to now; that further perfections and simplifications may be possible, but that the main question at issue, the chief part of the problem, is solved by the facts recorded in the above report. Professor Koch gave his kind permission to quote these decisive conclusions in this Hall and to use the very terms I used, and he added that, in his conviction, the chief struggle against cholera must certainly take place on the banks of the Ganges, in the home of the disease; that this struggle is to be effected by preventive inoculation, and that he sees in the application of this method the way in which, by gradually restricting the area of the extension of the disease, it shall be brought to such a limit when it will become possible to control its prevalence by simple measures of a sanitary police.

PROGRAMME FOR NEXT OPERATIONS.

Allow me now to consider the question whether the new facts brought to light during my absence in India ought to be incorporated into my method of anticholera vaccination. The treatment by antitoxic serum, which by now may be considered as having proved a decided success in diphtheria, could not, unfortunately, be substituted for a preventive vaccination, its effect being rapidly worn out by the system. According to the observations made up to now, neither the

antidiphtheritic nor an anticholera serum could be used for protecting a population against an epidemic lasting more than a few days, not to speak of an endemic prevalence of the disease. The question stands otherwise as regards the possibility of treatment in individuals actually affected with cholera. Although in this particular disease we have against us the great rapidity with which the symptoms take hold of the system, the antitoxic serum has accomplished in other instances such excellent results that there is every possibility of its being beneficial in the case of cholera also. I intend, therefore, on my return to India, to give, in connection with the physicians of the country and with the help of Professor Pfeiffer from Berlin—who most kindly put at my disposal all his experience in the matter, as well as a supply of a very active antitoxic serum—an extensive trial to this method.

In case a simple application of the antitoxin serum proves to be insufficient to stop the rapid course of the symptoms, I intend to combine it with intravenous saline injections and to prolong in this way the period left for treatment. And if in this case also the attempt should fail, I shall try to utilise the new therapeutic for accelerating the effect of my vaccines in a manner which I will characterise in a few words. We have seen up to now that in the places where anticholera vaccination has been applied in a prevalent epidemic, the total number of deaths was reduced from two to seven times in comparison with the deaths in the non-inoculated, but the effect of the treatment was *nil* in the first four or five days after the first inoculation. There is the possibility that, by injecting a mixture of my vaccines with a powerful antitoxic serum, the mortality may be reduced also in the first days after the treatment, the serum arresting the disease for the time necessary for the vaccines to produce their full effect. The admixture of antitoxic serum with the vaccines may mitigate the vaccinal reaction, as has been suggested to me by Professor Wright from Netley, and this reduction of reaction may possibly reduce the amount of active protection conferred by the vaccines. A series of bacteriological laboratory in order to investigate this important question.

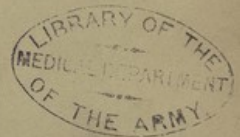
Mr. Chairman and Gentlemen,—On the day when I came back from my expedition to India, I found my former chief, M. Pasteur, lying on his bed of death. Whatever might have been his appreciation of the work done in India, there can be only one desire on my part, that all the honour for the results which may possibly come out of my efforts, should be referred to him, to his sacred memory.

To the Government of India, the gentlemen of the Indian and Army Medical Staff in India, to Professor Hankin in Agra, Dr. Powell, and especially to Dr. Simpson, the eminent health officer of Calcutta, I address my hearty expressions of gratitude for the assistance they have given me in carrying out my work. I beg these gentlemen, if my present words are destined to reach them, to accept this public acknowledgment that without their most efficient help I would have never been able, with all my individual powers, to accomplish in India the smallest part of the work which has been done.

I also beg the Chairman and the organisers of the present meeting to accept my best thanks for having given me this opportunity of making the present communication.

Received
24th Oct
1884.

Reprinted from *The Indian Medical Gazette*, No. 9 (Sept. 1894).



CHOLERA AND PREVENTIVE INOCULATION IN GAYA JAIL.

BY
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Superintendent and Civil Surgeon of Gaya District.



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BY SURGEON-MAJOR R. MACRAE, M.B., I.M.S.,
Superintendent and Civil Surgeon of Gaya District.

AWAITING, as all are with great anxiety, the issue of the momentous question whether preventive inoculation is to prevail against cholera or not, it seems to me opportune to publish the results obtained during a recent epidemic in Gaya Jail, under circumstances which have hitherto not been paralleled. I trust therefore that the following account of M. Haffkine's anti-cholera inoculations will prove of interest to your readers.

Cholera has been excessively prevalent in the Behar districts since the commencement of the rainy season, as well as in the N.-W. Provinces. In the Gaya district it has spread with great violence, and caused a mortality in the month

of July which has not been equalled in any month for the past ten years. The disease was reintroduced into the district by pilgrims and others returning from the Kumb Mela at Allahabad in the month of February, and spread to some extent; but it was not till the rains set in—as is its usual course in Behar—that it assumed severe epidemic dimensions. A very marked contrast in this respect of prevalence appears between this and the previous year, when only 748 deaths were recorded during the year for the whole district; while in the month of July alone 6,005 deaths from this disease were registered.

Cholera broke out in the Gaya Jail on the 9th July, and from that date to the 2nd August 34 cases occurred, with 20 deaths, there being on date of first attack 422 prisoners in jail. The disease was clearly traceable to importation, but its diffusion among the prisoners was a question of much greater difficulty. The sanitary condition of the jail is excellent; it was built quite recently on the latest plans, and is generally considered a model jail. The water-supply, which is from a well, is of excellent quality and protected from pollution, and it is believed that the spread of the disease was largely due to the agency of flies finding access to food and milk after being in contact with cholera poison, and contaminating them. From the 9th to the 17th July, 6 cases occurred with 5 deaths.

Many of the prisoners on being told about preventive inoculation wished to be inoculated, and M. Haffkine, who had previously been communicated with, and whose zeal and enthusiasm in the cause that he so well advocates are beyond

praise, arrived here on the 18th July, and in the presence of Surgeon-Colonel Harvey, who kindly assisted, and myself, inoculated 147 prisoners, and on the 19th 68, making a total of 215 out of 433 present in the jail on that date.

Being purely voluntary, no selection of prisoners was possible; but all cases in the jail were represented, male and female, old and young, habituels and less frequent offenders, strong and weakly, convalescent and even hospital patients sent their representatives. No difference of any kind was made between inoculated and non-inoculated prisoners; they were under absolutely identical conditions as regards food, water, accommodation, &c., in short, in every possible respect.

The method adopted by M. Haffkine he has already described in your pages and need not be further referred to here.

No test of anti-cholera inoculation, approaching in importance the one I am about to describe, has hitherto been undertaken. Thousands of the general public have been inoculated in various parts of India, and results of the greatest promise have been obtained notably in Calcutta; but in all these instances it cannot be said that the people inoculated remained under similar conditions with those not inoculated, and who were subsequently attacked by the disease. It cannot be said that they were equally exposed to the possibility of infection.

In this instance, however, within the four walls of a jail there is no loophole for doubt, the conditions of inoculated and not inoculated were absolutely identical, and there is further the great advantage that it was possible to check the results obtained with absolute accuracy. It

must not be forgotten, however, in judging the results that the inoculations were placed at a disadvantage in so far as the epidemic continued to progress during the period which is required before their full effect can be anticipated.

I have stated that up to the 17th six cases and five deaths occurred.

As, owing to the progress of the epidemic, a large number of prisoners were removed from the jail into camp, it will be found convenient to consider the effect produced by the anti-cholera inoculation under three headings:—

(a) *The first* will include the period from the 18th July, the date of first inoculations, to the 24th July, the date on which final reinoculations were made, and refers to all the prisoners.

(b) *The second* concerns the prisoners who remained in jail after the majority were removed into camp, and comprises the period from the 25th July to the 2nd August, on which date the final case occurred among this body of prisoners.

(c) *The third* refers to the body of prisoners who were moved into camp on the 25th July and includes the period between that date and the 1st August, when the final case occurred among this body.

The subjoined Table No. I gives from day to day details of the occurrences during the first period.

There being nothing to record on the 18th and 19th, the dates of first inoculations, they are excluded from the Table, which commences with the occurrences of the 20th. The daily totals, shewn day by day, are those actually present after deducting cases attacked and re-

leases, and adding admissions if any. A footnote shews dates on which fatalities occurred.

TABLE No. I.

Date.	No. of inoculated prisoners present.	No. of uninoculated prisoners present.
	215	213
20th July 1894... Cases	...	2 Cases
Fatal	...	2 Fatal
	213	210
21st July 1894... Nil.	...	Cases
	211	Fatal
22nd July 1894... Cases	...	2 Cases
Fatal	...	2 Fatal
	209	206
23rd July 1894... Inoculated	164	Nil.
Reinoculated	45	
Cases	1	
(in prisoner inoculated once.)		
	208	206
24th July 1894... Inoculated	20	
Reinoculated	188	
	Nil.	Nil.

* Fatalities occurred on 20th and 25th: * Fatalities occurred on 25th and 22nd; 23rd and 24th July 1894. 22nd, 23rd and 24th July 1894.

The next two Tables are of a still more interesting character, affording, as they do, an opportunity of contrasting two independent groups of observations occurring during the same period of time. It may be here stated that on the 23rd 45 prisoners and on the 24th 143 were reinoculated with the second vaccine, which completes the treatment as practised by M. Haffkine. On the morning of the 25th 325 prisoners were moved into camp, while 84 remained in jail.

The following Table No. II gives the number of inoculated, reinoculated, and non-inoculated

* These dates refer to those on which the patients died.

prisoners and the occurrences in the jail from
25th July to 2nd August :—

TABLE No. II.

Date.	No. of inoculated prisoners present.	No. of uninoculated prisoners present.
	34	50
25th July 1894...	Inoculated ... 3	
	Reinoculated ... 31	
	Cases ... 1 Cases	... 1
	(in prisoner reinoculated.)	
	33	48
26th July 1894...	Inoculated ... 3 Cases	... 1
	Reinoculated ... 30 Fatal	... 1
	<i>NH.</i>	
	33	48
27th July 1894...	Inoculated ... 3	
	Reinoculated ... 30	<i>NH.</i>
	<i>NH.</i>	
	33	49
28th July 1894...	Inoculated ... 3 Cases	... 3
	Reinoculated ... 30 Fatal	... 1
	<i>NH.</i>	
	32	45
29th July 1894...	Inoculated ... 2	
	Reinoculated ... 30	<i>NH.</i>
	<i>NH.</i>	
	32	46
30th July 1894...	Inoculated ... 2 Cases	... 1
	Reinoculated ... 30 Fatal	... 1
	<i>NH.</i>	
	32	49
31st July 1894...	Inoculated ... 2	
	Reinoculated ... 30	<i>NH.</i>
	<i>NH.</i>	
	32	49
1st August 1894	Inoculated ... 2	
	Reinoculated ... 30	<i>NH.</i>
	<i>NH.</i>	
	32	53
2nd August 1894	Inoculated ... 2	
	Reinoculated ... 30 Cases	... 1
	<i>NH.</i>	

* Fatalities occurred
on 27th, 28th, and
30th July 1894.

The third Table gives the number of in-
oculated, reinoculated and non-inoculated pri-

* These dates refer to those on which the patients died.

soners removed into camp on the 25th July, and
the daily occurrences till the 1st August. It
will be noted that the average present in column
'Inoculated' in this and the preceding Tables
includes both inoculated and reinoculated.

TABLE No. III.

Date.	No. of inoculated prisoners present.	No. of uninoculated prisoners present.
	174	151
25th July 1894...	Inoculated ... 17	
	Reinoculated ... 157	<i>NH.</i>
	<i>NH.</i>	
	174	151
26th July 1894...	Inoculated ... 17 Cases	... 2
	Reinoculated ... 157 Fatal	... 3
	<i>NH.</i>	
	174	147
27th July 1894...	Inoculated ... 17	
	Reinoculated ... 157	
	Cases ... 2	<i>NH.</i>
	Fatal ... 1	
	(in prisoner reinoculated.)	
	171	150
28th July 1894...	Inoculated ... 17	
	Reinoculated ... 154 Cases	... 1
	<i>NH.</i>	
	170	144
29th July 1894...	Inoculated ... 17	
	Reinoculated ... 153	<i>NH.</i>
	<i>NH.</i>	
	170	147
30th July 1894...	Inoculated ... 17	
	Reinoculated ... 153	<i>NH.</i>
	<i>NH.</i>	
	170	141
31st July 1894...	Inoculated ... 17	
	Reinoculated ... 153 Cases	... 1
	<i>NH.</i>	
	168	141
1st Aug. 1894...	Inoculated ... 17	
	Reinoculated ... 151 Cases	... 1
	<i>NH.</i>	

* Fatality occurred on 27th July 1894.

* Fatalities occurred
on 28th July 1894.
Ditto.

* These dates refer to those on which the patients died.

Summaries of the three preceding Tables are subjoined in juxtaposition for convenience of reference.

TABLE No. IV.
(Summary of Nos. I, II and III.)

	Average present.	Cholera.	Percentage of average strength.	Deaths.	Percentage of average strength.	Percentage of deaths to cases.
No. I.						
Inoculated ...	211.2	5	2.37	4	1.89	80
Not inoculated ...	209	7	3.34	5	2.39	71.42
No. II.						
Inoculated ...	32.5	1	3.07	Nil.	Nil.	Nil.
Not inoculated ...	48.55	7	14.42	3	6.18	42.86
No. III.						
Inoculated ...	171.42	2	1.16	1	0.58	50
Not inoculated ...	146.5	6	4.09	2	1.36	33.33

The summary of Table No. I shews that out of an average of 211.2 inoculated prisoners present during the first 5 days of observations five cases were attacked with a percentage of 2.37, while out of an average of 209 non-inoculated prisoners seven cases were attacked with a percentage of 3.34, the mortality being in both groups, inoculated 4 deaths, per cent. to population 1.89; non-inoculated 5 deaths, per cent. to population being 2.39.

The results as shewn above are such as might have been anticipated. It has been stated by M. Haffkine that these inoculations would not become effective immediately; the results shewn in the Tables are in accordance with this belief. Moreover, it is in accordance with what has been proved of all other vaccines, none of which are immediately effective. For example, for vac-

cination against small-pox a period of 8 days from date of operation must elapse to render it effective. Similarly, anthrax and rabies require periods of 12 and 15 days after the operation is completed.

One of the chief points disclosed by the figures of Table No. I is that both classes of prisoners, inoculated and non-inoculated, appear to have been equally exposed to infection, which makes the results shewn in Tables II and III still more significant. So far as any difference appears in the results of Table No. I, it is in favour of the inoculations both as respects liability and mortality.

The summaries of Tables Nos. II and III after reinoculations were made shew a very marked difference as regards liability. While among an average inoculated of 32.5 prisoners in jail, 1 case occurred which did not prove fatal, a percentage of 3.07; among an average non-inoculated of 48.55, 7 cases occurred with 3 deaths, a percentage of 14.42; that is to say, nearly five times as many were attacked. The same result is disclosed in the summary of Table No. III. In an average inoculated of 171.42 prisoners there were 2 cases and 1 death; while in an average of uninoculated of 146.5 prisoners there were 6 cases and 2 deaths; in other words, 1.16 % against 4.09 were attacked.

The conclusions to be drawn from the results above recorded appear to me to be that for the first few days the inoculations have scarcely any protective influence; then their effect seems to gradually increase. M. Haffkine in his publications has laid stress on the fact that he anticipates a period of 10 days would elapse from date of first inoculations before the full effect would be obtained.

The above Tables, shewing as they do a gradually decreasing incidence of attacks and mortality among inoculated prisoners, seem to justify his anticipation. The following Table No. V brings this out very clearly:—

TABLE No. V.

	During the first 5 days after 1st inoculation.		First 3 days after 2nd inoculation.		Last 6 days.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Inoculated	5	4	3	1	<i>nil.</i>	<i>nil.</i>
Not inoculated	7	5	5	3	8	2

Further observations are necessary to prove whether the inoculations as now practised will prove of lasting benefit; the results obtained in Gaya Jail seem to me to justify the conclusion that their temporary beneficial effect is undoubted.

In face of such a disease as cholera, the possession of a remedy which, as appears to have been the result here, greatly lessens the liability is simply invaluable; and if the results are confirmed by observations elsewhere, there is reason to hope that we are at last within measurable distance of being in a position to deal with this terrible disease on more equal terms than has hitherto been the case, and possibly putting an end to epidemics.

No doubt certain modifications in procedure can be introduced which will be attended with even better results.

I have been informed by M. Haffkine that he proposes to introduce a certain modification of his method, with the object of affording protection to patients during the ten days necessary for the action of his vaccines. I think there is every reason to believe that better results

would have been obtained here had the inoculations been performed at an earlier period instead of during the epidemic.

It has been anticipated by scientific authorities that the result of the inoculations practised by M. Haffkine would serve to settle, once for all, the much-disputed question as to whether comma bacilli are, or are not, the *causa causans* of cholera.

The duration of the epidemic here did not allow sufficient time to settle the question as to whether the effect of these inoculations is lasting or temporary. If other observations prove them to have a lasting effect in reducing both liability and mortality, the conclusion would seem to be obvious that comma bacilli—from which these vaccines have been prepared—are the real and unique cause of the disease; but if the effect is found to be only temporary the question will remain in its present unsettled condition.

Drs. Klein, Sobernheim, Pfeiffer, and others have shewn that a temporary immunity can be produced against certain forms of toxic poisoning produced by comma bacilli and other microbes, by means of inoculations with microbes which can have no connection with cholera.

It is thus possible that a temporary immunity can be conferred by inoculations from vaccines of comma bacilli even if the latter are not the direct cause of the disease.

In connection with this question of comma bacilli, and as I have not seen the point referred to hitherto, a word may be added as regards the treatment of cholera. It has been and is probably still the belief of the majority of medical men that opium, in some form, in the first or premonitory stage of cholera is simply invaluable,—is in fact our mainstay. It has, however, been

asserted by Dr. Koch that the effect of opium by keeping the digestive tract in a state of quiescence brings about a condition which he believes to be extremely favourable to the development of comma bacilli. It is also found by experiment on guinea-pigs that comma bacilli undoubtedly generate a virus which is quickly fatal when injected into the peritoneal cavity, but to which the animals remain immune when injected into the intestinal canal *unless they are first brought under the influence of opium*. These facts appear to me significant and suggest a doubt as to whether opium, as used in cholera, should not be put under the ban which has relegated to obscurity all the so-called specifics which have been tried in cholera and unhappily failed.

(Reprinted for the Author from the BRITISH MEDICAL JOURNAL April 27, 1889.)



THE MEDICAL PROFESSION IN THE ARMY, AND LORD WOLSELEY'S "SOLDIER'S POCKET-BOOK."

No one who has any intimate acquaintance with matters which concern the army at the present time can fail to notice the prevailing depreciation in military estimation of medical officers and their special functions. The contrast between the prestige which formerly belonged to the medical profession in the army and the position occupied by it to-day is so noticeable that, obviously, if the state of things should continue unchanged, it must react unfavourably on the profession at large. The subject therefore assumes a character of general importance, and this consideration seems to make it worth inquiring how far the change which has taken place may be due to causes originating in the medical service itself and its officers, and how far, if such causes really exist, they may admit of remedy. The prevailing tone of detraction is all the more remarkable inasmuch as, notwithstanding that we hear persons holding high positions in the State declaring the remuneration of the medical officers is extravagant, and that the medical establishment is excessive and should be largely reduced in its numbers, there is no accusation brought against the medical officers as a body of professional incapacity, or of deterioration in those high qualities of courage and devotion in the field which have at all times formed one of the characteristics of the soldier-surgeons of the British military service. The question arises whether the army surgeons have fallen back in some other respects, and so have lost ground in the estimation of their comrades of the combatant ranks, and of others associated with them.

Nowhere, perhaps, do we find stronger illustrations of the small worth attributed to the army medical officers and their sanitary functions, than in the well-known book by General Viscount Wolseley, entitled the *Soldier's Pocket-Book for Field Service*, which is in almost every combatant officer's possession. Lord Wolseley is the Adjutant-General of the Army, and practically, though always acting in the name of the Commander-in-Chief, is in most matters regarded as the ruler and director of its concerns. His opinions consequently carry the greatest weight, and must influence those of every officer and soldier in the army. It cannot be supposed that he can have any other desire than that all the parts of the great military machine under his control should move together smoothly and harmoniously, and it might be presumed that he would certainly not entertain any prejudicial views in disparagement of the medical part, as one of his own brothers was

¹ The *Soldier's Pocket-Book for Field Service*, by General Viscount Wolseley K.P., G.C.B., G.C.M.G., Adjutant-General to the Forces. Fifth Edition, Revised and Enlarged. London: Macmillan and Co. 1889.

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serving in it until recently, when a lamentable accident unhappily caused his decease. We can only regard, therefore, the expressions used by Lord Wolsley, in the work above mentioned, as the result of careful thought and matured conviction.

On turning to the portion of the book which particularly relates to the medical service of the army, we are at once made aware of the antagonism between the opinions of the author and the conclusions arrived at by the Royal Commissioners who were appointed to inquire into the sanitary affairs of the army subsequently to the sad events which so greatly distressed the nation at the time of the Crimean war. As is well known to all who have taken an interest in the proceedings of that time, one of the outcomes of the prolonged inquiries which followed the war was a very strong conviction of the need for special study of sanitary science by military medical officers, in addition to the knowledge of medicine and surgery possessed by them in common with all medical practitioners. An accurate acquaintance with hygiene in its general sense, and with its practical applications in all the varying conditions under which an army might have to act, was therefore insisted upon as one of the qualifications of all military surgeons, and adequate means for imparting the necessary information to them on these topics were provided. Among other administrative changes resulting from the recommendations of the Royal Commissioners already alluded to was the appointment of a sanitary officer to be attached to the staff of the quarter-master-general of an army in the field, who was to be prepared for giving advice on any sanitary question that might arise. This arrangement has since been carried out in most of the wars in which a British force has been engaged since that date. Lord Wolsley regards this innovation as an act of folly, a "fad," and recommends, rather contemptuously, that any such sanitary functionary, if hereafter appointed, should be left in the rear. "In future, as long as this fad continues," he writes, "my recommendation is to leave him at the base,² where he may find some useful occupation as a member of the Sanitary Board" (p. 110). But this suggestion is not given without also giving reasons for

² The survivors of the war with China in 1840-41, ending with Sir Henry Pottinger's treaty of Nankin, are now few. It seems from this passage that Lord Wolsley is very imperfectly, if at all, acquainted with the history of the first occupation of Chusan, one of the most lamentable episodes in our military annals. Here was an example of the noble lord's ideal. The "fad" of military sanitation and a sanitary officer at headquarters had then no existence. The officer in command had a free hand, and did as he thought fit in all things. The senior medical officer, Superintending-Surgeon Dr. King, of the Bengal Army, was not armed with the right to tender advice on questions affecting the health of the troops. Nevertheless, seeing the result—that every principle of common sense in its application to health was set at defiance, with the inevitable result, a shocking amount of sickness, horrible suffering and mortality, culminating in pretty nearly wiping the 26th Regiment (Cameronians) off the face of the earth—he did offer advice. It may be news to Lord Wolsley, but the fact is painfully remembered by the few survivors, that Dr. King's advice was rejected, according to the fashion then in vogue, with insolent contempt. Dr. King was not technically "sent to the base" (Chusan was the base), but, unwilling to subject himself a second time to have his "fads" contemptuously rejected, he took advantage of falling health and retired from a scene of misery he was not permitted to alleviate. If a fearless *Tues* correspondent had been on the island of Chusan in the year 1840, and had given to the public of England the details of that horrible summer, it is probable that at least some of the Chusan shameful scenes would not have been repeated on a greater scale in the Crimea. Viscount Wolsley, it would appear, desires to return to the mode of carrying on military operations in vogue in 1840. Will nothing short of another Chusan episode satisfy the gallant officer that military sanitation is something more than a "fad"? Does his lordship desire the power to say to a sanitary officer, as Sir Archibald Campbell did in the first war in Burmah: "Medical advice is a good thing, when it is asked for?"

3

it. "In the numerous campaigns," Lord Wolsley adds, "where I have served with a sanitary officer, I can conscientiously state I have never known him make any useful suggestion, whereas I have known him make many silly ones." On reading this remark, one is prompted to ask how the sanitary officers referred to by Lord Wolsley have been selected. Accepting this statement, we say that great blame rests with the authorities that made the selection of his lordship's sanitary officers. If his description be true, it is clear that the mischievous principle that "One man is as good as another" must have governed the selection. It is certain that in the list of officers in the Medical Staff there is no lack of capable men well versed in military sanitation whose advice it would not be safe even for Lord Wolsley to reject with contempt.

But it is not only the hygienic functions of the army medical officers that are discounted in Lord Wolsley's book; the medical department itself is regarded with any but a favourable eye by the noble author. The medical staff with the army is said to be too large, and the medical officers have advantages beyond what their duties entitle them to. One of the indications of the rank and position of military officers has hitherto been the number of horses allotted to them in the service. It seems to be an arrangement hardly consistent with common sense, but so it always has been, though it is difficult to find a satisfactory reason for it.

On turning to the Forage Regulations of the Army issued in 1887, we find, for example, an officer commanding, if he be a full General, is entitled to forage for eight horses, if a Lieutenant-General to forage for six, if a Major-General for five, if a Brigadier-General to four. With regard to the Medical Department, Lord Wolsley observes (p. 109): "The medical staff laid down in regulations for an army corps is too large" (it comprises six officers), and adds, "Thirteen chargers are allotted by regulation to this staff, four of which are alone intended for the principal medical officer. The principal medical officer might have two chargers, and all the other medical officers one each; this would be ample for the work they have to do." Elsewhere in a table (p. 131) showing the detail of the staff of an army corps and officers attached, the six officers of the Medical Department nominated for the corps are thus referred to: "The number of officers and chargers here allotted to the Medical Department is absurd, and should not exceed three officers and four chargers; indeed, three chargers would be ample." Whether the reduction in the medical staff here recommended is practicable without entailing overwork, and perhaps inefficiency, must depend upon the extent to which the noble author is really acquainted with all the details of the medical duties to be done, and the amount of official correspondence which devolves on the medical officers concerned. We are not aware of any particular difficulties that would result from the reduction proposed in the number of horses; but as no less than forty horses are allotted to the eleven staff-officers who head the list, it certainly seems open to question whether, on like grounds, the number of chargers might not also be curtailed in their instance. But the recommendation which is made at page 114 to deprive the medical officers doing duty in the hospitals on the lines of communication of all their horses seems certainly to be open to strong objection. The establishment of one of these hospitals includes ten officers, namely, one Brigade-Surgeon, four Surgeons-Major, four Surgeons, and one Quartermaster, and Viscount Wolsley remarks: "The officers have fifteen chargers! none are necessary, so some money allowance should be given in

lieu." If the medical officers put on duty in one of these hospitals were discharging their professional functions on the same terms and under the same conditions as the medical staff of a civil fixed hospital in a town, the allowance of a horse for each surgeon might be superfluous, but, on active service in the field, when medical officers are constantly liable to be moved from place to place, marching with troops, on sick convoy duties, to fill gaps left by casualties in the field establishments or elsewhere, the service of the army might be gravely inconvenienced if the medical officers had to proceed on foot. A medical officer's duties in the field are often continued when other officers have few, if any, demands upon them, and are free to take their rest; and unless he is spared to some extent from bodily fatigue during the movements of the day, he can hardly be expected to be in a fit condition for his work at night. It is known that sickness and mortality are usually greater among medical than among other classes of army officers, and it can readily be understood why this is the case, seeing that they are not only exposed to the ordinary risks and accidents of field service, but are also subject to the special risks to which their calling among the sick in the hospitals exposes them. This being so, all the more should their strength be economised, and none the less because, unlike what occurs in most other branches of the army, medical officers when they break down in health in the course of a campaign are not readily replaced. An officer belonging to any other department, in a case of urgent need, can act as a combatant; but no other officer can act as a substitute for a medical officer.³

No doubt the severance of the close connection which existed between medical and other army officers, when the regimental hospital system prevailed, has interfered with the good fellowship and friendly relations which ought to be maintained between the combatant and medical officers of the service. It is also open to question whether there is not some foundation for the observation occasionally made by those officers who, like Lord Wolseley, speak slightingly of medical officers, that the medical officers are in many instances inferior to them in literary acquirements. Certainly a change has occurred during recent years in the relations of the two sets of officers in this respect. In former days, when combatant officers obtained their commissions and steps of promotion by purchase, entering the army at a very early age, literary and scientific attainments were notably very deficient among them, while from the nature of the medical officer's education, his acquaintance with certain branches of science allied to his professional pursuits, as well as the longer duration of his studies, he held a far superior position in respect to general education than the majority of his military comrades. Now under the competitive system, a candidate for a combatant commission must be very fairly versed in general literature, mathematics, geography, modern languages, and other branches of knowledge that fall within the scope of what is called a "liberal education" in order to be successful in gaining the object he has in view. The competition among the candidates for medical commissions in the army is very severe, but it is confined to subjects peculiar to their own profession. It is true that before a medical student can com-

³ At the beginning of a campaign the strength of the medical staff always appears excessive. Long before the end the reverse is invariably the case. Sir Charles Wilson records that such was the effect on the medical officers who had to march all day and work among the sick and wounded at night, that a staff-surgeon fell fast asleep from sheer exhaustion in the middle of a surgical operation.

mence the study of his profession he must pass an entrance examination in general education, but in some instances, owing to the diversity of the portals and the varying facilities of access by which admission to the medical profession can be obtained, this preliminary examination is a very superficial affair. The consequence is that while the combatant officers are, as a rule, conversant with subjects which are frequently introduced in ordinary discourse, and are usually capable of expressing their ideas with clearness in writing as well as in speaking, there can be no doubt that some medical officers are deficient in these qualifications, however well they may be informed in the technicalities of their own profession. The military officers are competent to note deficiencies in literary accomplishments, though they are not capable of forming a correct judgment on the extent of a medical officer's surgical skill or other professional acquirements. The relatively lower standard of general education which exists in occasional instances among medical officers is a matter which seems to deserve the serious consideration of those who have the direction of medical education, for if the examinations into the educational acquirements of the young men who aspire to become medical practitioners are as defective as they are understood to be in some instances, for the honour and credit of the profession the defect ought to be remedied.

It is well known that there are great variations in the pecuniary outlay necessary for acquiring a title to practise medicine in different parts of the kingdom, owing to competition among the schools where a medical education can be obtained, as well as among the different bodies from whom licences to practise medicine and surgery can be got. While in London medical education is prolonged and expensive, licences for practice can be obtained elsewhere at comparatively little trouble or cost, and, as a consequence, the ranks of the profession are in such places occasionally recruited by youths whose social bringing-up and surroundings have been of a very humble character. These facilities are perhaps necessary for meeting the wants of the community at large, especially of the poorer classes, who can afford but scanty remuneration for medical advice and attendance, but it may be readily comprehended that if the medical officers of the army were recruited from this class of young practitioners, there would be little in common between the ideas and habits of the medical and the other officers of the army. Yet it must be to this class that the army will have to look in future for its medical recruits if, on the one hand, the medical officers are treated with scant consideration in regard to their status and remuneration, while, on the other, the risks and service demanded from them are rendered excessive. Of late, the number of army medical officers on the active list employed in the United Kingdom has been considerably reduced; many of the more desirable appointments at home have been allotted to retired members of the department; the periods of foreign service have been extended, a serious matter as regards health and life, since nearly all the foreign stations in which the army is now employed are in relatively unhealthy climates, while through the reductions in the medical establishments, both at home and abroad, the work of the medical officers has been largely increased.

The recent changes in medical administration seem to have been chiefly based on the plan of trusting to the volunteer medical staff for enlarging the medical resources and meeting the wants that must occur in case of the country being not merely threatened with invasion, but also in case of it becoming involved in a

war abroad. It will be a grave matter, indeed, if such a source of demand for medical aid should arise, and the trust be found to have been in any great degree misplaced. During the Crimean war, and on other occasions of British military operations, the medical establishments had to be augmented by civil practitioners; but it caused much inconvenience to the military authorities, and was effected at considerable cost, for the current pay of the civilians was very high by comparison with that of the regular staff, and the contracts included a large sum of remuneration at the termination of the engagement, as a compensation for the conditions and risks of service, and for the loss arising from the interference with their ordinary avocations. Their services could not have been otherwise obtained, and it is hardly to be expected that the aid of experienced and competent practitioners will be secured for war service on more favourable terms in the future.

No doubt plenty of young men who have much to learn and observe will be available on demand, but whether, with little knowledge of military ways and military subordination, and no acquaintance with the regulations of the army, the help of such persons will be of any great advantage to the sick and wounded, or the service at large, certainly admits of doubt. Even military medical officers, who are used to the ways of soldiers and acquainted with the army regulations, require, according to Lord Wolseley, a good deal of supervision and control in the discharge of some of their field duties. His lordship writes: "The commander will have to exercise a most careful watch over the medical department, to prevent soldiers being sent away who are either malingerers or whose state of health does not warrant their removal from the theatre of war. It is the natural tendency of all medical officers to clear out their hospitals by sending home the sick with too little discrimination; unless this is checked, the fighting strength of an army will soon fall off." How will this be if medical practitioners unused to the habits of soldiers are called upon to act instead of army surgeons?

In most European armies the medical officers seem to be treated with the respect and distinction due to their profession and military status. In Russia a title of high nobility was recently conferred on the chief of the Army Medical Department, and only the other day the Grand Cross of the Legion of Honour, the highest distinction in France, was given to a medical officer on his retirement from active service (Médecin Inspecteur-Général Didot), amid the congratulations of officers of all branches of the service. Had he been a field-marshal, the French Government could not have given him a higher decoration. Such honourable distinctions give a prestige to the whole medical service, and are calculated to animate every medical officer to increased zeal in discharge of his military and medical duties.

It would be of immense advantage if the good feeling and impartiality which prompt from time to time such tributes to the worth of the medical profession in other countries were extended in a like degree to the members of the profession in Great Britain.

* *Op. cit.*, p. 116.

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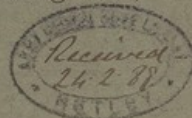
DELIVERED ON THE 4TH FEBRUARY, 1889,

AT THE

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AT THE END OF THE 57TH SESSION OF

The Army Medical School,



BY

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SURGEON-GENERAL,

LATE

PROFESSOR OF MILITARY MEDICINE IN THAT SCHOOL.

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PREFACE.

This address having, with more or less fitness, served its temporary purpose, would, by its author, have been willingly allowed to pass to the limbo where such discourses usually find their final resting place. My old Colleagues desire to prolong its ephemeral existence for a brief season, in, I suppose, the half despairing hope that the part of it which deals with the responsible duties young and inexperienced Medical Officers, landed in India without special training have to perform, may cause some in responsible positions to reconsider opinions formed, it may be, without much knowledge of the important question now, for good or evil, awaiting final settlement.

SIR THOMAS CRAWFORD, PROFESSORS, LADIES AND GENTLEMEN.

When three years ago, in this hall, I bade "my neighbours and my work farewell," I thought that my voice, once a familiar sound here, would never again be heard within these walls. My old Colleagues in the Senate have ordered it otherwise, by doing me the honour of inviting me to deliver the prizes on this the closing day of the 57th Session of the Army Medical School, in which I had the honour to serve for twenty-six years. When I call to mind the fact that the place I fill to-day has, in years gone by, been occupied by Cabinet Ministers and others holding high office in the State, by soldiers who have commanded armies in the field, and by men in the front rank of our profession, whose names are known and respected throughout the scientific world, you will easily believe me when I say that I appear before you with unaffected diffidence, and grave questionings as to my fitness for the duty I have undertaken to perform. I take courage in the fact that the majority of those I address to-day are old friends and old pupils, who I flatter myself have kindly recollections of the days when from this place I was wont to speak to them in the garb and with the authority of their professor. I greet you now as a senior comrade, who hath, like Falstaff, since last you saw him here, "some smack of age in him, some relish of the saltiness of time," and I give you my hearty congratulations on having once more successfully completed a course of study in the Army Medical School, and revived the pictures in your minds, which Bacon tells us are laid in fading colours, and unless frequently renewed are apt to fade away. To the younger part of my audience, about to enter my old service, I give the right hand of fellowship, and sincerely congratulate them on the termination of their labours here, labours eventuating in their entry into the Military Medical Service of the greatest dependency of the Crown.

Those who preceded me in the duty I am discharging were never called upon to address so small a body of young Medical Officers as I am to day. To outsiders it may appear an easy thing to win prizes where the competition is so limited. But before you were able to put in an appearance at Netley, you had to face a competition for your position as Surgeons on probation of far more than ordinary stiffness; the competitors were many, the appointments unprecedentedly few. To have been the successful ones in such a race is in itself a distinction, and I may add that unless the marks gained at the final examination here had satisfied your examiners, there would have been no distribution of prizes at all.

The Herbert prize has always been considered the "blue ribbon" of the Army Medical School. It commemorates the name of a Statesman whose memory will ever be dear to the Medical Officers of the British and Indian Armies, and more than this, deserves to be held in honour by every soldier worthy of the name, from the General to the drummer-boy. No man, in or out of office in his time, so completely took to heart the stern lessons taught in the Crimea; and no man laboured with more earnestness to prevent the necessity for like lessons in the future. With a few other like minded men Lord Herbert saw that in the British Army the saying that "prevention is better than cure," had practically no recognized place. The doctrine that the only business of the Doctor was to cure, was deeply planted in the military mind, perhaps with less vitality, it lingers there still. Bitter was the fruit—apples of the dead sea they were that this unwholesome tree produced. Who can reckon up the treasure spent, who can number the thousands sent to untimely graves by the practical neglect of a proverbial saying, which has now passed into the region of the common place, and has become a familiar heading in the copy-books of Board School Children? Much of the good work of Sydney Herbert has vanished into air, it would be hard to say exactly when or why; but this remains, in the Army it is recognised and acted on that prevention is better than cure, and the result is seen and read of all men. Nor can I forget that mainly to this far seeing administrator we owe the existence of the School which through good and evil report has been the expositor of his deep convictions, and has, I venture to say it in the face of friends and foes,

contributed its share in promoting the health and happiness of the soldier, the end and object that was nearest the heart of this humane and true philanthropist. Surely then the man who wins the prize that bears the honoured name of Sydney Herbert may well be proud of the distinction.

The Martin memorial gold medal perpetuates the name and work of a man who was cast in a heroic mould, and was one of a service that has produced many men of mark who have faithfully served the State.

The education of what has been called the governing class, in India as at home, was, and to some extent is still so conducted, as to exclude even the most elementary acquaintance with what is now known, the world over, as hygiene, in plain English the laws of health.

In Sir Ranald Martin's day, and for many a day after his Indian career was closed, there was a passive acquiescence in the fact that the mortality of Europeans in India was excessive, and with it an equally stupid acquiescence in the belief that for this there was no remedy—it was a melancholy fact, and, to use the favourite phrase of old Samuel Johnson, "there's an end on't." This was not the aspect in which a death rate, taking one year with another of 69 or 70 per 1000, presented itself to the mind of Ranald Martin, and so he set himself to combat this system of *laissez faire* which was abhorrent to his nature. On his return home he saw the first dawn of the sanitary movement, and hailed it with joy. He served on the Health of Towns Royal Commission, and although the fact is not so well known as it should be, the stand he made in favour of substituting medical men instead of attorneys as health officers under the act, converted his colleagues to his view of the question, and to him it is due that the sanitary authorities, in town and country, are guided and advised by competent members of our profession, and not by a class of men who regard questions of public health from the Gallic standpoint. The two powerful commissions that enquired into the health of the army at home and in India, had the inestimable advantage of his membership, and anyone who will take the trouble to look into the vast storehouse of facts collected, classified, and reported on by the able commissioners, will see, more particularly in the report on the Indian Army, how largely he contributed to the glorious revolution in the health of the army at home and abroad, which in the time to come

will make a bright page in the annals of a glorious reign.

Nor was this all, Ranald Martin was a loyal man to his profession and to his service. For himself he sought no reward; but he was jealous for your honour. He deeply felt any slight to your class, any want of recognition of your services to the State, and he claimed for you, and won for you, admission to the most coveted distinctions reserved for those who give themselves to the military service of the Crown and serve it well. For myself I regard it as a high privilege to have enjoyed the friendship of such a man, and what I said of the Herbert Prize I repeat of the Martin Memorial Medal, it is a high distinction to win it.

What of the Parkes' Memorial Medal? What of the man that medal commemorates? Is it necessary that in this hall, in this great Hospital, where his memory is fresh and his name a household word, I should enlarge on the virtues of one with whose life and work you are all so familiar? I feel that to do so would be almost an impertinence. As most of you know in the early days of his life he was an Army Medical Officer, and served in the 84th Regiment where he was beloved by officers and men, not as a wise physician only, but as a friend to whom old and young could go for help and sympathy in seasons of difficulty and trial. These friendly relations did not end with his military life, but were by his old brother officers continued to the last. A year seldom passed without some of them renewing intercourse that on both sides was warmly cherished. The work Dr. Parkes did in India stands to this day a model of careful observation, to which those who make the diseases of Tropical climates a study refer with profit. Of his professional work in this school, if it were needful to say anything it is not within these walls. With the science he made his own his name will always be imperishably associated, and the youngest amongst us knows how well his important text book on hygiene was kept up to the highest level of advancing science by his brilliant and lamented successor. In a long life it has never been my fortune to meet a man in whom the intellectual and moral faculties were so well balanced as in Professor Parkes. To coarser natures, my own among them, it sometimes appeared as if he carried the milk of human kindness and amiability almost to the length of a fault, and his colleagues, as they now sadly remember, were often amused at the ingenuity with which he could

discover good where we were uncharitable enough to see only the seamy side of the character under observation. If this were a fault, surely it was on virtue's side.

Why do I so fondly dwell on the lives and work of the men I have passed in review before you? It is because with all the earnestness of which I am capable I seek to influence the minds of the young medical officers about to enter on the work for which their long pupilage has been only the preparation. Can I wish you, gentlemen, anything better than that keeping before you as your models such men as Sidney Herbert, Ranald Martin, and Alexander Edmund Parkes, you should regulate your lives according to their bright example. If you do, I cannot promise you, that as a matter of certainty, you will attain worldly success and worldly honour, but this I do promise you, you will secure what is "more to be desired than gold, yea, than much fine gold," the love and esteem of worthy men, the peace of a conscience void of offence, and of these rewards no man, be he friend or foe, can ever deprive you.

The career on which you are about to enter is one that offers boundless opportunities of doing good. You now belong to an honourable service which has great traditions. It has been said by one of the most distinguished soldiers that India, fertile in good soldiers, has produced, that more than any other branch of the public service the men of the Medical Department of India have reconciled its people to a foreign government. The reason is not far to seek. The mission of the Medical Service in India is to heal the sick, to give light to the blind, and to mitigate human suffering by all the means and appliances that Western Science has armed them with for so beneficent an end. Surely it is not a light thing to be privileged to take a part in this great work. One word more on this part of my subject, while you minister to the health of others, be reasonably careful of your own. On the famous occasion when Carlyle delivered his memorable Rectorial address to the students of the University of Edinburgh, he was mindful in his closing words to impress this lesson on their minds. He reminded them that the German term for holy, *heilig*, also means health—a priceless blessing, not to be lightly esteemed and thrown away. And now before I say "the word that has been and must be," and bring this address to a close, suffer me to say a few words on a subject that of

late has been much in the thoughts of those, who, like myself, are deeply interested in the cause of Military Medicine, using the term in its widest acceptation.

It would be affectation, almost amounting to folly, if I, of all men, pretended ignorance on a matter that for months past has been openly discussed in the press, lay and professional. Need I say that I refer to the proposal to discontinue sending the young Medical Officers for H.M. Indian Service to Netley for special instruction. When this very unwelcome rumour reached my ears, my mind naturally turned to my own experience in the early years of my Indian career, which was briefly this. I landed in that country fresh from the Civil Schools in which I received my professional education, about as well armed for my new duties, let me say, as an average young Doctor who comes to Netley as a Surgeon on probation, and equally innocent of everything relating to the specialities of my military medical duties. After a brief sojourn in the Madras General Hospital, I found myself in orders to embark on a transport ship intended to embark a Regiment of Native Infantry at a Port on the Coast, and to proceed with it in medical charge to Tenasserim in Lower Burmah—and to return to Madras with the relieved regiment. Here was a novel position for me—such practical knowledge as I received in the General Hospital, was very much what I had been accustomed to in a Civil Hospital at home. I kept a record of my "cases" as I would have done as a clinical clerk in an Edinburgh or London Hospital, and I entered on my new duty without the least knowledge of such matters as the keeping of records, drawing up reports, and above all the medical arrangements and regulations for troops at sea, and very much at sea I felt myself. To add to my difficulties the Regiment embarked in a condition little short of mutiny. It was a time of unrest, and some evil disposed persons had persuaded the ignorant Sepoys that as soon as they embarked the Government intended to stop their family certificates, and leave their families to starve. It required much tact and firmness on the part of the officer commanding the station, to disabuse their minds of this foolish notion, and to get them to embark, which they finally did, only half reassured and in great depression of spirits.

No sooner were we at sea, in this untoward state of affairs, than cholera broke out, which did not lessen my anxieties.

The commanding officer was kind to my inexperience, and in every way considerate and helpful. The loss of life was not great and in a few days we got rid of the grim visitor that had boarded us. No sooner had I returned to the Continent of India than I was put in medical charge, not of a regiment only, but of the whole cantonment in which that regiment was quartered; I did my best, and again I was fortunate in my military commander who was indulgent as I blundered along. On the other hand my medical chief in the division, although also well disposed to me, was master of a fine vein of sarcasm, and when, as he often had occasion to do, he returned my ill prepared and altogether irregular documents, in form, most informal, he ironically complimented me on the ingenuity displayed by his victim in contriving out of his inward consciousness "forms" not to be recognized by the official mind, leaving me, however, to get them into shape as well as I could. My next move was a turning point in my life, I was ordered to the most important station in the Madras command, to do duty with Her Majesty's 55th Regiment, then quartered in what was known as the Old Infantry Barracks of Secunderabad in the Deccan. No one now living knows the black and disastrous history of that legalized pest-house better than Sir Thomas Crawford, and old pupils who are present to-day have heard from my lips not a few particulars of my experience connected with them. The surgeon of the regiment, Dr. Shanks, who some years afterwards ended an honourable career in New Zealand, gave me at once the sick of one wing to treat, and then, comparatively inexperienced, without ever having had a systematic lesson in the pathology of tropical diseases, I was brought face to face with the most formidable maladies known to medical science, some of them from the pernicious surroundings of the place presenting themselves in the most malignant forms. I look back to that time through the long vista of years with a vivid remembrance of my anxieties. I went about with an abiding consciousness of the costly lives committed to my inexperienced hands, I took, as doctors often say, "my cases to bed with me," and was haunted by my responsibilities regarding them when I should have been sleeping. No doubt I learned many precious lessons that I have done my best to convey to others, but I had then and I have now, a deep conviction that the "system" that placed me in such

a position was rotten to the core. Then I was sent with a wing of this fine regiment, in sole medical charge of nearly 500 men on a march of upwards of 400 miles.

Some will say, it was a compliment to one so young, perhaps it was. All the same, I don't think it wise or just to pay such a compliment at the possible cost of valuable lives. In this school the duties of Medical Officers on the line of march in all climates, and under all conditions and circumstances, are taught, and if a Netley-trained man on landing in India was ordered off on such a march, it would be his own fault if he felt embarrassed and nervous in the position. In my case I was fortunate, the march was completed without disaster or loss of life. No sooner had I once more arrived in Madras than I found myself in sole charge of the Queen's General Hospital, a position of great responsibility for one whose service was far short of two years. You must excuse the frequent repetition of the personal pronoun, without this unpleasantly egotistical resource I could not bring the system before you except in vague general terms. To this bad system, or some variation of it, it is proposed to return. We are vaguely told that under the system which is to take the place of the Netley training, the young Medical Officers will be duly trained in the Presidency Hospitals of India, which are not, never were, and never can be Military Hospitals. The answer is that the Government of India has always kept the Medical Service so short-handed, that the so-called training was merely nominal. Dr. Alexander Grant has shown that on the first sign of pressure the young medical officers have always been hurried to the front within a few days of their arrival. This happened to Dr. Grant himself, and he tells us that in the first Sikh war he saw young medical men without special training, and without experience, in charge of the wounded. To revert again for a moment to my own experience. I also was supposed to have undergone "training" in a Presidency Hospital. I can only say that not one lesson did I receive in military surgery, or surgical field duties. Yet under this system I was deemed fit to be intrusted in war, before I had completed two years' service, with the field surgery of one of the finest regiments in H.M. Service. It was well for me and my gallant patients that before I entered the service I had for five years been the pupil of Liston, perhaps the greatest Surgeon

of his time, and had more surgical experience than many young men of my age and service.

It is for reasons such as these I, in merest outline, have here given, that some of the leading men in the medical and surgical professions have addressed the Secretary of State for India, and his Council, strongly protesting against so retrograde a step in military medical education as the one proposed. In this they have been supported by many of the most able and experienced retired medical officers of the three Presidencies, many of them successful teachers of their profession in India, whose opinion on such a question is entitled to great consideration; more particularly when weighed against that of what is known as the Simla Commission, which could only discuss the question on its financial side, and on which there was not a medical educational expert to represent the really important part of the question, namely, its bearing on the usefulness and efficiency of the Medical Service of India.

The question has been sent back to India for the opinion of the Viceroy in Council, with much evidence that was never presented to the Simla Commission, where the scheme of returning to the paper system of training is believed to have originated. Let us hope that wiser counsels will prevail. Even should the decision go against Netley in India, I refuse to despair. I believe that when the matter is once more returned for final settlement by the home authorities, it will be found that the "resources of civilization" are not exhausted, and that the cause of common sense and sound education will prevail—

"This creed I fain would keep,
This hope I'll not forego."

And now to conclude this, I fear too long discourse, let me, Gentlemen, in my own name, in that of the Professors, and this good company, bid you God speed, so that you may stand up like men to your work to the end. In this hope I bid you farewell.





Thursday, March 22, 1888.

LIEUTENANT-GENERAL D. ANDERSON, Governor Royal Military College, in the Chair.

THE PHYSIQUE OF THE SOLDIER AND HIS PHYSICAL TRAINING.

By COLONEL G. M. ONSLOW, Inspector of Gymnasia.

I am here this evening, in response to the courteous invitation of the Committee of the Aldershot Military Society, because I felt sure that they would not have requested me to read this paper, unless they considered the subject of it one which would be of some interest to the members of the Society, and to the public at large. It is really a subject of the very greatest importance, and one of interest not only to soldiers, but also to civilians, and I cannot but feel diffident of my ability to adequately deal with it, or to place it before you in an interesting and practical manner. However, I can only claim your indulgence for all shortcomings, and I trust that if I succeed in nothing else, I may be fortunate enough to attract attention to the object at which I am aiming, viz., the physical improvement of the soldier, and to invite criticism of the method by which it can, I think, best be arrived at.

You will observe that in the résumé of my paper I have grouped the subjects under two heads. The first, the "Physique of the Soldier," is to my mind the more difficult to deal with, and would undoubtedly be better handled by one of the medical profession, on account of the physiological considerations upon which nearly all arguments concerning it should be based. It is also necessary to enable one to arrive at any sound and reliable conclusion concerning it, to be able to compare the physique of the soldier of the present with the soldier of former periods, and also with that of other countries; but, in the first instance, one is met with this difficulty, that until within the last few years no records of measurements, weights, &c., were kept, if these were ever even taken, which I doubt, and consequently there are but few data to go upon for purposes of comparison.

One gallant officer sitting before me, when talking the subject over with me, said "You know it would be very interesting if you could compare Tommy Atkins with the soldiers of the army sent by Pharaoh in pursuit of the Israelites in their flight from Egypt," and doubtless it would, but this I regret to say I have not succeeded in doing, and indeed I find that it is only within the last twenty years or so that any reliable statistics have been collected, during which period the physique of neither the nation or the army can have appreciably altered.

There is an impression on the minds of many people that the English race is degenerating, and that the soldier of to-day is not what he was fifty years ago, and that at any rate the British Infantryman is not physically the equal of the man who fought under Wellington; but this I believe to be erroneous, though we are unable by figures to arrive at any conclusion on this point; but there is one fact worth mentioning, and it is, that the average age of the soldier in the army in 1803 was 27 years, and the standard height was 5 ft. 5 in. for the Infantry, and no chest limit; whereas, although the average age of the men now serving is certainly not more than 25 years, and the minimum standard height 5 ft. 4 in., there is a chest limit of 33 in., and the large proportion of 769 per 1000 of the men serving are 35 in. chest measurement and upwards, and 920 per 1000 34 in. and upwards; and the Inspector-General for Recruiting in his report for 1887 says "there is probably no army in Europe in which the physical qualities of the recruit are more carefully criticised both by medical and military authorities than in this country. In other armies the main care of the inspecting officer is exercised lest any recruit who might render service should be too easily rejected. In the British Army, every officer who successively inspects a recruit endeavours to find some point with which he can find fault." It is not, I think, unreasonable to assume, therefore, that with all these safeguards the "physique" of the soldier is probably now superior, at any rate equal, to that of eighty years ago.

The minimum height and chest measurement of our Infantry recruit compares very favourably with that of continental armies.

In France the minimum age is 20 years, height 5 ft. 0½ in., chest measurement 30-867 in.

In Austria, age 20, height 5 ft. 1½ in., chest 30-06 in.

Germany, age 20, height 5 ft. 1 in., chest (no limit, but is considered).

Russia, age 21, height 5 ft. 0½ in., chest no limit.

The English Infantry recruit is taken at 18 years of age, height 5 ft. 4 in., chest 33 in. Eligible recruits under 20 years of age between 5 ft. 3 in. and 5 ft. 4 in., and in other respects up to the above standards, may, if considered by the medical officer as likely to develop into efficient soldiers, be specially enlisted for the Infantry of the line.

By this it will be seen that though our age limit is lower, our minimum standard generally is higher than in foreign armies. Apparently in the early part of this century we did not bother our heads much about details of this sort, but took men more by height and appearance than by anything else, and were glad to get them. The following figures taken from the general annual return of the British Army for 1886, are of some interest, and confirm me in my opinion that the physique of the British soldier is still good:—

Of men serving with the colours in 1886, 901 per 1000 were 5 ft. 5 in. and upwards; 931 per 1000 were 34 in. and upwards chest measurement, and 834 per 1000 over 20 years of age. In the same year the number of men recruited was 39,409. Of these 28,286 measured over 5 ft. 5 in. in height, 25,617 were 34 in. and upwards chest measure-

ment, and of these 12,028 were 35 in. and upwards, and 14,288 were over 20 years of age.

Now the average height of British lads of 18 years is from 5 ft. 5 in. to 5 ft. 8 in., depending upon whether the average is taken among the best favoured, viz., non-labouring communities, or among the artisan classes; so that as regards height there is nothing to complain of, and the fact that about ¾ of them measured round the chest 34 in. and upwards cannot be deemed unsatisfactory, especially bearing in mind that nearly ¾ of the whole number were under 20 years of age.

Now another fact that must not be lost sight of in considering this question of physique is that there are a number of lads (and a considerable number) who say that they are 18 years old, when in reality they are but 17, and in some cases only perhaps 16; therefore if these lads of under 18 fulfil the physical conditions required of those of 18 years and upwards, it is a strong argument in favour of my contention, that it is not so much the physique as the youth of the men we are now getting that we have to grumble about, if we have to grumble at all. I may here also mention that from reliable data it has been ascertained, that a range of growth of from one to two inches may be expected from 19 to 25 years of age; and the experience of Doctors Balfour and Lawson, well known officers, late of the Army Medical Department, as embodied in reports issued by them from 1860 to 1864, show that a recruit of 18 years of age may be expected to grow 1 in., increase 1½ ins. in the chest, and about 10 lbs. in weight, before he reaches the age of 23. Other observers have arrived at like conclusions. These data were fixed when physical training was almost unknown in the English Army, and certainly had done little or nothing toward improving the soldiers' physique.

Both from what I have gathered in conversation with men well capable of judging, and from my own personal observations, I am convinced that at the present time the physique of the soldier is as good, if not better, than in the past. Look at what our men did in 1880 in the march under Roberts from Cabul to Candahar, in a foreign climate, and in hot weather, 232 miles in 14 days, an average of 16½ miles per diem: does that look like deterioration of physique? But this march was not performed by immature lads, but by seasoned men; therefore I say our material is good enough, if only we give it time to mature, and train it properly while maturing. There is, however, one element of danger threatening which it is incumbent on us to guard against, and it is this—The tendency of the population of the country is to gravitate towards certain centres, to seek employment in large towns, and this must, I fear, have in time a very deteriorating effect on the physique of the nation. There are in England now two town-bred children to one country-bred child, and the proportion must steadily increase year by year.

The Director-General of the Army Medical Department (Sir Thomas Crawford), in a paper he read to the British Association, stated "that he believed the recruits taken from large towns showed inferior physique to those coming from rural districts," and it is a fact that

the number of rejections has increased 43.91 per thousand of men seeking enlistment in the last 26 years, which is rather ominous, though this may perhaps be partly accounted for by extra care on the part of the medical officers inspecting, and may be partly attributable to agricultural depression and bad trade driving many men to enlist that would not otherwise offer themselves, and which enables the recruiting authorities to be more particular as to who they accept; but it must also I fear to a certain extent be attributable to a deterioration in the physique of the town-bred populations, and this is a very grave matter indeed, and one which if it goes beyond a certain point must seriously affect us as a nation. I mention this as going to show that it is imperative on us to consider, and will become so more and more as time goes on, what we are to do, and what measures we should adopt to improve the material we get, and to put it into a condition to meet the requirements of military service.

THE FOOD OF THE SOLDIER.

Now it occurs to me that in dealing with this subject of the development of the young soldier, the improving of the material, one must before going into the question of his training, ask, does he get enough to eat, and a sufficient number of meals, or rather perhaps are the hours at which he is fed well chosen? The answer is to my mind "No!" In the first place the present ration was fixed at a time when there were at least 90 per cent. of old soldiers in the ranks, many (alas too many) of whom lived almost as much on drink as on food, and who certainly did not consume their whole ration, and the young soldier in those days got his own share and a portion of the old soldiers' as well, and probably got as much as he required; but now owing to the annual large influx of growing lads into the ranks, ready to devour all their ration and as much again if they could get it, it is extremely doubtful whether the food they are allowed is sufficient to supply the nourishment necessary for immature men.

Now about the hours at which he gets his meals; 8 o'clock for breakfast and 1 o'clock for dinner is all right, but 4.30 for tea, if you do not give him another evening meal, is all wrong. It simply means that he goes from 5 in the evening until 8 the following morning, i.e., 15 hours without any sustenance, at a period of life when the waste of tissue is greatest and requires constant renovation. If you can't give him another meal, at any rate let his last one in the day be later. I know one of the arguments against increasing the rations, is that it would cause a material increase in the army estimates, and that the British soldier is better paid than any other, and that if only he would spend in purchasing extra food what he spends in drink, that he could get a substantial meal every night of his life. This I grant, but the fact to be recognized is, that a very large proportion of men of the classes from which we mostly get our recruits will, if they have a sixpence in their pockets, go into a publichouse rather than a cookshop, and will buy drink rather than food. The gin-palace offers attraction in the shape of light, warmth, and convivial company which the other place does not.

This food question is one that is of course more within the province of the medical profession to deal with than mine, but it is so important a factor in the question of the ultimate development and staying power of the man that I cannot pass it by unnoticed.

We now come to the second heading—

PHYSICAL TRAINING, ITS OBJECTS.

I must impress upon you, gentlemen, that all the remarks I make on the subject of physical training apply more particularly to the Infantry soldier, as I consider that once a Cavalry or Artilleryman is dismissed his recruits' course of gymnastics, the work he gets is sufficient for all practical purposes to keep him in sound condition; and sweeping out stables, wheeling barrow-loads of manure, exercising and grooming one, and perhaps two, horses, cleaning and lifting a saddle on and off a rack, and performing the many other ordinary duties that fall to the lot of Cavalry and Artillery soldiers, renders anything further unnecessary.

One of Napoleon's military maxims was "that the first quality of a soldier is the ability to support fatigue and privation, physical courage is only the second." This shows the value he put upon physical strength. A more ancient authority, Vegetius, said—"It is of much more importance that a soldier should be strong than that he should be tall." Bodily strength, activity, stamina to enable a man to endure privations and protracted fatigue, are as essential to the soldier now as in the days of Xenophon, Caesar, or Napoleon. How are these to be obtained? I reply by a scientific system of physical training, regulated by the fitness of those who undergo it, progressive in character, and calculated to develop the body to its full power and perfect conformation.

The necessity for a properly regulated system of physical education is recognized and acted upon by most continental nations both for their soldiers and in civil schools, but it is of comparatively recent years that it received any attention in England, and we in the army may, I think, justly lay claim to having taken the initiative in the movement, though we are very far yet from realizing its great importance from either a military or a national point of view. It is about eight-and-twenty years ago that the question was first seriously considered by the military authorities, and shortly after a batch of non-commissioned officers under Major (now Major-General) Hammersley, the father of army gymnastics, was sent to be trained at Oxford by Mr. Maclaren, and on completion of their training, and the building of the Gymnasium in the Permanent Barracks here, the military system of gymnastic training was introduced into the army.

To the ability, energy, and patient labour of General Hammersley is due the sound establishment of the system throughout the whole service, and very few have any idea of the difficulties caused by ignorance and prejudice which he had to contend against, and I regret to say that these same causes of obstruction are occasionally to be met with in the present day. I have come across now and again officers

who have had an extraordinary antipathy to the Gymnasium and everything connected with it, and who hated their men attending for instruction. They have been few and far between, but still I have met with them, and I have always attributed this antipathy to their not properly understanding the unquestionable benefit systematized exercise is to a man, and the impossibility of the human frame ever approaching full and uniform development without it.

There are two objects to be attained in the physical training of the soldier. The primary one is to make him strong, active, enduring, and hardy; the secondary one is to teach him to apply practically the activity, self reliance, and strength that the first has given him, to enable him to overcome obstacles and difficulties he may encounter in the field, and to use with ease and skill the weapon with which he is armed. Now to make a man fulfil the conditions which are the object of the first, it is necessary to so work him that the whole, not part, of his muscular system is exercised. Even supposing a man has had opportunities of indulging in the manly games for which this country is famed, he still, to become uniformly developed, requires systematized exercise. For instance by playing football, the lower limbs only are developed. By rowing, lower limbs and loins principally. Racquets, lower limbs and right arm moderately. Cricket, lower limbs and right arm principally. Walking, running, jumping, lower limbs entirely.

All these games, grand as they are, and I like to see every fellow play them, only partially develop a man. They result in irregular instead of harmonious improvement, certain parts of the body being cultivated and developed to the exclusion of others. Then there is the man recruited from the labouring classes. You will find him more or less developed in those muscles that have been most used in the work by which he has earned his bread, and in the great majority of cases, to the detriment of the others. Our business, then, is to keep in good condition what is already so, and to improve and supply what is bad and deficient. To enable one to comprehend the necessity of systematic exercise one must understand its effect on the muscular system. Maclaren briefly defines exercise as being "muscular movement produced by muscular contraction by which every motion of the living organism is accomplished." Our muscular system is composed of voluntary and involuntary muscles. Our frame is composed of myriads of atoms, each of which preserves its vitality for a given period, then dies and is separated from the tissue of which it is a part, and is eventually cast out by the organs of excretion. Exercise, that is contraction of the voluntary muscles, greatly expedites this process of disintegration, and every muscle put in action causes the decay and death of certain of the tissues composing it. Now were it not for some reparative process, this decay and consequent loss of tissue would of course cause diminution of size and power, but in the nutritive system is the necessary reparation found, and by the conversion of our food into blood, and by its constant and never failing supply, the necessary material for making good what has been wasted is pumped by the heart to every part, to every tissue of the body, and through

the medium of the blood what is required for renovation and further increase, is carried and deposited throughout the entire frame. By a beautiful and never failing law, during the period of growth, and until the limit of the individual capacity of development is reached, the supply of tissue in a healthy body invariably exceeds the decay, and the body in consequence is constantly being built up and enlarged. From this it will be readily understood that every muscle requires to be put in constant action to cause the necessary and uniform disintegration of its atoms, without which its proper growth and increase is retarded, if not stopped altogether, and this can only be ensured by a carefully arranged system of physical culture.

But not only is the soldier required to be strong, but he is required to be healthy, hardy, and enduring. These are qualities that directly depend more upon sound organs than upon physical strength.

Hear what Professor Aitkin says in his admirable book entitled the "Growth of the Recruit." "All the parts of the organization of man are connected and correlated together, so that with the increased or decreased dimensions of the whole body, or any particular part of it, certain organs are also increased or diminished or modified, and modifications which arise during the earlier stages of growth tend to influence the subsequent development of the whole man." Every time you put in motion one of the voluntary muscles there is a corresponding action of some involuntary muscles in connection with it, and these are the muscles of the digestive organs, and of the heart, lungs, kidneys, &c., so that the proper condition of these, their health and capacity to rightly perform their functions, depends greatly upon the impulse they receive from the voluntary muscles. Put the organic system into a high state of health and vitality, and you enable the body to resist the evil effects of extremes of heat or cold, or other deleterious influences, and you get the sound, hardy, and enduring man.

Most continental nations fully realize the necessity of making the soldier active and strong, and it may not be out of place before examining our own system to take a glance across the water and see what is done by the different countries of Europe.

GERMANY.

We will take Germany first. With the Germans as with some others, physical education is not only a military but a national question. The founder of it was F. Jahn, who attributed the crushing defeat of the Prussians by the French at Jena, in 1806, to physical defects on the part of the former, and he made it his business to prepare the German youth for the defence of his country by improving his bodily powers. He it was who laid the foundation of the German Gymnastic Union, now composed of 4,764 societies, and numbering 400,000 associates. At one time these societies were suspected of Socialistic tendencies, and some of them were suppressed, and Jahn was locked up, only however to be shortly set at liberty again, when the movement made great strides.

In 1842 gymnastics were declared to be necessary in all educational establishments, and schools were formed to train masters of gymnastics, one being the central school in Berlin. A section of this school is set apart for the instruction of officers commanding regiments. Under officers are also trained there, and every regiment has now to send one officer yearly, so that in every battalion there are a number of officers capable of conducting the physical training of their men. Great weight is attached to practical or "applied gymnastics" in the German Army, and the men are continually exercised in them throughout their whole service. No one can deny the fact that physical superiority (the result to a great extent of their excellent physical training) was one of the causes that enabled the Germans in '70-71 to alter the verdict given at Jena.

RUSSIA.

We first hear of Gymnastics in Russia in 1785, and some few years after the Emperor Nicholas ordered gymnastic exercises to be practised in the army, and in 1839, at the great manoeuvres near Borodino, gymnastic experiments were tried in the presence of the Emperor, with which he was so pleased that he decorated the Director of Gymnasia with the Order of Stanislaus. However the system does not appear to have flourished much until after the Crimean War, when on the termination of that campaign, so unfavourable to Russia, it was established in every military school and corps, and it has been increased and improved upon steadily ever since. All recruits are under instruction in peace for 4 months, and in time of war for 2 months. The system is progressive, and commences with the simplest exercises, advancing by degrees to applied gymnastics, viz., the overcoming of obstacles, escalading walls, &c., to which they attach very great importance. Here, again, I must draw attention to the fact that the necessity for cultivating the physical qualifications of the soldier was not fully recognized until after an unsuccessful war.

FRANCE.

In France gymnastics were first introduced by a Spanish Colonel Amoros, at the beginning of this century, and he founded a school in Paris in 1827. He did not succeed, however, in enlisting any public interest. In 1847 an attempt was made to establish a system in the army, but no good results were arrived at owing to imperfect organization.

By the exertions of Eugene Pay, Founder and Director of the "Grand Gymnase de Paris," in 1869 the Government were induced to issue a decree making gymnastics compulsory in all schools, but the war of 1870 upset everything and no good came of it. At the termination of the war, however, France awoke to the necessity of taking measures to cultivate a strong race of men, and to toughen and improve their muscular fibres, and throughout the country gymnastic societies were founded, now numbering 650, as compared with 10 in existence prior to the Franco-German War.

In the spring of 1878 conferences were held in Paris under the

presidency of Mons. Victor Hugo, on the "Education and Instruction of Youth," the outcome of which was, that the Government were induced to make gymnastics compulsory in all schools. The results are considered to be most satisfactory, and immense strides have been made in the physical training of the French.

Here, again, we see conviction on this all important question brought home to the mind of a nation by a great military disaster.

AUSTRIA.

In Austria we find the highest importance attached to the physical education both of soldiers and civilians, it being compulsory in all schools; but as late as 1848, the educational spirit dominant in the country was absolutely hostile to it, and it was not until the year following their humiliating defeat by the Prussians that a proposal made by one Dr. Steiger to establish a compulsory system of physical training in all educational institutions, was entertained by the Government and put in force the following year, since which time it has rapidly and steadily grown to large dimensions.

It would be wearisome to go through the remainder of the list of countries, but it will suffice to say that in Italy, Norway, Sweden, Denmark, and Switzerland, systems all more or less similar obtain, and physical culture is looked upon as necessary as, and also as being an aid to, a man's mental education. Why we, with such a consensus of opinion in favour of it, do not institute a system of compulsory physical education in our board schools, I am at a loss to understand, but with this I have nothing to do, and allude to it only to emphasize the necessity of a high physical training for our soldiers, for if it is necessary for soldiers of continental armies, all of them men who have had a preparatory training while at school, how much more must it be necessary for our men, recruited as they are from a population that has no such advantages.

OUR OWN SYSTEM OF PHYSICAL TRAINING.

I have found when enquiring into the military systems of the different countries I have enumerated, that the soldier's physical training commences immediately he joins, and it is continued to the end of his service with the colors. There is no such thing as a man commencing a course of gymnastics and being taken away in the middle of it for musketry or military training, to return after an absence of perhaps weeks to begin again, having forgotten much he has been taught, and having lost much of the benefit he may have derived. No, he starts with it at once, and it continues systematically and progressively to the day he is passed into the "Reserve," and he therefore gets the full benefit out of it, and neither the time, labour, or money expended on it is wasted. Now, what is our system? By our regulations the "recruit" does not commence his course of gymnastics until he has completed his recruits' drill and been put through the recruits' course of musketry. What is the result? Why he is a trained soldier in every other but a gymnastic sense, and when

he does join for instruction he is liable to be withdrawn at any moment for military training or for the annual course of musketry, and he is grudging by his commanding officer and adjutant because he is not available for parades, guards, field-days, &c., and the consequence is, that the gymnastic training is viewed by some officers with disfavour, not on account of any demerits of its own, but for the reasons I have mentioned. There is another disadvantage in not conducting a man's gymnastic training concurrently with his recruits' drill, and it is this, that "drill," *per se*, does little or nothing to supple and strengthen a man, but as regards certain muscles rather the reverse, and the present extension motions won't do much good in that direction either; so for the first three or four months after a man joins, you may say that next to nothing is done to give him either strength or flexibility of limb.

In the drill necessary to prepare him to take his place in the ranks you teach him to walk uprightly and stiffly, to look straight to his front, and to hold his arms rigidly by his sides. In fact you constrain his every movement, and you deny to the trunk of his body and to his upper limbs any exercise or freedom of movement whatever, thereby stopping that action of the muscles which I have endeavoured to point out is so necessary for their development, and this at a period of his career when you should be using your best endeavour to encourage it. The recruits' course is supposed to last three months—say 90 days—from this you have to take at least 12 Saturdays and Sundays, *i.e.* 24 days, which leaves 66 working days, and from this again has to be deducted a certain number of absences entailed by a man being in hospital, medically excused, or in the guard-room, &c., amounting probably to another 12 or 14 days, so that the actual number of lessons that a man gets is most likely not more than 50 or 55. It is obvious, therefore, that every hour he attends must be devoted to the one object of making him strong and active, and in teaching him to co-ordinate his movements, a thing many men cannot do; and there is absolutely no margin left for making what should be the next step in his physical training, that of teaching him how to apply practically what he has learnt. It is, however, a great point gained to have partly attained our primary object—that of making him stronger—and one must have constant opportunity of observing the beneficial effect even under our present system that the training has upon men to fully realize its importance.

Instances of men not showing a decided improvement as regards development, power, and activity, are rare, and the following figures I think prove conclusively that great good has accrued to them generally.

Among the 15,504 men that completed their full course of training during the past year in the gymnasia in the United Kingdom, the average increase was:—Weight, $2\frac{1}{2}$ pounds; chest measurement, $1\frac{1}{2}$ in.; forearm measurement, $\frac{1}{2}$ in.; upperarm measurement, $\frac{3}{4}$ in. So you see that in less than three months these boys increased in chest girth almost as much as Doctors Balfour and Lawson gave them five years

to do in, before the gymnastic training was introduced. Does not this speak for itself? I could give you any number of cases in which the increase has been simply extraordinary, but will confine myself to one or two of the most wonderful on record.

Among the 12 non-commissioned officers who went to be trained at Oxford under Major Hammersley, the average increase in $7\frac{1}{2}$ months was 10lbs. in weight, $2\frac{1}{2}$ in. in chest, $\frac{1}{2}$ in. in forearm, $1\frac{1}{2}$ in. in upperarm, and one of the number, aged 19, increased from 33 in. to $37\frac{1}{2}$; and another aged 24, when he commenced measured 35 in. and when he finished was 40 round the chest, an increase of 5 in. in a little over 7 months. It is needless to say they required new tunics, &c., and I hope the country paid for them; but imagine what these figures mean. They represent not merely an increase of muscle, but an expansion of the osseous framework upon which the muscles lie, an enlargement of the chamber of the heart and lungs, thereby providing these with more space for functional activity and growth.

I have seen curious specimens join, men who have never used their limbs in their lives, who have never properly inflated their chests, and who, though they have been passed as medically fit, when put to the test of physical work proved practically useless as soldiers, but in these rare and extreme cases I have invariably found that all that was required was careful training, and extra time in training them. I remember one case of a man who could not jump over a stick two feet from the ground, and could scarcely bear the weight of his own body when hanging on a rope. The officer commanding his regiment tried to get rid of him, but he was ordered to be kept at the gymnasium for another course of instruction, and at the end of eight or nine months was so improved that there was no further talk of discharging him.

Up to the present I have spoken chiefly of gymnastics, because it is unfortunately almost the only physical training the soldier now gets, excepting "Running drill."

Now "Running drill" is doubtless highly important, and every soldier worthy the name ought to be able to run his thousand yards in seven minutes without being too distressed at the finish to use the bayonet if necessary, but only very gradual and continuous training will get him into such condition, and too much care cannot be taken in exercising the men at this drill. For instance, if you take a man or boy, whichever you prefer to call him, in the early morning to run round and round the barrack square until he is sick, you are doing him serious and perhaps permanent injury, and laying the seed of future disease.

After just rising from his bed his muscular system is relaxed, and not ready to withstand such fatiguing exercise, and his heart and lungs are unprepared for such quickened action, for such increased rapidity of respiration, and to aggravate the mischief this is all done on an empty stomach, after a fifteen hours' fast.

Don't misunderstand me, and imagine for a moment I wish to suggest that this is the manner in which Running drill is usually con-

ducted by regiments, but as I have known cases where greater discretion might certainly have been shown, I wish to call attention to the danger attending the absence of proper care, and also I object to the practice of running young soldiers on an empty stomach. Run him in the forenoon or afternoon, and run him to music, and give him something to think about while running, in the shape of simple changes of formation, &c., and you will attain your object without unduly fatiguing him.

When once he is dismissed his recruits' course of gymnastics, nothing more is now done regimentally in regard to keeping up or improving his strength, and he may or may not attend at the gymnasium for the drilled soldiers' course that he is supposed to annually undergo; one reason being, that he is very likely quartered in a place where there is no school, or his regiment is broken up into detachments and he can't be spared the duties being so heavy, and for various other reasons.

Now in my humble opinion this is a grievous and deplorable mistake, and if not remedied we shall one day pay very dearly for our shortcomings in this respect.

Reform is needed.

There are, however, many difficulties in the way of bringing about a reform. One is to convince men that it is necessary. The only way I can hope to do that is by endeavouring to get them to think over the question, and to give them digestible food for thought, and a great step in the right direction will have been made if only a deeper interest in the subject can be aroused in the minds of officers, and, if they will only give the subject the consideration it deserves, they cannot fail then to see its importance. The next difficulty is, that mystical body entitled the "Treasury," the stumbling block of all practical reform, the rock upon which the good ship "Efficiency" so often founders. Many a good practical scheme is blocked and comes to naught because of the cry "there is no money," but it does not do to be daunted by obstacles of this sort, and the only way is to hammer on, and in time one generally gets a portion, if not all, that one wants. But the great thing is to know what you want, and I am thankful to say that I do know what I want, and it is this—I want to see our present system altered, improved, developed. I want to see the fact recognised that it is no use to drill a man, no use to give him a costly arm of precision, no use to teach him to shoot, in fact no use to teach him anything, unless you first make him strong, active, enduring, and self-reliant. Physical strength, endurance, and discipline are the first qualifications of a soldier, the foundation upon which the whole structure of his efficiency is built.

The following is the sort of system that I should like to see established, without of course entering into minute details, as time will not admit of my so doing, and I do not lose sight of the fact that time, money, and many preparatory measures are necessary before what I hope to see one day authorized can be put into practice; but the sooner the ball is started rolling the better, and I hope and believe that it has begun to move in the right direction, and for this we have to

thank the General Officer Commanding the 2nd Brigade, whose warm co-operation has most materially assisted us in overcoming many difficulties.

I should like to see in all barracks of any size good large drill sheds erected, fitted with some portable apparatus, in which the soldiers' training could be carried on at all times, and without regard to the weather. I should like to see every regiment in the service to be obliged to send one officer and two non-commissioned officers to be trained in the Head-quarter School annually, so that in a short time there would be everywhere a sufficient number of regimental officers and non-commissioned officers capable of undertaking the instruction of their men. I want every man on joining, whether his regiment or his depot, to be at once taken in hand, and, *pari passu* with his ordinary drills, receive one hour and a half's physical training every day of the week, Saturday and Sunday excepted; three-quarters of an hour in the forenoon, and the same in the afternoon; this training to comprise elementary gymnastics proper, free movements (not the present extension motions), the rapid march—170 paces to the minute—the high balance step, running drill, practised differently to the way it now is; and when the men are ready to carry arms, the free movements to be performed with the rifle. Then as the men become proficient, the different squads should be massed, and the various series of exercises performed to music. When first this proposition was made, considerable doubts were entertained by some as to whether the correct performance of these several exercises to music by any large body of men would be found practicable. This has been put beyond question by the Officer Commanding the 1st Battalion Northamptonshire Regiment, which battalion does a variety of free movements, with and without the rifle, to music, in admirable time and with great precision, and H.R.H. the Commander-in-Chief expressed his high approval of the practices when he saw the regiment perform them on the occasion of his last visit here, and authorized their adoption for trial generally in the Division.

So much for the recruit's training. By this time he should be fairly active, supple, and strong, and he should be in a condition to be instructed in the practical application of the exercises he has been taught in the gymnasium. For the use of the trained soldier there should be in every barrack square "walls" similar to those which, on my recommendation, were built outside all gymnasia last year, with the object of teaching the men to escalate by "mutual support," and there should also be ditches for them to jump over, banks for them to jump off, bars for them to vault over, with first one hand and then the other, sometimes to be taken in their stride when at the double, and all these exercises to be practised with and without the rifle, and there should be issued to every regiment a certain number of old rifles for this purpose. The changes should be rung on these several exercises, and every drilled soldier should receive two hours' instruction a week throughout the year. If this were thoroughly and intelligently carried out, I am as convinced as that I stand here, that

the improvement in the physique, activity, and self-reliance of the men would be markedly apparent in a very short time. Remember also that if all this is done in a proper manner, the men can be trained to work and drill with great rapidity and precision without loss of cohesion, as each man's individuality will be developed, and his intelligence sharpened, and what is equally important, his interest in the work will be enlisted, and the dull monotony of the present routine relieved.

Doctor Warre in his able lecture here last month, in speaking of minor tactics, said—"These again have drill as their ultimate foundation, and depend for their success very largely upon its perfection," and I say that it again depends largely for its perfection upon the physical training and condition of the men.

Then there is another thing that I cannot help thinking is a very great mistake, viz., that more encouragement is not given to the Infantry soldier to become proficient in the use of the bayonet. I have heard it argued that he should never actually defend himself with it, but should rely on the quick shooting power of his rifle, if so, why give him a bayonet; but if you do give him one, you should teach him how to use it, which I maintain you don't. I think that the Government ought to give prizes for skill in the use of the bayonet, on somewhat the same lines as prizes for swordsmanship are given in the Cavalry, and the winners of regimental and company prizes should be allowed to wear crossed bayonets on the arm in gold or worsted. You may rely upon it that it would be attended by very good results, and apart from the benefit to the individual, we should not see, as we now do, more cavalymen and artillerymen enter for the bayonet competitions at the several tournaments and athletic meetings than infantry.

As I have previously said, more officers and non-commissioned officers qualified to instruct are required in every battalion before the system I advocate can be established, and before these could be instructed it would be necessary to build us a large, properly planned Head-quarter Gymnasium and "School of Arms" here, as in the wretched place we have at present (one of the worst in the kingdom) we have not room to train in the way I should wish the numbers now attending, and it would be simply impossible to take on many more. Among other innovations I am anxious to have an Officer of the Army Medical Department specially detailed to give a series of very simple lectures on anatomy, the muscular system, and circulation of the blood, &c., and a few practical lessons in the art of bandaging a fracture or dislocation in the event of an accident, for the benefit of the officers and non-commissioned officers qualifying as superintendents and instructors, so that they should know what to do, and what not to do, in cases of emergency, until medical assistance could be obtained. But a quiet room must be provided before this can be done, as it is impossible to teach men subjects of this sort in a small building where from 1,500 to 1,800 men are trained in the week.

I am convinced that a system of training of the character I have described is a great and pressing want in the service at present, and

this is admitted by many officers of high position and great experience, and I may say that I have not met with a single officer who has given the subject any thought, with whom I have discussed it, who has not admitted its necessity, although perhaps not agreeing altogether with me as to its practicability, or as to the method of carrying it out; but that sooner or later it will be accomplished I do not for a moment doubt.

If these few words of mine make any favourable impression on the minds of some of those who have hitherto not carefully thought over the question, or who may not for reasons of their own be in favour of what I advocate, or who have considered it one of secondary importance, I shall be more than repaid for the trouble I have taken in preparing this paper. Depend upon it, that (other conditions being equal) at the critical moment, when victory is trembling in the balance, the scale will be turned in favour of the commander whose troops are the most physically fit, and it is false economy on the part of the nation, and cruelty to men, to expose them to the hardships and privations of war, to the fatigues and exhaustion incidental to a campaign, without previously fortifying their constitutions, and storing up for them that reserve of vitality, strength, and endurance upon which they will most assuredly have to draw, and without which they must inevitably break down.

A few more words and I have finished. As I said at the commencement, we have, I believe, in our young soldiers a splendid material to work upon, and, as we know, it is a costly one; let us therefore economize it. At the early age we take them they can be usefully trained, but we have it on the highest authority that no man under 20 can be regarded as an efficient soldier, or fit for active service. We should, therefore, train him very slowly and progressively, asking him to do nothing beyond his powers of endurance, and we should gradually effect the adaptation of his heart and lungs to the unaccustomed labour they are called upon to perform. Lastly, we should encourage him to play cricket and football, and all other manly games, to bathe and learn to swim whenever an opportunity offers, and by every means in our power let us wean him from drink and dissipation by offering him strong counter-attractions in the shape of wholesome amusements of an evening in barracks, and we should make the best arrangements we can to enable him to get a square meal at night at the lowest possible price, and rest assured that the reward of such exertions will be less crime, higher morality, and greatly improved physique.

If we only go the right way to work, I can see no reason why it should not be said in the future, as it has been in the past, that the British Infantry is the finest in the world.

The CHAIRMAN: I hope, amongst the officers present, some will give us their views on the important subject before us.

Major-General HAMMERSLEY: I have been asked to start the discussion on the interesting and instructive lecture to which we have just listened. Now a discussion must necessarily to some extent mean a difference of opinion, and as I concur in almost everything the

lecturer has said it is rather difficult to start a discussion. There is one point, however, in the lecture to which reference has been made, which you might permit me to direct attention to. I mean the want of interest in, and in some cases active opposition to, the system of physical training. Now you know that in the army all novelties are disliked. I recollect when rifles were first introduced, it was with the greatest possible difficulty that we persuaded old soldiers that the rifle was better than the old "Brown Bess," with which a man could scarcely hit a hay-stack at a hundred yards. It was the same with the introduction of gymnastics. It is not altogether inexcusable is this objection on the part of commanding officers. Slow movements on parade are not likely to disclose any defect in physical training, and therefore any defects in such are liable to escape notice. If officers commanding would test the physique of their men by a few movements at the "double" they would very soon discover whether the physical training of the men had been attended to or not. In these times of rapid rushes it is of the greatest importance that men should be able to cover 300 or 400 yards of rough ground at a rapid pace, and at the end be in proper condition to use the rifle and bayonet, and this it is impossible to do without training. I am inclined to think this prejudice is caused more by want of knowledge of the system of training than by any actual dislike to the training itself, and I am in great hopes that the plan of having one or two officers and non-commissioned officers instructed in each battalion will cause the prejudice against it to cease altogether.

Colonel CREALOCK: Although as an ex-commanding officer I must sympathise with commanding officers, I wish to say nothing to run counter to anything our excellent lecturer has said. Every one cannot pass their youth and reach my time of life without knowing something of the enjoyments to be got from physical training, nor can commanding officers fail to feel pleasure in seeing their men get over the ground and still have the breath in their bodies. I must honestly say there is not the prejudice on the part of commanding officers there was formerly—30 years ago. If we introduce this thing to commanding officers and officers of regiments, instead of putting it down their throats, I am inclined to think we shall meet all we want. There is an idea among some of the men of the regiment I commanded that there should be an increased ration at the expense of a portion of their deferred pay, and I think, judiciously done, this might be beneficial.

Major-General SMITH: I am fully alive to the importance of this subject, my first remark is not by way of running counter to the lecturer, but rather to strengthen his plea. One of his conclusions is that muscular development is not inferior to what it used to be; my impression is that it is. Life is now very different to what it used to be. We have had within recent years an introduction and development which I believe, when history comes to be written, will be put down as the cause of a national falling off in this respect. That is steam. Steam is indirectly altering the habits of the people. Instead of walking from place to place as people used to, they go by train;

the carpenter stands by and sees the wood sawn, instead of doing it himself, and the blacksmith stands by his steam hammer instead of wielding a hammer himself. It is the same wherever you go—steam is producing a great depreciation of muscle. On this account we consider the recruit, as we get him, to be not so good as the one we used to get; but whether good enough for the purpose in other respects is of course a different matter. I can endorse Colonel Onslow's remarks as to the possibility of rectifying this state of things and bringing the soldier up to a standard more nearly approaching that of the olden times. I have myself noticed the difference between two regiments, one of which has had better opportunities of physical development than another. One regiment had been at the Cape some months and had been accustomed pretty well to marching, and another had only just arrived. In the former instance the regiment marched a great number of miles, but the men of the other after 5 miles were so exhausted that the camp had to be pitched as they could go no further. Therefore I believe Colonel Onslow when he says that by properly training the soldier you can create a reserve of strength which may be drawn upon when required, and you will have a man equal to anything he may probably be called upon to do. In the strength of the soldier lies the foundation of success in a campaign. The weakest will go to the wall. Successful plans will be of no avail without physical strength, because everything has to be done by flesh and blood. Then again a strong man is best in another respect. He knows that as soon as he can get at his enemy he can overcome him, and he tries to get at him, whereas the sickly man tries to keep as far away from him as he can. Then remember that men without physical training are more liable to fill your hospitals and do more harm than good. And lastly, if we have war at any short notice we shall have no time to look about us and prepare our men. We want a system of training that will always keep the men ready to withstand hardships. I felt very guilty when commanding officers were referred to who did not like gymnastics, for when I was a commanding officer I did not like it. (Laughter). Men were marched away from under our eyes and we used to ask ourselves if the time was not wasted. And to a certain extent it was wasted, for gymnastics were carried out in no practical way. If it had been otherwise I, perhaps, with others, should not have objected. They were put through a course for two or three months and then nothing more was thought of it. We were annoyed at it, but if it had been a more practical course with more lasting results, we should not have objected in the way we did. With regard to the question of food, I have always maintained that it was not "ample." In the confidential reports which required me to say whether the food was good and ample, or otherwise, I have always said it was "good, but not ample." At the same time doctors declare that on scientific principles it is enough. The soldier is a servant of the State and he performs the State a certain service which expends certain energy, and scientific men declare the food sufficient for the work done. If that is so, of course it is only fair if a man has more food than he should pay for it himself. The

duty of the State is to supply the waste caused by the service. I agree with Colonel Crealock that it ought to be done on some principle or system, and the waste supplied. All food used after that is a matter of luxury. But the medical officers assure me that it has been gone into and they do not consider it too little. I think when men are put in the army they should be trained in every way; you train a man's body, mind, and discipline, why should you not train his appetite? After the hours of his meals, give him a luncheon of bread and soup, and see how much better he will work; give him as long as he likes at his dinner; and at field days let him take a quarter of a pound of bread and cheese in his haversack. By a judicious diet and system of physical training the small men in the army might be made active and the big men strong; thus the great object will be attained and our Infantry will be justly entitled to be called the best in the world. (Applause).

Colonel COKE: Considering the multifarious duties of the soldier and the importance of his shooting and military training, I really do not think it possible at the present time to give the extraordinary time to physical development which seems to be wanted. I agree that it would be a good thing if soldiers could dine at 8 o'clock, but I am afraid it would interfere with their walking out, and walking exercise is very beneficial. The other day four officers showed what could be done in this direction by marching 35 miles in one day with full kits. I don't say that four men out of the ranks could not have done the same; they ought to do it better. But you will not find so many men who would do it as you would officers, for the simple reason that they do not get so much walking exercise.

Major-General BUCHANAN: Allusion has been made to the difficulty of carrying out a system of training in Aldershot. You will find it more difficult elsewhere, particularly in Ireland, where it is with the greatest difficulty men can get four nights in bed. The very fact that physical training strengthens the muscles of the arms and conduces to good shooting is sufficient justification for what Colonel Onslow has said. But I am afraid that as ours is a volunteer army, if you increase the duties of the soldier too much it will militate against recruiting. Still I sincerely hope that more attention will be given to gymnastics, which, it seems to me, is most advantageous.

Major FOX: In addition to the regular course of physical training, we want an improvement on the existing athletic meetings, where individuals are matched against each other. We want inter-regimental athletic sports, where the science of drill is also brought in, and where each regiment would send say 60 men who would have to run over a three-mile course in so many minutes, surmount certain obstacles, and do certain military work of a similar character to that on active service. This would test the combined powers of a regiment, instead of the exceptional powers of individuals.

Major WHITE: We tried the experiment of giving the men an evening meal and it had the effect of reducing drunkenness some 30 per cent. at a very disagreeable station. It has been said that the British Govern-

ment only gives enough food to the soldier to keep up the waste. If he is now required to do more work we might reasonably ask for more food.

Colonel HARRISON: I have had some experience and I am a great advocate for "system." A great difference between a good school and a bad one is that the good one has system and the other none. If all our institutions were carried out systematically there would not be an hour, let alone a month or a week wasted. Every bit of food a soldier eats should do him good, and every bit of instruction he gets should help to fit him for a good soldier. What I should like to see is that everything that is done for the soldier—whether in the form of physical or mental training—should be done with a practical object, and that the soldier should be taught that it is for his benefit.

The LECTURER in reply to some of the previous speakers said: Colonel Crealock remarked it would be very much better if this were left to the commanding officer instead of his having it rammed down his throat. I should be the last man to ram anything down anybody's throat except more food down the soldier's throat. (Laughter). I certainly do not want to ram my hobby, if you might call it a hobby, down anyone's throat. What I want to do is to get commanding officers with me, and when that is done my point is carried. I wish to avoid friction and I always try to avoid it. I think my remarks on the physical condition of the modern soldier were a little misunderstood by General Smith. I agree entirely with him that steam has detracted from the muscle of the recruit, and that is all the more reason for improved physical training. General Smith says some scientific gentlemen say the food of the soldier is enough. Dr. Aitkin, of Netley, a high authority, says it is not ample. I am of opinion that we should not only see that the food is sufficient, but give the man a little bit over. You don't want simply to keep the man alive, you want to put some pluck and strength into him. I am more pleased than I can say at the interest taken by you in this subject, although there has been a good deal of difference of opinion (No, No), and I venture to say that the more you think about it the more important you will see it is. (Applause).

The CHAIRMAN: It only remains for you all to join with me in offering to Colonel Onslow our heartiest thanks. I can only hope the keen interest he feels in this subject will be participated in by all present, because it is for the benefit of the soldier. I entirely endorse the lecturer's remarks about the food of the soldier. If you go through the barrack rooms you will find a regiment as regards dinner is rather badly off, particularly as to meat, for after the bone is removed there is scarcely anything. With regard to the question of gymnastics, I may say I have seen the full benefit of it and I hope to see the suggestion made by Colonel Onslow carried out, and I might be allowed to suggest, in addition, that commanding officers should combine ambulance drill with their gymnastic course as is done at Sandhurst.

SPOTTISWOODE & CO., NEW-STREET SQUARE, LONDON
1888



GENTLENESS IN SURGICAL PRACTICE.

WELCOME to Surgeons on Probation—Death of Dr. Lewis—Subject of address—Some effects of the change from a depressing treatment of disease, to a mild and supporting treatment, as shown by the change in treatment of Ophthalmia—Personal experience of variations in treatment of ocular inflammation—Mercury in the treatment of Eye disorders—Example—Ophthalmia in the British Army in Egypt in 1801 and in 1882—History of the epidemic in 1801, with an account of the treatment of the ophthalmic patients on that occasion—The epidemic in the French Army in 1801 near Alexandria—Special Medical Board on Ophthalmia in England in 1810—Treatment of Ophthalmia in 1838—Treatment in 1882—Changes of treatment in other diseased conditions.*

SURGEONS ON PROBATION:

As this is the first formal address of the present session, I bid you welcome to Netley in my own name and in the name of my colleagues. As you know, you have come here to go through certain courses of special study with a view to increase your fitness for undertaking the duties of surgeons in Her Majesty's military service in the various parts of the world under British rule, and I will only now say in regard to this topic that, while the purpose of your coming must be always kept steadily in view, it is the desire of everyone concerned in promoting that purpose so to arrange the work of the session that your time at Netley shall be passed no less pleasantly than usefully. You will shortly have

* Limit of time compelled some of the illustrative examples which are here printed to be omitted on the occasion of the delivery of the Address.

full opportunities of hearing what the different departments of study are, their particular objects, and how they are conducted, and I do not propose to allude further to these matters now.

Before I enter upon the particular topic to which I am about to invite your attention, I feel it incumbent on me to say a few words respecting one of our staff who has recently passed away from among us—the late Dr. Lewis, whose co-operation we who have been his colleagues shall greatly miss, and whose valuable services you will unfortunately lose, during the ensuing session. Although you may have been strangers to Dr. Lewis personally, you must have all heard of him as the discoverer of that remarkable disease in which the blood of the patient teems with myriads of living worms—the *Filaria Sanguinis Hominis*—but to myself, and to others who are here, he was known from the beginning to the close of his career in the public service. To us he was known as a thoughtful physician, open-hearted cheerful companion, and true friend, while such were his powers of investigation, depth of knowledge, earnestness, and perseverance, that we regarded him as destined to achieve successes in the department of science to which he had devoted himself of still higher value than those he had already accomplished. Now, so far as we who were his friends and admirers are concerned, there remain only the recollections of past association, a sense of satisfaction in his worth and work, and sorrowful regrets at the abrupt termination of his useful life; but to you who are only at the beginning of your course in the public service, Lewis's life furnishes some lessons that, properly appreciated, may be of the utmost advantage to your own. To some of you his history may afford encouragement and support, to others act as a stimulus to increased devotion to scientific work, to all it may well furnish an example for imitation. Have

any of you not had the pecuniary resources which some of your fellow-students have had, not the help of relatives and friends which others have enjoyed, or still enjoy, to smooth the way in your professional progress? Take encouragement from the fact that Lewis possessed none of these advantages at his start in life; but nevertheless, by his own independent exertions and determination of character, he succeeded in attaining all the qualities of an educated gentleman, and the status in the medical profession at which he had aimed. He was not satisfied with simply getting an established footing in our profession, but, from the first, he sought distinction in it. When he determined to compete for an army commission, his ambition led him to try for the first place in the competition; and having obtained that, when he came to Netley, his efforts were all directed to maintain the same leading position here, and they were again followed by the result he desired. Perhaps some may think it questionable, since only one in a class of competitors can gain the first place, whether this solitary chance is worth the labour of the struggle. If such a question were put to me, my reply would be that the exertion, if honestly made, will certainly meet with adequate reward, and here we have an instance in proof of it. It is something to avoid the disheartening consciousness of not having done one's best, but, beyond that, exertion of the kind soon assumes the nature of a habit, and the habit, whatever else it may lead to, will almost certainly attract the notice of some who may have the power to help you on your way in the future. In Lewis's case, his habits of real work convinced those about him that he had the necessary qualities for high professional trust, and hence it was that the professors of the school addressed the Government, through the School Senate, on the benefits that might accrue to science and the public service if, after

some further preparation in Germany, Dr. Lewis were entrusted with an important mission in India concerning the causation of cholera—a subject which, in consequence of certain theories of the time regarding it, was then attracting particular attention. The Government sanctioned the expense entailed in the suggested course of scientific investigation and study in Germany, and also acceded to the exceptional employment which had been asked for Dr. Lewis in India. The large amount of useful work accomplished by Dr. Lewis in India was a complete justification of the decision at which the Government had arrived, and the value of that work has been further stamped by the fact that a short time before Dr. Lewis's premature death he was chosen by the Council of the Royal Society to receive the honour of its Fellowship. Dr. Lewis's writings are to be collected and arranged by a committee of his friends, and they will be preceded by a sketch of his life which has been written by his friend, Professor Aitken.* When they are thus rendered available for reference, I hope you will take an opportunity of making yourselves acquainted with them; you will find they contain an ample justification of the advice I have given you to follow their author as a guide in shaping the course of your own professional work in the future.

I will now turn to the subject I have selected for present consideration, viz., the influence of certain changes in professional practice on the results of disease. The particular alteration of treatment which is uppermost in my thoughts is that from what, relatively speaking, may be said to have been violence to one of gentleness in surgical practice. By violent treatment I understand one in which the measures employed are such as act powerfully in depressing a

* This has since been done.

patient's constitution; by gentle treatment, one in which the vital powers and physical endowments are carefully guarded, while the remedies used to combat the disease are not of a nature to lower, or otherwise injuriously affect, the patient for any lengthened period. I might select several of the numerous disorders that figure in the list of our army medical returns to illustrate this text, but I have chosen Ophthalmia as a serviceable one for my purpose. Some surgeons attach little regard to the effects of the changes in the treatment of ophthalmia, but attribute the diminution in the severity of its symptoms and in the proportions of loss of sight consequent on it, as illustrated in the last Egyptian campaign of 1882, exclusively to sanitary improvements. But the improvements in treatment have also been most remarkable, and the beneficial results of these changes cannot wisely be disregarded. It will probably be found, on full and impartial inquiry, that bad treatment has been no less powerful for harm than bad sanitation, and better treatment no less beneficial than improved sanitation, so far as regards their respective effects on ophthalmia. Personally, I have a strong conviction that the violent treatment formerly in vogue had a greater share in producing the severe and unmanageable symptoms, and frequent instances of ocular disorganisation and blindness, which attended the ophthalmia of old days, than even bad hygiene. But the relative amount of mischief due to these two causes is not a subject on which I feel inclined to dogmatise, although knowing the effects on myself, and from having observed the effects on others, of various kinds of treatment for ocular inflammation without any change at the same time in conditions of sanitation, I am not without some justification for the opinions I hold on the subject.

I will first take an illustration of the effects of a

change from rough to gentle treatment of inflammation of the eye from experience in my own person, and afterwards consider it on a larger and more important scale in army practice. During the second winter of the Crimean campaign I occupied a small but compact stone hut, originally constructed for an officer who was mortally wounded at the final assault of Sebastopol. It was a luxuriously comfortable residence by comparison with the much worn and threadbare bell-tent in which I had passed the first winter, yet while I came out of the first period, in spite of the exposure to very cold and severe weather, and of many privations, without any rheumatic affection, though, like others, with a certain amount of scorbutic taint, and much weakened in constitution, I became saturated with rheumatism and suffered severely from sciatica toward the close of the second winter. Shortly after my return to England, in 1856, I was with my regiment in camp at Aldershot, where I had allotted to me two quarters of limited dimensions in a wooden hut. The leading features of an Aldershot quarter are well known to everyone who was familiar with the camp at that time: how that the occupier could open the window, shut the door, or stir the fire, without moving from his bed wherever he might place it in the apartment, but by no means could avoid being constantly in a draught of air. It was under these circumstances, and not having yet recovered my normal amount of strength, that I became the subject of ocular inflammation: firstly, acute conjunctivitis, then scleritis, and finally cyclitis, including iritis. A medical Board recommended my speedy removal from the camp, and I accordingly left and placed myself under the directions of a friend who at the time was ophthalmic surgeon of one of the largest hospitals in London. He at once adopted the orthodox treatment of the day. I was brought as quickly as possibly under the constitu-

tional influence of calomel as evinced by salivation, and at the same time subjected to various other depressing measures, the object in view being to reduce by their agency the local inflammatory action and to alter the conditions which favoured it. In spite of these active measures, however, as they were called, the inflammation did not subside; on the contrary, I had numerous repeated exacerbations of it while I was under the treatment. These were said to be due to the obstinate character of the disorder, which was then described as 'recurrent iritis,' as if the recurrence were characteristic of some special form of the inflammation. The general result was that I was kept for a period of about six months on fish diet, and all the while under the continued influence of what was regarded as a moderate employment of mercury—'given as an alternative and just enough to keep the gums tender.' Fortunately for me, it was considered that I had become too weak in constitution from exposure in the Crimea and long-continued illness for the employment of general venesection, and the blood-letting in my instance was limited to the occasional application of a few leeches. I eventually came out of the ordeal without any permanent impairment of central vision, though, owing to adhesions being established between the iris and lens capsule in each eye, my power of accommodation became interfered with, and I was left with the minor inconvenience that attends deficient power of pupillary expansion on going suddenly from a place that is fully lighted into one that is relatively dim. At the beginning of the year 1857 I was ordered with my regiment to India where the Sepoy mutiny was still in progress. At the time the order was received my eyes were free from all acute inflammation, but the sclerotics were chronically more or less injected and tender, and slight irritation sufficed to redden the conjunctivæ.

I doubted what might be the effect of the free currents of air on board ship, and especially of the long-continued glare of tropical light and the dazzle of the sun's rays reflected from the sea, for we had to sail round the Cape and up the Bay of Bengal to Calcutta, but so far from any harm resulting from the exposure, the omission of the medicines I had been previously taking, and the use of the ordinary diet of the ship, I landed in India with my eyes free from congestion, and stronger than they had been since the onset of the attack. Nor had I any return of inflammation in either eye during the time—about two years and a half—that I remained in that country.

On subsequently reflecting upon these occurrences, the conviction fixed itself strongly in my mind—so slight had been some of the causes that had sufficed to bring on sudden accessions of inflammation while I was under the mercurial treatment—that these accessions had been less due to the external causes to which they had been then attributed than they were to the poisoned and debilitated condition of the structures upon which the causes acted. On one occasion, when I had been taking a vapour bath, in going from the door of the house to the closed cab which was waiting for me—although none of the usual precautions were neglected—a stabbing pain darted through one of my eyes, a pain which still returns vividly in imagination when I think of the occurrence, and this brief and apparently trifling exposure was the origin of a fresh severe attack, and, with it, a fresh accession of the mercurial treatment which I now look back upon as having been more hurtful than the disorder itself.

I have lengthened notes of the case of a relative, who was subject to attacks of iritis for many years. The first, very severe and prolonged, was in the year 1845, when he was thirty-five years of age, and this

was followed by other attacks at intervals of a few months for twenty-four years subsequently. He was under the care of successive oculists, the most eminent in London, during this period. All administered mercury—not only while the attack was in progress, but also afterwards to remove its effects—to clear the vision. On each occasion he was confined to the house for several weeks, and each attack left him deteriorated in health. About the year 1869 he was advised by Mr. Alexander, the oculist, whom he consulted when suffering from an attack, to omit the use of mercury, and though he had various attacks afterwards down to the year 1883, they were all got rid of in a few days, without any resulting injury to health, under such gentle treatment as exclusion of light from the inflamed eye by moistened spongiopiline pads, temporary abstinence from animal food, and saline medicines. No attack has occurred since 1883.

Mercurial salivation is not wholly abandoned as a panacea in eye disorders. About two years ago a workman came to me from the shipbuilding works at Woolstone, and begged me to do something to relieve him from the pain in one of his eyes that had become blind and was torturing him beyond endurance. While he was speaking to me he had to keep a handkerchief to his mouth on account of the profuse flow of saliva. The history he gave me was briefly this—A week before he had been struck and badly bruised in the eye by a piece of iron. There was no cut. For the first three days he could see a little—only dimly—as if he were looking at things in a fog through a piece of red glass. Then even this amount of sight left him, and now all was completely dark to the damaged eye. Immediately after the accident he had taken the advice of a medical practitioner, who had ordered him a course of mercurial pills. When I looked at the eye, I saw it was filled

with pus and completely disorganised. The pain he was enduring was the pain of an abscess pent up in dense, unyielding structures. I think you will feel the same difficulty that occurred to myself in this case—the difficulty of comprehending how benefit could be expected to result from such a rude method of treatment; and perhaps also you will be inclined to join with me in doubting whether, if perfect rest of the organ had been secured by the exclusion of all light from the eye in its injured condition, cooling dressings applied to it, suitable regimen enforced, and the general health regulated by ordinary medicines of the simplest kind, vision might not have been saved and at the same time great suffering and loss prevented.

I will just add one or two more observations from my own case. I remained free from eye attacks for about ten years, when, in February 1868, I had rather a severe one, and after that I had several others, the last being in November 1871. Since that date I have not had any attack worth notice. For two or three years I remained liable occasionally to isolated patches of conjunctival and sclerotic congestion, and localised tenderness, after some unusual exposure, but they never caused me more than very temporary inconvenience, and for the last ten or fifteen years I have been free even from these slight attacks.

The attacks between 1868 and 1871 taught me several practical lessons, which it is not likely I should have learned so thoroughly had it not been for my personal experience. The severe attack of February 1868 originated in an accidental blow, rather a violent one, on my left eye, followed by exposure on the following day to a prolonged storm of cold wind and rain for several hours while I was superintending the landing of a large party of invalids at the Netley pier. Although the experience I had already gained made me

avoid all mercurial medicines, I believe that the treatment adopted was still needlessly depressing, especially as regarded the amount of blood removed locally by leeches, and that the relapses that followed were partly due to general weakness caused by this loss of blood, and partly to unwariness in some matters, the power of which for evil was not sufficiently estimated by me at the time. It is to a better appreciation of such things that I attribute my entire freedom from ocular inflammation of late years, and the ease with which for some time previously I had got rid of the indications of an approaching attack whenever any signs of one accidentally appeared.

My attack in 1868 was certainly prolonged by impatiently exposing the eye to light, and trying to use it before it had sufficiently recovered from the deteriorating effects of the injury and the inflammation it had undergone. I have known better since that time, that the total duration of ocular incapacity is shortened by a due prolongation of abstinence from early exertion; by not exposing the eye that has been inflamed to the stimulus of light, or to visual exercise, or to sudden reduction of temperature, until it is well and strong enough to bear with impunity the strain which such exposures entail. Experience has taught me that a comparatively slight abuse of the weakened eye in any of the directions I have named can easily become the starting point of what may prove to be a severe relapse of disorder; at the same time I am well aware it is not easy for those who have not had a similar experience to appreciate this fact to the full extent it deserves.

Another lesson my experience taught me, and one which it seems worth impressing on others, is the wonderfully small amount of injudicious interference, or apparently small amount, which will suffice to induce a considerable increase of the existing mischief in disorders of

the eye. During the period of occasional eye attacks from which I suffered between the years 1868 and 1871, probably nothing excited more dread in my mind than the prospect of a close examination of the inflamed eye by some surgical friend. Persons, from not themselves feeling it unpleasantly, are apt to forget the amount of muscular power that may be exerted by the pressure of a finger, or between the thumb and forefinger, but those who have happened to undergo pressure of the kind when the parts subjected to it have been in a disordered and abnormally sensitive condition, are soon made painfully conscious of the fact that a very considerable amount of force may be thus brought into action. I learned more than this—I learned what mischief may be done to an inflamed eye, not only by rough handling, but by any fingering at all, however gentle. Occasionally, when some of the vessels of the sclerotic were visibly injected, the mere application of a finger accompanying the inquiry—Is it tender there?—has been followed by aching for hours, and has sufficed to aggravate the attack and extend its duration. My personal experience in this respect has made me very chary of exerting digital pressure on an eye inflamed in any part, and has led me to examine tender eyes, when the touch is necessary, with an amount of caution that I know has often appeared fanciful to bystanders. I sometimes meet with surgeons who do not seem to consider pain inflicted in this way as being of any moment. They regard the shrinking from the approaching touch as a mere act of exaggerated sensitiveness or timidity on the part of the patient that does not deserve attention. Might it not be regarded, however, with more justice as an instinctive act of defence against threatened injury? I am convinced that you cannot inflict any degree of pain by pressure or by any other means in the examination of an inflamed eye—perhaps

I may say on any part of the body in a state of inflammatory disturbance—without adding to the existing mischief; the addition being in direct relation to the amount of pressure exerted, and sufficiently indicated by the amount and persistence of the pain resulting from it.

I will now bring to your notice, as far as time will allow, the effects of ocular inflammation as they have been presented on a large scale at two different periods in army practice. A British force was engaged in military operations in Egypt at the beginning of the present century, and again four years ago. In both British expeditions an epidemic of ophthalmia prevailed to a large extent among the troops, but in the first expedition the ophthalmia assumed symptoms of such intense severity, and led so frequently to destruction of the eyes and loss of sight, that it was regarded by many English surgeons as a specially malignant inflammation, and was designated 'Egyptian Ophthalmia,' while in the second expedition the inflammation did not assume any such intractable character, and most happily was not followed by loss of sight in a single instance. On the first occasion, as will be shown more particularly presently, the disease became highly contagious, and was widely diffused in consequence. Its communicability from person to person led to its transmission from older to younger soldiers, and from regiment to regiment, and so it happened that it was only after many years had elapsed that the ophthalmia was eradicated from the regiments of the British army in which it had prevailed. On the second occasion the epidemic of ophthalmia quickly subsided, and the disease disappeared shortly after the campaign was concluded.

The published records of the first campaign do not show that there were any differences between the climatic and sanitary conditions then met with locally

in Egypt and those experienced in the second campaign in 1882. It is very improbable that there was really any greater virulence in the ophthalmia itself which the troops contracted in Egypt in 1801, than there was in that with which the troops subsequently became affected in 1882, and the question naturally occurs, when the contrast between its effects on the two occasions is noted, whether some difference in the mode of treatment might not have influenced the different course which the inflammation followed, and produced the difference in its results. Even admitting that the troops sent to Egypt in 1882 were less susceptible to the disease, which is probably true, owing to the more hygienic conditions under which they had been previously living than those who were sent to Egypt at the beginning of the century, this will surely not satisfactorily explain the different consequences of the inflammation when once the men had been attacked by it in that country.

When, however, we sift the question of treatment, we find that the contrast between the symptoms developed in the course of the inflammatory action in the two expeditions is not more remarkable than is the difference between the modes in which the ophthalmia was dealt with on the two occasions, and, further, when the probable effects of these different kinds of treatment are fully considered, the differences in the course followed by the disease subjected to them, and in its results, will, I think, be in a great degree explained.

The second experience of the British army in Egypt with respect to ophthalmia enables us to explain with more confidence various points which were subjects of doubt and of frequent deliberation by military surgeons, and civil ophthalmic surgeons also, at the beginning of the present century and for many years subsequently. The complete lesson taught by the two outbreaks is

somewhat analogous in its nature to the instruction afforded in another direction by the experience of the Crimean war, in which two armies, placed side by side, subjected to the same influences of soil and climate, engaged in a similar service, yet presented diametrically opposite conditions with respect to sickness and mortality, each army in turn being in a high state of health and efficiency at the very time when the other with which it was allied was laid prostrate by debility and disease.

It is not likely that many of you have heard much about the first of the two outbreaks of ophthalmia to which I have alluded, and yet its history is of enduring interest in surgical science whether we regard the occurrence simply as an historical event, or consider the value of the instruction that may be derived from it. As the severe treatment which prevailed at the time seems to me to have been the most active agent in causing the special characters of the ophthalmia, the violence of its symptoms, and the loss of sight which attended it, the outbreak, from its extensive nature and striking features, will well answer by way of contrast the object I have in view, of impressing upon your attention the importance and value of what I have ventured to call 'gentleness in surgical practice.' I will, therefore, invite your attention to a rapid sketch of some of the most salient facts connected with this early outbreak of ophthalmia, and the manner in which it was dealt with.

In the spring of the year 1801 a British army, under the command of General Sir Ralph Abercromby, fought a memorable battle against the French at Alexandria. At the same time a force was brought from India to Egypt, just as was done again in 1882, to co-operate with the troops sent from England. The Indian force was under the command of General Baird,

and Dr. McGrigor, Surgeon of the 88th Regiment, subsequently Sir J. McGrigor, Director-General of the Army Medical Department, whose admirable portrait, painted by Sir D. Wilkie, may be seen in the messroom, was appointed its medical chief. He subsequently, in 1804, published a volume entitled 'Medical Sketches of the Expedition to Egypt from India,' and in this work he gives an account, though only a brief one, of the ophthalmia which prevailed among the troops. His words regarding the ophthalmia are that it was 'next to the plague in importance,' and he describes it as being 'though less fatal, a more distressing malady.' Of the Indian contingent, which was under his own medical direction, he mentions 'fifty were sent home invalids from blindness; most of them from the 10th and 88th Regiments' (*op. cit.*, p. 147). Assistant Surgeon Dr. Power of the 23rd Regiment who served in the campaign published a work (Lond. 1803) entitled 'An Attempt to Investigate the Cause of the Egyptian Ophthalmia,' and he describes it as 'one of the most dreadful diseases that has ever visited mankind.' Many similar remarks might be quoted, but these will suffice to show how little control the English surgeons of that day had over the disease. The suffering that accompanied it is described as being terrible. That it must have been so can be readily understood, for it is mentioned in the reports of the time that the ophthalmia usually became purulent; that, in spite of the treatment adopted, the inflammation in many instances did not remain limited to the conjunctiva and superficial parts of the eye, but spread to the whole organ; and that the ophthalmitis thus established went on until the attack ended in suppuration of the globe, disorganisation of the eye, and, of course, total destruction of sight.

In the same year (1801) that ophthalmia was producing such disastrous results in the British army, the

disease was also very prevalent among the troops of the French army. We have an account of this epidemic related by Baron Larrey, who was Surgeon-in-Chief of the expeditionary forces under Bonaparte.* He describes the French army marching from Cairo to repulse the English who had landed at Aboukir, and relates that after the battle of March 21, 1801, the heat by day, the heavy work of the entrenchments, and the coldness of the nights, increased by the mists from the lake Mareotis, on the borders of which the troops were encamped, soon caused ophthalmia to appear among them. In the space of two months and a half upwards of three thousand ophthalmic patients were treated in the hospitals, and so successfully that not one single man lost his sight out of the whole number ('il en est résulté que, sur trois mille et quelques ophthalmiques, il n'y en a pas eu un seul qui ait perdu la vue'). It is noteworthy that Larrey mentions only local bleeding was employed, and that to the slightest amount, being limited to superficial scarifications of the skin (*mouchetures*) of the temples and eyelids. He expressly states that general bleeding was not suitable, 'la saignée générale ne convenait point' (*op. cit.*, p. 218). There is not the least ground for supposing that the French troops were in a more sanitary condition than the British at this time. On the contrary, knowing that they had already been nearly three years in Egypt, that many of them had previously suffered from ophthalmia on the Nile and at Cairo, we may be sure that there would have been few eyes among them, if they had been examined, that would not have presented the hypertrophied conjunctival papillæ and follicular granulations to which so much attention has been given of late years by all observers of ophthalmia, and that, in fact, the men of the French army must have been

* *Campagne d'Egypte, Mémoires, &c.*, i. 217.

quite as susceptible of the disease, and of the disease in its worst forms, as the men of the British army could have been at that time. We are thus forced to the conclusion, on considering the different results of the ophthalmia on the two armies in 1801, placed almost side by side as they were in the same climate and in the same part of Egypt, that it must have been mainly to differences in treatment that the difference in the course and results of the disease was due.

But the distressing, and almost intolerable, symptoms which accompanied the ophthalmia of the British army in 1801, and the blindness which in numerous instances resulted from it, calamitous as these results were, do not constitute the worst features in the history of the visitation. As the ocular discharges had acquired an infectious character, the regiments of the expeditionary army in which the ophthalmia had been prevalent became so many nurseries, as it were, of the disease. Even after the army was broken up, the ophthalmia remained rooted in these regiments, notwithstanding their removals to other stations, and to different climates, and the disease was communicated by them to other regiments who had not been exposed to its exciting causes in Egypt, and in which it had been previously unknown as a prevailing disorder. The unsanitary conditions under which troops lived in those days, and the drinking habits of the time, favoured the spread of the disease and the maintenance of its virulent character. Ophthalmia thus became endemic in the British army.

There was no such prevalence of ophthalmia among the French troops after they left Egypt, notwithstanding that they had served for a longer period in the country than the British, had suffered from much more exposure and fatigue, and that they had been subjected to the depressing circumstances of defeat. This immunity from the disease after the French returned to Europe

was attributed by some English surgeons of the period to the active service in which the French became engaged on the Continent—proceeding from conquest to conquest, bivouacking in the field, or quartered on the inhabitants whom they subdued—so that dissemination of infection among them was prevented. Looking back as we can now do, it is certainly questionable whether the milder treatment employed by the French had not also an important influence in the result referred to.

In the British army, on the contrary, the disease became so widely disseminated, and the cases in some regiments were so numerous, that a suspicion arose, and in some of the newspapers of the time it was even asserted as a fact, that an extensive conspiracy had been formed among the soldiers of the army to malingering. A belief prevailed that the men produced the ophthalmia by artificial means in order to get themselves discharged from military service. We meet also with traces of another and different notion in the writings of the time, viz., that the men contracted the disease accidentally, but afterwards tampered with their eyes, not so much to avoid military duty as to escape from the confinement and depressing conditions to which they were subjected while under treatment in the hospitals. Those who held this view founded it on a belief that, owing to the numerous instances of blindness which occurred among their comrades in misfortune, the men, despairing of their own recovery of sight, did not hesitate to adopt measures for producing the very end which they dreaded but regarded as inevitable, so bringing their disease to its conclusion by a short and rapid, instead of a prolonged, course of suffering. I have arrived at the conclusion, after perusing many published writings on the subject, that both surmises were baseless, and that there was no general malingering.

ing or tampering at all. This view has been strongly expressed by Staff-Surgeon Farrell, who, referring to the opinion entertained by many military and medical officers that the soldiers wilfully produced the ophthalmia in order to render themselves unfit for service, remarks: 'I have now had under my care some thousands of ophthalmic patients, and I must confess that, although I have used a vigilance sharpened by a bias towards that opinion, I have not as yet been able to make out clearly a case in which the soldier produced the disease in himself by improper means, or even intentionally aggravated its violence' ('Observations on Ophthalmia, &c.,' Lond. 1811, p. 13). As I have already indicated, more extended experience seems to show that the virulent characters and blinding effects of the disease which led to the notion that the patients were tampering with themselves were really due to causes not at all suspected at the time by anyone, and certainly least of all by those in whose views of the treatment necessary for the cure of the disease they had their origin.

It seems not improbable that among other sources of aggravation of the condition of the patients who were attacked by ophthalmia some amount was traceable to the administrative arrangement by which they were congregated in special ophthalmic hospitals. These hospitals were established solely for the reception of ophthalmic patients, whether suffering from the disease in its acute or chronic stages. The convalescents from the disorder were also kept in them. Dr. Vetch* mentions that the ophthalmia dépôt for the exclusive reception of ophthalmic patients, under his superintendence, in the year 1808 contained 900 cases belonging to upwards of forty different corps (p. 184). It must be remembered that the ophthalmic hospitals were not at all analogous to the civil eye hospitals of

* *Diseases of the Eye*, by J. Vetch, Phys. to the Forces. &c., Lond. 1820.

the present time, in which the large majority of the cases treated do not consist of cases of superficial inflammations of the eye accompanied with purulent discharges. These, however, were just the kind of cases which were collected in the military ophthalmic hospitals of that day. The plan of segregating the men labouring under ophthalmia was adopted owing to the general belief in the contagious nature of the disease, and with the well-intentioned object of preventing its spreading among patients of other descriptions. It is only fair to mention that some of the officers, under whose advice these special hospitals were instituted, have recorded that they had the effect of diminishing the number of men attacked, and that the favourable results derived from them far exceeded their most sanguine expectations. This may have been strictly true, but, as regards the patients themselves who were treated in these special hospitals, there is evidence enough to show how greatly the close confinement, and the monotony of the existence in them from the very nature of their maladies, added to their misery. It can readily be imagined what deleterious effects, moral and physical, would probably result from herding together patients under the circumstances in which they were placed. The scenes in the wards, the severe sufferings of the patients in the acute stages of the disease, the depressing effects of witnessing their comrades deprived of sight in one or both eyes, together with the nauseating and lowering remedies employed, the frequent bleedings, the spare diet, &c. must have caused even a short stay in them to be trying enough; a prolonged confinement in them must have made men almost desperate. No wonder that Staff-Surgeon Farrell should have experienced the difficulties he describes in preventing the patients from breaking out at night and occasionally getting intoxi-

eating drinks, when referring to the 'hospitals for ophthalmic patients solely, usually containing from 100 to 150 patients or more' which had been under his care in Egypt and Sicily.

The ophthalmia, originated and propagated as described, did not lose its severe character as time went on, even in the temperate climate and under the clouded skies of England. Dr. Vetch, Assistant-Surgeon of the 2nd Battalion 52nd Regiment, which was not formed until November 1804, and therefore not exposed to the disease in Egypt, mentions that in the period of a year, between August 1805 and August 1806, there were 636 cases of ophthalmia admitted into the regimental hospital, and that of this number fifty were discharged with the loss of both eyes, and forty with the loss of one eye. The regiment was then quartered at Hythe, in Kent, and its strength was 691 men.

Now let us look at the mode of treatment in vogue. Mr. Peach, surgeon of this regiment, has recorded the treatment followed for the cure of the disease, in a paper in the '*Edin. Med. and Surg. Journ.*' of 1807, vol. iii. p. 54. He writes:—'It is not sufficient to abstract twenty or thirty ounces of blood. I have taken sixty ounces very frequently; enjoining perfect rest; avoiding the smallest portion of animal food; and putting in practice every other part of the antiphlogistic treatment. . . . The greatest reliance is to be placed on the strictest antiphlogistic regimen, and very liberal venesection.' And Sir J. McGrigor, then principal medical officer at Portsmouth, adds the remark to Mr. Peach's paper, that the practice so successfully had recourse to by Mr. Peach and Dr. Vetch in the 52nd Regiment had, to his knowledge, been carried out with success in the 89th Regiment, and in the 8th Veteran Battalion. Notice what was regarded as success in treatment at that time. Dr. Edmondston, who served

in Egypt in 1801, and who wrote a treatise on ophthalmia in 1806, also referring to the same battalion of the 52nd Regiment, reports that, 'although it has been removed to Maidstone, the Egyptian Ophthalmia continues to rage in it to a terrible degree.' In the year 1810 the number of soldiers on the pension list for blindness occasioned by the disease was so excessive, —2,317 is the number given for December 1, 1810, by Dr. Vetch—and purulent ophthalmia was still so rife in the army, that the Commander-in-Chief caused a special Medical Board to be assembled to take the subject into consideration. The most eminent civil physicians and surgeons of the day were associated with military surgeons on this committee, and the report made by them was embodied in a general order, and circulated for the information of the commanding officers of regiments, and for the guidance of all medical officers belonging to the army. As the treatment to be pursued in the disease formed part of the subject of the report, the document is still of importance as it remains a source of authoritative information on this point.

Independently of this source, however, the records of the treatment which was employed for the cure of ophthalmia in those days are very ample. The disease seems to have been regarded as an intense form of inflammation that had to be instantly reduced, and that could only be overcome by lowering all the vital powers of the patient. Hence copious abstraction of blood from the general circulation, salivation by mercury resorted to as an alterative (a term which, from a therapeutic point of view, seems to have had about as much meaning in it as amaurosis had before the discovery of the ophthalmoscope), nauseating medicines like antimony, very spare diet, local depletion by cupping and leeching, abscission of portions of the tumefied conjunctiva, repeated scarifications of conjunc-

tival vessels, and counter-irritation by blistering, constituted the chief remedial measures adopted for the arrest and cure of the disease. To change the character of the local inflammation powerful collyria of sulphate of copper, acetate of lead, and nitrate of silver were applied to the eyes. The mixed civil and military Medical Board to which I just now referred divided their report into two parts, one on the means of preventing the spread of the disease, the other on the methods of cure. With respect to the prevention, the Board did not omit hygienic matters; they specially recommended isolation, cleanliness, use of separate bedding, basins, towels, &c.; in fact, much the same hygienic measures as are inculcated and practised in our own day. With respect to the treatment, the first point noted was 'on the necessity of taking blood'; and under this heading the Board gave the following instructions:—'When this disorder attacks persons who are strong and plethoric, there cannot be any doubt relative to the propriety of taking away a large quantity of blood. When the disorder attacks those who are weakly, if the inflammation be accompanied with great tumefaction of the conjunctiva, and a profuse purulent discharge, with much pain in the head and eyes, the necessity of taking away blood also appears to be so strong, that the Board does not think it can be postponed without imminent danger to the patient's sight, but the quantity to be taken away need not be so great in this as in the former instance.' The modes of bleeding mentioned are—opening a vein in one or both arms, opening the temporal artery, cupping on the temples or nape of the neck, and leeches. 'Sometimes,' the Board remarks, 'after taking away blood from the arm, it becomes necessary to repeat the operation more than once, and occasionally to apply leeches many times in succession.' As regards diet,

the Board states:—'A total abstinence from animal food and fermented liquors, and a very low diet in every respect, are absolutely required, so long as the violence of the inflammation continues.' Mr. Ware, an oculist of great repute at that time, wrote with regard to the local blood-letting, as quoted by Dr. Edmondston:—'Opening the temporal artery is on all hands allowed to be a mode of bleeding the most effectual as well as speedy for the purpose.'

The extent to which this mode of abstracting blood from the neighbourhood of an inflamed eye was carried by some surgeons may be inferred from a remark by Dr. Farrell on the use of it in his own practice. He is answering the objections raised by some surgeons who had found it impossible to obtain a sufficiently large quantity of blood by opening the temporal artery (*op. cit.* pp. 69–71). Dr. Farrell writes: 'My assistants and myself have now opened each some hundreds of temporal arteries, without failing, I may safely say, in half-a-dozen instances, to procure fully as much blood as was required. Nay, we have performed the operation on the same persons three or four times, or even more, and have uniformly obtained as much blood each time as we wanted. I have been obliged, in about one case in a hundred, to relinquish the first incision, on account of not getting blood enough from it and to make a second incision, sometimes in the other branch of the artery, and at other times lower down in the same branch. I have uniformly succeeded in the second attempt,' &c. It is very difficult for us who are under the influence of such different doctrines to understand the immense importance attached to such copious abstraction of blood by our predecessors of the early days of the present century. Nowhere in the writings of the leading surgeons of that time have I met with any expression of doubt as to the necessity of taking blood away largely from

the general circulation as well as locally; the only questions discussed with reference to it seem to have been the most effectual modes of abstracting it.

The remarks I have last quoted on the practice followed in the treatment of ophthalmia have had reference to comparatively a short time after the disease was first contracted in Egypt. But much the same practice appears to have been followed for many years subsequently. In 1838, for example, when Sir G. Ballingall published the second edition of his 'Outlines of Military Surgery,' the principles laid down by him for the treatment of ophthalmia were these: 'In so far as general remedies are concerned, the practice I would urge in the acute stage of ophthalmia, as it occurs among young and otherwise healthy soldiers, consists essentially in bleeding and low diet.' He mentions thirty to forty ounces as the average quantity of blood to be taken, and refers to the case of a young soldier affected with ophthalmia from whom 'fifty-two ounces were withdrawn, while the patient stood erect with a vein opened in each arm.' The topical applications were also similar. Sir G. Ballingall recommends the undiluted liquor plumbi acetatis, and solutions of nitrate of silver, the application of which he states (p. 401) has long been in general use, and 'is particularly urged by some of those whose experience has been acquired in the extensive field which the army has unfortunately presented for the treatment of this disease.'

Contrast the treatment I have described with that employed for the ophthalmia in the last campaign of 1882—you will find the latter recorded in recent volumes of the Army Medical Reports—and I think you will have no difficulty in accounting for the absence of the severe symptoms, at the latter date, that marked the advance from bad to worse of the cases of the disease during the earlier Egyptian campaign, without

coming to the conclusion the ophthalmia contracted at the two periods were diseases of different types. In 1882 no bleeding, no mercury or antimony, no incisions or abscissions of conjunctiva, no famine diet, no powerful collyria, but, on the contrary, the simplest antiseptic applications, or mild astringent lotions, careful protection of the eyes against excess of light and avoidance of all other sources of ocular irritation, with the simplest constitutional treatment, and due attention to the preservation of general health and strength. A very large number of patients invalided for ophthalmia from Egypt were admitted into this hospital (Netley), with the disease subsided into a partly chronic stage, and no trouble was experienced in gradually bringing back the eyes to a normal condition of health under very mild applications and without any reduction of general strength.

At the time of the first outbreak in 1801 the prevailing conviction that ophthalmia of a violent character was especially associated with a vigorous state of constitution led to the logical conclusion, which was carried out in practice, that the general strength ought to be lowered in order to lessen the severity of the disease. The force of the inflammation and the physical force of the patient appear to have been regarded as in some way mutually interdependent.* The Medical Board of 1810 mentions in one part of its report, as a circumstance worthy of remark, that 'some patients, who had been weakened by previous

* 'In the army, where the disorder has been more prevalent than in any other class of people, it has been found indispensably necessary to draw off a large quantity of blood from the general system. The quantity taken away was seldom less than sixteen ounces, and it has been extended with advantage to thirty, forty, and even sixty ounces. When so large a quantity is drawn off, it should be recollected that the object in doing it is not merely to diminish the action of the inflamed vessels, but the power of the constitution to carry it on.'—*Remarks on the Purulent Ophthalmia*, by J. Ware, Surgeon, F.R.S. London, 1808, p. 24.

indisposition, had had the inflammation and the purulence more severely than others who, previous to the attack of the disorder, were in high health and strength.' How strange it now appears to us that it should have been regarded as remarkable for the inflammation in some instances to have been more severe, and more unhealthy in character, when it fell upon men whose strength had been reduced by previous indisposition than when it attacked men whose health and strength had been well preserved! The fact is familiar enough to most of us that when epidemics of ophthalmia have occurred in schools, it has always been the weakly children who have most suffered, and whose cases have been the most difficult to deal with. We see the same thing in practice among hospital outpatients. Consider an attack of ophthalmia occurring in a man whose constitution has been reduced by dissipation, want, insufficient or unwholesome food, neglect, and fatigue, or in a sickly and enfeebled child, and remember the apparent virulence and obstinacy of the symptoms presented by it, the difficulty of controlling them, and the many risks attending the attack with respect to the ultimate preservation of sight. How different the character and course of the symptoms, and the readiness with which, in the majority of instances, they yield to ordinary measures of treatment when the attack occurs in a relatively well cared for and healthy subject. May we not trace in the different features and risks presented by an attack of the disease in two such classes of patients an analogy between the different characters and results of the two Egyptian epidemics in the armies of 1801 and 1882?

The great amount of loss of blood, the spare diet, and the lowering remedies to which the patients in the campaign of 1801 were forced to submit, must have degraded their frames physically almost to as low an

ebb of vitality as that presented by the infirm and vitiated constitutions of the exhausted pauper patient or ill-conditioned strumous child; and when the violent irritants to which the deteriorated ocular structures were subjected, the powerful collyria and the conjunctival scarifications and abscissions, no doubt performed in many instances with surgically impure instruments, are remembered, can wonder exist at the downward course the disease too often took, or at the loss of sight which so often followed? I have known an instance in which an eye of a sickly clerk, which was only affected at the onset with a simple attack of superficial inflammation, passed, under poulticing and other injudicious treatment, into general ophthalmitis, suppuration, and escape of contents by a spontaneously formed opening, all within the short space of a week!

More enlightened methods of treatment, better precautionary measures, and modern hygienic conditions, have practically banished ophthalmia from the British army; but, however excellent the sanitary state of a body of men may be, their good health at starting would avail them little if under special circumstances they should become victims to ophthalmia, and the treatment dealt out to them were the same as the treatment of the ophthalmic patients of the army in 1801. Such treatment, in fact, would place them in much the same position as if their sanitary state had been just the reverse of the healthy one supposed. One of the most marked general effects of unhygienic surroundings and a vitiated atmosphere is the decrease in the vital powers of the persons subjected to them. They readily fall victims to any disease that may be introduced among them, while the disease itself is enabled to spread with the utmost facility, just as the least spark serves to ignite and as the fire spreads in a piece of tinder. Had the men of the army who contracted ophthalmia

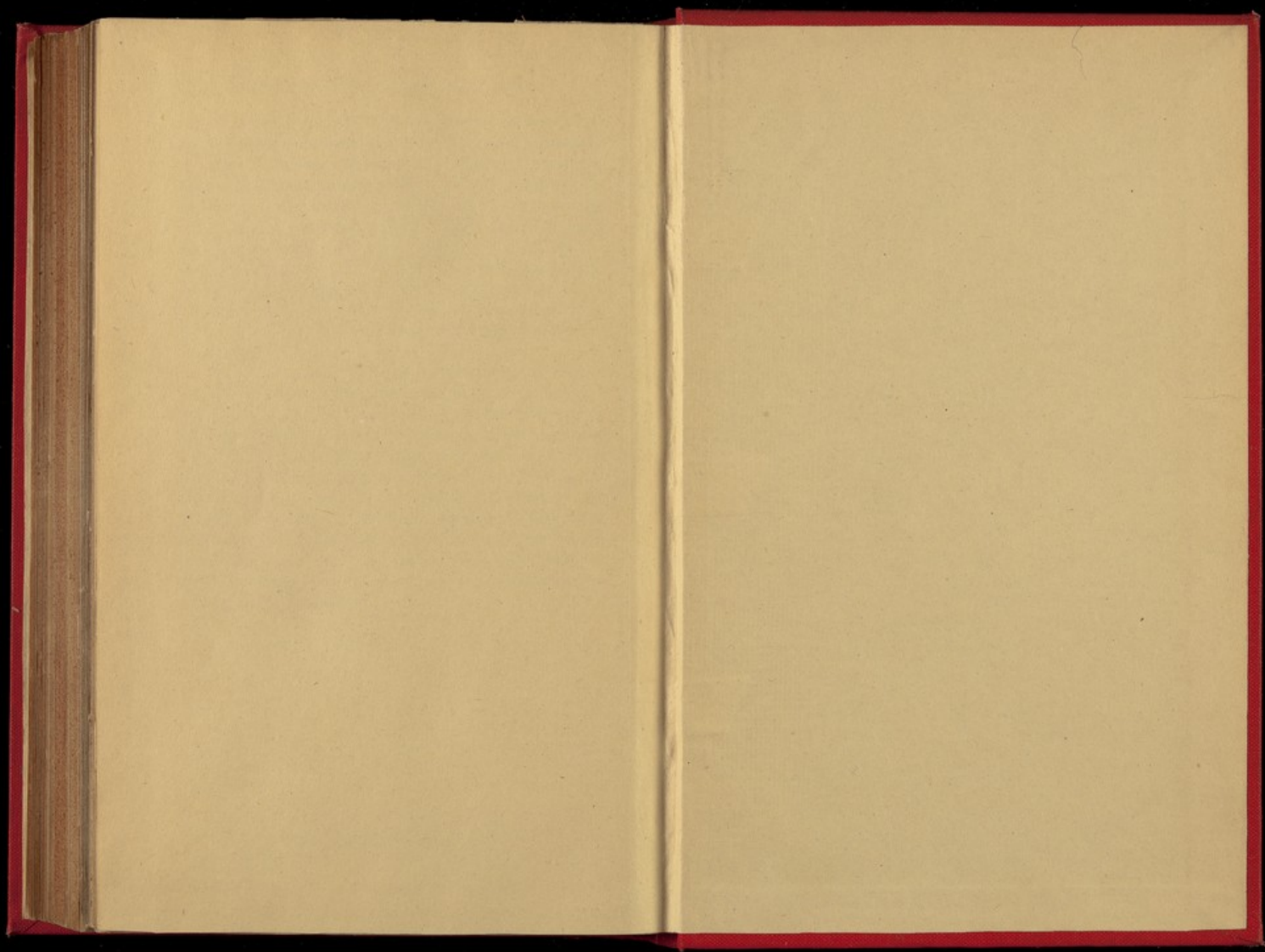
in Egypt in 1882 been bled and weakened, dosed with mercury and antimony, deprived of their normal amount of nutriment, and if, at the same time, their inflamed eyes had been subjected to powerful irritants of various kinds, the disease would have led to much the same results as if the patients had been exposed to the effects of prolonged unsanitary, instead of sanitary, surroundings before they happened to be attacked by it. The more the two army epidemics of ophthalmia are studied and compared, the more manifest becomes the potency for good of the relatively gentle treatment practised in the second of the two outbreaks, and equally the more obvious appears the mischief done by the rough and depressing treatment pursued in the first campaign.

A further confirmation of the correctness of the view I have taken may be drawn from the evidence afforded on the subject by the experience of the French army in Egypt before the year 1801, when the British troops had to contend with ophthalmia in that country. As already quoted from the writings of Larrey, although upwards of 3,000 ophthalmic patients passed through the French hospitals, near Alexandria, in less than three months of that year, sight was not lost in a single instance, and he expressly states that no general bleeding was then employed. But the French army had suffered from ophthalmia in previous years in 1798 and 1799, and at that time bleeding was employed. Larrey mentions that in those two years the ophthalmia was followed by complete blindness in rather a large number of individuals ('Chez un assez grand nombre d'individus la cécité complète.'—Tome i. p. 203). He describes the treatment then followed to have been general bleeding from the veins of the neck, arm, and foot, repeated according to the intensity of the inflammation, together with leeches to the temples.

The contrast between the different results of a rough and ill-judged treatment of disease on the one hand, and of a more rational and gentler treatment on the other, could hardly, I think, be more forcibly illustrated than it is in the histories of the two epidemics I have just brought to your notice. Many other surgical affections and their treatment might have been chosen to illustrate my text. I might have described the revolution in results which has attended the change from the surgically rough modes of dressing wounds of former days to the comparatively painless and gentle modes of treating them since the introduction of antiseptic dressings by Professor Lister. A still more striking illustration might have been furnished by the very great changes that have taken place in the ratios of mortality attending internal diseases, especially the diseases of tropical countries, contemporaneously with changes from violent to gentle treatment of them. This is a subject which has been largely, however, dwelt upon by my late colleague, Professor Maclean, whose earnest teaching for many years past of the vast advantages, the vital importance of the relatively gentle treatment now generally employed must have exerted a great influence for good on many army surgeons at starting in their military career, who have since carried out the improved modes of treatment with such great benefits to their patients and also with such immense advantage to the State, as the figures in the statistical returns of the Army Medical Department sufficiently show. While I was looking through Sir J. McGrigor's sketches of the expedition to Egypt from India for information on the outbreak of ophthalmia among the troops under his medical charge in 1801, I met with the following passage respecting the treatment of tropical dysentery: 'It will not be necessary,' he writes, 'to say much on the treatment of tropical dysentery. Mercury is now the remedy

relied on everywhere.' What a picture this brief summary of the treatment of tropical dysentery raises in the mind! Sanitary science has wonderfully lessened the amount of dysentery, as it has of other diseases in the army, by removing, or neutralising, its causes; but, as we know, cases of dysentery still occur in large numbers in India, and let them be treated by the mercury and extreme depletion of former days instead of the mild measures which are now employed, and notwithstanding the improved hygienic surroundings of the men, how long would the present low rates of mortality remain?

Let me hope that some of the observations I have brought to your notice may linger in your minds, and lead you not merely to maintain the gentler and more rational methods of treatment that have been already achieved, but also induce you to try and extend the principles on which these methods are based to all parts of your future practice in the treatment of diseases and injuries in the army. Let improvements in treatment and improvements in hygiene advance *pari passu*, and with these improvements combined, the mitigation of suffering and the safety of your patients will then be most thoroughly ensured.



PAMPHLETS

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