

**Medical and sanitary report of the native army of Bombay, for the year 1879. : Framed on the weekly and annual returns, on the reports of regimental medical officers, and on the inspection reports of deputy surgeons general. With statistical tables.**

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THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH,  
MEDICAL AND SANITARY REPORT

ON THE  
NATIVE ARMY OF BOMBAY  
FOR THE YEAR  
1879.

FRAMED ON THE WEEKLY AND ANNUAL RETURNS, ON THE REPORTS OF  
REGIMENTAL MEDICAL OFFICERS, AND ON THE INSPECTION REPORTS  
OF DEPUTY SURGEONS GENERAL.

WITH STATISTICAL TABLES.

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*Compiled in the Office of the Surgeon General, Her M.'s Forces.*

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Bombay:  
PRINTED AT THE  
EDUCATION SOCIETY'S PRESS, BYCULLA.  
1880.



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KEPPEL STREET,  
LONDON, W.C.1

THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH,



THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH,

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1. MEDICAL AND SANITARY HISTORY

OF THE

NATIVE ARMY OF ROMANIA

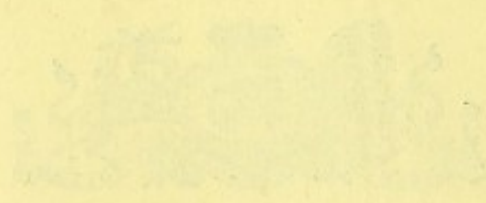
OF THE

1878.

PREPARED BY THE MEDICAL AND SANITARY DEPARTMENT OF THE ROMANIAN ARMY, AND PUBLISHED BY THE ROMANIAN GOVERNMENT.

WITH STATISTICAL TABLES

BY THE MEDICAL AND SANITARY DEPARTMENT OF THE ROMANIAN ARMY.



1878.

PRINTED BY THE

ROMANIAN GOVERNMENT, BUCHAREST.

1878.

FROM

THE SURGEON-GENERAL,

HER MAJESTY'S FORCES IN BOMBAY,

TO

THE SECRETARY TO GOVERNMENT,

MILITARY DEPARTMENT.

Bombay, 15th December 1880.

SIR,

I have the honour to submit, for the information of His Excellency the Governor in Council, the Medical and Sanitary Report of the Native Army of Bombay, the medical administration of which I took over from Surgeon-General Hunter on the 1st April.

2. From Table A, appended in the margin, it will be seen that the year under review compares unfavourably with the six preceding years. As regards the sick-rate and mortality, with the exception of the year 1878, the number of admissions is higher than it has been in any of the last six years; the ratio per cent., however, of admissions is actually higher; for with a daily average strength of 22,406, there were 38,246 admissions, being a ratio per cent. of admissions to strength of 170.6 against 169.03 the year before and 111.3 in 1877. The average daily sick per cent. to strength is also greater, being 4.93 compared with 4.4 last year.

*Table A.—Bombay Army.*

Years.	Average strength.	Average daily sick.	Admissions.	Deaths in Hospital.	Average daily sick per cent. to average strength present.
1873 ...	22,967	876.2	29,035	165	3.82
1874 ...	22,750	835.7	26,601	176	3.68
1875 ...	22,819	772.7	25,475	213	3.38
1876 ...	22,583	856.8	22,918	247	3.79
1877 ...	22,561	788.3	25,130	215	3.49
1878 ...	23,671	1042.8	40,012	305	4.40
1879 ...	22,406	1107.6	38,246	436	4.93

3. The number of deaths in hospital is 436, or 19.4 per *mille* of strength present, against 305, or 12.8 per *mille*, in 1878. Thus the mortality is nearly one-half as great again as it was the year before.

In addition to this there were 80 deaths, which occurred out of hospital and amongst men on leave, making a total of 516, or 21.6 per *mille* to average strength present and absent, against a total of 456, or 17.9 per *mille*, last year.

The ratio of deaths in hospital to admissions last year was 7.7 and this year 11.4. As regards the death-rate both in and out of hospital per *mille* between Mussalmans and Hindoos, in 1878 it was 15.6 and 19.1, respectively, whereas in the year under review it is 27.7 and 20.2, being greatly increased as regards the Mussalmans, though there is not much difference as regards the Hindoos.

4. The Table B shows the average strength, daily sick, admissions, and deaths in hospital for the different circles separately, for the present as well as the six previous years, excepting the men who formed the Afghanistan Field Force; this has been added separately. The average daily sick per cent. to strength was highest in the Northern Circle, where it was 5.8; it was lowest in the Poona Circle, where it was only 3.9; in the Sind and Presidency Circles it was 4.8 and 4.6, respectively.



*Table B.—Presidency Circle and Aden.*

Years.	Average Strength.	Average Daily Sick.	Admissions.	Deaths in Hospital.
1873 .....	3,358	140·2	4,513	28
1874 .....	3,343	133·4	3,861	32
1875 .....	3,288	125·4	3,551	36
1876 .....	3,207	128·7	3,363	45
1877 .....	3,196	104·2	3,547	40
1878 .....	4,633	175·5	7,440	37
1879 .....	2,723	125·0	4,357	33

*Poona Circle.*

Years.	Average Strength.	Average Daily Sick.	Admissions.	Deaths in Hospital.
1873 .....	8,209	250·4	7,334	35
1874 .....	8,197	241·2	6,855	36
1875 .....	8,145	224·2	7,607	40
1876 .....	7,448	220·4	7,249	42
1877 .....	7,771	261·2	8,671	72
1878 .....	6,822	246·8	9,608	88
1879 .....	6,025	231·0	7,302	57

*Northern Circle.*

Years.	Average Strength.	Average Daily Sick.	Admissions.	Deaths in Hospital.
1873 .....	8,450	392·9	13,498	52
1874 .....	8,362	376·2	12,426	53
1875 .....	8,547	318·2	10,714	105
1876 .....	8,937	365·5	11,177	68
1877 .....	8,601	294·4	8,977	67
1878 .....	8,264	451·9	16,540	131
1879 .....	7,379	427·5	14,795	85

*Sind Circle.*

Years.	Average Strength.	Average Daily Sick.	Admissions.	Deaths in Hospital.
1873 .....	2,950	92·7	3,690	50
1874 .....	2,848	84·9	3,459	55
1875 .....	2,837	104·9	3,603	32
1876 .....	2,999	142·2	5,129	92
1877 .....	2,991	128·5	3,935	36
1878 .....	3,952	168·6	6,424	49
1879 .....	3,110	150·7	4,871	59

*Afghanistan Field Force.*

Years.	Average Strength.	Average Daily Sick.	Admissions.	Deaths in Hospital.
1879 .....	3,169	173·3	6,921	202



The ratio of admissions to average strength was also highest in the Northern Circle, where it reached 200·5, against 200·1 the year previous; in the Poona Circle the ratio was lowest, being 121·2.

The ratio per cent. of deaths in hospital was lowest in the Poona Circle, being only 0·9 compared with 1·3 last year. In the Presidency, Northern, and Sind Circles the ratio is 1·2, 1·1, and 1·8, respectively.

As regards regiments, the 19th N. I. in the Bolan Pass has had the heaviest mortality, the ratio per cent. of deaths to average strength present being 8·2; in the 3rd Sind Horse at Khoosh-dil-Khan it was 8·0; in the 30th N. I. at Quetta 6·0; in the 1st Grenadiers, who were also in Afghanistan at various stations, 5·8; whilst of those which remained behind in the Presidency, the 16th at Malegaum suffered most, its mortality being 3·6; in the 22nd at Belgaum and 3rd Light Cavalry at Deesa it was only 0·4 in each, as is seen in Table C.

Table C.

Serial Number.	Corps.	Station.	Ratio of Deaths in and out of Hospital per cent. to Average Strength present and absent.
1	19th Regiment N. I.	Bolan Pass	8·2
2	3rd Sind Horse	Khoosh-dil-Khan	8·0
3	30th Regiment N. I.	Quetta	6·0
4	1st Gr. Regiment N. I.	Afghanistan	5·8
5	16th "	Malegaum	3·6
6	1st Sind Horse	Jacobabad	3·0
7	28th Regiment N. I.	Surat	2·7
8	2nd Sind Horse	Jacobabad	2·6
9	7th Regiment N. I.	Bhoj	2·3
10	15th "	Ahmedabad	2·2
11	Sappers and Miners	Afghanistan, Poona & Aden	2·1
12	12th Regiment N. I.	Rajkote	2·1
13	2nd "	Nusseerabad	2·0
14	No. 1 Mountain Battery	Rajkote	1·7
15	3rd Regiment N. I.	Hydrabad	1·7
16	27th "	Jacobabad	1·7
17	11th "	Poona	1·6
18	5th "	Kurrachee	1·5
19	10th "	Neemuch	1·5
20	20th "	Baroda	1·5
21	21st "	Bombay	1·4
22	9th "	Bombay	1·1
23	Aden Troop	Khormaksar	1·0
24	14th Regiment N. I.	Belgaum	1·0
25	23rd "	Ahmednugger	1·0
26	25th "	Aden	1·0
27	26th "	Deesa	1·0
28	8th "	Sattara	0·8
29	1st " L. C.	Neemuch	0·8
30	6th " N. I.	Mhow	0·7
31	13th "	Mhow	0·7
32	24th "	Mehidpoor	0·7
33	2nd " L. C.	Poona	0·6
34	Poona Horse	Siroor	0·6
35	18th Regiment N. I.	Poona	0·6
36	17th "	Dharwar	0·5
37	22nd "	Belgaum	0·4
38	3rd " L. C.	Deesa	0·4
39	No. 2 Mountain Battery	Afghanistan	Return and report not furnished.
40	4th Regiment N. I.	Poona	{ Records lost in Afghanistan.
41	29th "	Afghanistan	



5. Table D (page v) shows the total number of men invalided for discharge and physical disability is 1,214. Of these 167 were discharged from the Presidency Circle, 362 from the Poona Circle, 420 from the Mhow Circle, 144 from Sind, and 121 from the regiments on Field Service. Of the total 1,214, there were 672, or rather more than half, discharged for old age and debility, 89 for rheumatic affections, 65 for diseases of the eye, 36 for syphilitic disease, 28 for scorbutic affections, and 324 for various other complaints. It is worthy of note that of these last only 13 were for malarial fever, which is a very small proportion, considering the large number of admissions into hospital for this disease. It would seem, however, that this does not cause so much permanent disability as rheumatic and other affections mentioned above; nevertheless it—probably in conjunction with other illness—was an important agent in producing the debility for which 672 men, entered in the return under “old age and debility,” were discharged. Of the 89 men invalided for rheumatic affections 45, or more than half, were in the Northern Division; 19 men were invalided from the Poona Circle alone for syphilitic disease, out of a total of 36 in the whole Presidency.

The greatest number of men invalided from any one regiment was 76 from the 6th N. I.; there were 73 men from the 11th N. I., 57 from the 19th N. I., and 61 from the 22nd.

The regiment which invalided the fewest number of men was the 3rd Sind Horse, which discharged only 5 men; the Poona Horse, 3rd Light Cavalry, and the 1st N. I. discharged only 10 each, and the 24th N. I. 15.

6. During the year 647 men were sent on sick leave to their homes. Of these 65 were from Field Service, 94 from Sind, 135 from the Poona Circle, 166 from the Presidency Circle, and 187 from the Northern Division.

Of the total 647, there were 249 men granted leave for debility from malarial fever (and of these no less than 110 were from the Northern Division). Leave was granted to 51 men for rheumatic affections, and to 30 for syphilitic diseases (of which 10, or one-third, were from the Poona Circle).

It will be seen from Table E (page vi) that 57 men obtained leave from the 28th Regiment—this is the highest number from any one regiment in the Presidency. There were 44 men from the 10th Regiment and 39 from the 25th N. I.

The fewest men were sent from the 12th and 13th N. I., which granted leave to 3 and 4 men, respectively. The 24th Regiment and Poona Horse, too, only sent 5 men each.

7. The largest number of admissions to hospital was for malarial fever, there being 21,768, being a ratio of 56·9 per cent. to the total number of admissions. This compares favourably with last year, when the ratio per cent. was 59·7.

The ratio per cent to admissions in the different Circles was as follows:—Sind Circle 48·6, Poona Circle 50·8, and Presidency Circle 53·6, whilst in the Cabul Expedition it was only 43·7. There was a total of 101 deaths from this cause.

The greatest number of cases occurred in the 20th Regiment N. I. at Baroda, where there were 1,437 cases, and the 3rd Regiment N. I. at Hyderabad furnished 1,321 cases; in the 24th Regiment at Mehidpoor there were 1,316; the regiments stationed at Bhooj, Neemuch, and Nusseerabad also suffered heavily. In the 19th Regiment N. I., stationed in the Bolan Pass, there were only 559 cases of malarial fever, with 15 deaths; in the 16th Regiment at Malegaum there were 334 cases and 11 deaths.

8. There were 2,530 cases of injuries of various kinds, or 6·6 per cent. of the total admissions, 14 cases of which terminated fatally.



TABLE D.

Invalided for discharge and Physical disability.

CLASSES OF DISEASES. (N.B.—The numbers quoted are those of the Nomenclature of Diseases.)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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Sub-Division A.					Sub-Division B.					Diseases of the Nervous System, 59 to 104.					Diseases of the Eye, 111 to 185.					Diseases of the Heart, 219 to 244, and 250 to 258.					Diseases of the Lungs, 290 to 337.					Diseases of the Stomach and Intestines, 494 to 509.					Diseases of the Liver, 591 to 620.					Diseases of the Spleen, 521 to 530.					Gonorrhoea, 585 to 594.					Abscess, 819, and elsewhere according to site.					Ulcers, 859.					Skin Diseases, 827 to 901.					Other Diseases of this class.					Old Age and Debility, 904 and 905.					Poisons, 905 to 991.					Injuries, 992 to 1,140, and Blistered Feet, 1,148.					Punishment.					Physical Disability.					TOTAL.																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																															
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## TABLE E.

## Sick Leave.

CLASSES OF DISEASES. (N.B.—The numbers quoted are those of the Nomenclature of Diseases.)

		GENERAL DISEASES.										LOCAL DISEASES.															INJURIES.		TOTAL.				
		Sub-Division A.					Sub-Division B.																										
		Fevers.					Other diseases of this class.																										
		Eruptive, 1 to 5.	Continued, 6 to 14.	Malarious, 15 and 16.	Malignant Cholera, 18.	Other diseases of this class.	Rheumatic Affections, 34 to 42.	Syphilitic Affections, 43.	Scorbutic Affections, 54.	Dropsies, 57.	Other diseases of this class.	Diseases of the Nervous System, 59 to 104.	Insanity, 105 to 110.	Diseases of the Eye, 111 to 185.	Diseases of the Heart, 219 to 244, and 250 to 258.	Diseases of the Lungs, 290 to 337.	Diarrhoea.	Dysentery.	Others.	Diseases of the Liver, 501 to 520.	Diseases of the Spleen, 524 to 530.	Gonorrhoea, 585 to 594.	Abscess, 819, and elsewhere according to site.	Ulcers, 859.	Skin Diseases, 827 to 901.	Other diseases of this class.	Old Age and Debility, 904 and 985.	Poisons, 906 to 991.		Injuries, 992 to 1,140; and Blistered Feet, 1,148.	Punishment, 1,147.		
PRESIDENCY CIRCLE.																																	
No. 1 Company Sappers and Miners.	(Vid e Head Quarter s.)																																
Aden Troop																1	2														4		
9th Regt. N. I.		8		2		3		2								1	2						1	1	2	2	4					30	
21st do.		15		5		4		5						1			2	1	2						2	2						36	
25th do.		10		1		8		1		1						1	4					1	10		2	2						39	
28th do.		28		3				4		2						8	1	1				2	1	1		2						57	
Total		61		11		516		7		3		1			13	210	2		3	1	2	11	5	4	7		2				166		
POONA CIRCLE.																																	
Poona Horse																1															5		
Depot, Sappers & Miners.	(Vid e Head Quarter s.)																																
22nd Regt. N. I.		3		2		3						1				5	1															15	
18th do.		3		1										1													2					8	
8th do.		5		7		1		1		1						2	1					1		1	2	1		1				24	
4th do.	Records lost.																																
11th do.		15														1					1											17	
17th do.		2		3		1		1				1				1	1															10	
16th do.		6		12		1		1								2											1					14	
14th do.		3		12												5	1			1		1				1						14	
23rd do.		4		2		1										2	1										1					11	
2nd Light Cavalry		4		3												1	1			1				1	1	1				5		17	
Total		45		1910		4		1		1		1	2	1	20	5	2		2	1	1	2	1		2	4	6		6			135	
NORTHERN CIRCLE.																																	
3rd Light Cavalry		3		1																											6		
1st do.		4		2												1			1		1		1									10	
No. 1 Mountain Battery																																2	
15th Regt. N. I.		16																														17	
6th do.		10		1		1										2			1	1							1					18	
12th do.		2				1																										3	
10th do.		37		3						2										2												44	
7th do.		8		1																												13	
2nd do.		8		1		1		1								9			2	2												24	
26th do.		3				2										1																6	
29th do.		16		2		2		1		1						5	1		1	2												35	
13th do.										2																							4
24th do.		3																														5	
Total		110		110		5		4		4		3			18	1	5	8	2	4			1		11							187	
SIND CIRCLE.																																	
1st Sind Horse		5		1				1		1		2				2	2															16	
2nd do.		4		2		1										2			1						1	1	1					13	
5th Regt. N. I.		2						3		1						1										1						8	
3rd do.		14		5		1		1								3	1	5	1	1												33	
27th do.		2		6		1										1	1			1			1	4	2	3	2					24	
Total		27		7		8		1		5		2			2	1	9	3	5	2	2		1	5	4	4	5					94	
AFGHANISTAN FIELD FORCE.																																	
Sappers and Miners	Diseases not given																															9	
No. 2 Mountain Battery	Report and return not received.																															16	
3rd Sind Horse		2		2		1		1																								10	
1st Regt. N. I.		4		1		5		1								1		1														8	
19th do.						1		3																								12	
29th do.	Records lost.																																
30th do.	Diseases not known																															1	
Total		6		4		2		9		1						1	6	4														65	
Grand Total		249		151		3034		118		8		1	5	2	61	17	26	14	5	8	3	4	17	11	12	39		9				647	



9. There were 1,220 cases (or 3·1 per cent. of total admissions) of rheumatism during the year, with only 6 deaths; and in 1878 there were 1,368 cases, or 3·4 per cent., with 6 deaths. 437 of these cases, or 2·8 per cent., occurred in the Northern Division. At Rajkote, Baroda, and Bhooj there were 82, 52, and 50 cases, respectively; at Nusseerabad there were only 13 cases.

10. Of these there were 1,360 cases, or 3·5 per cent. of total admissions, with 92 deaths, against 1,190, or 2·9 per cent., last year, with only 52 deaths. At Quetta there were 100 cases with 15 deaths, in the Bolan Pass 85 and 7 deaths, and at Malegaum there were 86 with 5 deaths. As regards the different Circles it will be noticed that in the Northern Circle, in which there are always so many cases of malarial fever, and where there is a great diurnal change, there are only 380 cases, or 2·5 per cent. of total admissions in the Circle, compared with 381, or 2·3 per cent., last year. This is a lower percentage than in any of the other Circles. In the Presidency, Poona, and Sind Circles there were 4·2, 4·5, and 2·7, respectively.

11. These were chiefly diarrhoea and dysentery. Of diarrhoea there were 1,395 cases, or 3·5 per cent., with 37 deaths, against 1,057, or 2·6 per cent., with 23 deaths last year. As might be expected, the greatest number of these cases occurred amongst the men on Field Service, there being 563 in number, or 8·1 per cent., with 25 deaths, whereas in the Presidency, Poona, Northern, and Sind Circles there were only 3·3, 3·3, 2·1, and 2·7 per cent., respectively.

In the 19th Regiment, 18 cases out of 164 proved fatal; 4 out of a total of 128 amongst the 1st Grenadiers died; and in the 30th Regiment at Quetta there were 114 cases with one death. In the 20th Regiment at Baroda there were 107 cases, and in the 22nd at Belgaum there were 93.

The number of cases of dysentery compares favourably with last year, there being only 1,033, or 2·7 per cent., with 28 deaths, against 1,394, or 3·5 per cent., and 19 deaths in 1878. The largest number of these also occurred amongst men on field service, there being 463 cases, or 6·7 per cent., with 15 deaths. In the Presidency Circle there were 2·8 per cent.; in Poona 1·9, in Northern 1·1, and in Sind 2·5.

The 1st Grenadiers had 172 cases and 9 deaths and the 19th Regiment 113 cases with 2 deaths. In the 3rd Regiment N. L. I. at Hyderabad there were 57 cases, and in the 28th at Surat there were 45.

12. There were 228 cases of scurvy, being 0·5 per cent. of admissions with 7 deaths; 75, or 1·2 per cent. of admissions, were amongst the regiments on service; in Sind there were 30, or 0·6 per cent.; in the Northern Circle 22 cases, or 0·1 per cent. Of these one died.

13. Syphilis gave 728 admissions, or 1·9 per cent. of the total, with 4 deaths, against 626, or 1·5 per cent., with 7 deaths last year. 3·9 per cent. of the admissions in the Poona Circle were due to this cause, 1·9 in Sind, 1·3 in the Northern Circle, and 0·9 in the Presidency Circle. The stations in the Presidency which furnished the largest number of cases were Ahmednugger 59, where the 23rd Regiment was stationed, Poona and Deesa contributed 45 cases each, the 11th Regiment being at Poona and the 26th at Deesa. The 8th Regiment at Sattara had only 34 cases.

14. This furnished 217 cases, against 173 last year, being 0·5 per cent. this year against 0·4 per cent. in 1878. No less than 32 of these cases occurred at Rajkote in the 12th Regiment N. I. There were no deaths from this cause.



15. There were only 11 cases of small-pox, whereas last year there were 63.  
 Small-pox. This year there were no deaths from this disease.
16. There were 100 cases of cholera throughout the year, being only 0·2  
 Cholera. per cent. of the total admissions, against 86 cases, or  
 0·2 per cent., last year. Cholera, however, gave 68  
 deaths in the present year, whereas last year there were only 49.
17. There were 46 cases of chicken-pox and 15 cases of measles, but not a  
 single case of enteric fever is reported amongst the troops.
18. As regards the influence of climate on both Europeans and Natives, it  
 Climate. appears from the history of the past year that the  
 stations in the Bombay Presidency, taken altogether,  
 are fairly healthy for a tropical climate, those badly reported on being very few  
 in number.

At Nussereabad the rainfall was 23·9 inches against 19·4 inches in the previous year. Malarial fevers were very prevalent, together with scurvy—the latter is attributed to the high price of vegetables. Neemuch and Rajkote were also very malarious for the same reason. At Hyderabad much of the fever is due to the swamping of the ground when the river is high for the purpose of nourishing the trees in the cantonment. At Deesa the percentage of sick in the 26th Regiment was very high throughout the year, but in the 3rd Light Cavalry the percentage is very much lower, and the Medical Officer, speaking of the climate, simply calls attention to the fact that the detachments at Palunpoor very frequently contract syphilis. Surgeon Parakh, of the 6th Regiment, reports unfavourably of the climate of Mhow, and supposes it to have an injurious influence on the health of the sepoys on account of the great diurnal change. This is very marked at Bhooj, where the difference between the maximum and minimum thermometer has been as much as 30° in 24 hours. In some stations, which are in themselves healthy, the cantonments are rendered less salubrious by certain local conditions, thus at Poona the lines of the 2nd Light Cavalry are in close proximity to irrigated fields, and are badly drained, giving an average daily sick of 4·3 per cent. to strength, against 1·7 and 2·6 for the two previous years, respectively, when the regiment was at Deesa. Again, at Belgaum paddy fields are close to one extremity of the lines, and it is an important fact that there were 245 admissions for malarial fever amongst the men of the Left Wing, which was near the paddy fields, whilst only 129 cases were furnished by men of the Right Wing, which was quartered at the further end of the lines, and the cases from the former were also less tractable than those of the latter. As regards Dharwar the decrease of sickness in the 17th Regiment after its arrival is very striking, though Surat, where it had previously been stationed, is itself comparatively healthy. In 1877 there were 1,501 admissions, in 1878 there were 1,130, whereas in 1879, when the regiment moved to Dharwar, there were only 617.

In Table F, the regiments, with the principal stations at which they have been during the year, are arranged in the order of sickness, the ratio per cent. of admissions to average strength present being taken as the standard.



Table F.

Corps.	Station.	Serial Number.	Ratio per cent of admissions to Average Strength present.	Daily Sick per cent. to Average Strength present.
20th Regiment N. I.....	Baroda .....	1	311·6	8·7
No. 1 Mountain Battery .....	Rajkote .....	2	306·5	7·7
3rd Regiment N. I. ....	Hydrabad .....	3	274·8	9·0
1st Grenadiers „ .....	Afghanistan .....	4	265·4	3·7
12th Regiment N. I. ....	Rajkote .....	5	264·1	5·6
Sappers and Miners .....	Afghanistan .....	6	247·0	6·5
24th Regiment N. I. ....	Mehidpoor.....	7	242·2	4·3
28th „ .....	Surat .....	8	238·2	5·6
2nd „ .....	Nusseerabad .....	9	235·6	8·6
10th „ .....	Neemuch .....	10	234·0	7·5
22nd „ .....	Belgaum .....	11	225·3	6·8
30th „ .....	Quetta .....	12	224·0	8·6
Aden Troop .....	Khor Muksar .....	13	209·3	4·1
15th Regiment N. I. ....	Ahmedabad .....	14	208·5	8·9
19th „ .....	Bolan Pass .....	15	195·1	4·7
7th „ .....	Bhoj .....	16	192·8	6·8
21st „ .....	Bombay.....	17	184·2	3·8
3rd „ L. C. ....	Deesa .....	18	150·4	3·9
6th „ N. I. ....	Mhow .....	19	143·9	3·2
9th „ .....	Bombay.....	20	141·5	3·9
11th „ .....	Poona .....	21	138·4	5·5
5th „ .....	Kurrachee.....	22	138·0	3·0
1st „ L. C. ....	Neemuch .....	23	136·1	4·6
2nd „ „ .....	Poona .....	24	134·4	4·3
16th „ N. I. ....	Malegaum.....	25	126·7	4·6
3rd Sind Horse .....	Khoosh-dil-Khan .....	26	126·4	3·4
1st „ .....	Jacobabad.....	27	124·1	3·2
13th Regiment N. I. ....	Mhow .....	28	118·0	2·2
8th „ .....	Sattara .....	29	116·0	3·6
27th „ .....	Jacobabad.....	30	115·9	4·6
2nd Sind Horse.....	Jacobabad.....	31	113·6	3·7
23rd Regiment N. I. ....	Ahmednugger .....	32	108·9	3·3
14th „ .....	Belgaum .....	33	104·7	3·3
26th „ .....	Deesa .....	34	98·8	3·8
17th „ .....	Dharwar .....	35	95·9	3·1
18th „ .....	Poona .....	36	87·0	1·7
25th „ .....	Aden .....	37	78·3	5·1
Poona Horse .....	Siroor .....	38	55·9	1·4
No. 2 Mountain Battery .....	Afghanistan .....	39	Return and report not furnished.	
4th Regiment N. I. ....	Poona .....	40	} Records lost in Afghanistan.	
29th „ .....	Afghanistan .....	41		

19. The lines of the native regiments, which consist of long rows of pendals, are nearly all deficient in ventilation, there being no means for air to enter except through the doorways and the interstices between the tiles in the roof, except in a few cases, where the sepoy—and these mostly married men—have made small holes as windows in the walls. The cubic space of the huts, too, is as a rule barely sufficient.

In the infantry lines the bathing places in the verandah are frequently noticed by the Medical Officers as being most objectionable, and the chief cause of the native huts being damp; small chunammed bathing places, as have been made in a few instances, would be a great improvement.

The lines of the 17th N. I. at Dharwar are reported by the Inspecting Medical Officer to be superior to any he has seen in the Presidency; these were



built in 1875, but many stations are still badly in want of new lines. At Assirgarh new lines have been sanctioned, but the lines of the 13th N. I. at Mhow are reported as being so dilapidated that they are apparently about to fall. At Deesa, where the 26th were stationed, they are old, dilapidated, and past repair, and have been already condemned twice or thrice; they have no plinths, and the floor is below the level of the surrounding ground. The lines of the 7th N. I. at Bhooj are bad, but it is stated that orders have been issued for them to be rebuilt.

The roofs of several of the lines leak in the rains, and those of the 20th N. I. at Baroda and the 2nd Light Cavalry at Poona were flooded in the rains, the former on account of the insufficient depth of the drain running from the north-west corner, and the latter owing to an insufficient fall to insure a flow in the drain. To remedy this the Officer Commanding (Colonel Macnaughten) had moorum laid down and a stone surface drain built with a small brick reservoir at the end, which was sunk below the ground level.

As regards the cavalry lines, the small walled-in enclosures in front of each hut are universally condemned as being merely cloaks for dirty habits. It would seem advisable, if they cannot easily be dispensed with on account of the prejudices of the particular caste of natives who enlist in these regiments, that they should at least be inspected and cleaned out once or twice a week, as is done in the Poona Horse.

Drainage to prevent the sullage of the horses, which are picketed between the lines, soaking into the ground, would also be very beneficial, and might be carried out at a small expense.

20. The trench system is used in many of the native lines where it is possible, but latrines on the standard plan are far more common. In both, the distance the men have to go from their lines is a great drawback, as it is difficult to enforce the use of them on all occasions on the women and children, who frequently make use of the lines or their own huts. At night, too, it is well known that the men will not take the trouble to walk to the latrines. Dirty naturally in their habits and education, they cannot be expected to appreciate the benefits conferred on them by civilization. The nuisance that consequently follows in the lines might be partially prevented by having urinals in the lines, as has already been done at Nussereabad, where the 2nd Grenadiers were stationed. The Medical Officer states that there are six urinals with masonry beds in the lines for the men; dry sand is used in these and changed twice daily. This is an excellent plan, and one that will not only improve the general conservancy of the line, but also contribute largely to the comfort of the men.

The use of trenches is favourably reported on by all the Medical Officers of stations where they are in use, and it would appear that, when practicable, this is the best system to use, provided, however, that the trenches are supplemented by latrines to be used in the rains. At Ahmednugger the Medical Officer of the 23rd N. L. I. reports that "from the position of the lines and nature of the soil in camp it would be impossible to use trench latrines," and the Medical Officer of the 20th Regiment at Baroda states that in consequence of the scarcity of suitable ground the regiment has reverted to the use of pukha-built latrines, the expense having been defrayed during a portion of the year by contributions from the men themselves. The latrines themselves, which are built on what is known as the standard plan, are most objectionable. They are built of brickwork with partition of the same material and with an earthen rough stone floor raised a foot or more above the ground; in these are placed so many wooden or iron pans, generally of a square shape, which are drawn out through an opening in the back wall once or twice a day; the stone on which they are placed is rough, laid level, and without any drain in it, the consequence is that the urine, which men do not take the trouble to pass in the pan, together with the water which natives use for



the purpose of ablution (*lota* water), runs down over the floor through the opening in the back of the wall and dribbles over the brickwork, which latter, in the course of a few months, becomes so completely saturated that it is impossible to keep the latrines in a proper state, so that with the slightest breeze from windward they become a constant nuisance to the camp.

The 7th N. I. at Bhooj have pukha-built stone latrines; the stone, however, is not obtainable at all stations, but I think the nuisance might be diminished to a very considerable degree, as suggested by the Medical Officer of the 25th N. I. at Aden, by having a small drain leading from each of the stones on which the pans are placed to a large drain running along the back of the latrine with a sufficient fall to empty itself into some receptacle placed at one end, which might be emptied daily. With reference to this point I would invite attention to the remarks on conservancy by Surgeon-Major Heffernan, 25th N. I. at Aden, and Surgeon-Major Barry, 2nd Light Cavalry, Poona. At Ahmedabad also the latrines of the 15th N. I. are reported to be unpaved. In the cavalry lines of the Poona Horse at Siroor "the system of shallow pits with drains leading off the fluid excreta in each house is still in vogue," and the fluid excreta from each house is run to the root of a tree planted outside each house enclosure, which enclosure, with its latrine and surface drainage, is inspected once a week. In the 2nd Sind Horse the dry-earth system is carried as far as possible.

21. Water-supply is mostly obtained from wells, which are situated usually one between every two lines, and the reports of the water-supply are on the whole satisfactory. The opinions of the Medical Officers, however, are not formed from any analyses of the water (except in the case of the water at Siroor, of which two analyses are to be found in Surgeon Stewart's report of the Poona Horse), but on the general appearance and taste. At Nusseerabad the wells yield slightly brackish water, and have to be supplemented by about 394 gallons from the Dilwarra well, three miles from the cantonment. The Medical Officer of the 8th Regiment N. I. reports that the water is hard and brackish, and in the hot weather, on account of the scarcity, it has to be brought from a well some distance. The water was analysed by the Government Travelling Analyst.

At Mehidpoor the water is indifferent most of the year, and very bad in the hot weather: it is obtained from three wells and the River Sepra.

The native infantry lines at Hyderabad are supplied by the river Indus, the water of which is pumped up to the cantonments by steam-power.

At Jacobabad itself the water is good, but is bad at the outposts, causing dysentery and diarrhoea; Soorie and Gharanasi are the worst in this respect.

At Aden the water-supply is bad, and brackish water has to be used for washing purposes, and condensed water for drinking. Two gallons of condensed and three of brackish are allowed a day to every fighting man, but followers are only allowed one gallon of condensed and two of brackish, and the families of followers receive none at all. The quantity for fighting men is sufficient, unless they are married, when one gallon more of each kind is required. The condensed water is well known to be a cause of stomach derangements and bowel complaints, and it would be a great boon to the station if Government could supply some means to remove the flat, heavy condition of the condensed water. The state of the drinking water at Aden must be an important element, amongst others, which deteriorates the health of the troops there.

Most of the wells belonging to the native infantry lines in the Presidency are uncovered and liable to organic contamination, especially those overhung by trees.

22. The sepoy, who obtains his own food from the bazaar, lives, according to his caste, on the different grains of the country, supplementing it in some cases with meat, and to enable him to provide himself with a sufficiency in times of scarcity, he receives compensation



from Government for dearness of grain, which in Bombay, the Medical Officer of the 9th reports, reached at one time as much as Rs. 5. This is a matter of no importance to the unmarried men, but in the case of a man with a family means that out of his ordinary pay he has to pay for the additional price of grain for each member of his family at just the same rate, so that the higher the compensation allowance the poorer he becomes. To pay for his clothing and other necessities he saves the money which should be spent on his food, and being thus underfed, becomes thin and loses his physique. Many others underfeed themselves by trying to live on their additional allowance and to save all their pay. Several Medical Officers have therefore recommended that rations should be universally supplied to the Native Army, the only place in which this is done at present is Aden, where free rations are supplied by Government, which consist of wheaten flour 1 lb., rice 12 oz., ghee 2 ozs., salt  $\frac{3}{4}$  oz., cocum 1 oz., curry stuff  $1\frac{1}{2}$  oz., vegetables 7 ozs., and firewood 3 lbs. The Medical Officer at Aden states: "The quantity here is sufficient, but there is a total absence of fresh meat, and the quality of the vegetables is as a rule very inferior, and the result is, a regiment suffering from scurvy. As a proof that the vegetable ration is very inferior, I may mention that during the few so-called cold months, when vegetables could be obtained in the bazaar at moderate rates and of good quality, there was a decided improvement in the health of the men with regard to scurvy. There can be no doubt that scurvy and scorbutic dysentery, which were the chief causes of serious illness during the year, were entirely due to the character of food issued to the men. Brinjals and bhendies were the chief vegetables issued, and these indeed contain very little anti-scorbutic properties." The Medical Officer suggests the issue of potatoes with radishes, bajee, and other vegetables of this description. Should this be carried out, however, it would be advisable to find some means of preventing the men from selling their rations. The Officer in medical charge of the 1st Light Cavalry states that the average quantity of food taken by both Mahrattas and Mussalmans is—

Rice .....	8 oz.
Bread.....	$1\frac{1}{2}$ lbs.
Mutton .....	4 oz.
Dhal .....	4 oz.

Mussalmans take more mutton, and others who do not eat rice more bread.

Considering that the ration at Aden is given free by Government, and the men have occasional opportunities of supplementing it, I am of opinion that it is sufficient, though doubtless the troops do suffer from scurvy when stationed in Aden more than in other places.

The regimental bazaar of the 15th N. I. at Ahmedabad seems to have been useless as regards the purpose for which it was instituted, for the sepoy could obtain supplies cheaper and better in the city.

23. All officers appear to be agreed on the fact that a loose-fitting blouse or jacket with knicker-bockers and putties or gaiters is the best kind of dress for the native soldier. The tunic issued at present to the sepoy of most regiments is pretty satisfactory when made loose, but few men wearing the English cloth trousers are comfortable. The most general complaints are about the socks and boots, no good substitute having yet been provided. But in the 12th Regiment N. I. at Rajkote two descriptions of foot rags are under trial instead of socks, the latter being too expensive. In the 22nd Regiment two pairs of socks were issued to each sepoy. On the march from Poona to Neemuch of the 1st Light Cavalry there were forty-two cases of shoe-bites; this is excessive. Sepoys, however, are very averse to wearing socks, and the complaints about the boots and the hard leather ought probably to be put down to the bad fit of the boot.

There is no universal covering for the head in the Native Army, some regiments wearing small caps, whilst others wear puggarees; the latter, however, must



certainly be more suitable, for besides being part of their native dress, it is more useful as a protection from the sun, because the native certainly must feel the heat of the sun, though not to so great an extent as a European; and though he cannot be so susceptible to its influence, yet it is a question—though they often expose their bare heads to the sun—whether they, especially if weak or debilitated after an attack of fever, are not liable to suffer from its effects, and have a recurrence of the fever after exposure.

A great addition has been made to the clothing of the 12th N. I., viz., wadded jackets are substituted for the white, and the question regarding the issue of plain warm clothing to a regiment arriving at certain stations in the Presidency is well worthy of the consideration of Government. Such stations are in Central India, Mhow, Indore, Neemuch, Nusseerabad, Mehidpoor, Augar, &c., Hyderabad in Sind, where the diurnal change in the temperature is very great. Fevers also are most prevalent at many of these stations, due, I consider, in no small degree to the sudden chill that fills the air just after sunset and the insufficient protection afforded by the sepoy's plain cotton clothes; for though these may be sufficient when he is in his own part of the country, it must not be forgotten that in the Konkan, whence the greater number of sepoys come, there is a more even temperature; and further that he is not subject to such vicissitudes of climate as when he is moving about with his regiment. In the 24th Regiment N. I. every man had a good English blanket, and was also ordered by Colonel Henderson, the Commandant, to sleep on a cot, with which he provided himself for 12 annas. This is an excellent arrangement which the Inspecting Officer in his report advises should be carried out in all native infantry regiments, and with him I fully concur.

23. Speaking generally the hospital accommodation throughout the Presidency is very good, consisting mostly of good pukha Hospitals. building, standing apart from the lines and with separate cook-rooms, out-houses, and accommodation for the medical subordinates. In a few exceptional cases an ordinary bungalow is made use of, as is the case at Surat for the 28th Regiment N. I. The 1st Light Cavalry at Deesa have an old artillery barrack which serves the purpose well, and the 8th N. I. also have a bungalow. The objection to this plan is, that there is a general complaint of insufficient accommodation, there not being a sufficient number of separate or detached rooms to supply all the requirements of the hospital, and even regarding the regularly built hospitals this is too common a complaint; for instance, the hospital servants' quarters of the 7th Regiment N. I. are dilapidated and unfit to live in; in the 12th Regiment at Rajkote there is insufficient accommodation for the medical subordinates; there is no latrine for the hospital of the 13th Regiment at Mhow. The Medical Officer of the 20th Regiment N. I. at Baroda writes, "the accommodation provided was altogether inadequate during the last four months of the year, when the sick rate was so high, and many men on the sick list were, therefore, allowed to live in the lines. A suitable house has recently been built for the senior hospital assistant, but the other subordinates, being unprovided with quarters, occupy one of the corner-rooms of the hospital. The hospital still lacks a bathing room and a dead-house." The Inspecting Officer reports the hospital used by the 15th N. I. at Ahmedabad as being too dark, and its ceiling and flooring are in bad repair. Its surgery is too small, and has not sufficient light in it; the latrine is in bad order, should be removed and another substituted for it on a better plan.

The hospital latrine used by the 3rd N. L. I. at Hyderabad, the Medical Officer states, "is built of mud, and having merely *chunammed* depressions as receptacles, the chunam frequently cracks and breaks away, allowing soakage. There is a nullah posteriorly for the reception of fluids; it is therefore exceedingly difficult to keep it in good sanitary condition." This is just what might be expected from such a bad arrangement, the chunam is one of the most possibly worst substances that could have been selected for this purpose, the action of the



urine from the very first must have affected it, and ever since caused it to continually wear away.

Nearly all the other hospitals have very good accommodation, and some of them are excellent buildings.

24. With few exceptions both the health and physique of the men in the Native Army are very moderately good, and in those cases where they are not quite up to the standard, a satisfactory explanation is given; and it may be fairly expected that when these regiments are placed under more favourable circumstances and go to more healthy stations, they will compare favourably with the other regiments in the Presidency, thus the health of the 2nd Grenadiers deteriorated on coming to Nusseerabad. The 15th Regiment suffered a great deal from fever, and many men were rendered unfit for anything but light duty whilst they were at Ahmedabad. In the 24th Regiment the physique of the men was good, but those at Mehidpoor were debilitated from fever; whilst the men in the other wing stationed at Augar always enjoyed good health, with the exception of those who were transferred from Mehidpoor. The men of the 28th improved in health after their arrival at Surat, as also those of the 11th, whose station was changed from Bhooj to Poona. The health of the 1st Sind Horse became much deteriorated from exposure and work in the Bolan Pass, and the epidemics of cholera between Jacobabad and Dozan Nullah, and the outposts not being relieved sufficiently often. But of all the regiments the 25th at Aden appears to have been the most broken down as regards health, which is bad. This is due to scurvy, which is always more or less rife at Aden. This question is at present under consideration, but I would invite attention to the remarks by the Medical Officer on the subject, and am of opinion that the recommendation first suggested by Deputy Surgeon General Johnstone, that the troop should be relieved after eighteen months' service, is worthy of trial. Though the health of the regiment was bad, the physique has not much deteriorated.

25. Few of the duties of the sepoy appear to have had any injurious effect on their health, with the exception of men on the frontier, where the work was necessarily heavy and somewhat trying for the men. At Aden the public guards' duties are heavy, but the ill health of the troops is attributed to other causes. But the Medical Officer of the 7th Regiment writes: "When the running drill was commenced in the beginning of November there was a very cold north-east wind blowing, and in two or three days the increase of admissions into the hospital was so great that I recommended the running drill should be stopped for some weeks. This was done, and when the running drill was resumed in January it was found to have no ill effect." The 15th Regiment at Ahmedabad had to perform the entire duties of the station, which were previously shared by two, the men at one time having less than two nights in bed. The Medical Officer says: "Such an amount of duty, involving exposure and want of rest during a season like the past, when malarious influence had been so prevalent, has told on the men's health, and many primary cases of intermittent fever and many more re-admissions from it have appeared as results." When the 3rd Light Cavalry were stationed at Deesa it was noticed that many men going on duty to Palunpoor returned with syphilis. In every regiment the sepoy are encouraged to join in various sports, as running, wrestling, &c., but the cavalry regiments have a great advantage in being able to vary their amusements more than the infantry. Some of the men, too, take great interest in musketry firing: the men of the Right Wing, 24th Regiment N. I., fired off no less than 16,317 rounds at their own expense before the annual course began.

Gymnasia are common in the native lines, but the 2nd Sind Horse are reported to be greatly in want of gymnastic training for the recruits and young sowars of the regiment, and the Medical Officer states that this important subject "does not seem to have received the attention it deserves."



26. Sixteen Medical Officers have expressed their opinions on the value of the cinchona alkaloids as an anti-periodic in malaria. Of these seven speak highly of it, one considers it most beneficial, and the remaining six consider it efficient, successful, and valuable; the other eight consider that it is only useful in the mild cases, but of no use in well marked malaria, and the Officer of the 15th Regiment states that it has failed in so large a proportion of cases in preventing recurrence of the paroxysm, that the year's experience does not enable him to report favourably on it as an anti-periodic. It is a question in the case of the mildest cases how far the change to hospital with warm clothing is beneficial in warding off the fever.

27. There were no epidemics among the troops during the year, but a few cases of small-pox occurred in the 6th and 12th Regiments, all of which recovered. One child was attacked in the 2nd Sind Horse. Two mild cases of cholera were admitted into the hospital of the 3rd N. L. I. during the epidemic at Sukker, both of which recovered, and the Medical Officer of the 1st Sind Horse states that whilst there was cholera along the route from Jacobabad to Kandahar, a great number of men stationed along the posts as far as the top of the Bolan were attacked.

28. The printing of this report has been delayed in hopes of ultimately obtaining the reports from No. 2 Mountain Battery, 4th Regiment N. I., and 29th Regiment N. I., but I regret that even now the report is necessarily incomplete, owing to the above not having been received, and it is stated by the Medical Officers of the 4th N. I. and 29th N. I. that copies sent twice in the early part of the year were lost in transit by post, and a third copy could not be furnished, as all the records of the regiments were lost in Afghanistan.

I have the honour to be,

Sir,

Your most obedient servant,

J. M. S. FOGO, Surgeon-General,

Her Majesty's Forces in Bombay.







# INDEX.

[The Regiments are placed as they stood in the Army List on the 1st July 1879.]

## PRESIDENCY DIVISION, ADEN, AND BOMBAY MARINE.

	PAGE
Aden Troop, Khor Maksar.....	1
9th Regiment N. I., Bombay .....	3
21st do. do. ....	5
25th do. Aden .....	6
28th do. Surat .....	11
No. 1 Company Sappers and Miners.....	13

## POONA DIVISION.

2nd Regiment L. C., Poona .....	53
Poona Horse, Siroor .....	55
Sappers and Miners, Kirkee .....	57
8th Regiment N. I., Satara .....	58
11th do. Poona .....	61
14th do. Belgaum .....	63
16th do. Malegaum .....	65
17th do. Dharwar .....	69
18th do. Poona .....	71
22nd do. Belgaum .....	73
23rd do. Ahmednugger.....	75

## NORTHERN DIVISION.

1st Regiment L. C., Neemuch .....	15
3rd (Queen's Own) Regiment L. C., Deesa .....	17
No. 1 Mountain Battery, Rajkote .....	19
2nd (Prince of Wales's Own) Regiment N. I., Grenadiers, Nusseerabad .....	21
6th Regiment N. I., Mhow.....	24
7th do. Bhooj .....	28
10th do. Neemuch .....	30
12th do. Rajkote .....	33
13th do. Mhow .....	35
15th do. Ahmedabad .....	38
20th do. Baroda .....	41
24th do. Mehidpoor.....	46
26th do. Deesa .....	50

## SIND DIVISION.

1st Sind Horse, Jacobabad.....	77
2nd do. do. ....	79
3rd Regiment N. I., Hydrabad .....	81
5th do. N. L. I., Kurrachee.....	86



## CABUL EXPEDITION.

Sappers and Miners, Afghanistan .....	90
3rd Sind Horse do. ....	91
1st Grenadiers Regiment N. I. do. ....	95
19th Regiment N. I., Bolan Pass .....	99
30th do. Quetta .....	103

## STATISTICAL TABLE.

Statement showing the sickness and mortality among the Native Troops in the Bombay Presidency during the year.....	110
Summary of do. do. ....	112

## APPENDIX.

Annual General Return exhibiting the sick of Her Majesty's Native Troops in the Bombay Presidency.....	113
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# MEDICAL AND SANITARY REPORT

OF THE

## NATIVE ARMY OF BOMBAY,

FOR THE

YEAR 1879.

(The Regiments are placed as they stood in the Army List on the 1st of July 1879.)

### PRESIDENCY DIVISION, ADEN, AND BOMBAY MARINE.

Average Strength present during the year ..... 2,723  
 Average Daily Sick per cent. to the Average Strength Present ..... 4·6  
 Ratio of Mortality per cent. to the Average Strength Present ..... 1·2

#### Aden Troop.

KHOR MAKSAR.—In Medical charge of 1st Class Hospital Assistant GUNGAJI RAMJI.

Average Strength .....	100	Deaths in Hospital .....	1
Do. Present .....	86	Do. out of Hospital.....	...
Admissions .....	180	Invalided .....	1
Daily Sick .....	3·5	Sick Leave .....	4

Years.	Stations.	Rate per cent. to Average Strength Present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Khor Maksar .....	176·5	6·8	0·1
1877.....	Do. ....	159·0	4·0	.....
1878.....	Do. ....	204·2	4·4	.....
	Average.....	179·9	5·0	.....
1879.....	Khor Maksar .....	209·3	4·1	1·2



1. The head-quarters has been in the interior four times on patrolling duty during the year, and small detachments from June to September in the plains, six or seven miles distant from Khor Maksar, in consequence of rinderpest disease amongst the horses.

2. The lines consist of two long (pucka) pendals, lying north and south, facing inward, with the horse lines (pucka), built during this year, between them. The lines are at the western side of the hospital. The site is good, and the whole have been in good repair during the year. The pendals are divided by bamboo partitions into rooms. The space between the two blocks of pendals is 228 feet; height of plinths is about  $1\frac{1}{2}$  feet. Roof composed of Zanzibar rafters and reeds; the matting is covered with stones and chunam. Ventilation good, by means of holes in the walls. Height to ridge of external wall is 3 feet 8 inches, of internal wall 8 feet 8 inches, and of doorway 7 feet 7 inches. Superficial area of single men's rooms, including verandah, is 126 feet. Cubic space per man is 648 feet. There are, besides, three Native officers' houses. The family quarters are temporary buildings erected by the married men at their own expense.

3. There is one permanent conveniently situated latrine attached to the hospital, which is kept clean; the night-soil is removed three times a day. The men and the male followers resort to the neighbouring sandy plain for natural purposes, and the small privies in the family lines are regularly cleaned by sweepers; no nuisance or injury to health is occasioned by this system.

4. Fighting men received two gallons of condensed and three gallons of Shaik Oothman's (brackish) water a day; both are good of their kind, and the quantity is deemed sufficient.

5. Rations are not issued to the men of the Aden Troop. Khakee or white clothing for the hot season, and cloth for the cold season, are well adapted for the climate.

6. Ordinary guard duties and patrolling in the interior; they seem to have no injurious effect on the health of the men. The men exercise in playing polo, athletic sports, &c., and sword exercise, which appears to do them much good and to improve their health.

7. An excellent hospital is in use, with accommodation for 12 patients; it gives a space for each patient of 3,212 cubic feet. The accommodation is good, and the surroundings are in very good order.

8. With the exception of the large number of admissions in the months of March and April, the general health during the year has been good and the troop is fit for active service.

9. During the year the rainfall consisted of only a few slight showers, which in no way affected the health of the Troop or exercised any influence on the state of the climate, which was said to have been cooler than usual. The climate of Aden is most enervating, and affects the system of those serving in it to such an extent that it renders them very subject to diseases peculiar to the station, notably fevers, bowel complaints, and bronchial affections.

10. The average strength of the year was 86.4 and the total number of admissions into hospital 180, out of which 161 were discharged, 16 transferred to the 25th Regiment N. L. I. Hospital for treatment, 1 died, and 3 remained under treatment on the 3rd December 1879, making a total of 181 treated, including 1 remaining from previous year, being 14 cases less than in the preceding year.

Ague, as usual, caused the largest number of admissions, and furnished 65 cases. The disease was of a mild type and occurred chiefly in the months of January, February, March, and April, soon after the Troop returned from the malarious country. The cases were all treated in the usual way with cinchona alkaloid, and quinine in the more severe ones.

There were 11 cases of rheumatism, due in a great measure to exposure to vicissitudes of climate.

There were 9 cases of bronchitis, acute and chronic, caused by exposure; one man sent on sick leave to Hindoostan for this complaint. There were 9 cases of splenitis treated; out of these, one proved fatal. The man recently returned from furlough and had been sent with a detachment into the interior on duty, where he contracted fever and an enormous spleen. The cases of wounds were mostly slight ones, and the remaining admissions require no comment.

Mortality, and its causes.

11. One death occurred from enormous enlargement of the spleen, caused by long residence in Aden.



12. There has been no epidemic disease in the Troop during the year, but in the town there was an outbreak of small-pox, imported by pilgrims returning from Mecca.  
Epidemics.
13. Eight children have been successfully vaccinated during the year; the lymph was good and the vesicles well formed and left good cicatrices.  
Vaccination and re-vaccination. There was no re-vaccination carried out during the year.
14. One man was invalided for palpitation of heart and general debility.  
Invaliding, and its causes.
15. There has been nothing particular to recommend or require.  
Requirements and recommendations.
16. I have not followed any new plan of treatment since assuming charge of the Troop.  
Special observations.

## 9th Regiment N. I.

BOMBAY.—In Medical charge of Surgeon Major P. COCKELL.

Average Strength.....	693	Deaths in Hospital .....	6
Do. Present .....	642	Do. out of Hospital.....	2
Admissions.....	909	Invalided .....	51
Daily Sick .....	25.0	Sick Leave .....	30

Years.	Stations.	Rate per cent. to Average Strength Present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Baroda .....	68.2	1.8	0.9
1877.....	Do. ....	71.2	2.2	1.9
1878.....	Bombay, Malta, and Cyprus	121.8	2.9	1.0
	Average.....	87.0	2.3	1.3
1879.....	Bombay .....	141.5	3.9	0.9

1. The Regiment has been stationed at Bombay the whole year. One detachment of 16 men is stationed at Junjira and has been relieved twice this year. Another detachment of 89 men, under one European and two Native officers, went after the dacoits in the Konkan at Mahar in the month of November, and are still out in the district.

2. The lines were fully described last year. They are situate between the Crawford Market and Carnac Bunder, having the native town on the north, and Municipal buildings and workshops and sweepers' lines on the south. On the north, at the extreme easterly corner, is the sewage pumping station for that part of the native town, and the smell is disagreeable when the wind sets in from the north-east. There are ten blocks of pendals facing north and south, and ample accommodation is provided for the Regiment.

3. There is one general latrine divided into two parts, for women and for men, and properly flushed with water by the sweepers after use, for which purpose there are four stop cocks in each division, and the filth mixed with water runs into the pumping station close at hand, from whence it is pumped into the sea about 400 yards off through a large sewer. The number of seats in the latrine is said to be too few, there being only 14 each side, 28 in all, and half of these are for women, and the number of people using them is about 1,200.

4. The water is Vehar water, and is supplied by the Municipality. It is contained in four large iron tanks, which hold 700 gallons each; the amount is unlimited, sufficient for every use, both for washing and drinking.



5. There is a capital market close at hand, from which all supplies can be obtained. Clothing is also easily procurable from the native town. The men have two suits of regimental clothing, one warm red serge cloth, and the other American drill for the summer. Food is dear in Bombay, but the men draw their usual grain compensation, which is Rs. 5 in addition to their pay every month.

6. The duties in Bombay are rather hard, as the number of nights in bed is generally only 2, and there are generally two parades a week in the summer and three or four in the cold season. There is a gymnasium in the lines, and the recruits are exercised at it.

7. The hospital is 200 feet long and 38 broad, consisting of four wards each 50 feet by 20, with verandahs on each side 8 feet wide. Each verandah has its door at the end of its ward, and when they are left open, they form either a walk for the patients, or a place for trying the stamina of recruits. At the end of the verandah there are four rooms at the four corners of the hospital, 10 feet by 10, two for patients, and two for the consulting and store room. The hospital stands in a compound 275 feet by 232, and faces the sea on the west side and the Marine Lines and Scotch burial ground (now unused) on the east. The north looks towards the city, and the south towards the officers' bungalows. The hospital can accommodate 50 beds without using the verandas, which in a case of emergency could accommodate 36 more, making a total of 86 beds. The hospital has not a dispensary in the main building, which is a great defect, and plans were sent in both for that and a bath room, but the present state of the finances would not allow of their being made. The hospital is supplied with Toolsee water from two hydrants, and the water is of excellent quality. There is also a capital exercise ground in front of the hospital for the patients.

8. The general health has been good since the Regiment came back from Malta; the physique of the men is good, most of them being over 5 feet 6, and over 32 inches chest measurement. Some of them are good gymnasts and wrestlers.

9. The climate of Bombay is very good, and always brings up the health of a Regiment if it was suffering from any disease or epidemic before its arrival. The daily average of sick this year is 25.0, a slight increase on last year, as there was a great deal of fever in May, June, and July, making the total of admissions for that disease 100 more than last year. The lines are very hot in the summer months, as there is no shade from trees, and being surrounded by buildings on three sides, the ventilation is not good, especially at night, when the wind fails.

10. There were 428 cases of malarious fever, an increase of 81 over last year. Remittent fever 2 cases, bowel complaints 49 cases, 21 dysentery and 28 diarrhoea, spleen disease 5, respiratory disease 60, consisting chiefly of bronchitis and bronchial catarrh, with 1 case of pneumonia, 7 cases of phthisis, 2 of dropsy, 19 cases of scurvy, rheumatism 32, venereal 8, and eye disease 17 (chiefly conjunctivitis), abscess and ulcers 14, wounds and accidents (including shoe-bites) 83, all other causes 170.

11. There were 6 deaths in hospital; their causes were, 1 from remittent fever (complicated with bronchitis), 1 from dysentery, 1 from scurvy of long standing, 2 from phthisis, and 1 from self-poisoning by opium.

Epidemics.

12. There was no epidemic this year.

13. 27 children were primarily vaccinated, 18 boys and 9 girls; 83 recruits and 18 women were re-vaccinated. These vaccinations were all successful.

Vaccination.

14. 43 men were invalided in the year, 16 old and past service, 6 for chronic bronchitis, 4 for general debility, 5 for eye disease, 2 for varicose veins, 2 for chronic splenitis, 1 each for dysentery, chronic rheumatism, chronic orchitis, phthisis, secondary syphilis, local paralysis, heart disease, and cheloid cancer.

Requirements and recommendations.

15. A dispensary and bath room added to the main building of the hospital on the side facing the sea at each corner.

Special observations, new experience in treatment.

16. Iodoform has been found very beneficial applied over indolent ulcers with lint, strapped over and excluded from air for two days.

Salicylate of soda has also been found of great benefit in reducing the temperature in remittent fever, in doses of 10 or 15 grains in water every four hours.



## 21st Regiment N. I.

BOMBAY.—In Medical charge of Surgeon Major W. H. COLVILL.

Average Strength .....	695	Deaths in Hospital .....	8
Do. do. Present .....	666	Do. out of Hospital .....	2
Admissions .....	1,227	Invalided .....	38
Daily Sick .....	25.7	Sick Leave .....	36

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Bombay.....	80.6	2.5	0.4
1877.....	Do. ....	82.8	2.5	1.1
1878.....	Do. ....	150.4	4.3	1.3
	Average.....	104.6	3.1	0.9
1879 .....	Bombay .....	184.2	3.8	1.2

1. The head-quarters and main body has as usual been stationed in Bombay, besides furnishing the usual detachments in course of annual relief to the Persian Gulf and Indian Government steam vessels, as per subjoined details:—

Baghdad .....	16
Bushire .....	25
Bassadore .....	10
Gwador .....	23
Jask .....	78
I. G. S. S. Dalhousie .....	8
Ditto Abyssinia .....	8
Ditto Magdala .....	8

The lines and their surroundings; present condition, hygienic and otherwise.

2. The same as reported in previous year.

Conservancy.

3. The same as reported in previous year.

4. From Vehar by means of cast iron pipes for drinking purposes, and from wells in and near the lines for washing and other purposes; the quality of the Vehar water has been excellent and the supply is abundant.

Food and clothing.

5. It seems desirable the sepoy should be fed, for if he had a large family, he starves himself to feed it.

The clothing is sufficient for the climate in which he serves, but he certainly ought to be obliged to wear stockings to prevent sore feet.

6. Not heavy, the men had on an average 3.94 nights in bed during the year at head-quarters. The amusements of the men are principally of their own invention. A few young sepoys compete for the prizes at the annual running, jumping, climbing and sack races on the Esplanade.

Duties, exercise, and amusements; their effects on health.

7. The hospital accommodation has been sufficient, and there was no overcrowding; the hygienic condition of the hospital and its surroundings has been the same as reported before.

Hospital and its immediate surroundings; present condition, hygienic and otherwise.

General health and physique.

8. The general health and physique of the men has been on the whole fairly good.

The regiment is recruited from the two classes of men, viz. Mohamedans from N. W. Provinces, and low caste Hindoos, called Purwarees and Moochees, from the Concan. The total number of admissions has been 1,227 during the year, including all the Detachments now serving in the Persian Gulf and on the Government steam vessels, with the exception of the Detachment at Baghdad.



The total number of patients treated at the head-quarters amounted to 566, including 15 last remaining; 676 were from various detachments.

The following table gives the number of admissions at the head-quarters and detachments mentioned below:—

	Head-quarters.	Gwadur.	Jask.	Bushire.	Bassadore.	I. G. S. S. Dalhousie.	I. G. S. S. Abyssinia.	I. G. S. S. Magdala.
Admissions ...	551	272	269	13	122	.....	.....	.....

9. Throughout the year the health of the men of the detachments at Gwadur and Jask has been greatly reduced by the effect of that climate and Influence of climate or local circumstances on health. malarious fever. Many of the men were sent from the Persian Gulf owing to their debilitated condition requiring medical aid sick furlough, or invaliding at last.

10. The treatment of the sepoy is unsatisfactory and must remain so until there is some, means of dieting him. I joined the regiment only at the end of September 1879, so I cannot enter much into its health or Details of treated. details of treatment.

11. During the year under report there have been 10 deaths. Eight were at the head-quarters and two on sick leave at their homes. Four died Mortality and its causes. from dysentery; out of this three were arrivals from the Persian Gulf. Two from hepatitis, one from remittent fever, and one from suicide (gun shot wound); the case of suicide was brought to the hospital and died within five minutes.

Epidemics. 12. No epidemics.

Vaccination and re-vaccination. 13. 59 children have been primarily vaccinated during the year, out of which four were unsuccessful and rest were successful.

14. 38 men were invalided during the year, and their causes as follows:—5 from Invaliding and its causes. rheumatic affections, 3 from syphilis, 3 from scurvy, 2 from nervous diseases, 5 from eye diseases, 1 from enlarged spleen, 18 from old age and worn-out by long service, and 1 from fistula in ano.

Requirements and recommendations. 15. A dissecting table is highly needed in the dead-house.

Special observations, new experiences in treatment, sanitation, &c. 16. None.

### 25th Regiment N. L. I.

ADEN.—In Medical charge of Surgeon Major M. HEFFERNAN.

Average Strength.....	663	Deaths in Hospital .....	4
Do. Present .....	644	Do. out of Hospital.....	3
Admissions.....	504	Invalided .....	29
Daily Sick .....	32.9	Sick Leave .....	39

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Mhow and Indore.....	130.4	5.1	0.1
1877.....	Do. ....	133.2	3.8	0.3
1878.....	Aden .....	86.2	2.2	0.3
	Average.....	116.6	3.7	0.2
1879.....	Aden .....	78.3	5.1	0.6



1. The Regiment has been stationed at Aden during the year, furnishing a detachment of 50 men to the outpost on Perim island, which was relieved every two months.  
Location and movements.
2. The Native Infantry lines at Aden are situated in the lowest part of the Crater position, surrounded by hills and shut off from the influence of any sea breezes which may prevail. They are divided into two portions, which are separated from each other by the European officers' quarters and Mess house. Those on the south side are occupied by the unmarried men, and consist of six parallel rows, separated from each other by longitudinal and sub-divided by three cross streets into four pendals each. The twenty-four pendals thus formed are again sub-divided by a wall running through the centre of each. Each pendal has a superficial area of 1,452 square feet and a cubic space of 14,157 cubic feet. They are intended to accommodate 22 men, 11 in each room. The average cubic space to each man, after deducting all encroachments, is about 600 cubic feet, and the superficial area 65 square feet. The streets are very narrow, the longitudinal ones being only 13 feet from verandah to verandah, and the cross ones 17 feet from house to house.  
Lines and their surroundings.

The married quarters consist of six pendals divided into 14 rooms each, and having the verandahs walled up to a certain height. Each room has a cubic space (exclusive of verandah) of 900 cubic feet, and a superficial area of 90 square feet. The verandahs are walled in, contain a bathing place, and have a superficial area of about 70 square feet each. The maximum number of occupants in the single men's rooms amounted to not more than eleven at any time during the year. I cannot speak positively about the married men's quarters, but I know there was no overcrowding.

The ventilation of the lines is carried on by openings in the front walls above the verandah roof, of considerable size, and protected by bamboo trellis work, by covered ventilators at the ridge, and by fourteen oblong shaped openings at either end of the pendals. There is no defect in the amount of space allowed for ventilation; but the situation of the lines, with their narrow streets and low and chunamed roofs, renders them close and unbearable in the hot weather. The bathing places alluded to as existing in the verandahs of the married men's houses, were the subject of much discussion towards the end of the year, as a very suspicious case of fever, supposed to be typhoid, was admitted from the family lines. On inspecting the house from which the patient was admitted, a bathing place was found in the verandah, which sloped outwards, and discharged its contents by a small drain into a covered cesspit placed immediately outside the outer wall of the house, in the open street. The effluvia from the cess-pit of course found its way into the house, and as a consequence the inmates were living in an atmosphere polluted to a great extent. When on enquiry it was ascertained that these places were used for all the purposes of nature by the women and children, the foul smell emanating from them was easily accounted for. On my recommendation the cess-pits were dug out, and all the polluted and saturated soil removed and replaced by fresh earth. The drains now open on the free surface of the streets, over which the refuse water and other fluids are allowed to flow, pending some permanent arrangement for their disposal. Several remedies have been suggested for the removal of this dangerous nuisance, such as providing conservancy pans for the married men's houses, or making permanent masonry drains along the lines to carry off all fluids, or sinking receptacles in the streets, into which the bathing places could drain, and which could be emptied daily by sweepers; but none of these recommendations have been carried out, as their adoption would entail a certain amount of expense, which the authorities do not seem disposed to sanction at present.

3. There are three permanent latrines in use, and of these, one is allotted to the women. They are situated about three hundred yards from the lines, from which they are separated by the main road through the Crater position. They were noticed as defective in construction by the Deputy Surgeon General at his annual inspection, and also by me in my sanitary sheet of the Regiment for 1878; the defect complained of being that there is no means of carrying off the fluid excreta and washings, which do not fall into the privy pans. The stone pavement in front and rear of the seats is on a dead level, and as a consequence, the fluids remain stagnant on it, until a sufficient quantity collects to cause an overflow, when it trickles down the hill side towards the main road. This state of affairs gives rise to a foul smell, which in the hot months nothing can prevent, and which is very dangerous to the general health, and highly disagreeable, being so close to the main thoroughfare through camp. The state of these latrines has, I understand, been several times brought to notice by the Deputy Surgeon General, and a long correspondence on the subject with the authorities has also taken place, but no change or improvement seems to have resulted from either. A very moderate expenditure of public money would, in my opinion, remedy the evil. The stone pavement should be sloped from before backwards, and a water-tight drain of the same material carried along its posterior edge, to a small tank at one or either end,  
Conservancy.



where an ordinary iron filth receptacle could be placed for the reception of all fluids, excreta or otherwise. The latrines are cleaned twice daily and the pans emptied into covered receptacles, from which the excreta are removed nightly in a covered filth cart outside the fortifications to a place called Holket's Bay, and there buried.

There are three urinals close to the lines. No bad effect on health has been attributed to the conservancy system carried out at Aden, but this is owing more to the absence of rain and the general dryness of all the surroundings, than to the excellency of the arrangement.

4. The water supply is very defective as regards quantity, particularly in the amount allowed to followers, whose families received none. The supply during the year was obtained from two sources, condensed and well water. Each fighting man receives two gallons of sweet or condensed water, and three of well or brackish water, and each follower one of condensed and two of well water. This allowance is ample for single men, but for married sepoys an increase of one gallon of each kind is certainly required. The followers' families have to provide themselves with water. An increase in the allowance of sweet water in the hot months was recommended by my predecessor, but the recommendation was not acted on. The quality of drinking water is of course pure, yet the sepoys attribute stomach derangement and bowel complaints to its use. There is no doubt but condensed water, when drunk freely, gives a feeling of weight about the epigastrium, and other symptoms of indigestion.

5. This has been the subject of much discussion, and very different opinions have been expressed on the matter, but one thing however is quite clear to all, and that is, the want of antiscorbutic properties in the free ration supplied by Government. The ration consists of 4 oz. dhall, 1 lb. wheaten flour, 12 oz. rice, 2 oz. ghee,  $\frac{3}{4}$  oz. salt, 1 oz. cocum,  $1\frac{1}{2}$  oz. currystuff, and 7 oz. of vegetables, with 3 lbs. of firewood and the quantity of water already mentioned. The quantity here is sufficient, but there is a total absence of fresh meat, and the quality of the vegetables is as a rule very inferior, and the result is, a regiment suffering from scurvy. As a proof that the vegetable ration is very inferior, I may mention that during the few so-called cold months, when vegetables could be obtained in the bazaar at moderate rates and of good quality, there was a decided improvement in the health of the men, with regard to scurvy. There can be no doubt that scurvy and scorbutic dysentery, which were the chief causes of serious illness during the year, were entirely due to the character of the food issued to the men. Brinjals and bendies were the chief vegetables issued, and these indeed contain very little antiscorbutic properties. Many of the cases of colic, dyspepsia and indigestion put down to condensed water and climate at Aden, are really caused by the men using dhall and other leguminosæ too largely as an article of diet. Rancid or old ghee may also have had a share in producing some of the bowel derangements. Succulent vegetables, such as potatoes, onions, Native radishes, bajee, and others of this description, which are really within the reach of Government, should be issued to the Native Troops at Aden. There could be no difficulty in procuring a daily ration of potatoes for the sepoys, and the good which would result to the general health of the men, would more than repay the Government for the expense. Only those who have served with a Native Regiment for some years at bad stations, are aware of the great expense thrown on the revenues of the country by pensioning men prematurely broken down from bad food and exposure.

*Clothing.*—The men wore white tunics all the year round, except on night duty in the cold season, when red coats were worn. The only defect I see about the dress is to be found in the head dress. I do not consider the small forage cap sufficient protection under an Aden sun, and certainly think the men should have loongies. Many of the cases of fever admitted at Aden are in all probability due to exposure to the sun in this way.

6. The duties of the Native Troops stationed at Aden are always heavy, as they have to take all the public Guards in the settlement, with the exception of the one at the Barrier Gate, which is kept by the Europeans. The men have plenty of exercise now in going through the ordinary yearly course of drill, parades, and musketry. It seems to me that with judging distance, aiming drill, first, second and third class shots, and casuals, the musketry lasts pretty nearly all the year round. No ill effects on health however have been attributed to the severity of the duties. As regards amusements, the only time of the year when men could attempt any athletic sports, would be in the cold weather, and then they are generally on parade twice a day preparing for the review. During the remainder of the year the climate is oppressive and the men so washed out, that they have very little inclination for outdoor amusements.

7. The Native Infantry Hospital is an excellent building, erected on the Bengal standard plan, with double verandahs, affording ample and proper accommodation to the Native Troops, and in every way suitable



to the climate of Aden. It has three principal wards for the reception of patients, and the inner verandah to the rear, which is walled in and furnished with doors and windows, can be also used for that purpose, when required. The main ward is designed to hold twenty-two patients, giving each a superficial area of about 100 square feet and a cubic space of 1,964 cubic feet. The two small wards accommodate eight patients each, allowing the same measurements to the inmates. There are, in addition to the three wards mentioned, an office and surgery eighteen feet by twenty-four, and a dispensary twelve feet by twenty-four. There are also two small store rooms taken off the back, and a guard room off the verandah at the west end. The latrine was repaired and its construction in a measure improved during the year, and it is now in very good condition. The subordinates' and servants' quarters are sufficient and in a good state. The hospital is a new building, as are also all the out-offices, and both it and the general surroundings are very healthy. The building is isolated and situated on a dry stony site, with a well raised masonry plinth four feet high, floored with asphalt, thoroughly ventilated and exposed to the prevailing winds. There is no source of nuisance in the immediate vicinity.

8. The general health of the regiment during the greater part of the year was decidedly bad. This was chiefly due to the amount of scurvy which prevailed amongst the men. The cause of the great prevalence of this complaint, which was almost confined to the Native Infantry, is to be found in the deficiency of anti-scorbutic properties in the ration supplied from the Commissariat Department to the men. The actual number of men admitted into hospital under the head of scurvy will not convey the remotest idea of the extent to which the men's systems were saturated with the malady, as the impoverished state of the blood due to it, caused other complaints of a more prominent nature, for which the men sought admission. The men at headquarters were inspected weekly during the year, and the following percentages found tainted and had lime juice issued to them daily in the lines. In the month of February 5.75 per cent. were found tainted with scurvy, in March 3.67, in April 1.96, in May 7.34, in June 7.62, in July 22.10, in August 21.64, in September 25.29, in October 31.64, in November 33.89, and in December 32.20. From the above figures it will be seen that the lowest percentage of men affected with scurvy was found in April or at the end of the cold season. I attributed this, and I believe justly, to the comparative facility with which vegetables were obtained in the bazaar during the three previous cold months. Again, the great increase which took place in July, shows that the almost total absence of vegetables from the bazaar in the hot months, and the very inferior quality of those issued by the Commissariat, were the chief causes of the complaint, and that scurvy amongst the Native Troops at Aden is mainly due to an inferior vegetable ration. The low caste Purwaree from the Concan, and the grain feeding Hindoo from Hindustan, were the greatest sufferers. I believe Dr. Johnstone, a former Deputy Surgeon General of this Division, recommended that the Native Regiments at Aden should be relieved after eighteen months' service here, and the above percentages show the wisdom of this advice, as it was only during the last six months of the second year, that scurvy declared itself largely amongst the men and seriously affected the health of the Regiment. From what has been said on the subject of scurvy, it must be expected that the physique of the men has rather deteriorated during the past year, but it has not been so seriously affected as a person would be inclined to suppose, as the men are as a rule young, and will, with few exceptions, throw off the disease after a short time at a healthy Indian station. There are of course a few men irretrievably ruined in health, who will have to be discharged from the regiment, to eke out the remainder of their existence in their native villages as best they may.

9. During the year the rainfall consisted of only a few slight showers, that in no way affected the health of the Troops, or exercised any influence on the state of the climate, which was said to have been cooler than usual. No doubt the climate of Aden is most enervating, and affects the systems of those serving in it to such an extent that it renders them very subject to the diseases peculiar to the station. One would be inclined to think, that there is some peculiarity in the atmosphere of Aden which favours the development of scurvy, but the fact that the Native Troops are almost the only sufferers from the malady, proves that it is chiefly due to the quality of the ration issued to the sepoys. The Aden ulcer and scorbutic ulceration are very common, and due to local and climatic influences. I have noticed that in most of the cases of the true Aden or chronic ulcer, there were no scorbutic symptoms, and firmly believe that they are due to a depraved state of the blood, from some other as yet undiscovered cause, perhaps to the presence of some of the lately discovered living organisms in that fluid. Bowel complaints (particularly scorbutic dysentery) were influenced prejudicially by climate. Colics, dyspepsia, and diarrhoea were most likely caused by bad food and water. Fevers were most certainly to be attributed to a hot oppressive climate acting on systems already shattered from other enervating causes. I firmly believe in the presence of local malaria at Aden, and only a short distance from camp, enlarged spleens and malarial fevers of a grave type are contracted.



10. The average strength of the 25th Regiment N. L. I. at Aden and Perim during the year amounted to 644, the total number of admissions into hospital to 504, the daily average of sick to 35·84, the percentage of treated to strength to 81·52, the percentage of admissions to strength to 76·01, and the percentage of deaths to strength to 1·5. The total number of admissions into hospital at head-quarters amounted to 457, and of these ague, as usual, furnished the lion's share. The ague at Aden is not as a rule of a severe or well marked type amongst the sepoy, who are not allowed into the interior. There can be no doubt, however, as far as my experience goes, of the presence of a certain amount of local malaria in or around the settlement; but most of the cases which came under treatment during the year were relapses, occurring in men who had suffered from ague in India. There are two classes of men in the Regiment very liable to irregular attacks of intermittent fever on the slightest exposure to vicissitudes of climate or fatigue, and these are those who suffered severely from the disease at Mehidpoor, and others who have since joined, having their systems impregnated with malaria, before they left their native villages. In all 107 cases of ague were admitted at Aden, and 10 cases of simple continued fever. There were 11 admissions from ague in the Perim Detachment. The usual treatment was pursued, and except in well marked cases, the cinchonidine mixture was found sufficient to effect a cure. In well marked cases of ague, I cannot however agree with those who consider it a saving to the State to administer the cheap alkaloids instead of quinine. The length of time they take to cure an attack of ague, favours the development of malarial cachexia, which renders the subject an almost useless sepoy for the remainder of his service, and throws him on the pension list at an early age.

Under diseases of the digestive system there were 78 cases of bowel complaints. These were 24 of dysentery, 25 of diarrhoea, and 29 of colic. The causes of these admissions have been already alluded to under the subjects of food, water, and climate, and I have nothing further to add here. The remaining diseases of the digestive system, except dyspepsia, deserve no notice, and this was more an accompaniment of other diseases, than a primary cause of admission.

*Contusions.*—The number admitted into hospital under the head of contusion of right or left foot amounted to 69, or nearly a sixth of the total treated. These were as usual nearly all shoe-bites, due in some measure to carelessness, but chiefly to badly fitting boots. The men wear the English ammunition boot, for which, bad as it is said to be, no better substitute has as yet been proposed.

*Scurvy.*—Only thirty-eight cases of scurvy were admitted into hospital; but, as before stated, this is no criterion of the extent to which the disease prevailed in the Regiment during the year, as a large percentage of the men were receiving a daily ration of lime juice in the lines. I have already expressed my opinion as to the probable cause of the complaint, and the remedies likely to eradicate it, and have nothing further to add here on that part of the subject. Two cases of scurvy proved fatal, but in both instances complications existed, which helped them to that end. Eight men were sent on sick leave for scurvy. Several of the cases sent away for ulcers, debility and dysentery, were thoroughly saturated with scurvy, and in fact almost every man granted sick leave was more or less tainted with the complaint. Out of the 29 men pensioned, 15 were scorbutic, and at the close of the year 15 cases of the malady remained under treatment in hospital. Lime juice was of course "the chief" agent relied on in the treatment of the disease, but iron in various shapes, quinine, potash salts, barks, spirits, fresh meat, cod liver oil, eggs and milk were all used. Vegetables, when at all procurable from the bazaar, were recommended, and the sepoys induced to use them as much as possible. Potatoes were drawn from the Commissariat and issued to bad cases in hospital. The extractum carnis, obtained from the medical stores was found invaluable in the cases furnished by the grain-feeding Hindoos, who objected on caste prejudices to take meat of any description. Before leaving the subject, I beg to express a decided opinion against the efficacy, as an antiscorbutic, of the lime juice issued by the Commissariat Department, as compared with that obtained from fresh limes, and recommend the use of the latter, where and whenever possible. There was one admission only from the disease at Perim.

*Rheumatism.*—There were 39 admissions from this complaint at Aden, and 4 in the Perim Detachment. Those at head-quarters were 22 of chronic, 14 of muscular, and 3 of the synovial variety. I consider these cases due to the influence of the climate on systems saturated with scurvy.

*Respiratory Diseases.*—There were 22 admissions from chronic bronchitis, which were of the ordinary kind and presented nothing calling for remark.

A case of phthisis pulmonalis in a broken down, suspected opium eater, was admitted, and the patient, who, partly owing to his own urgent entreaties, was granted sick leave, died



at Bombay a few days after his arrival in India. A second case of the complaint proved fatal in a recruit boy, but as he is only classed as a public follower, he is not shown in the Annual Return.

*Bright's Disease.*—Two cases of acute Bright's disease were admitted, and of these one is dead, and the other still under treatment. Both cases were complicated with enlarged spleens and livers, and were accompanied by rapid ascites with general anasarca later on.

A case of apoplexy occurred and proved fatal in hospital.

*Debility.*—Eleven cases of debility were admitted, and the same number from splenitis. A case of dementia, which has improved so much that the man is now almost perfectly sane, but of course not fit for the duties of a soldier, has been under treatment. The man would have been sent to the Bombay Lunatic Asylum at first, but no private company would take him, and there being no Government vessel available, he remained at Aden, and will now be handed over to his friends. The remaining admissions present nothing worthy of special mention.

11. There were four deaths in hospital at Aden and three on sick leave. The deaths in hospital were due, one to apoplexy, one to Bright's disease, and two to scurvy complicated with ague, bronchitis and general debility. The deaths on sick leave were caused, one by phthisis pulmonalis, and two by ague, dysentery, and general debility.

12. There was a slight outbreak of small-pox amongst the native population, which did not extend to the Troops, and which was introduced by pilgrims to and from Mecca.

13. Vaccination was carried out as required in the Regiment by the public vaccinator at the Civil Hospital. There was no re-vaccination, as no recruits joined from India.

14. There were 29 men discharged during the year, and of these five had served over 32 years and were entitled to pension, eleven were old and worn out, five were worn out and scorbutic; one suffered from bronchitis, one from debility, one from deafness, one from splenitis, one from bad scurvy, one from scurvy and worn out, one from varicose veins and worn out, one asthmatic and worn out. There were two short service men in addition to the above discharged, one for dementia and the other for debility.

15. The Regimental latrines require altering, as their present condition is, as before mentioned, anything but satisfactory. The lines require some arrangement for the disposal of the refuse bathing water and other fluids in the married quarters.

16. In my opinion a very unwise move was suggested during the year by the Brigade authorities, and this was, the removal of the sick from the military native general hospital to the Native Infantry one. Nothing prevented this from being carried out, but the fact that both hospitals have been as full as they could possibly well be, since the affair was mooted. In spite of all this, it is still in contemplation, and on the relief of the 25th, when the 14th Regiment arrives, will I believe be carried out. I have expressed my opinion on the subject, and did my utmost to convince the local authorities that the move was an unwise one on sanitary grounds, and if carried out would convert a healthy and in every way desirable hospital into an overcrowded and unhealthy one. It was actually proposed to enclose the front verandah, thereby shutting off the ventilation. Aden is a place that requires plenty of space and free ventilation for the successful treatment of disease, and it seems a pity, when Government provides all this in the shape of a good hospital, to interfere on the score of a petty local economy.

### 28th Regiment N. I.

SURAT.—In Medical charge of Surgeon Major J. F. KEITH, M.D.

Average Strength .....	691	Deaths in Hospital .....	14
Do. Present .....	625	Do. out of Hospital .....	5
Admissions .....	1,489	Invalided .....	48
Daily Sick .....	35.8	Sick Leave .....	57



Years.	Stations.	Rate per cent. to Average Strength Present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876 .....	Rajkote .....	110.5	3.8	2.1
1877 .....	Do. ....	60.5	2.4	0.6
1878 .....	Do. ....	251.9	6.6	2.4
	Average.....	140.8	4.3	1.7
1879 .....	Surat .....	238.2	5.6	2.2

Location and movements. 1. The Regiment arrived at Surat on the 14th December 1878, where it has remained up to the end of the year.

2. The lines were inspected by the Deputy Surgeon General of the Division in September 1878, and condemned by him as badly ventilated, and badly constructed. On the arrival of the Regiment the floors of the huts, previous to their occupation, were dug up, and the walls all white-washed inside and outside. After they were thoroughly dry, they were occupied.

3. The latrines are situated to the east of the lines, and are kept scrupulously clean. The lines are always kept extremely clean.

4. The water supply is good and abundant. There are some brackish wells, but they are not in use.

5. The food is good and plentiful, and vegetables of sorts can always be had, which was not the case in Rajkot, and scurvy, which did so much there to injure the health of the men, has disappeared from the Regiment, the cases occurring in Surat having had their origin in Rajkot. A few men have suffered from the effects of insufficient quantity. There was one man admitted with ulcers which arose from shoe bite; sloughing and gangrenous ulcers followed on account of his being badly fed.

Duties, exercise, and amusements.

6. The same as last report.

7. The hospital is a large, upper storied bungalow, well built, well ventilated, and well situated; but there is a village close to windward, and its want of sanitation can be disagreeably felt from the upper story of the hospital.

8. The general health and physique of the men is good, and their health has much improved since last year. Although the admissions have nearly been as many, yet the fever was not of so severe a type; and incalculable benefit to the health of the men has been obtained from the change from Rajkot.

9. There was a break in the rains after about ten inches had fallen: this was the most unhealthy period of the year, there were then as many as 94 sick. The diseases were principally ague, boils, and shoe bite. The former diseases were owing I think to the men wearing their thick uniform during the rains; and it is almost a wonder the shoe bites were so few, as the leather of the boots the men wear is not of a very first class quality, and when the boots have got once wet and dried and hardened, it seemed a hopeless task to attempt to try to soften them again. There can be, therefore, as the men do not as a rule wear socks, only one result.

Details of treated.

10. The following table contrasts the causes of admission into hospital for 1878 with those of 1879:—

Names of Diseases.	1878.	1879.
Ague, quotidian .....	1,119	848
Chronic rheumatism .....	21	17
Soft chancre .....	4	3
Scurvy .....	21	15
Bronchitis .....	31	53
Asthma .....	1	.....
Pneumonia .....	6	3
Dysentery .....	30	45
Diarrhoea .....	30	53
Colic .....	13	5
Guinea-worm .....	12	7



## 11. Mortality, 19.

Names of Diseases.	Died in Hospital.	Died out of Hospital.
Ague, quotidian .....	6	.....
Acute rheumatism .....	1	.....
Remittent fever .....	1	.....
Dysentery .....	2	.....
Diarrhoea .....	1	1
Bronchitis, chronic.....	1	.....
General debility .....	2	1
Sudden death .....	.....	1
Cholera.....	.....	2

## 12. None.

13. All the recruits on arrival are sent to the Civil Hospital, where they are vaccinated by the Municipal vaccinator; but almost all are protected before enlistment. These cases are not as a rule successful.

Invaliding and its causes.

14. Table showing the number of men invalided, and its causes:—

Debility.	Defective Vision.	Enlargement of Spleen.	Hepatic Abscess.	Inguinal Hernia.	Partial Paralysis.	Varicose Veins.	Total.
30	1	1	1	1	1	1	36

Discharged for physical disability, 12.

## 15. None.

16. In reviewing the report, I may add that the cases of scurvy that occurred in Surat were in men who had been left in Rajkot with the left wing and in men who had contracted it there. The excess of diarrhoea and dysentery I believe is owing to the men, on their arrival at Surat, drinking the river water and water from wells which were not to be used, rather than trouble themselves to go to a distance. The cases of bronchitis, although more in number, were less intense, and so with the ague, the temperature of which rarely exceeded 100°, except in those cases which proved fatal, where the temperature reached as high as 105°.

## No. 1 Company Sappers and Miners.

ADEN.—In Medical charge of Surgeon-Major J. W. HEFFERNAN.

Average Strength present .....	60	Deaths .....	...
Admissions .....	48	Invalided .....	6
Daily Sick.....	2·1	Sick Leave .....	1

Ratio per cent. to average strength present—

Admissions .....	80·0	Deaths .....	...
Daily Sick.....	3·5		

Location and movements.

1. The company has been stationed in the Crater Position during the year.



2. The lines occupied by the Company are situated close to the Main Pass, in the north-western extremity of the Crater Position. They are temporary constructions of mud and laths, with roofs covered with jowley, a species of reed, and sides of bamboo matting. They consist of four parallel rows, separated by three streets of unequal width. The first street is 29 feet wide, while the other two are only about 9 each. The huts are built without plinths, and have no openings for ventilation. Neither of these defects are, however, of much consequence, as the air circulates freely through the doors, walls, and roofs, and owing to the natural dryness of the surface, no plinth is required. The following measurements of the huts are about correct—the height to ridge is 10 feet 6 inches, of external wall 5 feet 10 inches, and of door-way 4 feet 8 inches. The superficial area to each sepoy is from 95 to 100 square feet, and the cubic space about 700 cubic feet. There was no overcrowding. The married men's huts have of course bathing places in the verandahs, which drain out on the free surface of the street.

3. There are two latrines situated about fifty yards from the north-west corner of the lines, one for the men and one for the women. The buildings are of recent construction, composed of solid masonry, and fitted with the regulation dammered iron privy pans, and are very clean and in a satisfactory condition. There are no defects, except that they are roofless; but whether this want may be considered one or not, is a matter of opinion. The pans, which are fitted into the stone seats in the usual way, are removed at the rear, and emptied into covered receptacles twice a day by the sweepers. There are two iron receptacles, placed as urinals for men, between the latrines. The whole excreta is removed at night in a Government filth cart to Holkat's Bay, outside the barriers, where it is buried. No nuisance or injury to health has been attributed to the system.

4. The water-supply consisted of two gallons of sweet or condensed and three of brackish water for each man. The sweet water is defective as regards quantity, a larger amount being required, in the hot months at least.

5. The men receive a free ration from Government, which consists of dhall 4 oz., wheaten flour 1 lb., rice 12 oz., ghee 2 oz., salt  $\frac{3}{4}$  oz., currystuff  $\frac{1}{2}$  oz., and condensed water 2 gallons. This ration is defective in antiscorbutic properties, as the vegetable portion is insufficient in quantity, and as a rule inferior in quality, and the consequence is a certain amount of scurvy always existing amongst the men. The total absence of fresh meat is also a defect.

6. The men are exercised as working parties on the defences, and have no amusements that I am aware of.

7. There is no hospital accommodation for the company, but the sick are treated with those of the regiment in the Native Infantry Hospital already described.

8. The general health of the company, although a certain amount of scurvy did prevail amongst the men, was good. The physique of the men is very good.

9. Under this heading I beg to refer to my report on the 25th Regiment.

10. There were altogether 48 admissions into hospital, and of these, 12 were for ague, 5 for colic, 2 diarrhoea, 2 dysentery, 1 enteritis, 4 for muscular and 1 for chronic rheumatism, 1 neuralgia, 1 gonorrhoea, 1 congested stricture, 1 orchitis, 2 herpes preputialis, 2 bronchitis, 1 syphilis secondary, 1 splenitis, 1 scurvy, 1 simple continued fever, 1 scalp wound, 2 conjunctivitis, 1 abscess, 2 contusion, 1 debility, 2 boils. One man, who suffered from ague and debility, was granted sick leave.

11. None.

12. A slight outbreak of small-pox occurred, which was supposed to have been introduced by pilgrims.

13. Vaccination was carefully carried out, but there was no re-vaccination.

14. There were six men invalided at the Annual Invaliding Board and pensioned. Five of these were declared unfit.

15. None.

16. None.



## NORTHERN DIVISION.

Average Strength present during the year.....	7,379
Average Daily Sick per cent. to the Average Strength present.....	5.8
Ratio of Mortality per cent. to the Average Strength present...	1.1

## 1st Regiment Light Cavalry.

NEEMUCH.—In medical charge of Surgeon E. W. YOUNG.

Average Strength .....	478	Deaths in Hospital .....	4
Do. present .....	456	Do. out of Hospital .....	...
Admissions .....	621	Invalided .....	19
Daily Sick.....	21.0	Sick Leave .....	10

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Poona.....	111.7	3.9	0.7
1877.....	Do. ....	121.1	3.4	0.4
1878.....	Do. Malta, and Cyprus...	216.9	3.7	0.4
	Average.....	149.9	3.7	0.5
1879.....	Neemuch .....	136.1	4.6	0.8

1. The head-quarters of the regiment has been at Neemuch throughout the year; a squadron being stationed at Nusseerabad on detachment duty.  
Location and movements.
2. The lines are situated east of the cantonment, with an aspect north and south. The ten blocks of buildings are divided in the centre by one broad road 819 feet in width, the five blocks on either side being again separated by two streets parallel with the centre way, which are 65 feet in width; in addition to these, there are six smaller streets, in width 21 feet. None of the buildings are raised on plinths. The huts themselves are in tolerably good repair, but for the most part are small and badly ventilated; they have attached to them small courtyards—cloaks to dirty habits—which measure on an average only 12 by 11 feet. To carry away refuse water, trees were planted outside, on Dr. Wyllie's system, but this does not seem to act altogether satisfactorily; in some instances the fluid refuse is too abundant to become readily absorbed, and remains stagnant around the tree; in others, the trees have died and have not been replanted.  
The lines and their surroundings, present condition, hygienic and otherwise.
3. One sweeper is allowed to each troop, one for the regimental bazaar, and one for each latrine. One per troop is not sufficient; the number should be increased to two at least. Filth from huts of married people is removed every morning to a conservancy cart placed near the latrine, and despatched as soon as possible to the latrine pits. Cesspools still exist in some of the courtyards, in spite of orders issued that they should all be filled in. The latrines, two in number, condemned by Dr. MacDowell as being too near the wells from which drinking water is obtained, are still in use, but new ones are about to be built.  
Conservancy.
4. Plentiful and good drinking water is obtained from three wells, two of which are within fifty yards of the latrines. This evil will be remedied on the completion of the new latrines which are in process of construction.  
Water-supply.
5. During the months of July, August, and September provisions were dear and vegetables obtained with difficulty. Sowars with families drawing only Rs. 10 a month found it difficult to make both ends meet. There appears to be a great scarcity of vegetables here during the whole of the hot weather and rains; this may partly be accounted for by the large quantity of opium grown in the country.  
Food and clothing.



Meat is tolerably cheap throughout the year. The average quantity of food taken by the men daily, both Mahrattas and Mussalmans, is, rice 8 ozs., bread  $1\frac{1}{2}$  lbs., mutton 4 ozs., dhal 4 ozs. Mussalmans take more mutton, and Hindustani men, Brahmins, and Kshetryas, who do not eat rice, take more bread. The men wear on parade and at all mounted duty a blouse, which is loose and comfortable; at all stable and other duty a tight-fitting jacket; in other respects they are dressed in very much the same fashion as the Bengal Cavalry. Last year I pronounced the men's boots as unsatisfactory, and reported a large number of shoe-bite cases (42 admitted in hospital) which occurred on the march from Poona to Neemuch, incapacitating the men for work. A new and superior supply has since been obtained from Cawnpore, but there are still constant cases of shoe-bite occurring amongst the men, which either necessitates their being taken in hospital, or getting leave from riding parades. I am of opinion that this evil might to a great extent be remedied by making the men wear some kind of socks.

6. Duties not too heavy; nights in bed 9.4. Amusements of all kinds are supplied to the men, and I believe are most beneficial to their health. A good gymnasium has been erected in the lines during the year, and all recruits have to go through some eight or ten months' course of gymnastics on joining the regiment. Tent-pegging, polo, and native sports, such as wrestling, are encouraged.

Duties, exercise, amusements; their effect on health.

7. The hospital, an old Royal Artillery barrack, is roomy and well ventilated, the roof has recently been repaired. The latrine is within fifty yards of the hospital.

8. The general health at head-quarters has been remarkably good. A scurvy taint prevailed amongst the men in the detachment at Nusseerabad, necessitating a large number of them taking lime juice daily. There have been 621 admissions into hospital during the year, including the admissions in the squadron at Nusseerabad, against 1039 for the year 1878. The large number of admissions for 1878 was due to the regiment being on service in Cyprus, where they suffered from the fever of the country (bilious remittent?) and on return to Poona from general anæmia and malaria. The general physique of the regiment is excellent. Fifty-three recruits have been enlisted during the year, thirty-nine of whom were Hindus. Of this number (39), twenty-four were obtained from the Deccan by a recruiting party sent from the regiment. Most of these were considerably over regulation height (5 ft. 6 in.) and chest measurement (32 inches).

9. The year has been a particularly healthy one with the regiment. No epidemic has occurred. The rainfall for the year, 28 inches 7 cents, is considerably under the average, which, taking the last five years, is 36 inches 3 cents.

Influence of climate or local circumstances on health.

10. There have been 404 admissions for fever of all kinds during the year, the largest number for one month being in October. For dysentery and lung diseases 4 and 5, respectively. Injuries of all kinds admitted (60), considerably less than last year (93). Forty-four men were admitted for skin diseases, principally scabies and boils. For conjunctivitis 15, rheumatic affections of all kinds 18, and for nervous affections, such as neuralgia, tetanus, and vertigo, there were 6 admissions. Eleven cases of venereal diseases occurred during the year, primary syphilis 3, secondary syphilis 1, and gonorrhœa 7.

11. Four deaths have taken place during the year. One from traumatic tetanus, one from empyœma, following upon pleuropneumonia, a third the result of a fall from a horse in a recruit, the fourth occurred in a native officer, acute pneumonia subsequent to a severe attack of remittent fever.

Mortality and its causes.

Epidemics.

12. None.

13. Vaccination is carried on according to regulations; twelve children have been vaccinated during the year, all successfully. Eight at present unprotected, being under age.

Vaccination and re-vaccination.

14. Nineteen men have been invalided during the year, fourteen of which number were worn-out and debilitated, one debilitated with long standing syphilitic taint, one for epilepsy, two for lung diseases, and one for injury to head.

Invaliding and its cause.

15. On completion of the new latrines, the two old ones situated near the wells supplying drinking water should be done away with. To abolish female latrines in the courtyards of the huts a latrine for women is required, which should be built as near the lines as possible. This need not be in the least offensive or injurious to health, if kept properly clean. The huts themselves in many instances require repairing, and some more efficient mode of carrying

Requirements and recommendations.



off refuse water from the men's quarters is urgently required. I am of opinion that this might be most easily and satisfactorily carried out by means of stone or brick drains leading from the courtyards of each hut to a common drain outside, making each man pay for that portion of the common drain opposite his courtyard. The expense, I understand, would be from two to three rupees per man, or this expense might be borne by the regiment.

16. I believe cinchona mixed alkaloid, in doses of 15 to 20 grains, to be most beneficial in checking cases of intermittent and remittent fever: in but few instances does it produce vomiting or even nausea. Special observations, new experience in treatment, sanitary, &c. I am in the habit of dissolving it in a small quantity of tartaric acid and adding a few drops of spirits of chloroform. For the last six months, alternate cases of fever admitted into hospital have been injected with neutral quinine, the others being treated with 15 grain doses of cinchona, the date of discharge of each patient being noted, and a record kept of dates of admissions and discharges. At present the cases recorded are too few to justify me in giving an opinion as to which of these is most efficacious in subduing the fever. Out of some 20 cases injected, ulceration at the point of puncture has occurred in three; all of these three cases were operated on by my Hospital Assistant, who was at the time a novice at using the hypodermic syringe.

*Inspection by Deputy Surgeon-General HEWLETT.*

Inspected 15th December 1879. The head-quarters of the regiment have been at Neemuch throughout the year, a squadron being stationed at Nusseerabad. The lines, where, however, cleanliness is strictly maintained, have the usual defects of native cavalry lines. All the married quarters have an enclosure in front of them, where bathing is performed, and where there is a latrine from which the urine and water soak into the ground. The huts are deficient in ventilation. There is no subsoil drainage. All sullage and stale of the horses sink into the ground. The wells are for the most part across the parade yard; two of them are in too close proximity to the latrines. This arrangement is objectionable, and new latrines are to be built on a better site. One well in the lines ought to be closed. The hospital was formerly a European barrack, and is quite sufficient for all purposes. It has been well managed by Surgeon Young, who was absent on privilege leave at the time of my inspection; but I found everything in good and satisfactory order. The general health of the regiment throughout the year was very good, and the men appear to have got over the fever they suffered from at Cyprus.

*Inspection by Deputy Surgeon-General HEWLETT (Squadron Nusseerabad).*

Inspected 27th November 1879. The lines, like all native cavalry lines, are not good, as each married man's hut has an enclosure in front of it, in which bathing operations are carried on, and where there is a latrine. All sullage soaks into the ground in the immediate vicinity of the huts. The ventilation of huts effected through roof tiles and doors. The lines are kept as clean as they can be, but all the urine of the horses sinks into the soil. There is no subsoil drainage, the surface drainage is sufficient to prevent the lodgment of storm waters. The water-supply is drawn from a well on a higher level than the lines. The new water-supply has not yet been introduced. The hospital is situated on rising ground, and is well exposed to the breeze. I was much pleased with the management and evident care bestowed on the sick by Surgeon Bull, who is in charge. The health of the men has on the whole been fair.

**3rd (Queen's Own) Regiment Light Cavalry.**

DEESA.—In medical charge of Surgeon ELTON BURROUGHS.

Average Strength.....	474	Deaths in hospital .....	...
Do. do. present .....	450	Do. out of hospital .....	2
Admissions .....	677	Invalided .....	10
Daily Sick .....	17.7	Sick Leave .....	6



Years.	Stations.	Ratio per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Neemuch and Nusseerabad.	133.8	3.5	0.4
1877.....	Do. do. ...	103.8	2.8	.....
1878.....	Neemuch .....	218.0	4.0	0.2
	Average.....	151.9	3.4	0.2
1879.....	Deesa.....	150.4	3.9	.....

1. The regiment marched from Neemuch to Deesa on January 8th, 1879, and arrived at Deesa on the 4th of February. One squadron is stationed at Rajcote, and fifteen sabres are stationed at Palunpur as escort to the Political Agent there.

2. The men's quarters consist of five blocks of buildings, containing in all 336 (three hundred and thirty-six) dwellings: the married quarters are not separated from the single men's. The Native officers' quarters are to the rear of these blocks.

The dwellings for the syces are on the right flank, but outside the lines and in close proximity to the latrines: the dwellings for the bheesties and dhobies are on the left flank but inside the lines.

Most of the married quarters have small courtyards surrounding the entrances; all these dwellings are without plinths. The refuse water from the bathing places is now being carried away by small surface channel reservoirs, which are emptied twice a day: trees are as rapidly as possible being planted in the site of these reservoirs, so as to do away with them.

3. There are three latrines, situated about 200 yards from the nearest block within the lines: each latrine contains twenty compartments. Two of these latrines are for the men and one for the women. Three sweepers are kept. Twice daily the sewage is carted away.

Water-supply.

4. Good and plentiful; but nearly all the wells are overhung with trees, and are not covered in.

Food and clothing.

5. All kinds of cereals are fairly cheap and plentiful.

As yet the new dress has not been adopted, but it doubtless will prove a great boon to the men, it having given every satisfaction to the Sind Horse during the Afghan expedition.

6. The duties are light; and, with the exception that a great many men who go on duty to Palunpur return with syphilis, they do not seem to cause any injurious effect on the men.

7. The hospital consists of a large oblong building one hundred and fifteen (115) feet long and twenty-two (22) broad, giving a cubic space of thirty-five thousand, four hundred, and twenty feet (35,420), affording ample accommodation.

The hospital and its immediate surroundings.

At one end of the building is a contagious ward, and at the other end a store room and office.

The sick of the staff are also attended in this hospital.

The hospital latrine is situated far too near the road, and besides being an eyesore to the passengers and inhabitants of other bungalows, its plan and building is anything but satisfactory.

A requisition for a new one has been sent in to the P. W. Department.

General health and physique.

8. Health good, physique fair.

Influence of climate or local circumstances on health.

9. Under this heading I would beg to call the attention of the authorities to the great number of cases of syphilis, whose origin is to be traced to Palunpur or its vicinity.



10. Intermittent fever, 371; rheumatic affections, 40; syphilitic affections, 34; diseases of the eye, 30; lung diseases, 9; affection of the heart, 1; diarrhoea, 11; dysentery, 20; other digestive diseases, 20; urinary diseases, 6; skin, 41; debility, 2; injuries, 72.

Mortality and its causes. 11. Two sowars died on leave; the causes unknown.

Epidemic. 12. None.

Vaccination and re-vaccination. 13. Thirteen (13) children have been vaccinated during the past year; no re-vaccination.

Invaliding and its causes. 14. Two sowars were invalided for chronic rheumatism and two for general debility, and the rest (6) over 32 years' service.

15. In the lines I would suggest—(1) that all the small courtyards in connection with the married men's quarters should be razed to the ground, as these yards have a tendency to cause dirty and unwholesome habits; (2) that the latrines should be placed nearer the lines, as some of the frequenters have to walk from the extreme left flank to their present locality, a distance of over a quarter of a mile; (3) that all trees in close proximity or overhanging the wells should be removed or cut down; and the wells covered in, to prevent foreign matters from gaining an entrance.

In the hospital compound—(1) that the trees overhanging the well be cut down; (2) that a new site be selected for a latrine, which should not be built on such conservative ideas.

#### *Inspection by Deputy Surgeon-General HEWLETT.*

Inspected 10th November 1879. The lines, like all Native Cavalry lines, have shut in enclosures in front of each married man's quarters on account of the *purda-neshin* women. They are objectionable in a sanitary point of view, but I fear cannot be removed. They are kept as clean as possible. The sandy soil readily absorbs the sullage that runs out on to it from the *mores* and latrines within the enclosures. This is objectionable, and indicates the necessity for efficient drainage. The huts are deficient in ventilation and light. The doors are very low. The water supply is derived from wells in the lines, some of which are at a lower level than the horse lines, so that pollution from the stale of the horses is more than likely. The wells also should be covered, as they are mostly under large trees. The regimental latrines are at an inconvenient distance, at least 235 yards from the lines. They are also close to the syce lines, the occupants of which doubtless use them. Being on the standard plan, they emit a dreadful stench, though every endeavour is made to keep them clean. The health of the regiment has been fairly good during the year. There was no epidemic disease during the year, nor any case of enteric fever reported. Ague was slightly prevalent during the rains and early autumn, but subsided towards the close of the year. The generality of the men appear to be of good physique. My inspection of the hospital was not quite as satisfactory as it should have been. No diaries of cases had been kept, and there had been a great falling off in the number of persons vaccinated; otherwise everything was in a satisfactory condition. The hospital privy is most objectionable, being exposed to view from the public road, and immediately opposite the mess garden of the 26th N. I. The hospital itself was in fair repair, but the mud flooring is objectionable. In this hospital the sick of the Native Staff and details are treated—an arrangement which answered very well when the Surgeon of the Cavalry was also Staff Surgeon, but which may lead to friction when the appointment is held by another officer. There is no distinct hospital establishment allowed for the treatment of the Native Staff and details.

#### **No. 1 Mountain Battery.**

RAJKOT.—In Medical charge of Surgeon H. P. JERVIS.

Average Strength .....	113	Deaths in Hospital .....	1
Do. present .....	107	Do. out of Hospital .....	1
Admissions .....	328	Invalided .....	16
Daily Sick .....	8.3	Sick Leave .....	2



Years.	Station.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876 .....	Rajkot .....	70.0	2.5	.8
1877 .....	Do. ....	61.5	2.4	.8
1878 .....	Do. ....	239.1	7.4	1.7
	Average.....	123.5	4.1	1.1
1879 .....	Rajkot .....	306.5	7.7	.9

1. The head-quarters of the Battery have been at Rajkot throughout the year. Seventy-three men were transferred to No. II. Battery, and left for Porebunder *en route* to Kurrachee on the 7th November.  
Location and movement.
2. The general description of the lines has been given in former reports. They are clean, well ventilated, and in fair repair.  
Lines and their surroundings, present condition, hygienic and otherwise.  
The drainage is all surface.
3. No defects in the conservancy of either the lines or the latrines has been noticed.  
Conservancy.
4. The water-supply has been ample during the year under review, and apparently wholesome.  
Water-supply.
5. Grain was very dear till after the monsoon; but now it is at a fair price. Vegetables are expensive. No change has been made in the clothing since last report.  
Food and clothing.
6. The gunners' duties are necessarily heavy, but not apparently prejudicial to the health of the men. The men are given to taking exercise and amusing themselves in various ways.  
Duties, exercise, and amusements; their effect on health.
7. The defects in the hospital buildings were pointed out in last report, and nothing has been done to remedy them yet. The hospital itself is in good repair, well ventilated, and clean.  
Hospital and its immediate surroundings, present condition, hygienic and otherwise.
8. The general health during the year under review compares unfavourably with that of the year 1878, there being 328 admissions during the year 1879 as compared with 287 during the year 1878. The majority of the gunners are fine, big men, and the drivers, though smaller in build, are not deficient in physique.  
General health and physique.
9. The great prevalence of intermittent fever during the year was doubtless owing to the heavy rainfall of the year 1878.  
Influence of climate or local circumstances on health.
10. The following diseases gave the greatest number of admissions during the year:—fevers gave 193, of which 187 were for intermittent fever, and 6 for febricula; injuries 44, of which 28 were of the lower extremity; affections of the respiratory system 12, of which 7 were for bronchial catarrh, 3 for acute bronchitis, 1 for lobular pneumonia, and 1 for pleurisy; affections of the digestive system 7; venereal affections 16 (7 syphilis, 6 primary and 1 secondary, 7 gonorrhœa, and 1 bubo, 1 stricture); and affections of the cutaneous system 20.  
Details of treatment.
11. Two deaths occurred during the year, one in hospital from bronchial catarrh, complicated with pneumonia, and one, while on sick leave, from general debility.  
Mortality and its causes.
12. None.  
Epidemic.
13. Eight primary vaccinations were performed. All were successful. Of three re-vaccinations, one was successful.  
Vaccination and re-vaccination.
14. Sixteen men were invalided during the year, on the following grounds:—13 for general debility, 1 for cataract, 1 for imperfect sight of the right eye, and 1 for varicose veins.  
Invaliding and its causes.
15. The requirement alluded to in last report has not yet been looked to. I would again direct attention to it.  
Requirements and recommendations.



Special observations, new experiences in treatment, &c.

16. In my hands the cinchona febrifuge has proved successful in the treatment of the majority of cases of intermittent fever occurring in the men of the battery.

*Remarks by Deputy Surgeon-General HEWLETT.*

Marched from Rajkot before my arrival at the station, so that I had no opportunity of inspecting it.

**H. M.'s 2nd Prince of Wales Own Regiment N. I. (Grenadiers).**

NUSSEERABAD.—In medical charge of Surgeon G. H. BULL, M.D.

Average Strength .....	688	Deaths in Hospital .....	12
Do. do. present .....	604	Do. out of Hospital .....	2
Admissions .....	1,423	Invalided .....	30
Daily Sick .....	51.9	Sick Leave .....	24

Years.	Station.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Belgaum .....	63.8	2.6	0.8
1877.....	Do. ....	56.4	3.0	1.4
1878.....	Do. ....	80.4	2.9	0.4
	Average.....	66.8	2.8	0.9
1879 .....	Nusseerabad.....	235.6	8.6	1.9

1. The Regiment left Belgaum for Nusseerabad on 12th November 1878. It marched in two detachments from Ahmedabad. The head-quarters, consisting of five companies, leaving on 9th December, arrived at Pallee on the 1st January, and at Nusseerabad on the 14th January 1879. The other detachment, consisting of three companies, left Ahmedabad on 17th December 1878, halted at Kooshawarra on 1st January, and arrived at Nusseerabad on the 25th January 1879. The Regiment has since been located in Nusseerabad.

2. The lines, constructed on the standard plan, are situated on rather low ground at the south end of the camp.

The lines and their surroundings; present condition, hygienic and otherwise. They consist of fifteen blocks of pendals facing north and south. Each block contains 22 huts in two rows placed back to back. The huts are built of sun dried bricks and mud with single tile roofing. The plinths are only 10 inches in height. The central street, running east and west, is 105 feet 6 inches in width; the cross streets are 39 feet.

The verandahs in the married quarters are partially closed. The married and single men's quarters are of similar dimensions. Each hut has a superficial area of 75.5 square feet and a cubic space of 831 cubic feet.

There is a small ventilator in the roof of each hut, but most of the foul air escapes through apertures between the tiles. The principle adopted in the construction of the roofs is most defective. During the rains the water actually pours through and renders many of the huts uninhabitable. The women bathe in the verandah, and the water is carried by surface drains to trees planted in front of the huts.

The rain water during the monsoon is conducted by open drains in the centre of the streets to a nullah at the western side of the lines. The native officers' quarters consist of 16 houses, 8 being placed on either side of the lines. The roofs of these are also in a very faulty condition. The regimental bazaar is situated close to the lines, at the north-eastern corner. It is kept clean, and is in fair repair.



The quarter guard and cells (of which there are four) are built of stone masonry, and are roomy and in good order. They are placed to the west of the lines.

The only piece of cultivated ground near the lines is that used for the trench latrines. A crop of grain is grown there annually.

3. Trench latrines placed 230 yards to the south-west of the lines are provided for the men. The latter use them freely, and the system works admirably. A crop of grain is grown on the ground every year. The women are accommodated with two latrines on the standard plan, 130 yards to the south of the lines.

There are also six urinals with masonry beds in the lines for the men. Dry sand is used in these, and changed twice daily. They are a great boon, as by their use the ground in the immediate vicinity of the huts is kept quite pure and free from nuisance. The filth from the women's latrines and urinals is carted away and buried at the other side of the station.

4. Drinking water is obtained from three wells in the vicinity of the lines. It is slightly brackish, but otherwise appears of fair quality. It is augmented by a daily supply of 394 gallons of first class water from the Dilwarra well, situated about three miles from cantonment. This allows about five pints per man, which is not sufficient. Fountains have lately been erected, which will yield a plentiful supply of good water from a reservoir in the hills five miles from camp. But as the necessary arrangements have not yet been completed, the bulk of the supply is still furnished by the brackish water from the wells. The latter never run dry during the summer, so the supply, such as it is, is unlimited. They are uncovered, and the water is consequently liable to pollution from debris of various kinds carried in by the wind.

Water of inferior quality is obtained for washing purposes from five wells in the lines.

5. The supply of grain has been plentiful and of good quality, but fresh vegetables were scarce and dear during the summer months.

Knickerbockers and gaiters would be a great improvement on the trowsers now worn.

6. The duties, which consist of the usual guards, parades, musketry course, and occasional escort parties are not excessive, and do not appear to exert a prejudicial effect. The average number of nights in bed has been 4.8. During the prevalence of ague in the latter part of the year, the men were relieved of some of their guard duties by a detachment of the Mheirwarra Battalion from Ajmere. All the recruits go through a six months' course of gymnastics, which improves their physique wonderfully.

7. The hospital, which faces north and south, is situated on high ground to the south-east of the lines. It is built of stone and roofed with stone slabs. The floor is well raised from the ground, and the building is dry, well ventilated, and comfortable. There are two wards, each 115 feet long and 22 feet broad, in each of which 30 patients can be accommodated with a cubic space of 1,348 feet per man. It is surrounded by a spacious verandah, one-half of which is supplied with moveable jhamps, and is utilized as a ward during the unhealthy season, when the admissions are high. The latrines are on the standard plan, and are kept as clean and free from odour as possible by the use of carbolic acid solution and MacDougall's powder. In the centre of the building, between the wards, are seven rooms, used as follows:—one for eye cases, one for cases of a private nature, three as store rooms, one as a compounding room, and one for the office. Cases of an infectious nature are treated in huts and unserviceable tents. The Hospital Assistant's and servants' quarters, dead-house, and cooking rooms are in good repair.

Trees have been planted along the north side of the building. Crops are not grown near the hospital compound.

8. The general health has been very inferior to that of the three preceding years, while the regiment was stationed at Belgaum. The total number of admissions was 1,423, against 372 in 1876, 351 in 1877, and 508 in 1878. Of the admissions, the large number of 1,178 was for ague alone, which was very prevalent during the four latter months of the year.

The scorbutic taint, which was originally developed at Aden, became manifest at the commencement of the hot weather, and were it not for the free issue of lime juice and fresh vegetables, there would undoubtedly have been many cases of scurvy.

Owing to the prompt measures adopted, only four cases of scurvy occurred, and two of these were not severe. After the rains, when fresh vegetables became more plentiful and at the close of the year, only seventeen men were receiving a small daily allowance of lime juice.



The physique of the men is on the whole good, and that of the majority of the recruits enlisted this year excellent.

9. Prior to the monsoon the heat was greatly felt. The rainfall of 23.94 inches was considerably in excess of previous years, that for 1877 being 11.48 inches and for 1878 19.4 inches. To this cause may be attributed much of the malarious fevers which occurred. Owing to the scarcity and high price of fresh vegetables during the hot months, the want of this article of diet was much felt, and served to re-develop the scorbutic taint which was originally contracted by residence in Aden. Much of the ague and lung affections from which the men suffered may be attributed to the fact of their not being provided with cots, coupled with the dampness of the huts on account of the lowness of the plinths.

10. There were 1,423 admissions, which, with 22 remaining from the previous year, gives a total of 1,445 treated. Of the admissions, 1,178 were for ague. Most of the cases of this affection were not severe, and yielded to cinchona mixed alkaloids, but some were very intractable, and with these the mixed alkaloid had to be replaced by quinine. Many were complicated with bronchial catarrh and gastric irritability.

Remittent fever furnished three severe cases, which were followed by protracted convalescence.

There were 51 admissions for diseases of the respiratory system, including 22 for bronchitis, with one death; 9 for pneumonia, with 3 deaths, and 16 for bronchial catarrh. Dysentery gave 7 admissions, which all recovered under the ipecacuanha treatment.

Five cases of syphilis were treated (2 primary and 3 secondary). There were also 4 cases of scurvy (2 of which were severe), 2 of phthisis pulmonalis, 15 of diarrhoea, 1 of acute and 4 of chronic rheumatism, 8 of lumbago, 18 of eye affections, including 15 of conjunctivitis, and 1 of keratitis. The admissions for wounds and accidents and other causes call for no special remark.

11. There were 12 deaths in hospital during the year. Of these, 6 are returned under the head of ague, and include one case in which the fever assumed the remittent type. Acute bronchitis was the cause of 1 death, and pneumonia of 3. One case of obstructive jaundice terminated fatally, as did also a case under treatment for general debility. In the latter instance the *post mortem* examination revealed a subperitoneal abscess pressing on the liver and right kidney. There was also ulceration of the large intestine. Death was preceded by diarrhoea for a few days. Of the cases enumerated, 7 were taken ill on the line of march between Ahmedabad and Nusseerabad, and died either while on the march or shortly after arriving at this station. The causes of death in these cases were, ague complicated with pneumonia 3, ague and pleurisy 1, pneumonia 3. Two men died of acute bronchitis while absent from the regiment.

12. Vaccination has been strictly attended to. There were 41 primary and 13 re-vaccinations during the year. All the former and 11 of the latter were successful. Although small-pox was exceedingly prevalent in the Sudder bazaar, the regiment has been exempt from it. There are not any unprotected people in the regiment at present.

13. Twenty-nine men were invalided by the General Invaliding Committee. Of these, 17 were for general debility, 1 for asthma, 1 for valvular heart disease, 1 for chronic bronchitis, 1 for phthisis pulmonalis, 1 for chronic rheumatism, 4 for defective vision (3rd class shots), 1 for opacity of the cornea, and 2 for diuresis. One man was discharged for physical disability.

14. The huts and native officers' quarters should be newly roofed without delay, as they are quite unfit for another rainy season.

The western half of the hospital verandah ought to be provided with moveable jhamps, similar to those at the eastern side. A large amount of additional accommodation would then be provided for patients during the autumn months, when the admissions for ague are so numerous, and the necessity for utilizing tents would be avoided.

It was recommended that such of the men as required them should have an allowance of fresh vegetables and lime-juice when the tendency to scurvy was prevalent. The issue was sanctioned, and the most beneficial results ensued.



15. The mild cases of ague yielded to cinchona mixed alkaloids, administered in doses of from 5 to 10 grains three times daily; but in severe cases, although 45 grains were given daily, the cinchona failed to arrest or modify the attacks. Many of the latter cases were successfully treated by the hypodermic injection of the neutral sulphate of quinine.

Special observations, new experiences in treatment, sanitation, &c.

During the month of December, when ague was prevalent, as many of the men in hospital as were fit to be moved were sent into camp for a change, and speedily recovered.

It will be seen by the following table that the sickness and mortality amongst Hindoos were much greater than amongst Mussulmans :—

	Average Strength present during the year.	Admissions.	Deaths.	Percentage of Admissions to Strength.	Percentage of Deaths to Strength.
Mussulmans .....	66	65	None.	98·4	.....
Hindoos .....	525	1,300	12	247·8	2·3

### 6th Regiment N. I.

MHOW.—In medical charge of Surgeon D. N. PARAKH.

Average Strength ... ..	667	Deaths in Hospital ... ..	2
Do. present ... ..	610	Do. out of Hospital ... ..	3
Admissions ... ..	878	Invalided ... ..	76
Daily Sick ... ..	19·4	Sick Leave ... ..	18

Years.	Station.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876... ..	Aden ... ..	62·6	2·1	0·6
1877... ..	Do. ... ..	53·7	2·3	1·1
1878... ..	Mhow ... ..	124·0	2·7	2·6
	Average...	80·1	2·4	1·4
1879... ..	Mhow ... ..	143·9	3·2	0·3

1. The right wing of the regiment, which was stationed at Indore at the beginning of the year under review, joined head-quarters at Mhow on the 28th March 1879. From this date up to the 2nd December 1879, the whole regiment had been located at Mhow. The head-quarters and left wing left Mhow on the 3rd December 1879, and marched to Neemuch, where they arrived on the 20th December 1879, leaving the right wing behind.

2. The following defects in the lines at Mhow, which were mentioned in my former reports, still continue to exist :—(a) Defective ventilation of the streets as well as of the huts; (b) defective cubage of the huts; (c) want of plinth; (d) want of light inside the huts; (e) dampness of the wall and floor during the rains; (f) want of roof ventilation, and want of openings to remove smoke, foul gases, &c., from the hut; (g) want of well made chunam bathing places inside the hut. The same defects exist at Neemuch more or less. The floor of the huts at Neemuch is on a lower level than the ground outside. The difference between



the cubic capacity of the married and single men's quarters, which ought to be great, is very small, if, indeed, there be any; and if the single men complain of want of sufficient ground space, the married men must feel the want threefold, and so they do, even though no distant relations or dependants are now allowed to live in the lines.

3. The same as reported last year. The permanent latrines are very far from the lines both at Mhow and Neemuch. At the latter station the latrine has no roof, and this circumstance, I believe, adds to the general dislike of the men and their wives to use them. It would be a very inconvenient arrangement during the rains, and I have no doubt the women and children would use their own huts for the purpose rather than be drenched in the rain, especially during the night. I repeat my conviction, which I mentioned in my last report, of the necessity of urinals for the men and women, of some sort or other, near the lines, if hut and its surroundings' contamination is to be prevented.

4. At Mhow the supply was abundant, the water being of good quality in every way. The well which was reported by me last time as being near the latrines of the 13th Regiment N. I. has not been in use during the year, and has been abandoned. At Neemuch there are eight wells at the disposal of the regiment. None of them has any source of contamination near it. The water supply, though at present plentiful, threatens to fall short of the demand in the ensuing hot weather, for some of the wells are already beginning to dry up.

5. At Mhow food was on the whole dear during the year. Rice was 9 seers the rupee, dal 10 seers, ghee  $1\frac{1}{4}$  seers, wheat 10 seers, salt 9 seers, bajree 12 seers, potatoes 16 seers. At Neemuch the food is dearer still, and vegetables are still more scarce, potatoes particularly so. On inquiry I found that a single sepoy cannot live on less than from 5 to 7 rupees a month with grain compensation, which on an average for the year comes to about Rs. 2-12-6 per head, his pay comes to about Rs. 10-12-6, so that he has a balance of Rs. 3 per month for his clothing, for providing for his old age, and for saving for marches, &c. As, however, most of the men are married, at this rate the men are very badly fed, and their wives and children still more so. A sepoy when not wearing his uniform is very insufficiently and badly clothed for this climate. Used to the mild climate of the Deccan and Conkan, from which most of them come, he does not understand the necessity of warm clothing for himself or his wife and children. Hence he suffers in health, and his children especially suffer from the effects of vicissitudes of temperature. Just as there is a judicious order to adapt the quality and colour of the uniform to the necessities of the weather, so there ought to be for the sepoy's plain clothes.

6. Duties were not hard and not injurious to health. A gymnasium was started during the year at Mhow, and all recruits had to go through a course of gymnastics for several months. This was much liked and had a decidedly beneficial effect on the health. Duties, exercise, and amusements; their effect on health. Average number of consecutive nights in bed for the different ranks during the year:—Native officers 9, havildars  $8\frac{1}{2}$ , naiks  $7\frac{3}{4}$ , drummers  $8\frac{3}{4}$ , privates 5.

7. No alteration since last report. The accommodation was ample, the ventilation sufficient, and the sanitary condition very good. The Hospital Assistants' quarters have the same defect as mentioned before, viz. insufficient ventilation. The hospital latrine was kept clean and disinfected, and very carefully and often inspected. Hospital and its immediate surroundings; present condition, hygienic and otherwise. The servants' quarters were not allowed to be overcrowded with a lot of relations and dependants. The supply of water for the patients was drawn from a well in the compound of the 13th Regiment hospital, the water was good and abundant. The hospital buildings at Neemuch are satisfactory in every way. There is no table and no necessary appliances in the building which is intended for a dead-house.

8. The recruits selected from Punderpoor, Sholapoor, Jamkhundi, Kulladghee, Beejapoor, Bombay, Nassick, Mahad, and Chiploon, and sent to the Regiment to Mhow, were not very good specimens of physique. General health and physique. These, together with those picked up at Mhow, were induced to feed themselves up, practice gymnastics, and avoid all debilitating influences, and they improved considerably; but still coming from the abovementioned places, where the effects of the late famine had not yet quite died out, they preserved the tendency to succumb easily to the influence of disease; shoe-bites and slight sores festered in them more than they would in healthy persons, and they caught malarious fevers much more readily than up-country men. The health of the privates was much more satisfactory during this year than it was the year before, though there is still much room for improvement. Several men who were reported as bad shots were found on careful examination to be so, not on account of any defect or anomaly of vision, but because



they were generally weak and anæmic and therefore unable to take a steady aim. Out of 103 men who volunteered for active service and for transport duty, 38 were found unfit to proceed owing to general debility. These were quite fit for garrison work, but they were not fit to stand the exposure and fatigue incidental to the work they would be called upon to do. The wives and children of the men are very weak and unhealthy. Most of the recruit boys at present in the service look weakly and unpromising. Hardly one of them would make a good soldier when he comes of age. The climate of Central India does not seem to me to suit the Deccanees and Conkanes. There are extremes of temperature here which these men are not used to in their native country.

10. The total number of admissions in the regiment for all ranks was 878. The daily sick were 19·4. The average strength 667. Average strength present 610. The diseases that furnished the greater number of admissions were in their order of frequency as follows:—

(a) *Ague and other malarious fevers*, 509. There was only one case of remittent fever. The largest number of ague cases were of the quotidian type. The chief sufferers were the inhabitants of the Deccan and Conkan. Most of the cases were admitted frequently suffering from the same disease. Some of them were very obstinate cases and would only yield to the hypodermic injection of quinine for a time. These were recommended for sick leave as a last resource.

(b) *Contusions of the upper and lower extremities*, 71. These included cases of shoe-bite and minor injuries to the feet.

(c) *Lung affections*, 37. Of these, bronchitis and bronchial catarrh were the chief diseases. Besides occurring as independent affections in the cold and wet weather, these diseases often complicated ordinary malarious fevers. One case of pneumonia proved fatal.

(d) *General Debility*, 32. This cause furnished so many patients, because the regiment had not yet shaken off the scorbutic taint and weakness acquired at Aden.

(e) *Colic*, 25; (f) *chronic and muscular rheumatism* 25; (g) *diarrhœa*, 21. These were all very mild, and due to cold or indiscretion in diet.

(h) *Boils*, 20.

(i) *Primary syphilis*, 14; (j) *conjunctivitis*, 12; (k) *guinea-worm*, 12—guinea-worm principally affected the Mahrattas; (l) *scabies*, 12; (m) *buboes*, 8.

(n) *Ulcers*, 6. These cases of ulcers were very severe; some of them showed a very marked tendency to sloughing; others were actually phagedenic, and one was markedly scorbutic. All were very obstinate to heal; and most of them occurred in recruits just sent up to the regiment from other stations, who were weakly, scorbutic, and badly fed. These ulcers arose from slight injuries, such as scratches, slight burns, and so on.

(o) There were only 3 cases of dysentery. One of these was very severe, and had to be sent on sick leave.

There were seven admissions amongst the European officers; from ague 2, general debility 1, abscess 1, bronchitis 1, dysentery 1, lumbago 1. All were cured. One officer was recommended for sick leave to England. His case is briefly described in my last report. After his return from the Neilgherries, he was in a weak and irritable state, and required change to England for the complete restoration of his health.

11. There were five deaths in all in the regiment, of which one occurred in hospital and four out of hospital. The death in hospital was from extensive double pneumonia. It occurred in the person of a recruit who had recently been selected at, and sent up to Mhow from Sholapoor; and who was not in good health to begin with. He was pale, anæmic, scorbutic, and altogether out of sorts, so much so, that he was just about to be invalided when he caught the disease and died. Three of the four deaths out of hospital occurred in men who were on sick leave, having been sent away to their native places because they were suffering from chronic bronchitis, chronic pleurisy, and malarious fevers. The fourth occurred in the lines. The man shot himself with his rifle, and died immediately. It was a clear case of suicide, and the motive could not be discovered. The bullet passed through the heart, causing instantaneous death.

12. There were eighteen admissions from small-pox during the year; all recovered. They were mostly mild cases, and of the modified and distinct variety. Epidemics. Five of these cases occurred in sepoys, three in women, eight in children, and two in recruit boys. All the patients had been previously vaccinated, the marks of vaccination being distinct in all cases except one. In only one case there were marks of a previous attack of small-pox. Most of the cases could be traced to contagion. All the sepoys and recruits, and nearly all the children, were at the time protected by



vaccination or by previous attack of small-pox. The first case of small-pox occurred in February and the last case in May. The largest number of admissions were in the month of March.

There were three cases of chicken-pox in men and three in children, and there were three cases of measles in children. All these cases recovered.

Vaccination and re-vaccination. 13. Vaccination and re-vaccination were diligently and carefully performed.

(a) Primary vaccination ...	{	Successful.....	87
		Unsuccessful...	7
		Total ...	94
(b) Re-vaccination.....	{	Successful ...	22
		Unsuccessful...	22
		Total ...	44

On the 31st December 1879 all the sepoys and recruits were protected by vaccination or by small-pox marks. Nearly all the children were also protected. Those that were left unprotected were either too ill or too young to be vaccinated.

14. In the whole regiment 58 men of all ranks were invalided for pension, six for discharge, and one for discharge with gratuity, by the Annual General Invaliding Committee. Seven more were pensioned independently of a Medical Board, as they were men of over 32 years' service. Three more were invalided by Special Invaliding Committees which assembled from time to time. And lastly, one man was sent to the Lunatic Asylum, Colaba.

Chronic bronchitis and incipient phthisis pulmonalis, 1; old age and general debility, 45; varicose veins and general debility, 1; chronic rheumatism, 2; general debility, 15; acute dementia, 1; phthisis pulmonalis, 1; scorbutic ulcer and debility, 1; acute mania 2 (one of these sent to Colaba); long service, i.e., over 32 years' service, 7.

There were 18 men sent on sick leave suffering from—chronic rheumatism, 1; general debility, 1; sent from Indore from the right wing; phthisis pulmonalis, 1; dyspepsia, 1; dysentery, 1; secondary syphilis, 1; chronic bronchitis, 1; acute bronchitis, 1; ague, 10; sent from head quarters from Mhow.

15. All the defects already pointed out in the huts may be removed. There is hospital accommodation for women and children required, as the native women appreciate European medicine much more now than they did formerly, and the men have not so much objection to their being treated in hospital, particularly in Mahratta regiments.

A filter for dispensary use is much wanted. All the European officers drink filtered water in their houses, and their medicines, I think, ought to be made up with filtered water also. Mattresses for the men are very much needed, as in these large hospitals, which are far too much ventilated for native constitutions, they feel the cold very much, and without mattresses, or at the least straw bedding, their backs get very cold. Several unprofessional visitors to the hospital noticed this want and strongly urged on me to represent it.

16. One case of acute rheumatism was treated with salycilic acid in 20 grain doses every two, three, and four hours, according to the daily decreasing severity of the disease. The man was discharged cured in seven days. There was no heart complication. I obtained some iodoform privately for trial. I tried it in three cases of bad ulcer resulting from slight injuries and slight burns in some of the cachectic recruits above alluded to. The ulcers were very unhealthy-looking, with an uncontrollable tendency to spread and very obstinate to heal. After their spread was checked by strong caustics, they refused to heal until iodoform dissolved in ether was applied, which acted immediately. This application relieved the pain and brought them to a healthy condition. In one case of sloughing syphilitic sore, the same application proved very successful. In bilious and malarious headaches, podophyllin dissolved in absolute alcohol was used in drop doses, as recommended by Dr. Ringer, and its action was very beneficial when thus given. Croton chlorate hydrate also was tried in hemicrania with marked benefit. As cinchona mixed alkaloids have already established their reputation as antiperiodics, I need not say much about them. I always use them in mild cases, and in the majority of cases of ordinary ague with success. I reserve quinine for bad cases, for obstinate cases, and for officers with whom the alkaloid is not so useful as quinine. I believe the cinchona alkaloid does not produce nausea and vomiting if given in the form of a pill, and particularly if given in combination with minute doses of morphia.



*Inspection by Deputy Surgeon-General HEWLETT.*

Inspected 27th December 1879. The head-quarters wing marched from Mhow *en route* to Neemuch on the 3rd December before my arrival, so that I had not the opportunity of inspecting the entire regiment. The right wing occupies one-half of the regimental lines. These are in a very dilapidated condition, and are, like those of the 13th N. I. adjoining them, almost the worst I have seen in the Bombay Presidency. They are not nearly as good as the new buildings provided for the Commissariat followers at Mhow. Some of the pendals appear to be on the point of falling down. The huts are of a very bad design. They have no plinths. The cubage is insufficient, and the huts are built across instead of parallel to the slope of the ground on which they stand, so that they must necessarily be damp. The hospital is a good one, and has good accommodation, but it is in too close proximity to the lines. The men were, at the date of my inspection, fairly healthy though many had suffered from ague.

**7th Regiment N. I.**

BHUI.—In medical charge of Surgeon A. F. SARGENT.

Average Strength.....	693	Deaths in Hospital .....	10
Do. present .....	601	Do. out of Hospital.....	6
Admissions.....	1159	Invalided .....	51
Daily Sick .....	41.1	Sick Leave.....	13

Years.	Stations.	Rate per cent. to Average Strength Present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876 .....	Rajkot, Dwarka, & Tanna.	129.5	3.8	0.6
1877 .....	Do. do. ...	71.8	2.5	1.2
1878 .....	Do. do. ...	193.3	4.9	1.5
	Average...	131.5	3.7	1.1
1879 .....	Bhuj .....	192.8	6.8	1.6

1. The regiment has been stationed at Bhuj during the whole year.
2. The lines are old, small, and worn out. New ones are ordered to be built. I am not aware that they directly affect the health of the men, but last hot weather a few patients preferred being in the hospital to living in the lines, on account of the intense heat of the latter. There are no drains, and all effete matter is removed daily and burnt.
3. The trench system of latrines is used. There are trenches for males and for females one-third of a mile north and south of the camp. There are only four trenches among 900 people, and each has five seats. No matter what care is taken, this seems to be very disgusting and repulsive to the people using them, who always avoid them if they can. There seems no injury to health arising from the system, and it is not easy to suggest any substitute, except that there might be ten or twelve latrines instead of only four. There are pukka built stone latrines which are not used on account of Government not supplying a conservancy cart. Conservancy throughout the camp limits is well attended to, a cart going round once a day to take away all filth from the officers' bungalows, &c.
4. The water is drawn exclusively from wells. The well known as the "hospital well," from which the officers are supplied with drinking and washing water, is exceedingly good; the other drinking wells are all very fair, some being rather hard and containing a large amount of chlorides. I analyzed the drinking wells last April, and was well satisfied with them. They are all well placed in the maidan, away from any visible cause of contamination, and the stone work is in good repair.



5. Food is very expensive, the grain compensation at times amounting to Rs. 7-8-0.

Food and clothing. Fresh vegetables are very difficult to get for eight or nine months in the year. Mutton is cheap and good. Beef is not allowed to be killed in the neighbourhood of Cutch. Clothing is red uniform, except for four or five months in the hot weather, when the men wear white.

6. The duties are not too heavy. When the running drill was commenced, however,

Duties, exercise, and amusements; their effect on health. in the beginning of November, there was a very cold north-east wind blowing, and in two or three days the increase of admissions into hospital was so great that I recommended the running drill should be stopped for some weeks. This was done, and when the running drill was resumed in January, it was found to have no ill effects.

There is no gymnasium, the one left by the 11th Regiment having been sold for firewood and old iron. Carpet-making, basket-making, boot-making, carpentering, blacksmiths' work, tailoring, &c., are done by the sepoys. There is a native library. Native sports, and other athletics, as hurdle and flat races, the tug-of-war, &c., are encouraged.

Hospital and its immediate surroundings; hygienic or otherwise.

7. The hospital is all that can be desired: it affords accommodation for 28 patients without crowding, and 28 more can be put in the verandahs.

The ventilation is good. The conservancy cart attends daily. There are two bheesties, who bring drinking water from a well three-fourths of a mile off; another well 120 paces to the rear of the hospital supplies ablution water. The second class hospital servants' quarters are very dilapidated, and most of them are unfit to live in.

There is accommodation for one Hospital Assistant only. This, however, is of little consequence, as there is a deserted European hospital in the same compound, in one of the houses of which the Regimental Hospital Assistant and Kutch Agency Hospital Assistant live.

8. The health of the regiment seems very fair. The regiment came in a very debilitated state from Rajkote and Tanna at the beginning of the

General health and physique. year, and is now decidedly improved. The recruits and young soldiers seem very promising, but there are a large number of men over 20 years' service, who certainly ought to be pensioned. They can do their duty and keep off the sick list as long as the regiment is stationary, but they would be quite unfit for active service, or even for an ordinary march in time of peace—a fact I have personally witnessed as I marched with the right wing of the regiment about 160 miles. 71 of these were sent up to Bombay by the regimental invaliding committee, out of which number, 29 were returned to us as fit for active service.

9. The climate is decidedly agreeable. On two days, viz., May 22nd and 23rd, the thermometer in the shade registered 115°; these were considered

Influence of climate or local circumstances on health. two of the hottest days known here for years. For many weeks the thermometer reached 105° and over, but during this time the nights were usually pleasant. The lowest temperature registered was 46° in January. There is usually a strong wind blowing day and night: for nine months in the year the wind is westerly. October as usual was very hot and oppressive. The only known local influence on health is 6,000 square miles of the Runn of Kutch drying up every autumn, about twenty miles to the north-east of cantonment, and the north-east winds in October always increase the daily number of sick in consequence. The sudden variations in the daily temperature also possibly predispose, if not excite, disease, the maximum and minimum thermometer often differing over 30° in the twenty-four hours.

10. During the year there were 1,159 admissions, equal to 192·8 per cent. of the

Details of treated. strength present. There were 16 deaths, or 2·6 per cent. of strength. There were 860 cases of ague, 24 of remittent fever, 50 of rheumatism, 43 of wounds and accidents, 17 eye diseases, and 3 venereal. There was no cholera and no small-pox. Stone and gravel are common in the neighbourhood. I operated successfully on one boy for stone. I had another case of stone in a sepoy, but he passed the stone through the urethra. The absence of venereal disease is worthy of remark, and is unaccounted for, as a very virulent type of syphilis is supposed to prevail in Bhuj city. The local fever is not usually of a severe type, and is comparatively rarely accompanied by visceral complaints. A large number of men perform their duties with fever on them, and the notes of the cases taken during the year show that the majority of the men suffered from fever 6, 8, or 10 days before applying for admission into hospital.

11. There were 16 deaths in the year; of these, 10 were in hospital, and were,

Mortality and its causes. 5 quotidian ague, 1 remittent fever, 1 pneumonia, complicated with a large abscess of the liver, 1 perforating peritonitis,



1 rheumatism, and 1 valvular disease of the heart. Of the 6 who died out of hospital, 1 was dysentery, 1 was put down to general debility, 1 rheumatism, and in 3 the causes were unknown.

## Epidemics.

12. None.

13. Eleven children were primarily vaccinated, 10 successfully. There are at the present time 10 unprotected children; some of these are too young to be vaccinated, others are sickly, and some have lately joined the regiment. There were 39 recruits re-vaccinated, in whom there were 29 successful cases. One European officer was successfully re-vaccinated.

14. Twenty-three men were pensioned for rheumatism, 2 for general debility, 1 for quotidian ague and premature old age, 1 for cataract, 1 for asthma, 2 for varicose veins, 1 for dementia, and 8 were pensioned on account of having over 32 years' service.

Invaliding and its causes.  
Requirements and recommendations.

15. New lines have been recommended, and are urgently required.

Considering the isolated situation of the camp as regards communication with other parts of India, I should certainly recommend that the regimental hospital be better supplied with instruments as an exceptional case; say, with as many as is usually supplied to a second rate civil hospital. The regiment has now been stationed at Bhuj for a year, and is certainly very much more healthy than when it arrived. Nevertheless I should strongly recommend its being sent to a Deccan station in December next, as by that time it will have been in this neighbourhood eight years, viz., six at Rajkot and two at Bhuj.

The reason for my making this recommendation is as follows: the characteristic feature of the malarial fevers of Kutch is that they are not usually accompanied by severe paroxysms, and are not often fatal; but are so very persistent that men too often perform their duties irrespective of having fever on them. I have had many men come to hospital for medicine having been persuaded to do so by some officer who has seen them doing sentry and other duties with the perspiration running down their faces from fever, or has seen them shivering. I do not consider, therefore, that the number of admissions in the year to hospital is a fair criterion of the health of the regiment, but makes it appear rather better than it really is.

## Special observations, new experiences in treatment, sanitation, &amp;c.

16. Nothing of interest. The cinchona alkaloids, although not usually causing gastric irritation, are almost useless in the treatment of the local Kutch ague.

*Inspection by Deputy Surgeon-General HEWLETT.*

Inspected 12th February 1880. The regiment was stationed at Bhuj throughout the year. It has improved in health since arrival at that station. Ague, which is endemic, commenced to increase in the month of October, when 138 men were admitted with it. No case of enteric fever occurred, and there were no epidemics among the native troops during the year. The lines have been, I am informed, condemned for years past. They are very bad both in design and construction. I recognise that everything is done that can be done by the military authorities to keep them clean and to improve their condition as much as possible, but they must always be bad and each year become worse, for as the sand drifts up against the walls of the external enclosures outside each hut, the original floor level of the huts, which were built without plinths, becomes lower and lower. New lines, I am informed, have been sanctioned, but I think the site selected is too much exposed to the N. E. wind. The water-supply is derived from wells, and is said to be of fair quality. French latrines are in use, and answer very well.

**10th Regiment N. L. I.**

NEEMUCH.—In medical charge of Surgeon-Major F. R. O'KEARNEY, M.D.

Average Strength	...	...	...	703	Deaths in Hospital	...	...	...	10
Do.	present...	...	...	617	Do. out of Hospital	...	...	...	1
Admissions	...	...	...	1,444	Invalided ...	...	...	...	51
Daily Sick	...	...	...	46.1	Sick Leave	...	...	...	44



Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876 ... ..	Mehidpoor and Agar ...	230.9	7.7	0.8
1877 ... ..	Neemuch ... ..	189.9	6.1	0.1
1878 ... ..	Do. ... ..	300.6	9.7	1.2
	Average ...	240.5	7.8	0.7
1879 ... ..	Neemuch ... ..	234.0	7.5	1.6

1. The head-quarters were stationed at Neemuch during the year up to the 22nd December 1879, when the regiment was ordered to march to Bombay; several escort parties were sent along the Nusseerabad and Mhow roads.  
 Location and movements.
2. Continue much the same as given in former reports; they are kept clean and in good order.  
 The lines and their surroundings; present condition, hygienic and otherwise.
3. Good; remains as described in former reports.  
 Conservancy.
4. Has been good and abundant this year, owing to the favourable rainfall.  
 Water-supply.
5. The food supplies, though dear, were not so scarce as the previous year, the quantity and quality of grain and vegetable supplies were generally good, the regimental garden contributing towards the latter to the extent of about 225 rupees' worth. The clothing is the same as last reports; in addition 2 pairs of socks, 1 doopetta, 1 warm blanket per each man were distributed. Warm flannel underclothing is still much required, the absence of which must engender fever, bowel complaints, much illness, and invaliding.  
 Food and clothing.
6. Have proved not otherwise than beneficial to the general health. The average number of nights in bed has been as follows: native officers  $11\frac{1}{2}$ , havildars  $6\frac{1}{2}$ , naiks and lance naiks  $8\frac{1}{2}$ , buglers  $4\frac{3}{4}$ , privates  $7\frac{3}{4}$ , total  $7\frac{3}{4}$ .  
 Duties, exercise, and amusements; their effects on health.
7. Much as described in former reports, excepting that owing to decrease of sick, but two blocks of buildings, accommodating 120 men, were made use of for the hospital accommodation instead of three blocks and two pall tents as in previous year. The infectious disease ward recommended in former reports, has not yet been built; in the meantime one ward of an adjoining building was available for any infectious or suspicious cases occurring in the regiment.  
 Hospital and its immediate surroundings; present condition, hygienic and otherwise.
8. The general health, though unfavourable, has not been so to the extent as in the previous year. The general physique has been for the most part favourable, average height being 5 feet  $7\frac{1}{4}$  inches, average round the chest  $34\frac{1}{2}$  inches.  
 General health and physique.
9. As stated in former reports, owing to the general unhealthiness of the regiment, the climate cannot be said to have exerted other than deteriorating effect on the troops, and this was especially after the rains, when malarious fevers became endemic, with, however, less gastric, hepatic, splenic, or bronchial complications than were manifested during the previous year. During and after the rains may be considered the most trying portions of the year at this station, the remaining parts of the year, including the hot and cold weather, being comparatively milder and more healthy.  
 Influence of climate or local circumstances on health.



Details of treated.

10. The details of treated are as follows :—

	1878.	1879.
Average strength actually present ... ..	659	617
Average daily sick ... ..	64.5	46.1
Admissions ... ..	1,981	1,444
Total treated ... ..	1,999	1,516
Proportion of sick to strength per cent. ... ..	9.9	7.4
Admissions to strength per cent. ... ..	300.7	234
Percentage of treated to strength ... ..	303.4	244.7
Deaths in hospital ... ..	8	10
Percentage of deaths to treated ... ..	0.4	0.5
Percentage of deaths to strength ... ..	1.2	1.4
Invaliding ... ..	28	51
Percentage of invaliding to strength ... ..	4.3	8.2
Recommended change of air ... ..	45	44
Percentage of men got change of air to strength ... ..	6.9	7.1

The above table will afford an abstract of the comparative sickness, invaliding, and mortality, &c., for 1878 and 1879. The total number of treated was 1,516, of whom 72 remained from the former year. There were 1,444 admissions; the deaths were 10 in and 1 out of hospital, and the number discharged to duty was 1,423. Sixty-nine men were discharged in column otherwise, of these 44 were sent on sick leave, 9 were invalided on pension, 7 were discharged for physical disability, 1 man at his own request, and 8 sick were left behind in the hospital of the 6th Regiment N. I. on departure of the regiment for Bombay, thus leaving 14 men remaining in hospital at the close of the year. Of the total treated, by far the largest figure appears under the head of general diseases, especially those of malarious origin, of whom for fevers of this class 1,273 were treated. The treatment with cinchona alkaloid was found more generally efficacious this year than the previous one, owing probably to the difference in severity and character of the ague in both periods, as generally observed. There remain still 40 under the heading general diseases to account for, viz., 2 mumps, 29 rheumatism, 8 syphilis, and 1 diabetes. Of the 29 rheumatism, 4 were invalided, 3 had sick leave, and 24 were discharged to duty. Of the 8 syphilitic, all were discharged to duty. The case of diabetes in a bheestie had to be invalided. Of the nervous system, 3 cases were treated, 1 neuralgia discharged to duty, 1 shaking palsy of previous year invalided, and 1 sciatica had sick leave. Of the eye and ear, 21 conjunctivitis (mild form), 1 hordeolum, 1 pterygium, and 1 inflammation of external meatus discharged well to duty. Of the respiratory system, 17 were treated, viz., bronchial catarrh, 1 mild; bronchitis 5 discharged to duty; hæmoptysis 2, in the same man, invalided; asthma 1, died; 4 pneumonia left in the 6th N. I. hospital on departure of the regiment, and 2 bronchitis remaining at the end of the year. Of the digestive system there were 45. Of these, 22 were dysentery, 14 diarrhoea, 6 colic, 2 gum-boil, and 1 congestion of spleen. Of these, 17 cases of dysentery were discharged to duty, 2 sent on sick leave, 1 left in hospital of 6th N. I., 1 died, and 1 remaining at the end of the year. Of diarrhoea, 12 were discharged to duty, 1 left behind on departure of the regiment in the hospital 6th N. I., where he died; the 6 cases of colic, 2 of gum-boil, and 1 of congestion of spleen were discharged to duty. Of urinary organs, 2 cases of gonorrhoea were treated, 1 discharged to duty and 1 remaining at the close of the year. Of generative system, 2 cases of orchitis were treated, both discharged well to duty. Of locomotive system, 1 case of chronic synovitis in a young sepoy, discharged the service for physical unfitness. Cellular tissue, abscess 11; of these, 9 were discharged to duty, 1 invalided, and 1 was remaining at the end of the year. Guinea-worm 8 were treated; 7 discharged to duty and 1 left on departure of regiment in the 6th N. I. hospital. Cutaneous system 35, all of a mild form generally, and discharged to duty; 1 was remaining at the end of the year. General debility 2, discharged to duty. Injuries 53, of which 3 remained from former year; of these, 50 were discharged to duty, 1 invalided for physical disability, 1 unfit for pension, and 1 case of simple fracture of rib was left behind, on departure of regiment, in the hospital 6th N. I. Of European officers there was 1 case of dysentery, 1 diarrhoea, and 1 of inflammation of the external meatus, and all discharged to duty.

11. Ten deaths occurred in and one out of hospital; of the former, 2 occurred from malarious remittent fever, 1 ague quotidian, complicated with

Mortality and its causes. remittent fever and scurvy, 1 ague quotidian, complicated with broncho-pneumonia, 1 ague quotidian, complicated with parotitis and ascaris lumbricoides,



1 ague quotidian, complicated with perineal fistula. Out of hospital, 1 died from remittent fever on furlough; of the above, 8 were Hindoos, 2 Mussulmans, and 1 Christian.

## Epidemics.

12. None during the year.

13. Thirty-eight cases were vaccinated primarily, and 2 re-vaccinations were done in the regiment. The quality of lymph was good. The 6 unprotected were under one month, and unfit to undergo the operation at the time of departure of the regiment.

## Vaccination and re-vaccination.

14. Fifty-one cases were invalided; of these, 39 were Hindoos, 11 Mussulmans, and 1 Jew. Of the above, 7 were short service, and 44 of long service entitling to pension. Of the 44 abovementioned, 9 men were invalided after 32 years' service, 40 men invalided for ague and general debility, 4 for rheumatism, 1 chronic synovitis, 1 hæmoptysis, 1 diabetes and general debility, 1 shaking palsy, 1 sprain and rigidity of shoulder joint, 1 dislocation, and 1 for stricture of urethra with perineal fistula.

15. A contagious disease ward is still required, as recommended in former reports. Requirements and recommendations. The present lines should be abolished, and those on standard plan, with adequate space, plinths, drainage, &c., constructed.

16. As given in former reports, the sepoy, to maintain a good working standard of health for active service, should be rationed and have an adequate supply of warm flannel inside clothing, and be furnished with good English boots, especially during the trying cold and damp weather of Neemuch, as experienced during and after the rains at that station.

## 12th Regiment N. I.

RAJKOT.—In medical charge of Surgeon H. P. JERVIS.

Average Strength ... ..	709	Deaths in Hospital ... ..	11
Do. present... ..	699	Do. out of Hospital ... ..	4
Admissions ... ..	1,846	Invalided ... ..	34
Daily Sick ... ..	39.4	Sick Leave ... ..	3

Year.	Station.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876... ..	Dharwar ... ..	47.1	2.1	0.6
1877... ..	Do. ... ..	80.3	2.2	0.9
1878... ..	Do. ... ..	100.8	2.6	1.1
Average ... ..		76.1	2.3	0.9
1879... ..	Rajkot ... ..	264.1	5.6	1.6

1. The left wing of the regiment arrived at Rajkot from Dharwar on the 21st January 1879; and the head-quarters and right wing on the 30th January 1879.

Location and movements.



The bulk of the regiment was stationary during the year; but the following detachments and escorts were furnished by it.

Strength.	Where proceeded.	Date of Departure from head-quarters.	Date of Return to head-quarters.
(1) 84 .....	Dwarka ... ..	20th January ...	22nd December.
(2) 8 .....	Wudwan ... ..	3rd March ... ..	16th March.
(3) 14 .....	Kattywar Districts ...	11th do. ... ..	22nd do.
(4) 5 .....	Wudwan ... ..	22nd do. ... ..	2nd April.
(5) 14 .....	Kattywar Districts ...	4th April ... ..	14th June.
(6) 17 .....	Wudwan ... ..	31st May ... ..	12th do.
(7) 5 .....	Chotila ... ..	5th October ...	12th October.
(8) 5 .....	Do. ... ..	12th do. ... ..	17th do.
(9) 14 .....	Kattywar Districts ...	18th do. ... ..	22nd November.
(10) 83 .....	Dwarka ... ..	22nd November ...	Still at Dwarka.

2. The general description of the lines has been given in the annual report of the 18th Regiment N. I. for the year 1874. They are sufficiently commodious, well ventilated, and clean; and have been kept in good repair. There is only the natural surface drainage down to the river; but, as there is a gentle slope in that direction, it is fairly complete. There is no Regimental bazaar.

3. Permanent latrines are used during the monsoon months, and the "trench system" during the rest of the year. No defects in the working of either have been noticed.

4. The water supply has been ample during the year and apparently wholesome, as no affection traceable to this cause has occurred.

5. The various grains were very expensive till after the monsoon, but now they are at a fair price. Suitable "grain compensation" has been given throughout the year. Vegetables are expensive.

The white jacket of the recruit was found to be an insufficient protection during the cold months, and a brown wadded one has been substituted. As a substitute for socks (which are too expensive for the sepoy) foot rags, of two different descriptions, are under trial.

6. The guard duties were a little heavy; but they do not appear to have influenced the general health unfavourably. There is a "talim-khana" in the lines; and the recruits are put through a course of gymnastics. The sepoys are given to taking exercise and amusing themselves in various ways.

7. The hospital is nicely situated, well ventilated, clean, and in good repair. There is no accommodation for the medical pupils, and that for the second class establishment is incomplete.

8. The general health of the regiment during the year under review compares very unfavourably with that during the year 1878; the number of admissions in the year 1879 being 1,846, and in the year 1878 only 708. Many of the men are much debilitated by repeated attacks of intermittent fever. Most of the newly enlisted recruits are of good physique.

9. The great prevalence of intermittent fever was doubtless owing to the heavy rainfall of the previous year. During the "cold season" bronchial and pulmonic affections were pretty frequent, owing to the severity of the weather.

10. The following diseases gave the greatest number of admissions—"fevers" 1,396, of which 1,186 were for intermittent fever, 207 for febricula, and 3 for remittent fever; rheumatic affections 82, diseases of the digestive system 84, of which 26 were for dysentery, 26 for diarrhoea, and 32 for colic; guinea-worm, 32; contusions, 25; itch, 21; abscess, 19; and syphilis 17, of which 14 were primary and 3 secondary.



11. Twelve deaths occurred during the year, 11 in and 1 out of hospital. Three were from ague quotidian, three from lobular pneumonia, one from acute bronchitis, one from dysentery, one from colic, one from sub-acute rheumatism, and one from debility. The death out of hospital was one by accidental drowning.

12. There were no epidemics during the year. Two sporadic cases of small-pox occurred among the children. They were treated in the station "infectious ward." Both recovered.

13. Twenty-six primary vaccinations were performed and 24 were successful. Of fifty-three re-vaccinations performed, 29 were unsuccessful.

14. Thirty-four men were invalided for discharge, on the following grounds:—26 for debility, 2 for hernia, 2 for chronic rheumatism, 1 for asthma, 1 for syphilis, and 2 for physical disability.

15. Under heading 7, the absence of accommodation for the medical pupil has been noticed. He now resides in the lines, a very unsatisfactory and undesirable arrangement. I would therefore recommend that this defect be remedied as soon as possible.

16. Under this head I would remark that in my hands the cinchona febrifuge proved quite as efficacious in the Rajkot fever as in the others in which I had previously used it. I administered it in larger doses and at a longer interval, three hours before the next paroxysm, than I would quinine.

#### *Inspection by Deputy Surgeon General HEWLETT.*

Inspected 17th February 1880. The regiment arrived at Rajkot by wings from Dharwar in January 1879, and is located in lines formerly occupied by the 28th Regiment. The huts are far better than in most Native Infantry lines. The doors are at least 5 feet high, and there is a raised plinth, but the verandahs in some of the huts are enclosed. There are ventilating openings in the external walls, but in many instances these were found to be blocked. Cubic space both for married and single men sufficient. The cleanliness of the lines is strictly maintained, but there is no subsoil drainage, and the sullage from the married men's quarters runs out through half tile absorbent gutters to trees planted in front of the huts. During the fair weather trench latrines are used, and during the monsoon those on the objectionable standard plan. The water supply, of fair quality, is derived from wells which are not, as they should be, covered. My inspection of the hospital was on the whole satisfactory. Diaries of cases have not been kept by the medical officer, but I was pleased with the efficient supervision maintained in it. The building, with the exception of the flooring which is about to be renewed, is in good repair, and well ventilated. The accommodation provided for the native medical pupil and second class establishment is insufficient. The health of the regiment has not been good, as there was a good deal of intermittent fever during the early part of the year, which is, I consider, rightly attributed by the medical officer to the excessive rainfall of the previous year. The disease principally prevailed during the hot weather and reached its maximum in May, when 195 men were admitted suffering from it. I noticed with approval the judicious substitution of a thick padded jacket for the recruits instead of the ordinary white one, which was found to be insufficient to protect them during the cold weather.

#### 13th Regiment N. I.

MHOW.—In medical charge of Surgeon Major S. B. HALIDAY.

Average Strength	...	...	674	Deaths in Hospital	...	...	4
Do. Present	...	...	633	Do. out of Hospital	...	...	1
Admissions	...	...	747	Invalided	...	...	37
Daily Sick	...	...	13.9	Sick Leave	...	...	4



Year.	Station.	Rate per cent. to Average Strength Present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876 ... ..	Malegaon and Ahmedabad.	115.7	3.1	0.7
1877 ... ..	Do. do. ...	107.1	2.5	0.6
1878 ... ..	Malegaon ... ..	106.0	3.4	0.6
	Average...	109.6	3.0	0.6
1879 ... ..	Mhow ... ..	118.0	2.2	0.6

1. The head-quarters and right wing were stationed here till 27th March, when this wing went to Indore, where it has been located till the 22nd December, when it came into Mhow and remained till the present. The left wing arrived here from Malegaon on 16th March, and has been here ever since.

2. The lines are built on a stoney plain, mixed with some black earth, situated on the northern extremity of the cantonment, having a slight slope towards the east; they are constructed according to the standard plan of 3rd May 1864, but without plinth run almost perpendicularly north and south, are built of sun-dried bricks faced externally only with burnt bricks, and single-tiled roof. The lines, from action of age, climate, and rats, are only in a very middling condition, and the roofs are undulating, and sagged considerably in several places from the sinking in of the wood-work. Ventilation is free through the doors and roofs; these latter leak in the rainy season, and the floors being worn down, the water is retained in the huts. The drainage is surface, and is fairly effective. They are bounded on the north and west by an open plain, on the east, at a distance of 100 feet, by the 6th N. I. lines, and on the south by the commencement of the cantonment.

3. The latrines are situated on the open plain about 300 yards to the north of the lines, are 3 in number, on the standard plan, containing 28 seats each; 2 are for males, and 1 for females. They are attended to by 3 male and 1 female sweepers, who are paid by Government. The ordure is collected from the pans into large covered iron receptacles, which are emptied into an iron tank cart, which attends morning and evening, and conveys the ordure to a distance, where it is buried. Trench latrines near the permanent ones were used from the 17th January till 21st June, when the permanent ones were again used. The trench latrines suited satisfactorily. The lines are cleansed by 1 sweeper per company, who is paid by the men.

4. Good and sufficient water is drawn by leather and iron buckets, lotas, &c. from several wells conveniently situated near the lines, and are not exposed to any appreciable contamination. There are eight regimental bheesties, viz. one for each company, but these bheesties do not supply water to the men, only to the various guards and native officers; the men supply themselves.

5. Food was plentiful and of fair quality, but rather dear; this was compensated for by grain allowance. It had not any special effect on the health of the men. The clothing seemed sufficient, but ought to be looser.

6. These consisted of the usual routine duties of a cantonment, and had no special effect on the health of the sepoys. There is a good well-conducted gymnasium attached to the regiment, where the sepoys are taught various exercises, and all recruits have to go through a three months' course of training in it. Occasionally and on native holidays they wrestle, and during the gymkhana here they entered and won several of the sports. These had no special effect on the health of the men. The average number of consecutive nights in bed was 6.

7. The hospital is situated 50 yards to the east of the 6th N. I. lines, which intervene between the hospital and the 13th N. I. lines, so that the hospital is about 300 yards distance to the east of the 13th N. I. lines. On the north, at 70 yards distance, is the 6th N. I. Hospital; on the south, at 123 yards, is the 6th N. I. Hospital and its immediate surroundings; present condition, hygienic and otherwise.



regimental bazaar; and on the east is an open plain. The soil is stony, mixed with a little moorum. It is an oblong building running north and south, on a plinth of about 2 feet; it is very substantially built, with walls of great thickness, and arched masonry roofs; it has four doors in front, two of which are glazed; two glazed doors in rear, and two at each end. It contains two parallel wards, which communicate by four arches in the central wall; each ward is 98 feet long, 18 feet wide, 16 feet 9 inches high, with an arched masonry roof, and contains 8,676 square feet of floor, and 26,257 cubic feet, and is registered to accommodate 14 patients.

In front and rear is a closed in verandah of the same length as the wards (and communicating with them by four arches), 8 feet wide, 12 feet 8 inches high, with arched masonry roofs, containing 784 square feet of floor and 8,863 cubic feet. At each end of each ward is a partition wall 9 feet high with an arch in it, but without door, which communicates with the ward; thus four small wards for special cases are formed, 8 feet  $\times$  18 feet  $\times$  16 feet 9 inches; at each end of each verandah a few feet are partitioned off to form office, dispensary, godown, and orderly room: ventilation is provided by three ventilators in the roof of each ward 3 feet long  $\times$  2 feet wide, and by 10 loop holes (16 inches  $\times$  6) in front walls, 10 in the rear, and 4 each end, pierced at a height of 7 feet from floor of hospital.

The medical subordinates' quarters are well built and comfortable, as also are the second class servants' quarters. There are two latrines on the standard plan, one for males containing six seats, and one for females containing three seats. They are carefully attended to by the hospital sweepers; the pans are emptied into an iron receptacle, which is emptied into an iron tank cart, which attends every evening, and conveys the ordure to a distance, where it is buried.

At 150 yards to the left rear of the hospital is a pukka built contagious hospital; it is an oblong building 53 feet long, 17 feet wide, running parallel to the hospital, with an open verandah 9 feet wide all round; it is divided by a transverse wall into two equal sized wards 24 feet long, 14 feet wide, and 20 feet high, each ward containing 336 square feet of floor and 5,712 cubic feet. Each ward has two wooden doors in front and 2 in rear, and 1 glazed window in the end, with a double tiled roof and ridge ventilation; but it requires a small latrine, as there is not one at present. The present condition, hygienic and otherwise, of all these buildings is good.

General health and physique.

8. These were fair.

Influence of climate or local circumstances on health.

9. The climate had no special effect, and there are no unusual local circumstances.

10. The total number of cases admitted during the year for the entire regiment was 747, showing an increase of 44 over last year. The cause of

Details of treated. increase is owing to the large amount of malarious fever, which in 1878 gave only 258, while in 1879 it gave 424 cases, or an increase of 166 cases. One severe case of malarious remittent fever occurred, which was treated with tincture of aconite, Warburg's tincture, quinine, ice to the head, &c., and recovered satisfactorily. The ague was of a mild form and yielded to cinchona alkaloid, only a few cases requiring quinine. And there were no lung complications, as I have seen frequently in other places. The diseases treated were the following: malarious fever, 424; rheumatism, chronic, 34, no heart affection; contusion lower extremities, 36; boils, 31; blister of feet, 21; bronchitis, chronic, 18; primary syphilis, 22; contusion upper extremities, 13; conjunctivitis, 9; colic, 9; guinea worm, 7; itch, 8; bronchial catarrh, 7; diarrhoea, 8; lumbago, 7; sprain (hip, knee and ankle joints), 8; abscess cellular tissue, 7; dysentery, 5; neuralgia, 4; sore throat, 5; gonorrhoea, 4; orchitis, 3; gum boil, 3; diabetes mellitus, 2; epididymitis, 2; anaesthesia outside of right leg, 2; dyspepsia, 3; urticaria, 2; ulcer, 2.

11. The total number of deaths is 5; of these 3 died in hospital at head-quarters, 1 in detachment hospital at Indore, and 1 on sick leave at home. Mortality and its causes. The causes of death were ague 1, pneumonia (lobular), complicated with abscess of the liver which discharged itself into base of right lung, 1, diabetes mellitus 1 at Mhow; bronchitis, chronic, 1, at Indore; and abscess of liver, 1, on sick leave in the Punjab.

12. None. One mild case of measles occurred in an adult. The disease was contracted from the 6th N. I., who imported the disease from Indore, where a wing of the regiment had been stationed before it came to Mhow. Epidemics.

13. Twenty-eight primary vaccinations (all successful) and 50 re-vaccinations, of which 40 were successful and 10 unsuccessful. All recruits are vaccinated on joining. Only 10 children remain unprotected, and these are too young for the operation. Vaccination and re-vaccination.



14. Thirty-seven men were invalided during the year. Of these, 5 were time expired (over 32 years' service), 21 were pensioned, 6 received gratuity, and 5 recruits (without gratuity) were discharged.
- Invaliding and its causes.
- Requirements and recommendations.
15. A small latrine for the contagious hospital, and a wall round hospital assistant's quarters.
16. The head-quarters and left wing stationed at Mhow during the year presented no special peculiarities, but it is noteworthy that the native infantry stationed at the north end of the cantonment on the level of the plain suffered comparatively little from mild ague, while the Europeans at the south end, about two miles' distance on raised ground 80 to 100 feet above the level of the plain, suffered numerously from ague of a severe type during the autumn, though the conditions of the neighbouring surroundings are apparently the same.
- Special observations, new experiences in treatment, sanitation.

*Inspection by Deputy Surgeon General HEWLETT.*

The head-quarters and right wing was stationed at Mhow until the 27th March, when it marched to Indore, where it remained until the 22nd December when it returned to Mhow. The left wing arrived in Mhow from Malegaon on the 16th March 1879. Lines are old and very dilapidated, some of them are apparently about to fall, as the supports have given way and the eaves present an undulating appearance. The streets between the lines are much too narrow for efficient perfilation. In the huts the only ventilation is through the roof, tiles, and doors, some of which were only 4 feet high. All sullage from married quarters sinks into the subsoil, which must be kept constantly damp and therefore become a fruitful source of malaria. The urgent necessity for subsoil drainage in native infantry lines impresses itself on me at every inspection I make. The hospital is in too close proximity to the lines lately occupied by the 6th Regiment, which intervene between the lines of the 13th and the hospital. It was fairly well organised. The diaries of cases are kept in the handwriting of the medical officer. The accommodation provided is sufficient in ordinary times. The health of the regiment has been fairly good, and the medical officer notices in his report the fact that whilst the European troops on the higher level at the south end of camp suffered severely from ague during the autumn, the sepoys in his regiment in the more sheltered positions of their lines were, comparatively speaking, free.

**15th Regiment N. I.**

AHMEDABAD.—In medical charge of Surgeon Major E. P. BURROWS.

Average Strength	...	...	...	700	Deaths in Hospital	...	...	...	11
Do. Present	...	...	...	645	Do. out of Hospital	...	...	...	5
Admissions	...	...	...	1,345	Invalided	...	...	...	34
Daily Sick	...	...	...	57.7	Sick Leave	...	...	...	17

Year.	Station.	Rate per cent. to Average Strength Present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876...	Ahmednagar	67.8	3.3	0.7
1877...	Do.	101.3	2.9	1.2
1878...	Do.	124.3	3.5	2.2
	Average	97.8	3.2	1.4
1879...	Ahmedabad	208.5	8.9	1.7

**Location.**

1. The regiment has been stationary at Ahmedabad.

A detachment of 56 men has been furnished to Sadra throughout the year.

**Lines.**

2. The lines are in good repair, but of old construction without plinths or roof ventilation. They are badly situated, being shut in to the westward by the cantonment bazaar, in close proximity with broken ground, and latrines intervening. The dead level upon which a considerable portion of the pendals stand will always render their drainage unsatisfactory, but it has during the past year been made as good as practicable. Open tiled channels from married men's quarters, communicating with open central drains, have been constructed throughout under



the superintendence of the Executive Engineer, and, if still imperfect, it is at least an improvement on the pipe drain and cesspool system formerly in use in these lines. The work was completed before the rains.

3. Permanent latrines are alone in use. Their unpaved floors prevent their being kept in a good sanitary condition. Two are placed too near the lines.

Conservancy.

4. The water supplied by the line wells is always abundant, and I believe good. The river water is little used except for bathing and washing.

Water supply.

5. There has been no scarcity of good provisions of any necessary kind. As, however, the supplies in the city markets are both cheaper and of better quality than in the cantonment bazaar, the greater number of the men obtain their supplies from there, spending much of the little leisure their duties permit for the purpose. This should not be.

Food and clothing.

No alteration in the regulation dress has been made during the year. In the hot season light cotton clothing is worn for all duties.

6. The duties have been very heavy, this regiment since February having had to perform the entire duties of the station, which were previously shared by two. In September and October the men got but two consecutive nights in bed; during the latter part of October they had even less than this.

Duties.

Such an amount of duty involving exposure and want of rest during a season like the past, when malarious influences had been so prevalent, has told on the men's health, and many primary cases of intermittent fever and many more re-admissions from it have appeared as results.

7. The hospitals for two Native Infantry corps stand in the same compound, with an interval of 20 yards between them. Since February, when the remaining wing of the 26th Regiment was moved to Deesa,

Hospital.

both hospitals have been in use by this Regiment. This has prevented much crowding, and the necessity for the employment of tents. The hospital proper to this Regiment is in the same condition as reported last year.

The hospital latrine is not good. With earthen floor, and bases of walls saturated with urine and washings, it is impossible to keep it as it should be.

8. The general health of the men has decidedly deteriorated. The epidemic of malarious fever from which all ranks have so much suffered during the year, has left at its close very many of the men unfit for anything but light duty.

General health.

9. The level plain of light and most fertile soil on which this cantonment is placed renders its climate decidedly enervating and one in which those attacked with malarious fever or other illness do not readily recover health. Though the temperature of the hot season is not excessive, it is but little lowered by the rainfall, the monsoon breeze is little felt, and throughout the rains the nights as a rule are hot and unrefreshing. During the last year the rainfall has been about the average. The first heavy fall was on the 26th of June, the last on the 15th September. The temperatures in the table below were taken in the hospital ward:—

Influence of climate, &c.

Months.	Rainfall.		Temperature in Ward.		Proportion of Admissions to Strength.
	Inches.	Cents.	At 6 A. M.	At 4 P. M.	
January 1879	.....	.....	63.5	79.6	9.7
February	.....	6	67.7	82.5	6.0
March	.....	.....	73.1	87.7	10.8
April	.....	.....	79.7	95.3	10.0
May	.....	.....	86.3	99.4	12.3
June	8	79	84.6	94.1	15.3
July	6	48	82.1	89.7	14.2
August	10	36	78.8	83.0	12.9
September	3	87	71.8	87.2	19.6
October	.....	.....	76.3	87.3	45.6
November	.....	.....	65.6	78.5	32.2
December	.....	.....	63.0	72.6	18.0



- Details of treated. 10. The admissions were 1,345, 22 remained sick at close of previous year, making the total treated 1,367.
- General diseases. The re-admissions numbered 701.
- Malarious fever was the chief cause of sickness, 78·2 per cent. of the total admissions being shown under this head. Of 1,052 admissions, 94 were cases of febricula, 913 of ague, and 45 of remittent fever. One case of cholera occurred in September.
- Sub-Division A. The rheumatic affections were not numerous, 1·7 per cent. only of the total admissions.
- B. Syphilitic diseases contributed 1·4 per cent.; most of the cases were contracted on escort and detachment duties. 2 cases of scurvy occurred towards the end of the year. Both patients were men of long service; one was invalided, the other remains under treatment.
- Two cases of nervous disease have come under treatment, one of epilepsy in a young sepoy, the other of anaesthesia of the skin of lower extremity in a man of 22 years' service; both were invalided.
- Twenty-eight cases of catarrhal conjunctivitis were admitted, 24 of which occurred during the dry months of the year, the greatest number in one month being in March.
- There were four admissions from disease of the circulatory system, with one death from valvular disease of the heart.
- Diseases of the respiratory organs furnished 49 cases, being 3·6 per cent. of total admissions. Thirty-three cases of bronchitis and bronchial catarrh, 3 pleurisy, 4 pneumonia, and 9 asthma. The number of the last named referring to three patients only. Two were invalided and one remains under treatment. One case of pneumonia was fatal.
- The cases under head of digestive system numbered 71, a percentage of 5·2 to total admissions. They were chiefly of diarrhoea and dysentery, and neither was at any season specially prevalent. There were 7 admissions from guinea-worm, all contracted by men either on furlough or on detachment or escort duty. None have resulted in permanent injury.
- Boils, whitlow, and ulcer were the chief cutaneous affections. Two of the six cases of ulcer returned resulted from the hypodermic injection of quinine.
11. The deaths in hospital were 11, 3 from intermittent fever, and complication arising from it, 5 from remittent fever, 1 from cholera, 1 from valvular disease of the heart, and 1 from pneumonia.
- Mortality and its causes.
- Epidemics. 12. Nothing for remark.
- Vaccination. 13. Vaccination has been performed weekly from arm to arm, and the results generally satisfactory.
14. Thirty-four men were reported by the Annual Invaliding Committee as unfit for further service, 3 for general debility, 21 as worn out, 2 for chronic rheumatism, 2 for heart disease, and 2 for confirmed asthma. From chronic bronchitis and syphilis one each, 1 for broken down health from malarious fever, and 1 for dementia.
- Invaliding.
- All had served over 21 years in the ranks; the average service of the whole being between 22 and 23 years. One man of short service, subject to epileptic seizures, was also invalided.
15. The want of a contagious disease ward was noted by Deputy Surgeon General Wyllie in inspection report for 1878. The much worn and uneven brick flooring of the wards and the ceiling cloth hanging in tatters remain also as then reported. The wooden shutters with which the window opening of the wards are fitted, renders the wards either dark or draughty, and glass windows should be substituted. The earthen flooring of both hospital and line latrines should at once be replaced by stone paving.
- Requirements and recommendations.
16. Malarious fevers have throughout the entire district been of unusual prevalence. Detailed remark on this will no doubt be given by those under whose observation the civil population comes. The fact is to be especially noted in recording the medical history of the Regiment for the past year to prevent misconception, and lest these diseases from which the men have suffered so much should be attributed to insanitary conditions of their lines rather than to more general causes outside them. The extent to which the men's duties exposed them during the season when malarious influence was most prevalent, has already been noted under para. 6.
- Special observations.



The mixed cinchona alkaloid has been extensively used. I have not found irritability of stomach, headache, or other immediate unfavourable effects produced by its administration in doses of 10 to 20 grains. But though persistently given in most cases of apparently simple ague to the extent of 30 grains daily, it has failed in so large a proportion of them in preventing recurrence of the paroxysms, that the year's experience does not enable me to report favourably of its efficacy as an antiperiodic.

In very many cases in which the mixed alkaloid failed to effect cure, the use of quinine by hypodermic injection was substituted, and generally with good results. The disadvantages of its use in this way in regimental practice are that, to be safe, the instrument must be a delicate one, which, in constant daily use in many cases, is very liable to get out of order; and, however carefully the injections are made, inflammation of the skin and subcutaneous tissue is sometimes caused, occasionally resulting in abscess and ulcer. Two instances of such misfortune have occurred during the year in this hospital. Neither case gave much trouble in the cure of the local injury, but kept the men in hospital more than a fortnight, when otherwise well and fit for duty. The injection used was quinine 2 grains, diluted sulphuric acid 1 minim, water 3 minims.

*Inspection by Deputy Surgeon General HEWLETT.*

Inspected 28th January. The regiment has been quartered at Ahmedabad throughout the year. The lines are old and too near the bazaar; no plinths. Ventilation of huts defective. During the year half-tile drains have been laid from each married sepoy's hut to a central drain, which runs down the length of the lines, but at the further end the intercepting drain is so deep as to be in my opinion dangerous, and it abruptly ends in the earth, so that the sillage which has been conveyed by it stagnates and becomes offensive. The water supply is derived from wells; that for the Purwaries is the only one above the lines. All the remaining wells are situated between the lines and the bazaar. They ought all to be covered over, especially one beneath a large tree. The regimental privies are on the standard plan, and those on the south side are very inconveniently situated across a steep nullah, which is, as might be expected, fouled. The health of the regiment has not been good during the past year, there having been during the autumn an epidemic of malarial fever which has debilitated and much weakened the physique of the men. Other causes have also operated in producing a lowered vitality among the men. The regiment had to perform all the duties of the station ordinarily shared by another Native Infantry Regiment. In September and October the men only got two consecutive nights in bed, and during the latter part of October even less. I was much pleased at my inspection at the efficient supervision maintained by Surgeon Major Burrows over the hospital, &c. The number of sick was so large that for many months he was compelled to utilize the adjacent hospital in addition to his own. The hospital ceiling and flooring are in bad repair, and the hospital is too dark. The surgery is too small, and there is not sufficient light in it. The hospital privy is in bad order, and should in my opinion be removed and another one on a better plan be substituted for it.

**H. M.'s 20th Regiment N. I.**

BARODA.—In medical charge of Surgeon Major H. DETATHAM, M.D.

Average Strength	...	...	...	700	Deaths in Hospital	...	...	...	10
Do. Present	...	...	...	673	Do. out of Hospital	...	...	...	1
Admissions	...	...	...	2,097	Invalided	...	...	...	23
Average Daily Sick	...	...	...	58.8	Sick Leave	...	...	...	35

Years.				Stations.				Rate per cent. to Average Strength Present of		
								Admissions.	Daily Sick.	Deaths in Hospital.
1876...	...	...	...	Bombay	...	...	...	119.1	7.0	2.1
1877...	...	...	...	Do.	...	...	...	95.3	3.8	0.7
1878...	...	...	...	Baroda	...	...	...	156.7	3.3	1.5
				Average				123.7	4.7	1.4
1879...	...	...	...	Baroda	...	...	...	311.6	8.7	1.4



1. The regiment has remained at Baroda throughout the year, a few escort parties and recruiting parties only having (as usual) been detached from head-quarters at different times.  
Location and movements.
2. Having fully described the lines in a previous report, I refrain from doing so again. The lines and their surroundings; present condition, hygienic and otherwise. No alterations have been made, and the accommodation provided is found sufficient; the only addition has been the building of two new solitary cells near the quarter-guard; these are according to the regulation plan, and are provided with raised sleeping boards and privies; they are in every respect suitable buildings. The general hygienic condition of the lines was good during the greater part of the year, but during the rains their north-west corner was frequently flooded. I inspected them myself constantly both *during* and *after* rain, and I found that although the water did not actually flow *into* the men's houses, the streets of the first four companies were always under water to the extent of one section *during* and *for an hour or two after* heavy rain. The reason of this was evidently the insufficient depth of the drain which runs from the north-west corner of the lines in a southward direction to the nullah which skirts the commissariat compound, and thus during heavy rain water falls faster than the drain can carry it off. I am satisfied that if the abovementioned faulty drain were deepened and furnished with a proper slope in its course southwards, the flooding of the lines might be avoided.  
The ground in the vicinity of the lines (outside cantonment limits) was under water during the rains, and a large hole, which exists immediately to the north-east of the lines, also collects a great deal of water; this of course is likely to give off unwholesome emanations while in process of drying up, and as the wind blows from that direction in the cold weather, must be objectionable. The lower branches of all trees in the lines were lopped during the hot weather to admit of the free perfilation of air. At my frequent visits to the lines I made a point of noting, and reporting to the company officer, any of the drains leading from the inside bathing places which did not appear to flow freely, or were otherwise in an unsanitary condition, also inspecting them a day or two afterwards to see that the evil had been remedied. I am, however, fully sensible of the fact that *perfect* sanitation cannot be looked for as long as bathing places of *any* description are allowed inside the huts or enclosed verandahs, as the drains leading from them not being paved (indeed the majority of them are merely cut in the bare earth, a few only being tiled) the bathing water must soak into the ground immediately in front of the hut, leaving it damp and unhealthy. At one time, when conjunctivitis was rather prevalent, I had reason to think that in several instances it could be traced to this cause, viz. a dirty drain containing black mud and the wind passing along this through the hole under the wall into the house. Speaking *generally*, however, the lines have been (except during the rains as abovementioned) in as fairly good a hygienic condition as cutcha-built lines can be kept.
3. In consequence of the scarcity of suitable ground available for trench latrines, the regiment has reverted to the use of the pukka-built ones, the expense having been defrayed during a portion of the year by contributions from the men themselves; but application has been made to the Baroda State authorities for permission to make use of a piece of ground to the rear of the lines (which is outside cantonment limits) for the construction of trench latrines.  
Conservancy.
4. Under this head there is nothing to add to my remarks of last year, the *source* and *quality* are the same as previously reported, and the *quantity* has been amply sufficient throughout the year; it is clear to look at, though that yielded by *some* of the wells is slightly brackish to the taste.  
Water-supply.
5. The ordinary articles of food have been more abundant in the bazaar than during the previous year, but things are dearer here than in Bombay. *Vegetables*, which were very scarce during the hot weather of 1878, were fairly plentiful in 1879. The average monthly rate of grain compensation to fighting men for the year has been about four rupees six annas.  
Food.
6. No duties of any special character have been performed by the regiment, and the work has been much the same as usual, although of course when the sick-list was high the guard-duty was heavier for those *not* on the sick-list, who at one time had only  $2\frac{1}{2}$  nights in bed; but the average number of nights in bed for the whole year was  $6\frac{1}{4}$ . For exercise the men have had their usual parades, &c., and during the early part of the year and also at intervals during the rains, exhibitions of wrestling, leaping and other sports were held in the talimkhana, but latterly the sickness and prostration of the men have been such that they have but little strength or inclination for anything of the kind.  
Duties, exercise, and amusements; their effects on health.



7. The hospital in use is the same as that reported on last year; certain improvements have been made, the roof was thoroughly repaired before the rains, and the unevenness of the floor formerly complained of has been remedied by covering it all over with a layer of concrete 3 inches deep, which answers very well. The accommodation provided was altogether inadequate during the last four months of the year, when the sick-rate was so high, and many men on the sick-list were therefore allowed to live in the lines.

Hospital and its immediate surroundings; present condition, hygienic and otherwise.

The hospital itself is clean and well-ventilated, and its immediate vicinity in a good sanitary condition. A portion of the permanent latrine near the hospital is set apart for the use of the patients, and is kept in good order by the hospital sweepers.

A suitable house has recently been built for the senior hospital assistant, but the other subordinates being unprovided with quarters, occupy one of the corner-rooms of the hospital. The hospital still lacks a bathing-room and a dead-house.

8. The general health of the regiment *now*, at the end of the year 1879, cannot be described as otherwise than *bad*, although the number actually "remaining" on the sick list is only 58. During the first half of the year the sickness was only slightly in excess of that which obtained in 1878, but from July to December malarial fever, in many cases of a severe type, prevailed to an unprecedented extent, greatly impairing the efficiency of the regiment. Some idea of the helpless condition to which the regiment was reduced in the months of September and October may be formed when I state that the admissions during those two months alone amounted to 972, of which 859 were due to malarial fever. The highest monthly "average daily sick" was 158.8 (in September), and the lowest 15.2 (in May); the highest number on the sick-list on any one day was 243 (on the 22nd September). Many of the men who have returned to duty, present the undoubted aspect of chronic malarial poisoning, the result of repeated attacks of ague, and still frequently apply at hospital for treatment; debility being, I think, the prevailing ailment, while congested spleen has of late become quite common in the regiment (many of the *children* even being affected with it). There is no doubt that many of these men require change of air, but I know that were I to begin to make a selection of cases requiring such change, I should be embarrassed by the conflicting claims of over 100 men.

Under these circumstances I regret that I cannot speak so encouragingly of the general health and physique of the regiment as I was able to do last year. The standard for recruits having recently been lowered, a few of the recruits lately enlisted were hardly up to the general standard of the regiment, but all those passed have been carefully examined by myself, and I rejected many on account of defective vision and other disabilities.

9. There is no doubt that the climate of Baroda during the year, the constant variations of temperature during the rains, and the cold nights and mornings towards the end of the year, the flooding of portions of the lines, and the inundation of the ground (outside cantonment limits) in their vicinity, have been largely productive of admissions for fever, and my own belief is that the regiment will for some time to come feel the effects of the ordeal it has passed through.

10. The total admissions for the year were 2,097, and the average daily number of sick 58.8, giving an average daily percentage of sick to strength for the year of 8.7. It is worthy of mention, however, that the first half of the year furnished 382 admissions only, with an average daily sick of 24.1. Of the total admissions, 1,437 were due to malarial fever, in many instances of a severe type, being complicated with pneumonia, congestion of spleen, bronchial catarrh, anæmia, &c., and followed by great debility; of the above cases, 10 were registered as "remittent fever," and 1,427 as "ague," of which latter 1,137 were quotidian, 243 tertian, 1 quartan, and 46 irregular in type.

Dysentery furnished 13 admissions, and diarrhoea 107; only 26 were registered as cases of spleen diseases, but (as already mentioned) large numbers of the fever cases treated had congested spleen as a complication. Respiratory diseases and rheumatism were rather more prevalent than during the previous year; so also were eye diseases, which numbered 46, most of them being cases of conjunctivitis, which was rather prevalent among the families during portions of the year. Venereal disease has not prevailed to any great extent; only five cases were registered as scurvy, but many men in hospital for other affections showed traces of the disease. A few cases of chicken-pox occurred, but no small-pox or cholera. Among other cases worthy of mention, I may refer to—

(a) A severe case of diarrhoea admitted in February; neither the urine nor the bile were suppressed, but the patient was collapsed and almost at death's door, there being no pulse perceptible and the action of the heart exceedingly feeble. I remained with him myself for four hours, and gave him drachm-doses of tincture of digitalis at an hour's



interval (to improve the tone of the heart), besides soup and stimulants. The man gradually rallied, was sent on sick certificate to his own country for a time, and has since returned to duty.

(b) A fatal case of tetanus, following a slight contusion of the toe. The man died twelve hours after seizure, in spite of treatment, which consisted of chloral and belladonna, chloroform-inhalation, &c.

(c) A case of acute hepatitis, in which chloride of ammonium (given with the usual precautions as to the excretory functions, &c.) appeared to have no effect, but which rapidly improved under the influence of large doses of ipecacuanha.

(d) A case of pleurisy with effusion, in which I employed the aspirator with much advantage, withdrawing twenty-four ounces of fluid. The man recovered, and went away on sick certificate. He has since returned to duty, and the lung is now restored to its original position.

(e) A case of sudden death in a man in hospital for "diarrhœa"; his death is therefore registered under that heading. His disease had at once yielded to treatment; he had had no diarrhœa for twenty-four hours, and was apparently quite well; he died quite suddenly, and I attributed his death to heart-disease, but having no dead-house, and every corner of my hospital being occupied at the time, I was unable to make any post-mortem examination.

(f) A singular case of dislocation of the jaw in a man who was in hospital for bronchitis. It must have occurred during the night without the patient's knowledge, for he awoke in the morning with his mouth fixed open and not knowing what had happened, attributed his condition to supernatural influence! I found both condyles dislocated forwards, there was but little difficulty in reducing them, and the case did well.

The families of the regiment suffered from sickness to a much greater extent than usual. As an instance of this, I may mention that the twenty-four recruit-boys *alone* furnished 119 admissions with one death.

670 individual men contributed to furnish the total of 2,097 admissions in the following proportion:—

140	men admitted once,	giving	140	admissions.
150	" twice	"	300	"
133	" thrice	"	399	"
118	" four times	"	472	"
61	" five times	"	305	"
26	" six times	"	156	"
24	" seven times	"	168	"
10	" eight times	"	80	"
5	" nine times	"	45	"
1	" ten times	"	10	"
2	" eleven times	"	22	"
Total...670 different men.		Total...2,097 admissions.		

Thirty-five men were granted sick leave to their own country for periods varying from one to six months, the causes being as follows:—16 ague, 4 debility, 2 scurvy, 4 bronchitis, 1 hemiplegia, 2 congestion of the spleen, 1 pleurisy, 1 dyspepsia, 2 rheumatism, 1 phthisis, and 1 diarrhœa.

11. Ten deaths occurred in hospital, two from ague, one each from remittent fever, diarrhœa (already referred to), tetanus, scurvy, and pneumonia, Mortality and its causes. one from phthisis, and two from debility. One sudden death occurred out of hospital in the lines.

12. The only disease which can be said to have prevailed in an epidemic form is ague, from which, as already mentioned in para. 8 of this report, the Epidemics. regiment was almost prostrate and helpless in the months of September and October. I am unable to attribute the epidemic to any other causes than those already referred to in paras. 2 and 9 of this report.

13. These have been duly attended to, the lymph being in the first instance obtained from the public vaccinator in the city of Baroda, who at my Vaccination and re-vaccination. request brought the vaccinator to my hospital for my own inspection, and arm-to-arm vaccination was afterwards maintained, the results being as shown in the following table:—



	Operations.	Successful.	Unsuccessful.
Vaccinations .....	57	54	3
Re-vaccinations .....	54	29	25

The persons re-vaccinated were mostly recruits, with a few recruit-boys.

14. Twenty-three men were invalided out of the service on gratuity or pension during the year; of these, eight were time-expired men (over 32 years' service.) Of the remainder, six were cases of general debility, two of chronic bronchitis, one physical disability, and one each of the following disabilities:—Paralysis (hemiplegia), chronic rheumatism, varicose veins, atrophy of the muscles of one lower extremity, chronic disease of ankle-joint, and secondary syphilis with debility.

15. Under this head, in addition to the remarks made in my Report for 1878, I would suggest that serge trousers, such as are served out to sepoys, are hardly warm enough for the cold weather at stations in the Northern Division.

Quarters are still required for the junior medical subordinates; and also a dead-house, and a bathing-room for the patients. I would also suggest the advisability of instituting medical history sheets for native, the same as for European troops. They would prove very useful in October when the annual selection of men for invaliding out of the service has to be made, and would render unnecessary the keeping daily notes of cases possessing but trivial professional interest, the labour involved in which has during the past year been excessive, daily notes of every case having been kept in my own hand-writing.

I would further recommend that Government be moved to sanction the taking of such measures as may be necessary to prevent the flooding of any portion of the lines in future rainy seasons.

16. (a) I gave cinchona alkaloids a full trial, and found them a very efficient medicine in ordinary cases of ague when given in doses of 10 or 15 grains three or four hours before the expected accession. I also found many cases of congested spleen and brow-ague improve rapidly under its use. I am bound to say, however, that I did not find it equally efficacious in the treatment of the well-marked cases of malarial fever admitted in September and October. I then found that to begin the treatment of a case with the cinchona alkaloids was waste of both time and medicine; it was necessary to give quinine either by mouth or hypodermically for the first two or perhaps three days, after which the mixed cinchona alkaloids were of service in completing the cure. I also tried the latter medicine *hypodermically* in a few instances, but it did not prevent the accession of fever. The mixed cinchona alkaloids are also quite unfit for Europeans, whose stomachs are naturally more sensitive. In one case in which I gave a 15-grain dose, it caused severe purging and vomiting with symptoms of collapse.

(b) In the early part of the year I acquired a somewhat novel experience in the use of turpentine. I found that a two or three-drachm dose suspended in water with mucilage and given three or four hours before an expected accession of fever would often stave off the attack in the milder forms of quotidian and tertian ague; cases, in short, in which a relapse has been brought on by exposure to chill, irregularities in diet, &c., in a patient who has often previously suffered from the disease. I am not altogether prepared to say, however, that we possess in turpentine an antidote to the malarial poison, because in September and October, when the well-marked cases admitted may be supposed to have been the result of a freshly received dose (so to speak) of malaria, the turpentine treatment was not successful.

I imagine its success in milder cases may be chiefly ascribed to the fact that when turpentine does *not* cause stranguary, it acts as a diuretic, and I may mention that although I administered it in more than fifty cases, it only caused stranguary in *one*.

#### *Inspection by Deputy Surgeon General HEWLETT.*

Inspected 12th January 1880. The lines are defective in a sanitary point of view, as the huts have not sufficiently high plinths. The ventilation in them is also insufficient, being only through the roof tiles and doors. The doors are very low, some not more than 3 feet high by 2 broad. The storm-water lodges for some time after rain in the lines, as the drains are not sufficiently deep to carry it off. The old permanent latrines are used, but efforts are



being made to re-establish the trench system. The water-supply is obtained from wells; the water is said to be abundant and of fair quality. The health of the regiment has not been good, especially during the latter half of the year, when ague prevailed to a most unusual degree, so much so that the regiment was quite for the time prostrate. During the months of September and October there were 972 admissions into hospital, of which 889 were due to malarial fever. The highest number on the sick list on any one day was 243 on the 22nd September. I was extremely pleased with my inspection of the hospital, and I desire to bring to the special notice of the Surgeon-General, the excellent manner in which Surgeon-Major DeTatham has performed his duty. In every respect this hospital is quite one of the best managed I have ever seen. His diaries of cases were all in his own handwriting and carefully kept, and all his arrangements were excellent. The hospital, by a curious arrangement, has been built on the very confines of the cantonment. During the year an objectionable native village, Gowlipoor, complained of by my predecessor as being in the immediate vicinity of the hospital, has been removed. The want of a dead-house is much felt. Quarters have been erected for the hospital assistant, but there are none for the native medical pupils who are consequently obliged to use one of the verandah rooms of the hospital. There was of course great over-crowding in the hospital during the prevalence of the ague epidemic, which, although it has abated, has left the men much reduced in strength.

### 24th Regiment N. I.

MEHIDPUR.—In medical charge of Surgeon J. A. HOWELL.

Average Strength .....	715	Deaths in Hospital .....	5
Do. do. present .....	670	Do. out of Hospital .....	0
Admissions .....	1,623	Invalided .....	15
Daily Sick .....	28.7	Sick Leave .....	5

Years.	Stations.	Rate per cent. to average strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Mehidpur and Augar .....	120.7	2.8	1.0
1877.....	Do. ....	151.5	3.4	1.9
1878.....	Do. ....	182.3	3.8	1.9
	Average.....	151.5	3.3	1.6
1879 .....	Mehidpur and Augar .....	242.2	4.3	0.7

1. The right wing and head-quarters were stationed here at the beginning of the year, and were relieved by the left wing from Augar last February.

2. The lines have been often reported on as being very indifferent. The quarters for the married and single are the same, but in some cases a man with a large family is provided with two sets of rooms. Compared with the standard plan for native lines, they are greatly wanting in superficial area and cubic capacity. Ventilation is also very defective, being only by a door. The back of the rooms is a base wall; a small window to each room in this situation would materially improve ventilation. The floor is pretty dry, but as the men are provided with charpoys, the moisture from the ground, if any, cannot affect them.

Drainage is surface and pretty efficient; lines are in fair state of repair, and were, as usual, whitewashed thoroughly this year.

3. During the dry season the trench system is in use, and in the monsoon covered latrines. The trench system answers very well. The covered latrines used in the rains may be improved. New latrines properly constructed were applied for by the Annual Committee for station buildings in 1878, but this has not been attended to.



4. This is very indifferent the greater part of the year, and very bad in the hot weather. The supply is from three wells and the river Sipra. The men principally use the latter. During the cold and rainy seasons, when the river is high, the water is pretty good, especially if properly filtered. This operation, however, one cannot expect a sepoy to do. In the hot months of the year, when the river is very low and sluggish, the water is very bad, well-water being then preferable.

5. There has been no dearth of food; the men make use of the regimental bazaar, in which there is always a good stock of meat, grain of different kinds, and vegetables for sale. There is also a weekly bazaar held on Sunday, in the town of Mehidpur, which is also patronised. The bachelors, as a rule, live pretty well; married men with large families have to stint themselves. There has been no change in the clothing. Orderlies in the hot weather are allowed to go about in their native dress.

6. The duties have been the usual parades, guards, and musketry. Average number of nights in bed for all ranks was 7.7. The recruits have to attend a course of gymnastics, and some of the younger men join them. A few of the men fish and go out shooting. Duties have not been prejudicial to the health of the men.

7. No change made to the buildings, which have so often been reported on. They have been kept clean by being thoroughly whitewashed twice during the year; and the accommodation has been sufficient; the ventilation is good. The out-houses are all complete and in good order; a dead-house is required. Conservancy is well attended to; the men are always warned not to soil the floor with water or urine, and are provided with pans for that purpose. The excreta is daily removed by the conservancy cart, and burned three miles from camp. Water-supply is from the river Sipra and a well near the lines.

8. The wretched climate of Mehidpur has considerably affected the health of the men, and although several of them are naturally of good physique, and will bear a favourable comparison with most of the Bombay regiments, yet the period of service (three years) at Mehidpur, notwithstanding change of wings to Augar, has considerably weakened them, and it is to be hoped that the approaching change to Mhow will prove beneficial.

9. This has been freely dilated on by the different medical officers that have served at Mehidpur, and it is no doubt one of the unhealthiest stations in the Bombay Presidency. It is very depressing, and this together with malarial influence, renders life to both officers and men a wretched existence.

10. 1,623 cases were admitted during the year, compared with 1,258 the year previous, average daily sick being 28.7, compared with 26.3 for 1878. The increase of sick was due to a large amount of malarious fever, 1,316 being under this heading, 4 of which number were cases of remittent fever. The type was mostly quotidian, and was treated with the cinchona alkaloids, quinine being used in obstinate cases and in the remittent form. The cases of ague were generally uncomplicated. Several of the men, however, have enlarged spleens from repeated attacks of fever. Malarious fever is most prevalent in October and November. There were 55 admissions from diarrhoea and dysentery. In the cases of dysentery I found large doses of ipecacuanha most beneficial. Sixteen cases were admitted under the heading of chest affections, and the remainder from other causes.

11. There were 5 deaths in hospital, and none out, during the year; 3 under the heading of ague, 1 remittent fever, and 1 from dysentery. In the cases of ague the immediate cause of death in one instance was thrombosis of the heart; the second had otterrhœa, which caused abscess of brain and death.

12. I am pleased to record that neither a case of small-pox nor of cholera occurred during the year.

13. Thirty-seven cases of successful primary vaccinations and 23 re-vaccinations.

14. Two men pensioned as time-expired, 13 invalided, 8 with pension, 4 with gratuity, and one, under five years' service, without gratuity.



The 13 cases invalided were for the following diseases:—

- 2 opacity of cornea.
- 1 valvular disease of heart.
- 2 varicose veins
- 2 enlarged spleen.
- 1 hepatitis.
- 2 defective vision.
- 1 secondary syphilis.
- 1 chronic inflammation of knee joint.
- 1 debility.

Requirements and recommendations.

15. A dead-house should be attached to the hospital.

Special observations, new experiences in treatment, sanitation, &c., &c.

16. None.

*Inspection by Deputy Surgeon General HEWLETT.*

I inspected the head-quarter wing 24th N. I. on the 20th December 1879. The Native Infantry lines at Mehidpur have been frequently condemned. They have been placed in exactly the worst site that could by any possibility have been selected. They are at the very lowest end of camp, and when the river rises during the rains they are not unfrequently flooded; deep drains have been cut, but they are not sufficient. The lines themselves, too, are of the worst possible construction. The huts have no plinths; the only ventilation is through doors and roof tiles, and the cubage of each hut is only 684 feet. Everything that can be done to remedy such an unsatisfactory state of things has been done by Colonel Henderson, the Commandant, who has set an example which I earnestly wish was ordered to be carried out in every Native Infantry regiment in the Presidency, viz., he has compelled each man to provide himself with a charpoy at a cost of about 12 annas. This excellent and simple arrangement prevents the men sleeping on the damp ground, and I have no doubt that it has had a beneficial effect on the health of the men. I am decidedly of opinion that the cantonment at Mehidpur for health-reasons should be given up, but if it is to be continued, I think a site might be selected on the high ground above the native city. This would, I believe, be better than the site of the old cavalry lines, which I believe was proposed. I was pleased with my inspection of the hospital. I found all diaries of cases kept in the handwriting of the medical officer, and his other arrangements were good. There is ample accommodation in the old and new hospital. A dead-house, however, is much needed. The contagious disease wards have been built objectionably close to two roads and to the officers' quarters. The wing suffered severely from ague during the autumn, but at the time of my inspection was in a fairly healthy condition.

### 24th Regiment N. I.

AUGAR.—In medical charge of Surgeon C. G. W. LOWDELL.

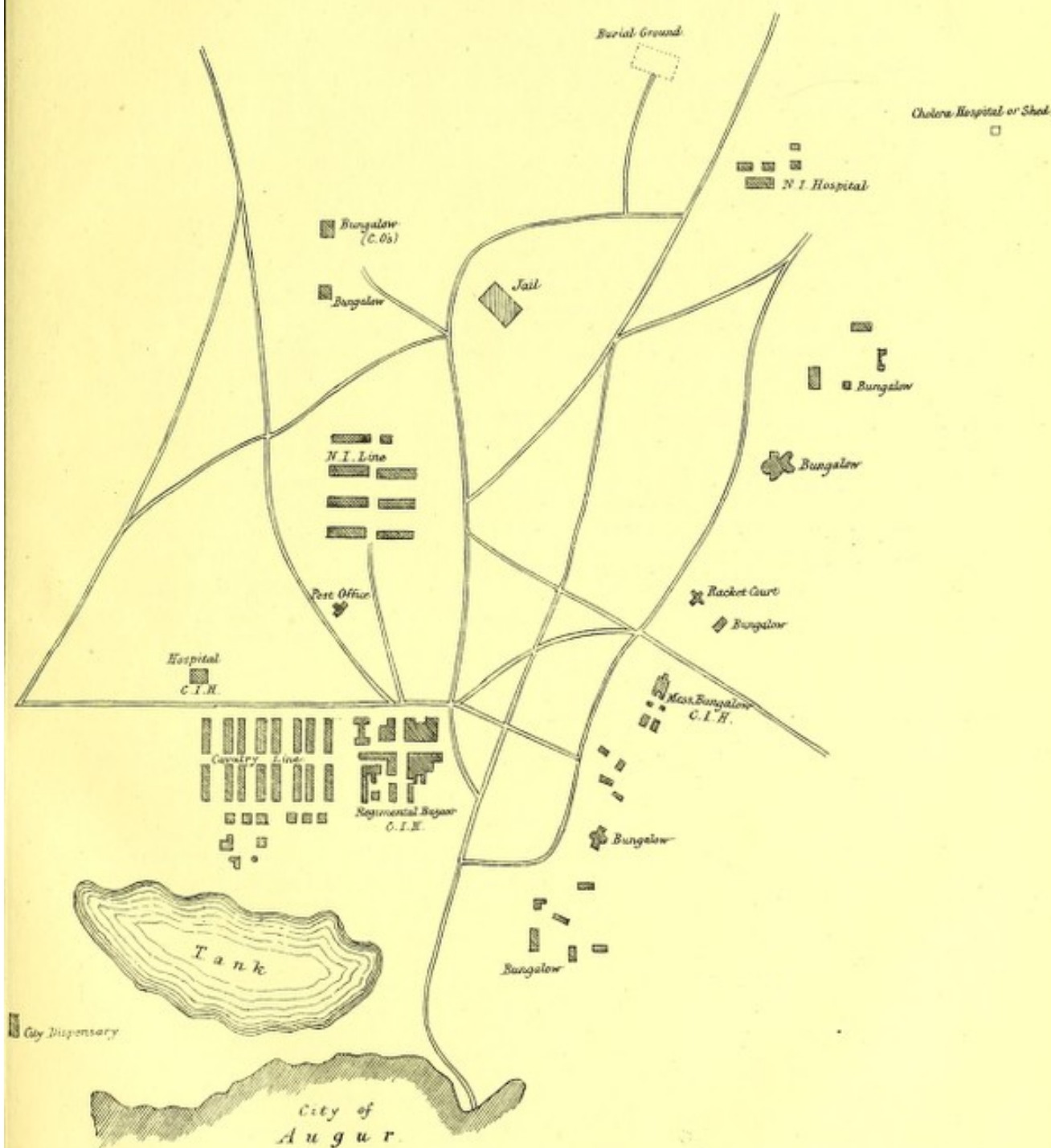
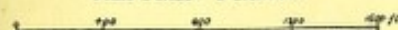
1. On the 1st of January 1879, the left wing of the 24th Regiment N. I. was quartered at Augar, and the right wing at Mehidpur. The left wing marched for Mehidpur, and was relieved by the right wing in February. Two companies of the right wing, B and D, arrived at Augar on the 18th of February, and two companies, A and C, arrived on the 22nd February.

2. The lines consist of rows of tiled huts running east and west; there is ample space between them, and a well between each at the west end. The huts are built of unburnt brick, and have an average cubic space of 760 cubic feet; in part of each is a small covered verandah, separated from the room by a mud wall and a small bamboo door. Part of this verandah is used for washing, and the water flows through a pipe into a mutkar placed outside, which is emptied twice a day. Ventilation of the lines is very good, but of the individual huts bad, consequent on there being no other opening but the door for the admission of air. They are in good repair, and are in a good part of the cantonment towards the north end, separated from the city of Augar by a tank, the Central India Horse lines, and a piece of open maidan. At the opposite north end is the regimental garden for the sepoys, and maidan with the officers' bungalows a short distance off. On the west is the parade ground and the open country, and behind the lines is the open ground of camp with a few trees. There are large trees in the lines which afford shade to the men, but no under-wood or other shrubs.



# MAP OF THE MILITARY CANTONMENTS, AUGUR.

Scale 1 Inch = 8 Chains.









3. The conservancy of the lines is very good, and they are always kept scrupulously clean. The only fault in the conservancy is the latrines, which, however, are to be given up shortly; they are old brick-work buildings, and have become saturated with the urine which the men pass at the side of the pans and then allow to dribble out behind. It is impossible now to keep these sweet and free from smell, and more than once they have been a source of annoyance when there has been a high wind, they being placed to windward of the lines on the other side of the parade ground.

Conservancy.

4. All the water used is obtained from wells, of which there is one between each line; one near the hospital compound, and one between two of the officers' bungalows. The water is of good quality.

Water-supply.

5. The men have plenty of good food, obtainable from the bazaar at moderate rates; for, though it is not as cheap as it was, they receive compensation, so have no reason to deprive themselves of it. They often obtain flesh, either buying it from shikarees bringing it in, or sometimes killing it themselves, of which opportunity they are always eager to avail themselves.

Food and clothing.

The clothing is good. Besides the Government clothing of uniform and great coat, they have their own undress clothing and good English blankets, which they have obtained for themselves. Every man, too, is ordered to obtain a cot, so that he should not sleep on the damp ground.

6. The duties of the men are light, but besides their regimental work, they furnish a guard to the jail here. Of late they have had rather more work owing to the drill season and musketry firing; they, however, take great interest in the latter, having fired off no less than 16,317 rounds at their own expense before the annual course began. The price of the ammunition, being obtained from the Regimental Rifle Association, was only one anna per four rounds.

There is no gymnasium, but the men gladly join any excursion to beat for large or small game; they also work in the sepoy's garden.

7. The hospital, situated in the north-east corner of camp, is a double-sloping tiled-roof building, with covered verandah on each side, and two small rooms at each end, used respectively as office, dispensary, store-room, and spare room. The hospital is capable of accommodating twenty patients, with five feet space between each bed, and both it and the subsidiary buildings are in good repair, except the post-mortem house, which is very bad. The hospital is on a rising piece of ground, in the best spot in camp, and has open maidan all round.

Hospital and its immediate surroundings; present condition, hygienic or otherwise.

8. The general health and physique of the wing altogether is good, though the men have suffered a good deal from fever, especially those who have come from Mehidpur. Several of the recruits who were transferred suffered badly from fever and splenitis, which consequently greatly weakened their constitution.

General health and physique.

9. Augar is, I believe, a very healthy place for India, the heat is not excessive; there is a moderate rainfall; it is 1,600 feet above the sea level, and a good dry ferruginous soil, so that the men are under no injurious influence of climate whilst here, nor are there any local circumstances affecting their health beyond the risk of living near a dirty native city. This year, however, they have been free from any evil influence from that direction.

Influence of climate or local circumstances on health.

10. All the cases of fever have been treated at first with the Government cinchona febrifuge, grains ten to fifteen doses, and occasionally in larger doses. This was found sufficient in the mildest cases, but others required small doses of quinine, grains five to ten; large doses of grains twenty to thirty were given in one obstinate case; others, when the cinchona febrifuge failed, were given liquor arsenicalis, minims ten dose, carefully watched. This was very successful, though, like the other, it occasionally failed. For dysentery, rest, opium, ipecacuanha, grains twenty to thirty, fomentations, and sometimes brandy were used.

Details of treated.

The cases of guinea-worm were poulticed, and attempts carefully made every day to extract them; two, however, after exciting abscesses disappeared and were not extracted. Salicylic acid, grains fifteen dose, was used for a mild case of acute rheumatism. There were no other cases of importance.



- Mortality and its causes. 11. There were two cases of deaths in the early part of the year; one from intermittent fever and the other from remittent fever.
- Epidemics. 12. There were no epidemics.
13. There have been 19 primary vaccinations during the year, but no case of re-vaccination. Of the total present strength 275, 205 are protected by vaccination, and 70 by small-pox. Of the 81 women, 63 are protected by vaccination and 18 by small-pox. Of 112 children, 96 are protected by vaccination and 16 by small-pox, so that of the total men, women, and children, 468, there are 364 protected by vaccination and 104 by small-pox.
- Vaccinations and Re-vaccination. 14. There was only one man invalided from the hospital, who had suffered from hepatitis, after long attacks of fever. Three other men were discharged for pension on account of long service, debility, and disability to perform their duties properly, but they were never in hospital.
- Invaliding and its causes.
- Requirements and recommendations. 15. None.
- Special observations, new experiences in treatment, sanitation, &c. 16. None.

*Inspection by Deputy Surgeon General HEWLETT.*

Inspected 22nd December 1879. The lines are on a good site, and are certainly above the average. The streets are wide and kept scrupulously clean. The huts, however, are defective from want of plinth and of efficient ventilation. Each man possesses a cot. The water supply is fairly good, and is derived from wells, the depth to the water being about 50 feet and the depth to the bottom about 20 feet more. The soil is laterite. There is an excellent sepoy's garden, which is managed by the officer in command, and which keeps the men supplied with excellent vegetables. The latrines are not good, but they are shortly to be pulled down and new ones erected in their place. I was much pleased with my inspection of the hospital, which stands high, and which has been well managed by Surgeon Lowdell, who has evinced great zeal and intelligence in carrying out his duties. Diaries of cases have been intelligently and well kept in the handwriting of the medical officer. The general health and physique of the men was good, though some of them who had come from Mehidpur have suffered from fever; but on the whole Angar is a very healthy station.

**26th Regiment N. I.**

DEESA.—In medical charge of Surgeon J. H. EARLE and

Surgeon-Major S. YEATES HUNTER.

Average Strength	...	...	...	659	Deaths in Hospital	...	...	...	5
Do.	Present	...	...	614	Do. out of Hospital	...	...	...	2
Admissions	...	...	...	607	Invalided	...	...	...	24
Daily Sick	...	...	...	23.5	Sick Leave	...	...	...	6

Years.	Station.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876...	Poona	132.5	5.1	0.8
1877...	Do.	134.2	4.0	0.7
1878...	Poona, Malta and Ahmedabad.	184.3	3.6	1.3
	Average...	150.3	4.2	0.9
1879...	Deesa	98.8	3.8	0.8

1. The head-quarter wing arrived at Deesa on the 13th of January, and the left wing on 2nd of March. Both wings marched up from Ahmedabad. Several escorts were being constantly sent to Massana and Mount Aboo.
- Location and movements.



2. The lines have been already condemned two or three times by committees, as old, dilapidated, and past repair. The huts have no plinths, and the floors are below the level of the surrounding ground. The roofs are tiled, and many of them leak, and the huts were very damp during the rains. The ventilation is natural, viz. through doors and the roofs. The drainage of the lines and cantonment is surface. The huts are shaded by numerous fine trees. The bazaar is only about 300 yards distant from the lines; its sanitary condition is satisfactory. New lines are most urgently needed.

3. The trench system of latrine is used. The latrines are two in number, one for each sex; they are situated in the sandy bed of the river in the dry weather, and on the river bank in the wet weather. This system of conservancy seems well suited to the locality. The lines are always kept very clean.

4. There are six wells in the lines, one in the hospital compound; one of the wells in the lines, which is set aside for low caste men, is not covered in. This is very objectionable, as there is generally some organic matter undergoing decomposition in the water. The quantity and quality of water is abundant and good.

5. The food is fairly cheap and good. As regards clothing, a lighter dress for the sepoy when on duty in the hot weather is very much needed; also some improvement I think ought to be made as regards their boots. Most of the sepoys wear no socks, their boots are ill-fitting, and the consequence is, that many men come into hospital suffering from shoe-bite.

6. The ordinary garrison duties and escort parties, parades, and drills give the men plenty of exercise; the men also go through a gymnastic course, and some also compete for prizes in running, &c. Neither the duties nor exercise appear to have any prejudicial effect on the men's health.

7. The hospital is well situated, clean, and in fair repair; its immediate surroundings are the subsidiary buildings for the hospital establishment and Subordinate Medical Department, two contagious diseases wards, a dead-house, and a latrine. The latter is built of masonry and is kept clean by hospital sweepers, who remove the excreta into covered receptacles, which are taken away at night in conservancy carts, beyond camp limits. The hospital affords ample accommodation for the sick; there has been no over-crowding. Ventilation is secured through apertures in the roof and near the ground, as also through opposite doors and windows. The water-supply obtained from a well in the hospital compound is good and abundant.

8. The general health on the whole has been very fair; the physique of the men is fairly good.

9. Climatic influence on health will be seen by looking at the following table, made out from observations on temperature and rainfall recorded, and from the register of sick:—

Months.	Rainfall.		Temperature in shade.			Percentage of sick to strength.	Average Strength.
	Inches.	Cents.	Max.	Mean.	Min.		
January.....	...	...	91	78	58	26.1	605.5
February.....	...	...	93	79	70	10.8	
March.....	...	...	96	87	72	7.8	
April.....	...	...	99	92	70	9.5	
May.....	...	...	105	95	82	11.5	
June.....	3	99	102	97	90	14.3	
July.....	1	79	92	87	81	11.5	
August.....	18	42	90	82	78	13.4	
September.....	1	75	87	81	78	11.0	
October.....	...	...	89	81	70	11.7	
November.....	...	...	81	71	53	15.6	
December.....	...	...	73	68	56	7.8	



10. There were 614 admissions under observation, including 56 re-admissions. There were 5 deaths in hospital. Six men were sent on medical certificate, three ague, two venereal disease, one phthisis. The principal diseases in order of frequency were as follows:—Ague 249, most of these cases being of mild type and quotidian in variety; eye-diseases 51, 49 being due to simple conjunctivitis; 2 others to iritis, contusion of lower extremities 54, most of these cases being shoe-bite due to ill-fitting boots; primary syphilis 28, diarrhoea 16, dysentery 16, lung diseases 22, secondary syphilis 17, guinea-worm 12.
- Details of treated.
11. There were 4 deaths in hospital, viz. 2 from phthisis pulmonalis, one from encephalitis, one from pneumonia. One man died out of hospital, having committed suicide by shooting himself through the left side of his chest.
- Mortality and its causes.
- Epidemics. 12. There has been no epidemic.
- Vaccination and re-vaccination. 13. Has been carefully and successfully carried out.
14. Twenty-four men were invalided; 13 general debility, 1 vertigo, 1 chronic rheumatism, 1 aneurism of thorax, 1 chronic bronchitis, 1 phthisis, 1 impaired vision, 1 iritis, 1 deafness, 1 chronic hepatitis, 2 chronic splenitis.
- Invaliding and its causes.
15. As recommended for the last three years, a small latrine is required for the regimental solitary cells, as prisoners confined there have to march under a guard to the hospital latrine, which is some way off.
- Requirements and recommendations.
16. In four rather severe cases of ague admitted into hospital during the hot stage of fever, Surgeon Earle found that tincture of opium given in half drachm doses was very useful (in three of the cases mentioned) in producing profuse sweating in about half an hour after the administration of the drug followed by sleep, and relief of all the symptoms, such as sickness, nausea, pain in the limbs and lassitude, patient complaining of only very slight headache. Surgeon Earle still considers the cinchona alkaloid only acts as a mild febrifuge. In many of the cases admitted into hospital he found rest and good diet far more beneficial than medicine in restoring the patient to good health.
- Special observations, new experiences in treatment, sanitation, &c.

*Inspection by Deputy Surgeon General HEWLETT.*

Inspected 10th November 1879. The head-quarter wing arrived at Deesa from Ahmedabad on the 13th January, and the left wing on the 2nd March. The lines in which the men are huddled are old, dilapidated, and of faulty design. They have been repeatedly condemned. The ventilation in the huts is defective, and all sullage from married men's quarters is absorbed in the immediate vicinity of the huts. The water supply is derived from wells; most of these are in the lines, but that for the Purwaries has been sunk under some trees near the river bank. I recommended this to be immediately covered over. Trench latrines are used and are effective, but in the interest of persons drawing their water supply lower down, I think the site in the river-bed is objectionable. The solitary cells being without any ventilation, I recommended that roof ventilation be provided, and that the walls be pierced. A latrine is also much required for the use of prisoners. The health of the regiment has been fairly good during the year. There was no epidemic, and there were only 244 cases of ague admitted during the year. The maximum number of admissions for this disease took place in May (38). No case of enteric fever was reported. I was on the whole pleased with my inspection of the hospital and its surroundings. The errors that I found are to be attributed to inexperience, and only required to be pointed out to be rectified. The hospital itself, I was informed, had been pronounced unsafe by the Superintending Engineer. It much requires repair.



## POONA DIVISION.

Average Strength present during the year .....	6,025
Average Daily Sick per cent. to the Average Strength present .....	3.9
Ratio of Mortality per cent. to the Average Strength present.....	0.9

## H. M.'s 2nd Regiment L. C.

POONA.—In medical charge of Surgeon-Major A. BARRY, M.D.

Average Strength ... ..	474	Deaths in Hospital ... ..	2
Do. present ... ..	445	Do. out of Hospital ... ..	1
Admissions ... ..	598	Invalided ... ..	47
Daily Sick ... ..	19.3	Sick Leave ... ..	17

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876... ..	Deesa ... ..	74.8	2.4	0.4
1877... ..	Do. ... ..	65.6	2.6	0.6
1878... ..	Do. ... ..	101.8	1.7	0.6
	Average ... ..	80.7	2.2	0.5
1879... ..	Poona ... ..	134.1	4.3	0.4

After a residence of seven years, eleven months, and eighteen days in Deesa, the headquarters reluctantly marched for Poona on the 7th of January 1879. The third squadron from Rajkot was met *en route* at Wassud on the 24th January, and the Regiment reached Poona on the 5th March, where the troop rejoined those who returned from Cyprus with the 1st Lancers in September 1878.

In May and June a small party of sowars was in pursuit of dacoits at Sherwall, Wye, and Mahableshwar. At present 20 sabres, under Major LaTouche, are after dacoits at Caprote and Bhole.

2. Great efforts have been made by Colonel Macnaghten to improve sanitation. In some parts of the lines there is no slope, so that the fall is not

Lines and their surroundings; present condition, hygienic or otherwise.

sufficient to insure a flow in the drains. In the rainy season the camp was flooded, in some places resembling a swamp, in others a ploughed field.

To obviate these conditions, "moorhum" was laid down in all the thoroughfares, and stone surface drains were constructed between the double rows of huts; but practically, owing to the level nature of the ground, in many parts the house refuse-water and urine remained stagnant, vitiating the atmosphere. To remedy this state, the Colonel has, at the end of each drain, built a small brick reservoir below the ground level, in which is placed a tub to receive liquid refuse. This tends to accelerate the flow in the drains, and the sullage is removed by pucks daily.

The horses are picketed in front of the huts, so there are usually heaps of organic matter in front of the doors.

The huts are badly built, ill constructed, floors about four inches below ground level, and ventilation most defective.

The lines consist of double rows of huts, ranging east and west. At the back parts the family men have constructed small enclosures, partly formed of mud walls and partly of tatties, containing a privy and bathing place, and other conveniences. The result was the daily deposition of fæces and urine on the ground, so that, although the ordure was removed



daily, the earth gradually became polluted, and as the family bathed anywhere in these enclosures, the soil was almost continually damp and evaporating.

On my recommendation, the Commandant has cleared away the earth to the depth of two feet, placed "moorhum" instead, and constructed chunam and stone floors for the bathing places and privies.

To the east and south, within a distance of 112 paces from the front of the lines, the fields are constantly irrigated by the Kurruckwasla water. I fear this is one of the main causes of the continuance of malarial fever throughout the year.

3. The latrines are situated 150 yards distant on the left front of the lines towards the north. They require white-washing, the floors are out of repair, and the walls require pointing, the base bricks being decayed. Conservancy. At present the sowars void urine on the floors, causing an insanitary state. I have recommended that urine should be received separately into pans.

4. Good. Kurruckwasla water through pipes. Some prefer to drink well water. Supply ample. Water-supply.

5. Food indifferent. Supply ample. No change of clothing since last report. Food and clothing.

6. Exercise parades three or four times weekly; considerable orderly duty, cleaning horses and accoutrements. Average nights in bed, consecutive 9.5. Amusements are tilting at the ring, tent-pegging, sword exercises, such as lime-cutting on horseback at speed and polo, all having a capital effect. Duties, exercise, and amusements; their effect on health.

7. Turning to the hospital, the contrast is indeed striking. On the one hand, a series of hovels unfit for human habitation; on the other, a splendid building, perfect in all its parts. In former reports it has been fully described. Within thirty yards of the compound there are irrigation fields. The latrines are kept beautifully clean, and are in very good repair. The dry-earth system is not in use. Hospital and its immediate surroundings; present condition, hygienic or otherwise.

8. During the first four months of the year the general health was excellent; but the rainfall brought in its train malaria, which soon reduced health below par. The cold weather, however, has had a most bracing effect; on the whole the physique of the Regiment is steadily improving, although great difficulty is experienced in obtaining able-bodied recruits with good chest development. General health and physique.

9. I am of opinion that bad drainage and proximity of irrigated fields have been the great factors in developing miasm, the agent exciting paroxysmal fevers and causing inefficiency. Influences of climate or local circumstances on health.

10. The total admissions, out of the average present strength, amounted to 598. Of these, 354 were from quotidian ague, being an excess of 105 cases contrasted with last year. This was due to the change from the very dry climate of Deesa to the moist air of Poona; and also to the very bad state of drainage in the lines after the rains, besides the moist state of the ground kept up all the year by irrigation. Details of treated.

The greatest number of admissions were in June, July, and August, when the daily sick amounted to 38. In most cases six grains of mixed cinchona alkaloids thrice daily were exhibited; but in severe cases always quinine in large doses were given with great effect. In one case of hyperpyrexia the patient became comatose, when quinine was administered hypodermically and ice applied to the head with a happy result. Of the remaining admissions, contusions gave 70, dysentery 27, syphilis 11, lumbago 10, rheumatism 9, brow ague 4, sciatica 1, conjunctivitis 5, inflammation of the ear 1, inflammation of the glands 1, gum boil 2, bronchitis 4, pneumonia 2, pleurisy 5, dyspepsia 1, diarrhoea 10, colic 13, constipation 1, fistula in ano 2, jaundice 1, splenitis 2, hæmorrhoids 1, gonorrhoea 5, bubo 1, orchitis 2, abscess 10, guinea-worm 7, erythema 1, urticaria 1, pemphigus acute 2, burns and scalds 1, fracture of forearm 2, sprain of ankle 5, simple fracture of leg 1, and 1 wound of thumb from horse-bite on the line of march. The distal phalanx of a sowar's thumb was bitten off by his charger. He was dragged for some distance, when a comrade hit the horse on the head with a peg, but the animal did not let go till he bit through the joint and tore out about 10 inches of the flexor longus pollicis tendon.

Colonel Sykes proceeded on three months' sick leave to Bombay with enormously enlarged spleen, the organ reaching to a point below the umbilicus, his health being seriously impaired.

Major Stopford obtained two months' sick leave to Mahableshwar, suffering with ague quotidian, neuralgia of face, and insomnia. Of an average strength of nine European officers, the admissions were as follows, viz., ague quotidian 5, neuralgia of face 2, diarrhoea 1, and splenitis 2.



11. Two deaths in hospital and one out of hospital. The two former were from pneumonia; the latter was that of a sowar serving with the 3rd Scinde Horse killed in action near Kabul.

Epidemics.

12. None.

Vaccination and re-vaccination.

13. Twenty-one children were successfully primarily vaccinated. No re-vaccinations.

14. Invalided for discharge 44, as follows, viz:—General debility 2, chronic rheumatism 2, long service, old, and worn-out 6, chronic bronchitis 1, chronic corneitis 1, varicocele and enlargement of testicle 1, fistula in ano 1, syphilitic rheumatism 1, chronic enlargement of ankle-joint 1, presbyopia and glaucoma 1, above 32 years' service 26, and fracture of leg simple 1. Three men were discharged for physical disability.

Requirements and recommendations. 15. I would beg to recommend the following, viz:—

1. That the floors of the huts be reconstructed and elevated one foot above ground level.
2. As the cubic space is deficient, especially in married quarters, a sky-light window should be made in all huts to carry off the products of respiration, &c.
3. A more perfect system of drainage should be introduced.
4. Irrigation should not be carried up nearer than 600 yards.

### H. M.'s Poona Horse.

SIROOR.—In medical charge of Surgeon A. K. STEWART.

Average Strength .....	493	Deaths in Hospital .....	3
Do. present .....	462	Do. out of Hospital .....	...
Admissions .....	258	Invalided .....	10
Daily Sick .....	65	Sick Leave .....	5

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Siroor.....	69.1	3.1	0.4
1877.....	Do. ....	53.7	2.4	0.9
1878.....	Do. ....	72.8	2.2	1.0
	Average.....	65.2	2.9	0.8
1879.....	Siroor.....	55.9	1.4	0.6

1. The head-quarters are at Siroor, but the Regiment has been considerably broken up for the past twelve months, detachments of various strengths having been out in the districts of Poona, Satara, and Sholapur in aid of the Civil power, small parties, too, constantly making excursions from head-quarters on similar duties for short periods.

2. The lines are situated too near the town, hence any outbreak of epidemic disease is very apt to be transmitted to the Regiment, and when the town is in quarantine, it is very difficult to prevent the men going into it. They are situated north and south nearly, so that the prevailing south-westerly winds readily pass through and ventilate the open streets.

3. The system of shallow pits with drains leading off the fluid excreta in each house is still in vogue. The iron pans tried last year having failed to give satisfaction, square earthen pots are now going to be tried instead, as the experimental pots seemed to answer fairly. The young trees planted last year have grown very well, and the fluid excreta from each house is run to the root of a tree planted outside each house enclosure, which enclosure, with its latrine and surface-



drainage, is inspected once a week. The night-soil is deposited some distance to leeward of camp, and is removed every morning before 8 A.M. by an iron conservancy cart, which attends regularly. As the cultivators in this part of the country do not seem to appreciate or know the benefits to be obtained from properly manuring their lands with the best manure, I proposed in a recent report to the Municipality of Siroor that the Mamlutdar should call a meeting of land-owners in the neighbourhood and explain matters to them properly, offering them the night-soil gratis at first. Having thus made the matter publicly known, I have little doubt but that it will subsequently be properly used up for purposes of culture, and not be simply thrown on barren and unproductive ground, as it is at present.

4. The water-supply comes from the river Goreh, and is fairly good and plentiful.

Water-supply.

Two analyses were made during the year of the river and the mess well water. The following are the results:—

*May 8th, 1879, Goreh River Water.*—Colourless, clear, and pleasant to the taste; no smell or sediment, and neutral reaction. Chlorine 4·17 grains; total hardness, 5·6 grains; temporary hardness, ·9 grains; permanent hardness, 4·7 grains per gallon. Oxidizable matter, ·98 milligrammes per litre.

*September 13th, 1879, Goreh River Water.*—Has a decidedly milky appearance; is somewhat fresh to the taste; has no smell; a very slight sediment, and is of neutral reaction. Chlorine ·9 grains; total hardness, 7 grains; temporary hardness, 2·8 grains; permanent hardness, 4·2 grains per gallon. Oxidizable matter, 3·8 milligrammes; oxidizable organic matter, 2·6 milligrammes; nitrous acid, 1·2 milligrammes, per litre.

*May 8th, Mess Well Water.*—Colourless, clear, sparkling, and pleasant to the taste; no smell or sediment, and neutral reaction; chlorine, 5·6 grains; total hardness, 2·8 grains; temporary hardness, 1·4 grains; permanent hardness, 1·4 grains, per gallon. Oxygen for oxidizable matter, ·5 milligrammes per litre.

*September 13th, Mess Well Water.*—Colourless, clear, sparkling, and pleasant to the taste; no smell or sediment, and neutral reaction. Chlorine, 4·4 grains; total hardness, 7·7 grains; temporary hardness, 5·8 grains; permanent hardness, 1·9 grains, per gallon. Oxygen for oxidizable matter, ·52, oxygen for oxidizable organic matter, ·3, nitrous acid, ·15 milligrammes per litre.

The analyses were made at two different times of the year, the one in the hot weather, when the water was low, and the other in the cold weather, when there was plenty of water.

5. Food has been cheaper than for the last few years, and this is also seen by the

Food.

fewer number of cases of scurvy which occurred owing to the men having fed themselves better.

6. The duties of the men are not heavy as compared with other regiments. Polo is

Duties, exercise, and amusements; their effect on health.

usually played twice a week, and besides being a matter of exercise, it teaches the boys and woomedwars of the Regiment to ride. There is a regular gymnastic course for the younger men and recruits. The Regiment is very healthy, the percentage of average daily sick being only 1·4.

7. The new hospital now in use was completed since last report, and is one of the best of

Hospital and its surroundings; present condition, hygienic or otherwise.

its kind in the Presidency. It was built at considerable expense, and is in all respects very pukka. It is built on the open ground to the east of the lines, and comprises a large number of out-buildings, such as cook-rooms, servants' quarters, &c., &c.

8. The general health of the men is very good, and though they are small as a body,

General health and physique.

their general health, physique, and intelligence is good. Since the standard of height has been raised from 5 feet 3 to 5 feet 6, larger men are coming in, and I believe they are a good size for a regiment such as this.

9. Climate is remarkably healthy and dry. 450 young trees were planted in the Cantonment during the year, making a total of upwards of 1,450 during the last two years.

10. The number of admissions during the year were 258. Of these the principal cases

Details of treated.

were 121 from fever, 36 from contusions and sprains, colic 21, rheumatism 16, syncope and debility 7, guinea-worms and ulcers 7 each, conjunctivitis 7, dysentery 3, and scurvy only 1.

11. There were three deaths during the year, one from pleuro-pneumonia, one from

Mortality, and its causes.

debility and ague, and one from diarrhoea and debility, the result of opium-eating.

Epidemics.

12. There were no epidemics except towards the close of the year, when a slight attack of mumps broke out among the women and children.



13. The total number of primary vaccinations during the year were 148, all successful. There were seventeen children on the rolls unvaccinated, who were either too young or sickly.

14. The number of invalids this year was unusually small, only ten, and this was partly due to all men not likely to stand service having been got rid of last year, when the Regiment was under expectation of active service. Of the men discharged, seven were for debility and ague, &c., one for varicose veins, one for palsy of the right arm, and one for physical disability.

15. None, except that some sorts of pans should be introduced into the latrine accommodation when funds permit.

16. Seven cases of guinea-worm came under observation, but only three of these could be experimented upon in continuation of the previous experiments reported. The reason of this was principally that the worms were too small and thready, rendering the operation of stinging them with a scorpion a difficult task; the best mode of doing so, however, was found to be by making a hole in a card and drawing the worm through, then seizing the scorpion with a handkerchief nearly half an inch from the tail and allowing him to sting the worm, drawn tight, himself. The worm when stung can undoubtedly be felt by the patient, as a peculiar thrilling and even very painful sensation is produced in the locality, which lasts for some time. The worm dies in a few days as a rule completely; but nearly always the next day about seven inches or so comes away quite dead and flat.

In chronic and sub-acute cases of dysentery the following enema has been tried with remarkable results. It seems to be a course of treatment which has not been extensively or thoroughly tried, as the leading medical works refer only lightly to the subject, and mention only nitrate of silver and sulphate of zinc simply, or they pass over the subject altogether. The prescription used was the following:—Sulphate of copper and tannic acid each xii grains, with 3 dr. vin. ipecac., and xx minims of hydrochlorate of morphia in oz. xiii of warm water, as an enema. Every other day the sulphate of copper was alternated with the sulphate of zinc. In chronic cases the pain is not much, but in sub-acute cases it is considerable. In some cases it acts like magic, and in all I have tried, which are not many, it has been decidedly beneficial. Deputy Surgeon-General Beatty had tried the treatment in one case when I last saw him, and he assured me that it had been very successful.

### Sappers and Miners.

KIRKEE.—In medical charge of Surgeon H. P. JERVIS, Surgeon T. MONKS, and Assistant Apothecary J. DIAS.

Average Strength .....	103	Deaths in Hospital .....	2
Do. present .....	103	Do. out of Hospital .....	...
Admissions .....	192	Invalided .....	5
Daily Sick .....	5·8	Sick Leave .....	...

- No. 3 and 4 Companies were quartered in the New Jhansi, Kirkee, until 14th October, when they proceeded to Field Service in Afghanistan, leaving a depôt at Kirkee.
- As reported last year, the hygienic condition of the lines is defective in drainage.
- No alteration from last year.
- From Khurruckwasla Canal; good and abundant.
- The food supply and clothing is as previously reported.
- Have been as usual at Kirkee.
- The hospital is in good repair, and affords sufficient accommodation.
- The general health and physique were much impaired by the effects of the expedition to Malta and Cyprus in the previous year.
- A considerable proportion of the admissions were for ague.



Mortality.	10. Two deaths occurred, one from nephritis, the other from suppression of urine.
Epidemics.	11. None.
Vaccination and re-vaccination.	12. Has been properly carried on.
Invaliding.	13. Five men were invalided, one for syphilis, one for varicose veins, one for debility, one for chronic rheumatism, and one for debility from ague.
Requirements and recommendations.	14. None.

## H. M.'s 8th Regiment N. I.

SATARA.—In medical charge of Surgeon-Major T. MILLER, M.D.

Average Strength .....	683	Deaths in Hospital .....	4
Do. present .....	648	Do. out of Hospital .....	2
Admissions .....	752	Invalided .....	31
Daily Sick .....	23·5	Sick Leave .....	24

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Poona .....	191·6	4·1	0·2
1877.....	Do. ....	155·7	3·8	0·9
1878.....	Do. ....	226·0	6·2	1·3
	Average.....	191·1	4·7	0·8
1879 .....	Satara, Bombay, Asirgarh.	116·0	3·6	0·6

1. The head-quarters have been stationed at Satara during the year, with a detachment at Bombay, strength 133 men, and at Asirgarh, strength 118 men. Small detachments were also sent, to Mahableshwar of 26 men, to Panchgunny 13 men, in October, and still remain at those places on account of the dacoits being out in the districts. On several occasions small parties of men have been placed at the disposal of the Civil authorities on the same duty.

2. The lines and their surroundings are still much in the same state as they have been for years back, and are not by any means what they should be. The huts are not pukka built, as at other stations, but seem to have been built for a temporary purpose, and composed chiefly of wood and plastered with mud. They are not well ventilated, have very low plinths, and are full of vermin of different kinds, and are not at all comfortable or healthy for the sepoys. New lines were sanctioned some time ago, but as yet no commencement has been made. The huts have no verandahs or bathing places attached; are about 850 cubic feet inside, and are separated from one another only by a thin partition wall about six feet high; the consequence is there is almost no privacy for the families. The drainage is surface, and the gutters are quite open and unlined with any sort of masonry; the consequence is a good deal of the water soaks into the bottom of the drains. There is no separate cell for prisoners, who have still to be kept in the quarter-guard room—not a good arrangement, I should say. The Sudder Bazaar is much too close to the lines, and the men pass a good deal of time there, not at all to their advantage in many ways.

3. The arrangements for keeping the lines clean are carefully carried out. The latrines are on the trench system, and seem to answer. A new trench is dug every morning, and filled in at night with earth, and the ground used for the purpose is changed as often as is thought necessary. There are two sites used, one for males and one for females, and they are screened from public view by



temporary partitions of bamboo matting. I have no doubt a good many of the men prefer going a little way into the jungle, when they have time, instead of using the latrines.

The number of sweepers employed in carrying out the conservancy work is eight, of whom four are regimental and four are employed by Government.

4. The supply of water is generally sufficient and of fair quality. Some of the wells contain hard and brackish water, but these are only used for washing purposes. In the hot season there is often a scarcity of water, and it has to be brought from what is called the Rajah's Garden, where there is a well which has a supply of water all the year round. This is at a considerable distance from the lines, and not at all convenient for the men. The scheme for supplying Satara with water from Khas by constructing a dam on the hills across the source of the Urmori River has not as yet been carried out. The water of the wells used by the troops was lately analysed by the Government Travelling Analyser, but I have not as yet received his report as to their qualities. It is commonly considered good.

5. The food used by the sepoys has been much the same as regards price as it has been for a year or two back. There is plenty to be got in the bazaars, but it does not seem to be much cheaper.

The average price of gram has been about lbs. 12½ for the rupee; wheaten flour lbs. 10½, rice lbs. 9, bajree lbs. 13, dal lbs. 10½, ghee lbs. 2½, salt lbs. 15, firewood lbs. 120, mutton lbs. 6 per rupee; and the usual food of the sepoy consists of above, with fish, vegetables, and onions, chillies, &c. As this season has been a better one for crops generally, prices should now be lower. As regards clothing, it still remains of the same old pattern. I believe one or two regiments have been put into a sort of Zouave uniform, but this has not been generally done, which is a mistake, I think, as the Zouave dress would improve the general appearance of the sepoy. The boots are also still a source of trouble from causing shoe-bites, and thus filling the sick list with trifling cases. The men seem when off duty to wear the same sort of clothing all the year round, and if they were made to have warm under-vests for the rainy and cold season, it would prevent a good deal of sickness from chest and rheumatic complaints. They should also be made to sleep on a charpoy and not on the ground, as is the usual custom. As regards their food, I believe many half-starve themselves in order to save money to send to their relatives, and so render themselves liable to complaints, which, if properly fed, they would not suffer from.

6. The duties are the ordinary ones. A good deal of extra duty was required during the year on account of small parties having to go out to the districts to aid the Civil authorities in hunting down the dacoits, who were very troublesome in this district. The men had on an average about four nights in bed out of the seven during the year, so I do not suppose the duties can be considered very heavy.

The exercises and amusements are of the usual kind. There is a small gymkhana for practising gymnastics, and some do work for the soldiers' exhibition, and there is a school for the instruction of the children, who do plain and fancy sewing work, as well as learn to read and write, &c.

7. The sick of the Regiment are still treated in an ordinary bungalow, as the regular hospital for sepoys is occupied, and has been for years, by the sick of the detachment of European troops stationed here. The present bungalow is better suited for an hospital than the one used last year, which was in the Sudder Bazaar. The sick were removed in October to this one, which is much better ventilated, has larger rooms, and houses for the hospital servants in the compound, as well as being much more convenient in every way, although it has of course some deficiencies, such as store-rooms, dead-house, and cook-room.

The latrines are also not quite what they should be for a hospital, but certainly better than those formerly used. The building is quite open to the breeze, and there are no buildings near to obstruct ventilation. There is still no separate room for the use of the hospital guard, and the men have to occupy a part of the verandah of the house, and also sleep there, which is very inconvenient and uncomfortable, both for the guard and the men under treatment.

8. The general health of the Regiment has been good during the year, there being a decrease in the number of malarial fevers and other diseases as compared with the previous year. There has been no epidemic disease, and the deaths have been fewer in number. A good many of the worn-out and elderly men have been pensioned off, and young men of good physique have been enlisted in their place. The number of recruits joined during the year was 56, of whom 29 were Mahrattas, 17 Mahomedans, 8 Ramoosees, and 2 Brahmins. The number of men sent on sick leave was 24, of whom 14 belonged to the detachment at Bombay, 6 to the Asirgarh detachment, and 4 to the head-quarters at Satara.



The diseases for which they got leave were ague 3, remittent fever 2, bronchitis 2, abscess 1, dysentery 1, debility 1, lumbago 1, mumps 1, nephritis 1, pemphigus 1, rheumatism 6, scurvy 1, sprain 1, synovitis 1, and syphilis 1.

The physique of the men is generally good. They differ in size considerably, according to their nationality, the Mahrattas being usually smaller men than those from the Punjaub and north of India. Of the different castes and religions, there are 23 Rajputs and Brahmins, 58 Sikhs, 1 Dogra, and 453 other Hindoos. Of Mahomedans there are 32 Punjaubi Mussulmans, 3 Pathans, and 70 other Mahomedans. Of Native Christians there are 16, and 22 others of no caste.

9. The climate seems to have had a beneficial effect on the men at Satara, as they have not suffered so much from malarial fevers as they did in Poona, their previous station. The duties there were much heavier, however, and that, I have no doubt, caused more disease. There was the greatest number of admissions for ague during the months of August and September, which is the rainy season, and the men sleeping on the ground, as well as the damp state of their huts, tends to increase the amount of sickness. The climate of Satara is considered good, but during the cold season a nasty east wind often blows, which does not agree with every one, and causes rheumatic and neuralgic as well as respiratory complaints. The healthiest season of the year for the sepoys seems to be during the hot months of April and May. The season has been normal, and the rainfall about the average.

10. The total number of admissions numbered 752 against a total of 1,345 for 1878, which shows a decrease of 593. This has been chiefly in the number of malarial fevers, the total of that disease in 1878 having been 938 against 366 for the present year. The average daily sick for 1878 was 31.6 against 23.5. The total treated at Satara was 461, at Bombay 151, and at Asirgarh 140.

The most prevalent diseases were ague 359 cases, of which 241 were at Satara, 52 at Bombay, and 66 at Asirgarh. Of remittent fever there were only 7, 6 at Satara and 1 at Bombay. Of acute rheumatism 5 at Satara and 1 at Bombay, total 6. There were 22 cases of primary syphilis at Satara, 4 at Bombay, and 1 at Asirgarh, total 27. This disease is rather common at Satara, there being no sort of check on the bazaar women, a Lock Hospital not having as yet been established. Of eye diseases there were 17 cases of conjunctivitis, 9 occurring at Satara, 2 at Bombay, and 6 at Asirgarh. Of bronchial catarrh 11, of which 5 at Satara and 6 at Bombay; and bronchitis 22, 5 at Satara, 3 at Bombay, and 14 at Asirgarh. Of diarrhoea 16 cases, at Satara 9, at Bombay 6, and Asirgarh 1. Of dysentery 15 cases, at Satara 6, at Bombay 7, and Asirgarh 2. Of gonorrhoea 8, at Satara. Of orchitis 7, at Satara 5 and Asirgarh 2. Of itch 14 cases, at Satara 10, Bombay 3, and Asirgarh 1. Of contusions 58 cases, 35 at Satara, 11 at Bombay, and at Asirgarh 12. Only one case of cholera occurred, and that was in the Bombay detachment. The actual number of men treated for all diseases was 232, and the actual number for ague 159. The number of men treated once for ague was 102, twice 43, thrice 8, four times 3, five times 1, and six times 2. January, July, August, and September were the months in which the greatest number of sick were admitted.

11. The number of deaths which took place in hospital was four, of which two occurred at Satara, one from remittent fever and one from bronchitis, and at Bombay two, one from scurvy and one from remittent fever. Two men died out of hospital, one from bronchitis and one from nephritis.

12. There has been no epidemic amongst the men during the year. There was one case of cholera in the detachment at Bombay, which recovered. The districts here seem to have been very free of cholera for some time back.

13. This has been carried on amongst the children, and 23 cases were successfully vaccinated. The families go away for months to their own villages, and the children are not to be got for vaccinating until their return, and thus in some years a greater number is done than in others.

14. The total number invalided was 31. The causes as follows:—5 for general debility, 4 for ague and debility, 1 ophthalmia, 1 chronic rheumatism, 2 short sight, 1 abdominal aneurism, 1 retinitis, 1 choroido-retinitis, 1 presbyopia, 2 chronic bronchitis, 1 bronchial catarrh, 1 hernia, 1 internal hæmorrhoids, 1 palpitation, and 8 old and worn-out.

15. As has often been stated, new lines and hospital with subsidiary buildings are very much wanted; also a better supply of good drinking water. The former have been already sanctioned, and should be built as soon as possible. The present ones are not either clean, comfortable, or healthy, and the cubic space for each hut too small. The drains also should be lined with masonry to prevent soakage.



16. The mixed alkaloids have been generally used in the treatment of ague, and seem to answer very well in the common run of cases, and I have not had many complaints of its causing headache; it is generally given in six-grain doses thrice a day. In cases of remittent fever I have always given quinine, and also in bad agues sometimes combined with liquor arsenicalis.

*Inspection by Deputy Surgeon-General BEATTY.*

The head-quarters of the Regiment have been quartered at Satara during the year, whilst detachments have been supplied to Bombay, and have likewise been employed against dacoits in the Southern Maratha Country.

Beyond reiterating the recommendation conveyed in previous reports, that the present huts should be removed and entirely rebuilt, any further remark regarding them appears unnecessary.

There is no hospital proper for the use of the Regiment, the sick being treated in a bungalow hired for the purpose. The books and records were carefully written to date, and the arrangements for the sick, as far as they could possibly be, were satisfactorily carried out. The medical officer drew attention to the unusually large number (22) of venereal cases which had occurred amongst the men since arriving at Satara, and attributed the disease to the want of check of any description to its prevention. Thirty-one men were invalided during the year, but the general health of the Regiment was good, and a steady diminution in admissions on account of malarial and other diseases was observed compared with the previous year.

### H. M.'s 11th Regiment N. I.

POONA.—In medical charge of Surgeon-Major C. K. COLSTON.

Average Strength.....	655	Deaths in Hospital .....	7
Do. present .....	630	Do. out of Hospital.....	4
Admissions .....	872	Invalided .....	73
Daily Sick.....	34.8	Sick Leave .....	17

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876 .....	Bhuj .....	71.5	2.8	0.2
1877 .....	Do. ....	108.0	4.3	0.7
1878 .....	Do. ....	346.6	10.9	2.2
	Average.....	175.4	6.0	1.0
1879 .....	Poona .....	138.4	5.5	1.1

Location and movements. 1. The Regiment has been stationed in Poona during the year, but has been employed in the districts also after dacoits.

2. The lines are situated to the east of the City of Poona and the Sudder Bazaar, being the middle set of three, those of the 4th Rifles N. I. being on the north and of the 18th Regiment N. I. on the south. The large expanse of the parade ground is to the east; they slope down to a nullah on the west, which is kept as clean as possible, and is occasionally flushed from the Kurruckwasla water works; the huts are in fair condition.

3. There are two latrines, one for the males, the other for the females, about 200 yards to the west of the lines: the filth is removed in the morning by carts to a long distance.

Water-supply, &c. 4. The water-supply is excellent both in quantity and quality, its composition according to a recent analysis by the Chemical Analyser being—

Total solids per gallon .....	5.85
Chlorine „ „ .....	0.42
Free ammonia parts per million .....	0.04
Albuminoid ammonia .....	0.06



5. Food-grains were somewhat cheaper than in the preceding year, and the men appear altogether better nourished, though I believe there are some of the sepoys who still deny themselves a sufficiently good quality and quantity of food to keep them in a good state of health, and it would, if practicable, be a good arrangement for the State if regular rations were served out in sufficient quantity to keep the men in health, for which moderate payment might be required, and this would do away with the necessity for compensation for dearness of grain.

I have no additional remarks to make on the clothing than were made last year, no change having taken place.

6. Have been rather heavy during the year, and the Regiment has been broken up a great deal in detachments out after dacoits, but the general health of the Regiment has not suffered therefrom.

7. The hospital is situated about a quarter of a mile from the lines, and consists of two separate buildings, the smaller having two wards, which is found convenient in the treatment of diseases. It is on the whole good, except the earth floors, which are difficult to keep neat. Asphalte would be preferable for reasons of cleanliness, comfort, and economy.

There are two latrines, also with earth floors, which get saturated with urine and water.

The Regiment generally has much improved in health within the past twelve months, as the sick returns show, and the men are fast losing the cachectic aspect that they most of them bore on arrival here from Bhooj. They do not fall out of the ranks through debility, as they did, and the influence of the Deccan climate seems to have been most beneficial to them.

8. The prevailing disease was as usual ague (quotidian and tertian), for which there were 497 admissions with one death. This is a great contrast to the preceding year, when there were 1,684 admissions with one death, and the cases have been of a much milder nature, with fewer complications. There were nine cases of remittent fever, in which for many days the temperature did not fall below 100°, and frequently ran up to 104°. In most of these cases there was some complication, generally bronchitis, and large doses of quinine are absolutely required, in such cases cinchona alkaloid being no substitute.

The cases of syphilis are rather numerous, occurring chiefly amongst the recruits: the number discharged from the Regiment on this account was 15. The two cases of general dropsy were due to diseased liver and spleen, with severe hæmatemesis in one case. Cases of disease of the lungs have been neither so numerous nor severe as in the preceding year, though the temperature during November and December was much lower in 1879. This I attribute to the improved health of the men generally. The same remark applies to dysentery.

The sickness has been for the most part so mild during the year that no further special remarks are necessary.

Epidemic.

9. None.

10. Forty-four children were vaccinated, all successfully, vaccination being from arm to arm. There were 116 re-vaccinations amongst recruits, of which 40 were successful.

Invaliding, its causes, &c.

11. There were 73 men invalided during the year, 15 of whom were for syphilis.

#### *Inspection by Deputy Surgeon-General BEATTY.*

The Regiment has been stationed at Poona during the year, but several detachments were employed from time to time in the districts after dacoits.

The lines and hospital were clean, and the books and records of the latter carefully kept to date.

The Medical Officer complained of the difficulty of keeping the bedding clean in consequence of the mud flooring, the dust arising from which was a constant cause of annoyance to the patients.

During the past twelve months a great improvement has taken place in the health of the Regiment, and the men are fast recovering from the cachectic appearance most of them bore on arrival from Bhooj.



## H. M.'s 14th Regiment N. I.

BELGAUM.—In medical charge of Surgeon-Major D. E. HUGHES, M.D.

Average Strength	...	...	706	Deaths in Hospital	...	...	3
Do. present	...	...	610	Do. out of Hospital	...	...	4
Admissions	...	...	639	Invalided	...	...	36
Daily Sick	...	...	18.5	Sick Leave	...	...	14

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Belgaum .....	82.6	3.5	3.1
1877.....	Do. ....	73.4	3.5	0.6
1878.....	Do. ....	114.1	4.4	2.5
	Average.....	90.0	3.8	2.1
1879.....	Belgaum .....	104.7	3.3	0.4

1. A detachment 81 strong, which had been stationed at Kaladgi, rejoined headquarters on the 7th January 1879. Since then the entire Regiment was stationed at Belgaum till it left on the 22nd December for Vingorla *en route* to Aden.

2. No alterations have been made in the lines at Belgaum. They were always kept scrupulously clean and in good order. The paddy fields in close proximity to the quarters of the left half battalion appear to have exercised a pernicious influence on the health of the men, as there were, up to the 22nd December, 245 admissions for malarial fever from the left wing and only 129 from the right. The cases from the former were also less tractable than those from the latter.

3. The conservancy arrangements have been fully described in previous reports. No improvement has been made in the disposal of the ablution water.

4. The water-supply was good and plentiful. The new wells at the Nagihiri, the sinking of which was mentioned in last year's report, have not yet been provided with wooden covers to prevent the leaves from the adjacent trees falling into and contaminating the water.

5. Food was plentiful and comparatively cheap, but not so cheap as it used to be in Belgaum before the famine years.

No alteration has been made in the clothing of men, which consists of the tight tunic and trousers of European fashion. Previous to the march from Belgaum, the men were ordered to provide themselves with two pairs of socks each, but as the sepoys, anxious to get as much for their money as possible, chose them two or three sizes too large, they were not of much use in preventing "shoe-bites." The German foot bandage would, I think, have been less expensive and more useful.

6. The ordinary parade, guard, and escort duties have not been very severe, and have had no prejudicial effect on the health of the men. The average number of consecutive nights in bed for the year was 5.1.

The men of this Regiment are fond of athletic sports of all kinds, including cricket, "putting" the cannon ball, and leap-frog. These exercises have of course improved their physique.

7. The hospital and its surroundings have been described and the defects of the buildings pointed out in previous reports.

8. The general health and physique of the Regiment are good. There are of course some elderly men who, though fit enough for the ordinary duties of a sepoy in time of peace, would have to be weeded out, should the Regiment be ordered on service. The Konkani recruits enlisted during the



last six months are almost without exception fine lads, and likely to turn out excellent sepoys.

9. This has been a healthier year than the last, and the rainfall was slightly less.

Influence of climate. In 1878, 51 inches 25 cents were registered in the regimental hospital, and during the months of September, October, and November the admissions for ague were 62, 60, and 72, respectively. In 1879, a rainfall of 47 inches 8 cents was recorded, and in the above months there were 40, 45, and 37 admissions for ague.

The influence of the neighbouring paddy fields on the health of the Left Wing has been commented on in para. 2.

10. From the number of admissions for guinea-worm (8), it might almost be thought that the disease was endemic in Belgaum. This, however, is not

Details of treated. the case, as in every instance the sufferer was either a Konkani recruit or a man ascertained to have been on furlough about twelve months before the appearance of the parasite.

The admissions for fever were 364, being less than in 1878 (422), but more than in 1877 (134). The admissions for dysentery were 14 in number, for diarrhoea 4. In the preceding year they were respectively 20 and 18. There were 8 admissions for gonorrhoea, 2 for paraphimosis, and 9 for primary syphilis.

11. Two Hindoos and one Mussulman died in hospital during the year. One Hindoo

Mortality, and its causes. died of paraplegia, or rather from blood-poisoning, and the exhaustion of large bad sores which formed in spite of every care. The second fatal case was that of a man under treatment for acute rheumatism. The patient, a Hindoo, died suddenly while taking his food, probably from fatty heart, as he had well marked arcus senilis; and symptoms of pericarditis, though watched for, had never been observed. The third death in hospital was from a suicidal gunshot wound of the abdomen, inflicted on himself by a young Mussulman, who took his Government rifle and several rounds of ball ammunition to the bazaar and committed the rash act there. He was brought to hospital with his intestines protruding from a wound a little above and to the left of the umbilicus, the ball had taken an upward direction, the wound of exit being at about the level of the tenth rib. The protruded intestines, which had escaped injury, were returned to the abdominal cavity, and the man carefully attended to, but he sank and died in the hospital of the 22nd Regiment N. I. nine hours after the infliction of the wound. Having left the station with the Regiment on the morning of the man's death, I am unaware of the precise internal injuries he received.

There were 4 deaths out of hospital, one that of a Sikh Jemadar, who for some unascertained reason hung himself in his hut—he had been dead some hours before his body was discovered, two unknown, and one from dyspepsia.

12. There were only 22 children vaccinated and 5 recruits re-vaccinated successfully

Vaccination. during the year. The small number of infant vaccinations may be explained by the fact that a good many families, in view of the anticipated transfer of the Regiment to Aden, had been sent to their homes. At the end of the year there were only five very young children unprotected with the headquarters.

13. Four native officers, three non-commissioned officers, and one man having completed 32 years' service, were discharged with full pension, and

Invaliding. five non-commissioned officers and 22 men having become unfit for further service by reason of old age, debility, loss of teeth, valvular disease of the heart, periostitis, syphilitic taint, chronic bronchitis, defective vision, and "stupidity," were pensioned off.

One man having been broken down by syphilis was discharged with a gratuity.

14. Fourteen men were sent to their homes on medical certificate; three had suffered

Medical certificate. severely from bronchitis, the same number from ague, and two from chronic rheumatism. Asthma, general debility resulting from gonorrhoeal rheumatism and gleet, pneumonia, periostitis of the femur, diarrhoea, and hepatitis each necessitated one patient being sent away for change of air and rest.

15. Being interested in finding out for myself the real value of the mixed cinchona

Treatment, when special. alkaloids as a febrifuge, a comparison (the details of which were given in a special report) was instituted between that drug and arsenic, which for long I had looked on as little inferior to sulphate of quinine in antiperiodic virtue. The series of observations made proved that the two remedies were very nearly equal in power. The mixed cinchona alkaloids appear, therefore, to be very useful, being capable of issue to persons who could not be entrusted with the management of so potent a remedy as arsenic.



Some observations have been made on the emetic properties of pulvis calotropis, the powdered root bark of the *C. Procera* or *C. Gigantea*. In doses of grains xxxv given in half a tumblerful of warm water it is as effectual and trustworthy an emetic as pulvis ipecac., and has the advantage of almost invariably producing bilious purging as well as bilious vomiting. A reference to the cases of ague, the treatment of which has been commenced with the exhibition of calotropis, shows that, as a general rule, the patient "vomited thrice, was purged once." In one or two instances the powder proved quite inert; but this inertness was probably due to insufficient dilution. I have not yet tried it as a substitute for ipecac. in acute dysentery, nor have I made myself acquainted with its alleged alterative and tonic properties.

16. The medical pupils are regularly practised in dispensing under the supervision of the Hospital Assistant. They have also had lessons in elementary anatomy, medicine, and the treatment of emergencies from me.

Medical Pupils.

### 16th Regiment N. I.

MALEGAON.—In medical charge of Surgeon B. N. KOYAJI.

Average Strength	...	...	708	Deaths in Hospital	...	...	24
Do.	present	...	625	Do. out of Hospital	...	...	2
Admissions	...	...	792	Invalided	...	...	26
Daily Sick	...	...	30.2	Sick Leave	...	...	14

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876...	Nusseerabad	200.4	6.0	0.6
1877...	Do.	124.4	3.3	0.4
1878...	Do.	291.3	11.7	1.8
	Average	205.4	7.0	0.9
1879...	Malegaon	126.7	4.8	3.8

1. The Regiment was stationed at Nusseerabad till the 17th January 1879, when it commenced its march for Malegaon *via* Neemuch, Jowra, Rutlam, and Mhow, arriving at this station on the 27th February.

The roads were not very heavy, but the weather was very cold. Foot soreness caused by ill-fitting boots was a general complaint, and a number of men used to fall out daily on account of it. Malarious fevers and lung affections supervening on ague were the principal causes of sickness. There were seven casualties, and the average daily sick was 31.5. The sickness and the mortality on the march were mainly due to vicissitudes of weather, unusual exertion, and insufficiency of proper food on men whose constitutions had been undermined and vital powers lowered by repeated attacks of ague while stationed at Nusseerabad.

The Regiment left 14 sick at Nusseerabad, 1 at Neemuch, and 2 at Mhow, making in all 17 sick left behind for treatment. Of these, the one left behind at Neemuch died there shortly after of remittent fever, four were sent on sick leave by the Medical Officer of the 2nd Grenadiers, and the rest arrived here by rail in a good state of health.

From 19th May to 12th July small detachments were employed on treasury guard duties at Nassick, Nandgaon, Niphad, Karjat, Egutpoora, Shahapur, Warra, Moorbad, and Sinnar.

2. The accommodation for the Regiment consists of the Native Infantry lines and the old artillery barracks. The lines consist of sixteen blocks of huts with broad streets crossing at right angles. They are built of sun-dried bricks set in mud, and are raised on a plinth of about a foot in height. They have no special arrangement for ven-

The lines and their surroundings; present condition, hygienic or otherwise.



tilation. Exclusive of quarters for the Native Officers, there are 352 huts, each of them measuring about 960 cubic feet. The accommodation is sufficient for a wing.

In the old artillery barracks and gunshed there are 189 dwellings, exclusive of the Native Officers' quarters. There has been some overcrowding in these barracks, as the accommodation is not sufficient for a wing.

The arrangement for ventilation in all the huts is fairly good.

The Native Officers' quarters are in good sanitary condition, and afford sufficient accommodation.

3. The trench system of latrines was in use from the beginning of the year up to the setting in of the monsoon, when the Commanding Conservancy Officer obtained permission to bring into use the permanent latrines situated to the rear of the lines, as the limited ground set apart for the trenches was impregnated with human excreta, and the soft soil, on becoming wet, was likely to cover the feet of people using these latrines with mud and filth. The only drawback to the trench latrines, which have hitherto worked well, is that they are situated on the parade ground close to the quarter-guard and solitary cells, and to windward of the barracks.

When the permanent latrines were used, they were kept clean, and dry earth was used for disinfection.

4. The water-supply, derived from wells in the vicinity of the lines, is sufficient for drinking and cooking purposes, and is of good quality. For washing and bathing, the water of the river Moosum is used. Water from either source has not been analysed since the year 1874.

Food and clothing.

5. A good and plentiful supply of food is always to be got in the bazaar at this station. Country vegetables are abundant and cheap.

The following table gives the average prices of the ordinary articles of the sepoy's food for the year :—

Wheat flour .....	13 lbs. per rupee.
Rice .....	13 „ „
Dhall .....	14 „ „
Ghee .....	24 „ „
Salt.....	23 „ „
Milk .....	23 „ „
Firewood.....	199 „ „
Mutton .....	12 „ „

The average rate of grain compensation for the year was Rs. 3-11-10. The highest amount was given in July, when it reached Rs. 4-5-11, and the lowest was Rs. 2-13-11 in February. But compensation does not make up for high prices in the case of the married sepoys, who have a large family to provide for, and consequently they seem to be underfed, and ailments resulting from insufficient nourishment are frequently noticed.

As regards clothing, a great improvement has been effected by discarding the old forage cap for a pugree. Nothing has been done to lessen the large amount of inefficiency caused by shoe-bites. The adoption of thick woollen socks for the feet would, I believe, diminish the number treated for blisters of the feet. I have brought this to the notice of the Commanding Officer.

6. The duties consisted of the usual guards, parade, musketry instruction, orderly duties, drill, &c. The consecutive nights in bed average about 71. Duties, exercise, and amuse- During the months of June and July, when a number of small ments; their effect on health. parties were detached from the Regiment on treasury guard duty, the average of nights in bed was only 5.

There is a very good gymnasium, where the young sepoys and all the recruits are taught various gymnastic exercises under a competent instructor. This seems to have a very good effect on their health and physique. There are regimental schools for the children, where they are taught reading, writing, and sewing.

The amusements of the men are of their own invention.

7. The hospital is situated about 200 yards to the east of the lines and 100 yards to the north of the Sudder Bazaar. It is a stone building, raised on a plinth of about 18 inches in height, and consists of one large ward capable of accommodating 24 patients, and five small rooms intended for dispensary, office, and regimental and staff stores. It is kept very clean and in good repair, but is too small to accommodate the sick Hospital and its immediate surroundings; present condition, hygienic or otherwise.



of a whole regiment and the staff patients besides. It is efficiently ventilated by means of doors and windows and three large openings through the roof ridge.

The latrine attached to the hospital is cleaned by the hospital sweepers twice a day, and the night-soil is carried away out of Cantonment limits. Carbolic acid and McDougall's powder are used for disinfection.

8. The general health of the Regiment, as deduced from the number of admissions in hospital, and the average daily sick, shows a marked improvement on the previous two years, and may now be pronounced good.

The physique of most of the men is good. The average height of the sepoys is 5 feet 7½ inches, and their average chest measurement 33 inches. The tallest man in the ranks measures 6 feet 2½ inches, and the shortest 5 feet ½ an inch. Some of the men have not yet got over the ill effects of the malarious cachexia and scorbutic taint acquired at Nussceerabad, and appear to be old and worn-out, though they have not been in the service more than twelve years. The recruits enlisted this year are very promising.

This Regiment has been warned for active service since the last four months, and was carefully inspected by a Special Medical Board in September last, when out of a strength of 642, 21 men were invalided, 3 discharged for physical disability, and 68 pronounced unfit for active service, though fit for ordinary station duties. I still consider about 62 men unfit for active service in a trying climate like that of Afghanistan. On the whole, the Regiment is now quite as fit to take the field as any other Maharatta corps.

9. The change from the unhealthy climate of Nussceerabad (where the men suffered considerably from ague and scurvy during the previous year), to this comparatively very healthy station, has proved very beneficial to the health of the Regiment.

10. During the year under review the total number of treated was 840, against 2,000 in 1878 and 914 in 1877. There were 792 admissions, out of which 696 were discharged to duty, 22 died in hospital, 26 discharged otherwise, and 47 remaining under treatment at the end of the year. The daily average number of sick was 30.2; the rate per cent. of admissions to average strength, 126.7; the rate per cent. of daily sick to average strength, 4.6; and the rate per cent. of deaths in hospital to average strength, 3.8.

The following tabular statement contrasts the cases of admissions into hospital for the years 1879 and 1878:—

Years.	Malarial Fevers.	Rheumatism.	Diseases of the Digestive System.	Diseases of the Cutaneous System.	Injuries.	Diseases of the Eye.	Disease of the Respiratory System.	Guinea-worm.	Syphilis.	Gonorrhoea.	Enteric Fever.	Scurvy.	Cholera.	All Other Complaints.	Total.
For 1878 .....	1,400	91	86	79	74	66	62	14	13	8	3	46	1	47	1,990
For 1879 .....	334	43	74	54	73	39	86	10	25	19	...	4	4	27	792

It will be seen from the foregoing statement that malarial fevers, as usual, head the list. Of these 334, 5 were admitted for remittent fever and the rest for ague. About a fourth of the cases treated for ague were complicated with lung affections, head symptoms, or splenic enlargement. In the list of diseases of the respiratory system, bronchitis furnished 73 cases, pneumonia 11, asthma 1, and phthisis 1. In diseases of the digestive system diarrhoea gave 28, dysentery 18, dyspepsia 1, splenitis 7, and hepatic disease 5. There were 73 admissions from injuries (mostly shoe-bites). In some cases small shoe-bites developed by degrees into large unhealthy sores, which, occurring as they did in weak and anæmic subjects, required a long course of tonics and nourishing diet to heal up. Diseases of the eye furnished 39 cases, of which 37 were from a mild form of conjunctivitis. Admissions from venereal diseases show a marked increase on the previous year. Though there were only four admissions from scurvy, about 35 men were treated as out-patients for a milder form of the disease.

There were two interesting cases which require special notice. One was a case of cirrhosis of the liver, originally admitted for dyspepsia, and the other was a case of abscess of the liver, not preceded by well marked symptoms of hepatitis. Short summaries of the two cases are given below:—



1. Private Goordutsing, aged 20, occasionally using spirits freely, came to hospital on the 17th March, complaining of pain in the abdomen and symptoms of indigestion. No organic disease being discovered at the time after a careful examination, his complaint was attributed to dyspepsia. About a month after admission, signs of ascites were noticed, when I suspected that the symptoms were due to cirrhosis of the liver. As the enlargement of the abdomen went on increasing in spite of all treatment, and caused much dyspnoea and discomfort, paracentesis abdominis was performed on the 19th May, and 100 ounces of a yellowish watery fluid were drawn off by medium sized trocar and canula. Due care was exercised in the performance of the operation and subsequent management of the case. After paracentesis the abdominal organs were carefully examined, when a considerable diminution in the area of hepatic dulness and slight enlargement of the spleen were noticed. This confirmed my suspicion regarding the cause of the ascites and dyspeptic symptoms. Though the patient was free from pain in the abdomen after the operation, fever of a remittent type and complicated with typhoid symptoms set in on the 20th, and brought on a fatal termination on the 23rd; maximum temperature was  $105.6^{\circ}$  Fahr. On *post-mortem* examination, a small quantity of yellowish serous fluid was found in the peritoneal cavity, but no signs of inflammation were discovered, and the wound had closed up on both sides. The liver was greatly contracted and granular, and weighed 1lb. 14ozs. The spleen was slightly enlarged and congested.

2. Lance Naique Nuthey Khan, aged 32, using spirits habitually and subject to recurrences of ague, and twice before in hospital for congestion of the liver, was admitted on the 24th September for slight pain and uneasiness in the hepatic region. On examination the liver was found to be enlarged, the area of hepatic dulness extending from the lower border of the fifth rib to about an inch below the costal margins. The local and constitutional symptoms of inflammation being absent, the enlargement was supposed to be due to congestion. Three days after admission he suffered from diarrhoea, which exhausted him, and continued more or less troublesome till his death. The evacuations were at first tinged with blood, but latterly they were of a dark brown colour, watery, and offensive. On the 7th November, he complained of severe pain in the right hypochondrium for the first time. Had a dry cough, but was free from febrile excitement. A slight increase in the area of hepatic dulness was noticed on the 8th. The pain continued more or less till the 14th, when a slight bulging of the affected side with fulness towards the epigastrium and below the costal margin was noticed, and hepatic dulness extended from the upper border of the fourth rib to about two inches below the costal margin. There being no longer doubt of the existence of an abscess, the pneumatic aspirator was employed on the 15th with the patient's consent, and 31 ounces of red-coloured pus were let out. He experienced considerable relief after the operation, and entertained hopes of recovery, but his pulse was very feeble and evening temperature below normal. In spite of all restorative measures, his pulse continued feeble, and he became languid and depressed, with collapsed and anxious countenance, cold extremities and dry tongue, and died on the 18th November at 4 A.M.

On autopsy, the liver was found considerably enlarged. In the right lobe, which adhered firmly to the diaphragm, there were two large abscesses communicating with one another by a small irregular opening in the firm cartilaginous wall separating them and containing 32 ounces of red-coloured pus. The liver weighed  $4\frac{1}{2}$  lbs. after the pus was removed. The left lobe was congested. The mucous membrane of the small intestine presented patches of redness.

11. There were 24 deaths in hospital during the year against 12 in 1878 and 3 in 1877. Mortality, and its causes. This shows that while the number of admissions in hospital during the year has been less, the mortality has been higher than the previous two years. The high death rate was directly or otherwise due to debility caused by malarial fevers and scurvy contracted at Nusseerabad.

The following were the causes of mortality:—Ague 8, remittent fever 3, cholera 4, pneumonia 4, bronchitis 1, dyspepsia and ascites caused by cirrhosis of the liver 1, diarrhoea 1, syphilis 1, and hepatic abscess 1.

In addition to these, two deaths occurred out of hospital, one man was drowned while bathing in the river Moosum, and one died while on furlough (cause unknown).

12. There were none in the Regiment. Though cholera was prevalent in the town of Malegaon and the surrounding villages, not a single case occurred in the regimental lines, as the men were prevented from going into the town, and arrangements were made to relieve the treasury guard weekly instead of daily, and to keep the men relieved from guard in quarantine tents for three days, before they were allowed to move into the lines.

Amongst the unfortunate men on treasury guard in the town, there were five cases of cholera and one of diarrhoea. The first case occurred on the morning of the 20th June, and proved fatal the same day at 1-20 P.M. This casualty having occurred out of hospital, has not been included in the returns. On the 1st July there were four cases, which were treated in two



tents pitched near the old fort in the town; three of these proved fatal and one recovered. The sanitary condition of the town was very unsatisfactory. Drainage was defective, and the drinking water derived from the river was muddy and very impure. This was brought to the notice of the Commanding Officer, who immediately made arrangements for the supply of good well water to the men on the guard. From that time not a single case occurred amongst our men, though the disease was prevalent in the town for about a fortnight after that.

13. The total number of primary vaccinations was 43, of which only one was unsuccessful. There were 93 re-vaccinations, of which 28 were successful.

14. Twenty-six men were invalided for the following causes:—Old and worn-out 10 (six of these having served over 32 years were pensioned off without medical examination), impaired vision 6, chronic rheumatism 1, chronic bronchitis 1, scurvy 1, sprained wrist with thickening 1, and physical disability 5.

15. A good filter for dispensary use is required very much.

16. Cinchona febrifuge was largely used as a substitute for quinine, and found very efficacious in the treatment of intermittent fever. From the 1st February to the end of the year 249 cases of ague were treated by the administration of the cinchona alkaloids given in doses varying from 5 to 30 grains, two or three times a day, according to the severity of symptoms. All of these cases were discharged cured. The ague from which these men suffered was free from visceral complications. The average number of days in hospital was 7. The longest stay in hospital was nineteen days and the shortest two days. In some cases the febrifuge caused gastric irritability, but on inquiry I found that in all such cases it was by mistake given on a loaded stomach. I am of opinion that it is a very valuable remedy, and has marked antiperiodic powers in ordinary uncomplicated ague.

In chronic ulcers and venereal sores the topical application of iodoform was tried with marked success. Indolent ulcers that remained open for months and baffled all treatment, rapidly healed up under its use. I have tried the boracic lint prepared according to Professor Lister's directions as an application to shoe-bites, small ulcers, and superficial abrasions, and think that it heals the sores more rapidly than the usual carbolyzed oil-dressing.

I am happy to state that Hospital Assistants Bhajoo Mahadhoo and Peerajee Sewajee and Passed Medical Pupil Ramchunder Wamon have performed their duties to my satisfaction.

### H. M.'s 17th Regiment N. I.

DHARWAR.—In medical charge of Surgeon H. W. BOYD.

Average Strength.....	680	Deaths in Hospital.....	3
Do. present.....	643	Do. out of Hospital.....	1
Admissions.....	617	Invalided.....	27
Daily Sick.....	19.8	Sick Leave.....	10

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Surat .....	189.0	5.6	2.4
1877.....	Do. ....	210.9	4.2	0.8
1878.....	Do. ....	169.1	3.7	3.7
	Average.....	189.6	4.5	2.3
1879.....	Dharwar .....	95.9	3.1	0.4

1. The Regiment arrived here by three detachments. The head-quarters on the 25th December 1878, the 2nd Detachment on the 4th, and the 3rd Detachment on the 20th January 1879. B Company proceeded



on duty to Kaladgi, remaining there until the 11th December 1879, when, being relieved by the C Company, it returned to head-quarters. The latter company still remains at Kaladgi.

2. The lines, which were built in 1875 on the standard plan, are everything that can be desired. The houses are well built on raised plinths; they are spacious, well ventilated, and are kept neat and clean; the surface drains are carefully looked after, and no water is allowed to stagnate. The regimental bazaar, situated about 200 yards to the south-west of the lines, has been kept during the past year in a very good sanitary condition.

3. The conservancy arrangements were well carried out. The trench system was the one used, and certainly during the cold and hot seasons nothing could have answered better; but during the rains this system suffers from many disadvantages. The latrines are situated about 250 yards to the south-west of the lines, and those using them were exposed during the monsoon to the inclemency of the weather when proceeding there. In addition the ground becomes sloppy at this season, and it is almost impossible to procure dry earth, the deodorizing property of that used is consequently much lessened.

4. Capital water is obtained from four wells in camp. It is easily procured and in sufficient quantity. One well is for the Purwaries, another for the hospital establishment, which was built last year, but is not sufficiently deep, and consequently runs dry in the hot season; a third well is for Hindoos and Mussulmans, and the fourth is principally used by European officers. All the wells have a pukka built coping, and they have a paving for about 15 feet all round, which slopes down on the outside and ends in a surface drain, which carries away the surplus water.

5. Both grain and vegetables were cheap during the year, though the latter were not very plentiful in the market. The highest grain compensation was given in the month of May, when it reached the sum of Rs. 3-4-0, and the lowest was in the month of November, when it was Rs. 2-13-6.

The clothing of the men seems to be ample at present, though when they first arrived from Surat a great many suffered from the great change of temperature, and were quite unprepared with warmer clothing than they were accustomed to in the former station.

6. The duties of the men are light. There is no workshop, and with the exception of a gymnasium, they have no means of amusement. I think this is very much to be regretted, as the men, not having any legitimate occupations between parades, ramble into the town, contracting irregular habits and swelling the number of admissions to hospital for syphilis.

7. The hospital has been so well described in former reports, that it is only necessary for me to say that it is kept neat and clean, that the conservancy arrangements are well carried out, and the lighting, ventilation, &c., are perfect. A stone floor has been sanctioned, and is now being laid down. This will be a great improvement. The only defect I see connected with the hospital is the absence of shutters for the windows of the Ophthalmic Ward. The windows at present are coated with blue paint, but this gradually gets worn away, or is scratched off by patients.

8. Since their arrival from Surat, the men have very much improved in physique. They suffered very much in that station from malaria, owing to the enervating climate, the impure water, and the badly constructed lines. Even yet a good many suffer from scorbutic taint, though, taking the Regiment as a whole, they are a fine able-bodied men. The recruits who have lately joined are beyond the average.

9. Nothing can better show the beneficial effect on the health of the Regiment produced by their change to this bracing climate than the great decrease in sickness since its arrival here. In 1877 there were 1,501 admissions from all causes. In 1878 there were 1,130, whereas for the year under notice only 617 cases were admitted into hospital.

10. Of the 617 cases, as many as 254 were admitted for ague quotidian, only 11 for ague tertian, and there were only 6 cases of remittent fever. There were 46 cases of chronic rheumatism, 37 cases of primary, but only 3 of secondary, syphilis. Dysentery gave 34 admissions, and contusions, principally shoe-bites, 32. There were also 14 cases of sprains and 15 cases of bronchitis.



11. Three men died in hospital, one from fatty degeneration of the heart, one from lobular pneumonia, and one from chronic bronchitis. One man died out of hospital while on sick leave from ague.  
Mortality, and its causes.
12. No epidemics occurred during the year, not a single case of small-pox, cholera, or other contagious or infectious fever was admitted.  
Epidemics.
13. Vaccination has been carried on during the year with great care and with success. The lymph has been good. At the close of the year, every one, both European and Native, was protected either by vaccination or by small-pox, with the exception of one European child and sixteen native children, all of whom were too young or too sickly to have the operation performed.  
Vaccination and re-vaccination.
14. The total number of men invalided during the year was 27. Of these 7 were invalided for general debility, 12 on account of their being old and worn-out, and 1 each for asthma, bronchitis, disease of the heart (valvular), loss of finger (middle, of right hand), chronic rheumatism, scurvy, and syphilis.  
Invaliding, and its causes.
15. In reference to the hospital, I think it would be advisable to have shutters made for the Ophthalmic Ward. The laying down of a stone floor in the hospital is being proceeded with. The first stones laid down were roughened on their surface, but as I considered that this might be the means of retaining dirt and infectious matter, I recommended that all the stones afterwards laid down might have a smooth surface, as they could be cleaned much more easily.  
Requirements and recommendations.
16. The cinchona mixed alkaloid has been very largely used during the year, and I am of opinion that it is very suitable in most of the ordinary cases of uncomplicated ague. I have used it in doses of from 5 to 20 grains thrice a day in solution with mineral or vegetable acids. I have also used both salicylic acid and salicylate of soda in cases of rheumatism with very speedy relief to the patients. One patient suffering from neuralgia, who presented himself for admission, was speedily cured by the inhalation of three drops of nitrate of amylene on a sheet of blotting paper.  
Special observations, new experiences in treatment, and sanitation.

*Inspection by Deputy Surgeon-General BEATTY.*

The Regiment has been stationed at Dharwar during the year, but has supplied detachments for duty at Kaladgi.

The lines, which were built in 1875, are superior to any I have inspected in the Presidency. They are spacious, well situated, and thoroughly ventilated.

Conservancy arrangements were well carried out, the trench system being the one in use.

The hospital building is all that can be desired: it was in excellent order, and the ventilation and conservancy arrangements perfect, the whole conduct of the hospital reflecting credit on the Medical Officer in charge.

The health of the men had much improved since their arrival from Surat in 1878, where they suffered severely from malarious fever.

The total number of men invalided during the year was 27.

**H. M.'s 18th Regiment N. I.**

POONA.—In medical charge of Surgeon W. A. BARREN.

Average Strength .....	639	Deaths in Hospital .....	2
Do. present.....	624	Do. out of Hospital .....	2
Admissions .....	543	Invalided .....	32
Daily Sick.....	10·8	Sick Leave .....	8



Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Deesa.....	81.1	2.5	0.4
1877.....	Do. ....	63.6	1.9	.....
1878.....	Do. ....	76.4	1.6	0.9
	Average.....	73.7	2.0	0.4
1879.....	Poona.....	87.0	1.7	0.3

1. The head-quarters and the Right Wing have been stationed at Poona since the 20th December 1878, the Left Wing arrived here on the 27th January 1879. The detachment of 103 men, which did jail guard duty at Tanna from 1st January to 31st December 1879, was relieved by a second detachment 102 strong during the year. Bodies of men were sent on duty to Tanna, Mahableshwur, Wai, Shirvell, Bhor, and Flying Columns to Saswad.

2. The lines, which have been considered as ill suited for the accommodation of native soldiers, are still utilised by the men of the 18th. The ventilation, which is effected through the tiled roof and doors, is considered very defective. The mud huts, which are without any plinths, leak freely—during the rains at least, so I am told. The cubage of each amounts to 1,025 cubic feet; the distance between the lines and the bazaar equals about 300 yards. I believe the sanitary condition of the lines and bazaar has been attended to during the past year.

3. Under this head I think it is sufficient for me to note that “the latrines are situated during the dry season in the bed of the river, which is several feet below the surface of the lines, and in the wet weather they are on the river’s bank. The trench system is used throughout the year.

4. Supply ample for all purposes. Quality good. Sources from springs and from Khurruckwasla.

5. Food ample and fairly cheap. No alteration has been made in the clothing.

6. The usual garrison duties and escort parties. There is no gymnasium, and the men’s amusements seem confined to those in ordinary vogue amongst natives: neither appear to affect the general health.

7. The hospital is built in an excellent situation, and there are no surroundings except the usual buildings. It is in good repair and the accommodation is ample. No fault can be found with the method of ventilation, which is free and good. The latrine is built of bricks and mortar, and answers its purposes completely. The bowel dejections are removed by the sweepers and the night-soil carts.

8. The physique of the men compares favourably with that of other regiments. The general health has been fairly good.

9. The highest number of admissions with ague was in the months of April, May, and June, the lowest in January and February. No lung diseases were treated in January, April, May, June, and July. February, August, September, and December give the greatest average.

10. There were 543 admissions into hospital, being 62 more than the previous year. There were 4 deaths; 8 men were sent on medical certificate for change to their own country. The admissions with ague equal 306, i.e., 95 in excess of the number under treatment in 1878. June yields the highest average. A few of the cases were complicated with lung disease. Conjunctivitis gave a total of 12, rheumatism 29, syphilis 32, and chicken-pox 2; chest diseases 20, diarrhoea 16, itches 10, general debility 10, blisters of the feet 22, due to ill-fitting boots, and gunshot wound 1. The case of the latter, as drawn up by Dr. Ross, is as follows:—



"The death in the lines from gunshot wound was suicidal. The deceased appears to have seated himself on a raised earthen sleeping place with his back to the wall, and held the muzzle of the rifle with his left hand against the abdomen and pushed the trigger with his right toe. On entering his hut, about an hour after the event, the deceased was lying in a semi-recumbent position with his head supported by the right hand resting on the right shoulder. The left shoulder was resting against the wall, and the left arm, with the hand clenched, lying across the chest. The barrel of the rifle rested on the right thigh; the butt projected beyond the raised earth-work or sleeping place. The deceased's cotton jacket was much burnt in front. The wall against which the deceased was lying was broken as if by a heavy blow, which was doubtless the case, produced by the bullet striking the spine about the 11th or 12th dorsal vertebrae, cutting it in two. There was no wound of exit. The integuments in the lower dorsal and upper lumbar regions were much ecchymosed. The deceased was removed to hospital and a *post-mortem* held in an empty ward. The skin from left nipple to umbilicus was severely scorched and abraded in two places. So also was the left wrist, which had one abrasion. The wound by which the bullet entered was situated about  $1\frac{1}{2}$  inch above the umbilicus and a little to the left of the median line. The splenic end of the stomach was perforated. The spleen itself was clean ruptured, and the left kidney disorganized and containing fragments of lead and splinters of bone near the 11th and 12th dorsal vertebrae. The bullet itself was found in the spinal canal of first and second lumbar vertebrae. The deceased had a syphilitic history, and having, as it is reported, lost his virility, made away with himself."

11. The mortality register notes altogether five deaths, *i.e.*, including one European officer. The causes are one from primary syphilis, one from pneumonia, one from gunshot wound of abdominal walls and viscera, and one is marked unknown.

Epidemics.

12. No epidemics.

13. The vaccination duties have been, I believe, carefully carried out. Nine males and six females were primarily vaccinated successfully. Thirty-eight recruits were vaccinated, but sixteen were failures.

Vaccination and re-vaccination.

Invaliding, and its causes.

14. Thirty-two men were invalided. Of these, five were about 50 years of age, five between 40 and 50, one between 30 and 40, and 22 for physical disability.

Requirements and recommendations.

15. As has been recommended periodically for the last three years, a latrine is required for the solitary cells used by the Regiment.

Special observations and new experiences in treatment, sanitation, &c.

16. None.

#### *Inspection by Deputy Surgeon-General BEATTY.*

The head-quarters of the Regiment has been stationed at Poona since December 1878; but during the year detachments have been constantly employed in the districts against dacoits.

The lines are ill suited for the accommodation of sepoys, the ventilation is defective, and the huts, which are without any plinths, leak during the rainy season.

The trench system of conservancy is used, and seems to answer satisfactorily.

The hospital, which is admirably situated, was in good order, and the books written to date.

The ventilation of the building is good, and the latrines and out-houses were kept scrupulously clean.

The general health of the Regiment was good, and the physique of the men generally compares favourably with that of the other regiments stationed in Poona.

Thirty-two men were invalided during the year.

#### **H. M.'s 22nd Regiment N. I.**

BELGAUM.—In medical charge of Surgeon-Major H. A. LEWIS.

Average Strength .....	653	Deaths in Hospital .....	2
Do. present .....	596	Do. out of Hospital .....	1
Admissions .....	1,343	Invalided .....	61
Daily Sick .....	40.6	Sick Leave .....	15



Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Baroda ..	97.9	3.4	0.9
1877.....	Do. ....	122.9	5.6	2.3
1878.....	Ahmedabad, Bombay, and Belgaum .....	211.3	6.1	0.5
	Average.....	144.0	5.0	1.2
1879.....	Belgaum .....	225.3	6.8	0.3

- Location and movements. 1. The Regiment has been stationed in Belgaum during the past year.
2. The lines have been described in previous reports. They are kept clean by doing away with covered drains and keeping down rank vegetation and thinning trees.
- The lines, &c.
- The ventilation of the men's huts is good. Towards the east of the lines the ground is quite flat, and for some distance from them towards the Khanapur Road during the rains there was a perfect swamp, and in some places the ground was under water, the water reaching close to the latrines.
- Conservancy. 3. The same as last year. The latrines are kept clean, and McDougall's powder is freely used.
4. The water is obtained from several wells situated in and near the lines. The quality is fair, and there is always a plentiful supply throughout the year.
- Water-supply.
5. Food is decidedly cheaper, and the price of grain is going down. The supply is good. Country vegetables are abundant in the bazaar.
- Food and clothing. There is no change made in the clothing, except that two pairs of woollen socks have been issued to each sepoy.
6. The duties consist of the ordinary parades, guard mounting, and escort in charge of stores, treasure, &c. There is a "Taliukhana" in the lines.
- Duties, exercise, and amusements, &c. The duties have had no bad effect on the health of the men. The average number of nights in bed was during the past year 6.5.
7. No changes have been made in the hospital and its surroundings. The single ward was often found to be insufficient, so that the front and back verandahs had to be utilised on several occasions.
- Hospital and its immediate surroundings, &c.
8. The general health of the Regiment showed no improvement on that of the previous year. The lowest number of sick at one time in hospital was 26 and the highest 60. The sickness can only be attributed to the heavy rainfall, viz., 53 inches during the year, to the before-mentioned swamp near the lines, which existed during and some time after the rains, and to the ground or subsoil water towards the east of the lines being so near the surface. With regard to the physique of the men it is on the whole good.
- General health and physique.
9. The geological formation of the station exercises a healthy effect on the climate. In most places the formation being "laterite," there is a ready escape of rain water. The atmosphere, however, is at times very chilly, and during the monsoon months it is damp and cold. About November until February an east wind prevails, giving rise to much sickness, viz., malarial fevers, rheumatism, neuralgia, liver and bowel complaints, and chest affections.
- Influence of climate or local circumstances on health.
10. There were 1,343 admissions during the year. Of this number 659 were from malarial fevers, lung disease 69, venereal 52, scabies, which is very common in Belgaum, 40. There were only two cases of dysentery. There were two deaths in hospital, one from chronic diarrhoea and the other was a case of ague, which became complicated with severe bronchopneumonia.
- Details of treated.



11. There has been no epidemic in the Regiment, unless malarial fever may be said to have assumed the form of an epidemic during and immediately after the rains.  
Epidemics.
12. Vaccination was carried out successfully: 29 children were vaccinated. There were no cases of re-vaccination.  
Vaccination and re-vaccination.
13. Sixty-one men were invalided for the following causes, viz., lung diseases 16, weak eye-sight 12, chronic rheumatism 6, general debility 6, perineal abscess 1, varicose veins 2, old and worn-out 15, deafness 1, hypertrophy of heart 1, and old dislocation 1.  
Invaliding, and its causes.
14. A separate ward for the treatment of special cases is required. The drainage of the site below and to the east of the lines should be attended to.  
Requirements and recommendations.
15. I have no remarks to make under this heading.  
Special observations, sanitation, &c.

*Inspection by Deputy Surgeon-General BEATTY.*

The hospital and lines were at time of inspection well kept, and the latrines carefully attended to.

Both the Commanding and Medical Officers drew particular attention to the swampy nature of the ground to the east of the lines, which during the rains was in some places quite under water. It was owing to the malarious state of the ground in the vicinity of the lines that the want of improvement in the health of the Regiment generally was attributed.

The number of sick in hospital throughout the year was never below 26 and reached as high as 60, the chief cause of admission being malarial fever.

I was particularly struck with the splendid physique of the recruits who had lately been enlisted.

**23rd Regiment N. L. I.**

AHMEDNAGAR.—In medical charge of Surgeon-Major J. SIMPSON, M.B.

Average Strength.....	683	Deaths in Hospital .....	5
Do. present .....	639	Do. out of Hospital.....	2
Admissions.....	696	Invalided .....	19
Daily Sick .....	21·2	Sick Leave.....	11

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876 .....	Mhow and Indore .....	140·4	5·6	0·6
1877 .....	Do. do. ....	123·4	3·5	0·6
1878 .....	Do. do. ....	158·9	4·2	1·0
	Average...	140·9	4·4	0·7
1879 .....	Ahmednagar.....	108·9	3·3	0·8

1. The head-quarters of the Regiment have been stationed at Ahmednagar during the year. The left half battalion arrived from Mhow on the 14th January 1879. During the year several detachments have been sent out and one large one was stationed for some time at Siroor.  
Location and movements.

2. The lines are situated to the north of the City of Ahmednagar, and are in good habitable condition throughout. They are built on a ridge of trap rock, with sufficient slope for drainage. The surrounding ground on all sides is dry, and there are no depressions for water collecting. To the north-east and south the ground is open.  
The lines and their surroundings; present condition, hygienic or otherwise.



On the west side is the regimental bazaar; on the south-west and in close proximity is the city. Some of the pendals are raised on a plinth, others are not; but from the nature of the ground there is no soakage from below, and they are never damp. The married men's quarters are provided with bathing places of pukka brick and chunam; the water is collected in proper receptacles outside and at once removed.

3. The conservancy of the lines is good; the regimental latrines are kept clean, and are used throughout the year, as from the position of the lines and nature of the soil in camp it would be impossible to use trench latrines.  

Conservancy.
4. The lines are supplied from the Kapurwaree aqueduct. The water is of good quality and sufficient in quantity.  

Water-supply.
5. A good and plentiful supply is always to be had in the city or regimental bazaar, and although dear, the sepoy need not want, as he gets good grain compensation.  

Food.
6. The duties are ordinary regimental ones and guard on the jail and treasury. The gymnasium has now been opened, and a great many men and boys are exercised there.  

Duties, exercise, and amusements; their effect on health.
7. The hospital, situated to the south of the lines, is in good repair. The building runs north and south, and is built on a good plinth. It consists of one large ward, with a small separate ward by the verandah on the north side being closed in. There is a separate building in the compound, well suited for a contagious disease ward. The hospital affords sufficient room for the sick. The latrine is connected with the main buildings by a covered way, but is, I think, too near, and not on such a good plan as it might be.  

Hospital and its immediate surroundings; present condition, hygienic or otherwise.
8. The health of the Regiment has improved very much since its arrival at this station. The general physique of the men is good.  

General health and physique.
9. The climate of Ahmednagar, which is dry and free from malarial influence, has had a most beneficial effect on the health of the men after their long stay in Rajpootana and Central India. The climate is, I consider, favourable to the health of Europeans. In the hot weather, which lasts from March till June, there are some hot days, but as a rule the nights and mornings are cool and refreshing. During the rains the climate is all that could be wished for; the cold weather is also very pleasant, but to some trying, owing to the variations of temperature being frequent and great. Rainfall during the year was 27 inches 16 cents.  

Influence of climate or local circumstances on health.
10. The returns for the year under report contrast favourably with those of former years. The admissions for the year were 696. Of these, 335 were for fevers, the months of August, September, and October giving the highest number. Venereal comes next. These diseases have been very prevalent in the Regiment at this station. Soon after the Regiment arrived, the Lock Hospital was closed, and the prostitutes of the city, who had been under supervision by the Contagious Diseases Act, became neglected, and venereal became very prevalent. These women were not taken on the register again till November. Diarrhoea gives 34 cases, boils 31, and contusions 24.  

Details of treated.
11. Seven deaths took place during the year, out of which five died in hospital, and two native officers died at their native villages on sick leave.  

Mortality, and its causes.
12. There has been no epidemic in the Regiment during the year.  

Epidemics.
13. Have been kept up during the year; 26 have been vaccinated and 29 re-vaccinated.  

Vaccination and re-vaccination
14. Nineteen men were invalided during the year: 12 aged and worn-out, 2 from lung diseases, two from rheumatism, one from scrofula, one from ulcer, and one from mania.  

Invaliding, and its causes.
15. The only recommendation that I have to make is that quarters be built for the Native Medical Pupils attached, as at present they have none.  

Requirements and recommendations.



## SIND DIVISION.

Average Strength present during the year .....	3,110
Average Daily Sick per cent. to the Average Strength present.....	4·8
Ratio of Mortality per cent. to the Average Strength present .....	1·8

## 1st Sind Horse.

JACOBABAD.—In medical charge of Surgeon J. McCLOUGHRY.

Average Strength .....	526	Deaths in Hospital .....	15
Do. present.....	522	Do. out of Hospital .....	1
Admissions.....	648	Invalided .....	14
Daily Sick .....	16·5	Sick Leave .....	16

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876 .....	Jacobabad .....	211·2	4·3	1·5
1877 .....	Do. ....	176·9	5·2	0·8
1878 .....	Do. ....	101·9	3·1	0·2
	Average.....	163·3	4·2	0·8
1879 .....	Jacobabad .....	124·1	3·2	2·8

1. The Regiment was stationed in Jacobabad from the 1st to the 16th of January, when the head-quarters (62 sabres) marched into Katchi on service. Location and movements. All the remaining men were on outpost duty or in Sibi. At the beginning of the hot weather the head-quarters returned to Jacobabad, where it remained till the end of the year. The Regiment furnished posts to all the camping grounds between Jacobabad and the Dozan Mullah, in the Bolan Pass. Detachments consisting of from 30 to 50 sabres were on duty at Gharanari, Soorie, Pulajee, Thall, and Lehri.

2. For each troop there are six latrines situated between the pendals and the horse lines. They are kept very clean, and on no occasion have I Conservancy. detected a bad odour from them. The filth, after having been mixed with ashes and dry earth, is removed, along with the horse litter, to a place about a mile from the lines, and there burned when it becomes sufficiently dry. Till the beginning of the present year no supervision was kept over the family lines, when a weekly inspection of all the houses by the Medical Officer was instituted. The drainage from the married men's houses is very bad, there being no exit for the bathing water.

3. The water-supply is sufficient and of fairly good quality in Jacobabad itself. Most Water-supply. of the cases of dysentery and diarrhoea, &c., and those affections due to bad water, which are treated in hospital, come from the outposts. Soorie and Gharanari are the worst in this respect.

4. The supply of all foods except vegetables was plentiful, but the prices have increased considerably, as may be seen Food and clothing. from the following :—



1878.	1879.
Flour 11 seers per rupee.	7 or 8 seers per rupee.
Ghee $1\frac{1}{2}$ „ „	$\frac{3}{4}$ or 1 „ „
Dhall 8 „ „	6 „ „
Meat (goat's) 5 „	4 „ „
Milk 12 „	9 „ „

Vegetables, wood, and fowls have increased in price even in a greater degree. Those men stationed beyond the "ration frontier" receive the usual ration of atta, dhall, ghee, &c. The dhall was generally bartered for meat, all the men of the regiment being meat-eaters, with the exception of six or seven. Each man generally consumes about  $3\frac{1}{2}$  lbs. of goat's or sheep's flesh in a week. A great boon would be conferred on the men on outpost duty were compressed vegetables served out to them free of charge, or at a nominal cost.

A great improvement has taken place in the clothing of the Regiment, the loose blouse being introduced instead of the alkalic, and thick cloth trousers instead of those made of khadi. Under the blouse a large amount of under-clothing can be worn, which was formerly impossible. When the Regiment was sent on service, each man received a water-proof sheet, blanket, jersey, a pair of gloves, and a pair of stockings. Lately Balaclava caps have been provided regimentally.

4. Outpost duty in some places has a decidedly ill effect on the health of the men.

Duties. On the 30th of June 59 sabres arrived from Soorie, and I find the following in my remarks made at the time in the weekly return of sick:—"The health of the detachment is very bad; all the men suffering more or less from scurvy." They had been at Soorie for over eight months without vegetables, and had to drink water containing large quantities of saline impurities.

5. No change has taken place in the hospital and its surroundings with the exception of some repairs done in the old ward. The walls and floors are still damp.

Hospital.

6. The general health of the Regiment has, I think, deteriorated during the year on account of the following causes:—Hard work and exposure to great changes of climate in the Bolan Pass, an epidemic of cholera along the posts between Jacobabad and Dozan Mullah, and the outposts not having been relieved sufficiently often. 103 recruits have been enlisted during the year, partly to fill up vacancies caused by invaliding, &c., and partly on account of the augmentation. Their physique, with a few exceptions, is excellent.

7. As there were no floods around Jacobabad, the climate throughout the hot weather was not as moist as usual; but during the months of September and October heavy dews fell every night. It was usual formerly to consider the drying up of the inundation water a cause of malaria, but this idea is completely disproved by the great prevalence of malarial fever during the past year.

Climate.

8. Of the 648 admissions, no less than 247 were re-admissions, the latter occurring chiefly amongst the recruits, who suffered during the autumn from repeated attacks of malarial fever. From the 25th of

Details of treated.

September to the 6th of November, the daily average number of recruits in hospital was 19, thus causing 43 per cent. of the daily sick during that time. Ague, which was unusually prevalent, but in most cases of a mild type, caused nearly two-thirds of the admissions. In some it was complicated by sudden congestion of the lungs, which in one case proved fatal, the patient being a young recruit. Some men who had served in the Bolan Pass were admitted for ague, accompanied by diarrhoea. These cases proved most obstinate in treatment, as when the diarrhoea was stopped the paroxysms of fever increased in severity and *vice versa*. A complete change of air was the only effectual remedy. Contusions, chiefly injuries received from horses, are the next most frequent cause of admissions. Some of the cases were due to the shoe worn on dismounted duty. Ulcers and boils, of which there were 14 and 23 cases respectively admitted, were the prevailing complaints during July and August, and were both due to the increased strain put on the cutaneous circulation during the hot weather. Dysentery and diarrhoea occurred chiefly in men on outpost duty, who were sent into head-quarters for treatment. Thirteen cases of gonorrhoea, 4 of primary syphilis, 5 of



secondary syphilis, and 2 of bubo were treated during the year. Scurvy caused 11 admissions, but this is no indication of the prevalence of the disease, as only those who suffer from a severe form of the complaint are admitted into hospital.

9. There were nine deaths from cholera amongst the men stationed at the posts between Jacobabad and Dozan Mullah, and one caused by diarrhoea at the latter camp. One man died from an unknown cause at Bag whilst the Regiment was on service; two men died at the depôt in Jacobabad, one from hernia and another from pneumonia. Three deaths occurred in hospital at head-quarters, two from ague and one from mercurial poisoning. In the former lung complications were the immediate cause. The case of mercurial poisoning occurred in a man who had been treating himself for tertiary syphilis. He was admitted with profuse salivations and diarrhoea, and died of exhaustion after being in hospital several weeks.

10. An epidemic of cholera during the hot weather travelled along the route from Jacobabad to Kandahar. Although it never appeared inside of the former Cantonment, a great number of men stationed at the posts as far as the top of the Bolan Pass were attacked.

11. Fourteen men were invalided during the year, four on account of chronic rheumatism and four for debility. Deafness, enlarged spleen, night blindness, secondary syphilis, and physical disability caused the remainder. Many men who ought to have appeared before the Annual Invaliding Board were on outpost duty at the time of its assembling; they will appear before a Special Board shortly.

### 2nd Sind Horse.

JACOBABAD.—In medical charge of Surgeon M. L. BARTHOLOMEUZ, M.B.

Average Strength .....	489	Deaths in Hospital .....	12
Do. present .....	462	Do. out of Hospital .....	1
Admissions .....	525	Invalided .....	22
Daily Sick .....	17.2	Sick Leave .....	13

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Jacobabad.....	117.3	3.4	0.5
1877.....	Do. ....	97.1	4.0	1.4
1878.....	Do. ....	122.6	4.0	1.5
	Average.....	112.3	3.8	1.1
1879.....	Jacobabad.....	113.6	3.7	2.6

1. The head-quarters of the Regiment remained at Jacobabad during the year. The following outposts were furnished by the Regiment:—

- 101 Sabres at Sangsila, from January 1st to February 26th, 1879.
- 100 „ at Sibi, from March 1st to 31st December 1879.
- 61 „ at Sooié, from June 13th to „ „
- 25 „ on transport duty, from January 1st to „ „
- 131 „ Major Sandeman's escort, from 1st January to 27th May 1879.

2. The sanitary condition of the lines is unsatisfactory. The lower portions of the walls are in a dilapidated condition owing to the presence of salt in the soil. The floors are damp and give rise to noxious vapours, which are a fruitful source of malarial fever amongst the men occupying them. The remedy is to build new lines on a plinth.

Lines and their surroundings; present condition, hygienic or otherwise.



3. The dry-earth system of conservancy is carried out as far as practicable, and this is found to answer very well.
4. The water-supply is good.
5. Food is plentiful, but dearer in price than in former years. Vegetables are plentiful during the season, but scurvy is at the same time a very common complaint. This is due to the fact that some of the men, through motives of economy, do not live on a sufficiently liberal and varied diet. The clothing is all that could be desired.
6. In previous reports I have dwelt on the want of gymnastic training for the recruits and young sowars of this Regiment. This important subject, closely bearing on the physical improvement of the soldier, does not seem to have received that attention which it deserves.
7. The hospital has been recently repaired, and affords sufficient accommodation throughout the year. The sanitary condition of the surroundings is satisfactory. A mud building (of no great importance) situated in front of the hospital, and shutting out all the available breeze, should be demolished.
8. The general health of the Regiment is good. The physique of the rising generation of the Sind horsemen will greatly improve if the systematic course of gymnastic training which I have over and over again recommended in my annual reports were adopted. Under existing circumstances, the physique must remain undeveloped.
9. This climate being highly malarious, and the Regiment being permanently located at this station, the men are constantly exposed to the ill effects of malaria.
10. The majority of cases under treatment were of a malarious nature, and the usual remedy employed in these cases was the mixed cinchona alkaloid. For neuralgia of a malarious nature, I have found the combination of bromide of potassium and liquor morphia with the quinine mixture to be most efficacious. Buboës are now never opened by me with a bistoury, as is usually the custom; for in these instances the wound which results takes a long time in healing, months instead of weeks, owing to the endemic constitution of the patients. I have experienced good results by treating the bubo in the suppurating stage by simply passing a few horse-hair with a suture needle, in the same way as a seton, in the long axis of the glands, and letting the matter draw through this; the bubo is then covered with lint soaked in carbolic oil, and the horse-hair drain is removed after a week or so, when a pad and bandage is applied for a few days, at the end of which time recovery is usually complete.
11. Four deaths from pneumonia, one from sunstroke, one from debility, one from stricture (chronic), two from cholera, two from drowning, one from diarrhoea, and one cause unknown.
12. A child was attacked with small-pox in the family lines. This case was isolated, and no other cases occurred. Small-pox was prevalent in the town during the period. Cholera was prevalent in the regimental lines. Two men of the Regiment fell victims to it at Dadur and Sibi.
13. Primary vaccination 46 and re-vaccination 44, successfully.
14. Twenty-two were invalided during the year for the following causes, viz:—Chronic asthma 2, old age and debility 11, chronic ulcer 1, ichthyosis 1, nyctalopia 1, chronic rheumatism 4, dislocation of the wrist 1, and impaired vision 1.
15. (a) With reference to the lines, as it would involve great expenditure to build new ones on a suitable plinth, I think it will be sufficient at present to keep them in thorough repair, and, in addition, to tile the floors so as to prevent the escape of noxious vapours from the ground.
- (b) The mud building facing the hospital should be cleared away so as to permit thorough ventilation of the hospital.
- (c) Recruits and young sowars should be made to go through a course of gymnastic training, and athletic sports should be encouraged.



## 3rd Regiment N. I.

HYDRABAD, SIND.—In medical charge of Surgeon T. E. WORGAN.

Average Strength.....	681	Deaths in Hospital .....	11
Do. present.....	669	Do. out of Hospital .....	1
Admissions.....	1,839	Invalided .....	32
Daily Sick .....	61·5	Sick Leave .....	33

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876 .....	Kolhapur and Kaladgi.....	95·3	2·7	0·3
1877 .....	Do. do. ....	111·8	2·9	0·6
1878 .....	Kolhapur and Sholapur ...	197·1	2·9	1·3
	Average.....	134·7	2·8	0·7
1879 .....	Hydrabad .....	274·8	9·0	1·6

1. In the last month of 1878 the Regiment left Poona *en route* for their present station—Hydrabad. On March 2nd the Right Wing and headquarters started for Sukkur, in which station they remained until July 10th. Numerous parties were sent up on escort duty to the various stations as far as Dadur. The Left Wing being sickly, remained stationed at Hydrabad during the whole year.

2. The Right Wing at Sukkur were under canvas up till the end of April. They then moved into the buildings previously used as the Native Base Hospital. Each building has an inner length of 90 feet, is about 30 feet in breadth, is lofty, has a good verandah, and is situated on a high ridge in such a position as to catch every breeze stirring. Yet the surroundings are unsatisfactory, for the maidan immediately below two of the buildings, and nearly every hill in this vicinity, are riddled by Mahomedan tombs—old it is true—still necessarily injurious to health. Fever assumes a most malignant type among those occupying these ridges. The lines at Hydrabad consist of 36 mud pendals, of old construction, and raised on no plinth. The inner length is 78 feet 6 inches, width 20 feet 6 inches, height 10 feet: cubic space 16,092 cubic feet. This is, however, somewhat diminished by the “sagging” of the rafters. The verandahs are small and low. In consequence of no married men’s quarters having been provided, the Beloochees have divided certain of the pendals into quarters by the erection of low partition walls. This is objectionable, as the married men’s quarters, which require most ventilation, receive least by thus impeding the free circulation of air. Small gutters run down to holes outside the hut, but as bathing is prohibited in the houses these are closed, and there is absolutely no system of drainage. Much water, therefore, for cooking purposes, &c., finds its way into the lines, which never returns. There are twelve huts for the Native Officers. Each hut is divided into four rooms, each officer being allowed two rooms. The cubic space is ample. The drains running to the exterior are old and worn-out, allowing a certain amount of soakage.

3. The Right Wing used trench latrines during the whole of their stay at Sukkur, and they proved most effectual, the sweepers having instructions to rake earth into the trench from the bank behind thrice daily. The latrines at Hydrabad are built of “pucka” brick, the longest of them being 87 feet in length, a roof above, and having a front wall 6½ feet high at its lowest measurement. In this wall three entrances are cut, each three feet in width, but the building being at direct right angles to the prevailing winds, much of the perfilation, which would be otherwise gained by these, is neutralised by a 12-foot screen wall immediately in front of them. The system of ventilation of these buildings is most defective. The receptacles are dammered iron pans of oblong shape. These are unsatisfactory for natives, as the *lota* water splashes both in front and behind the pan. The excreta are removed twice daily in closed carts and deposited in deep trenches well out of Cantonment limit. The ground so used is to be let shortly to agriculturists.



The water is pumped by steam power from the river Indus into a tank. From thence it passes along a covered aqueduct  $2\frac{1}{2}$  miles in length, to be again pumped on to the Cantonment level. In this way the suspended matters—the chief impurity of the Indus water—are deposited during its transit, and for the greater part of the year during which it has been thus used the water has been found excellent. In February last, while the river was low, the water was found contaminated by vegetable matters, but this has been obviated by the cutting of a more perfect channel down to the river's stream and by rejecting the first water drawn up in the morning. Supply ample.

5. Grain has been dear throughout the year, though cheaper than during the previous two years. Wheat has averaged about 17 lbs. the rupee to the sepoy. Vegetables of all kinds are plentiful, and have produced a most beneficial change in the health of the men, who were all more or less scorbutic on arriving in Sind. Meat also is fairly cheap and of good quality. The men appear to like the clothing, and no discomfort is complained of concerning it. The boots are, however, hard and often ill-fitting.

6. In Hyderabad the duties have consisted of the ordinary guards, &c., and have been in no way prejudicial to health. In Sukkur, in consequence of the small force present and the number of guards required, the men were very hard-worked, the number of consecutive nights in bed sinking as low as  $2\frac{1}{2}$  on two or three occasions. Escorts of treasure and transport were frequently sent up as far as Dadur, and so trying were the duties connected with this service, particularly in a climate where the midday temperature in double tents during day averaged  $110^{\circ}$  Fahr., that the major portion of such parties were compelled to pass a certain time in hospital on their return, suffering from fever, Sind ulcers, and debility.

The amusements in the lines have been few, the men as a general rule being too debilitated to indulge in gymnastic exercises when off duty. Bathing was much resorted to in Sukkur, and appeared to exercise a very excellent effect on the men's health.

7. The hospital at Sukkur was a building similar to those occupied by the troops described above. In size and coolness it answered its purpose well, and it was, however, like the other buildings, unfortunate in its surroundings.

The hospital at Hyderabad is a long mud building, capable of accommodating between 65 to 75 patients, giving an air space of 1,000 cubic feet to each. It is built on a mud plinth of only 6 inches height. The ventilation is excellent by ten wind-catchers, and a sufficient number of doors in front and rear. It is only 100 feet from the lines, which is rather objectionable, and is not quite raised enough from the ground. It remains in good repair. The latrine is in a line with the hospital, built of mud and having merely chunammed depressions as receptacles. The chunam frequently cracks and breaks away, allowing soakage. There is no nulla posteriorly for the reception of fluids; it is therefore exceedingly difficult to keep in good sanitary condition. There is a good dead-house to the leeward of the hospital.

8. This of necessity is of a somewhat low standard. Recruiting is now going on satisfactorily, but the result of the large amount of ague both last year and in the present one telling on one wing, while the influences of climate and duties hardly to be surpassed in severity by actual warfare acting on the other, have naturally reduced the general health and physique to a somewhat low status.

9. Within three weeks of the arrival of the Right Wing in Sukkur there was a hospital of 29 patients, all suffering from dysentery or diarrhoea. The lowness of the river and its consequent contamination by various foreign matters was no doubt a predisposing cause, but not an exciting one, as the townspeople did not suffer to nearly the same degree. Without doubt the exciting cause was the peculiar atmospheric condition which then obtained. Thus a considerable heat prevailed during the day, broken on two or three occasions by sharp showers of rain, followed at night by severe cold. This not only condensed all vapours, and with them the large amount of ammoniacal gas which was unavoidably present in the air, but by the difference of temperature between the interior and exterior of the tent, acted as an aspirator, raising noxious vapours from the ground and causing frequent chills.

This was obviated to a great extent among the European troops by the use of tent cloths on the ground. During a fortnight in tents the admissions for these diseases were 34. During a similar period shortly after moving into barracks, 3.

In Hyderabad the light duties and tolerable climate acted very favourably on the Left Wing up till the month of September, when malarial fever began to make its appearance. This station suffers considerably from malarial influences nearly every year, and for three



reasons. The Cantonment stands on a plateau, with a sudden but not very considerable drop to low ground covered with trees. During the height of the river, this ground is purposely swamped in order to nourish the trees. The river subsides, and this water gradually runs off. During the months of September, October, and November ague prevailed almost as an epidemic. This season was divisible into three periods, merging into each :

1st.—The water was disappearing and the powerful smell of decomposing vegetable matter was most noticeable, but a constant and very strong south-west wind prevailed, and doubtless modified its harmful effects. Admissions from September 5th to 19th, 33.

2nd.—This strong wind subsided, the ground was still moist and the weather warm. Admissions from September 27th till October 11th, 66.

3rd.—The days being still warm, chill nights came on, and no wind moving, the vapours, rendered perceptible by any smoke present, were seen to be condensed at sunset, forming a layer about 6 feet in height. Admissions from October 24th till November 8th, 202.

Doubtless this latter large number of admissions were not entirely fresh cases of malarial poisoning, but were frequently the result of chills telling on men who had previously suffered, and thus re-awakening the disease. During the second period hardly an officer or civilian in the Cantonment escaped.

10. Total admissions during the year 1,839, an increase of 530 on the previous year's admissions. Eleven deaths occurred in hospital as compared with nine during 1878. Daily average sick, 61·5. The following are the principal diseases in their order of frequency :—Ague 1,318, 534 more than during last year, cutaneous system 75, diarrhoea 64, dysentery 57, contusions and sprains 52, and debility 24 cases. Primary syphilis 22, secondary 9, muscular rheumatism 21, bronchial catarrhs 21, bronchitis 19, scurvy 10, phthisis 5, pneumonia 4, and remittent fever 3. The ague was generally of ordinary quotidian form, and was, as a rule, amenable to treatment. Exceptionally severe cases occurred, as in the cases of the three remittent fevers, two of which died under my care at Sukkur. Vomiting was not a marked symptom, but merely a persistently high temperature with low delirium. A few other cases in Sukkur were thus complicated. Towards the end of the fever period enlarged spleens with anæmia were exceedingly common. The large amount of diarrhoea and dysentery occurred mainly in the head-quarters during their six weeks' stay in tents before alluded to. Pulmonary affections were numerous in the early part and the decline of the year, due to the cold telling on debilitated men accustomed to the more equable climate of the Deccan. There is a decided diminution in the number of admissions for syphilis, still the number is very high, there being no Lock Hospital system in this town.

As it seemed probable that the differences of habits between the principal sects of the Regiment, more particularly of the high-caste Hindoos, of whom there is a large proportion, and the Mussulmans, would greatly influence their liability to disease, the following table was drawn up from the Hospital Register for the years 1877, 1878, and 1879:—

Average Strength.	MUSSULMANS.		HINDOOS.	
	105½.		407½.	
Diseases.	Total Admissions.	Per Cent. to Strength.	Total Admissions.	Per Cent. to Strength.
Ague .....	312	296·20	1,929	473·56
Affections of the alimentary canal .....	42	39·87	188	46·15
Pulmonary affections .....	22	20·88	93	22·83
Venereal affections.....	39	37·02	59	14·48
Rheumatic affections .....	7	6·64	81	19·88
Total .....	422	400·61	2,350	576·90



From this it appears that the Mussulmans are generally less liable to disease than the Hindoos. The most noticeable points are their comparative immunity from ague, diseases of the alimentary canal, and particularly rheumatic affections, while the great preponderance of syphilitic affections over the Hindoo forms a marked contrast to this. No doubt these differences depend greatly on the religious observances of the Hindoos. Within 15 minutes after a parade which has thoroughly heated them, numbers of men may be seen pouring cold water over their naked bodies quite irrespective of any cold wind blowing. It is easy to see how such chills must predispose to ague and rheumatic affections. Again, after going twice to stool, it is necessary to wash the feet in cold water, a custom which must be exceedingly injurious to a man suffering from diarrhoea or dysentery. The Mussulman, on the other hand, rather errs in the other direction, of washing too seldom. With regard to their system of dietary, small doubt can exist that many evils result from this. Two meals are eaten daily, which are necessarily exceedingly bulky, often consisting of a large quantity of some cheap but not necessarily nutritious substance, and the heavy task thrown on the digestion by the consumption of such a meal immediately before sleeping must certainly be very prejudicial to the general health, and consequently pave the way for incursions of every form of disease. Here again the Mussulman has the advantage of freedom from prejudice regarding every kind of animal food. The prevalence of syphilis among the Mussulmans would seem to depend on their greater bodily vigour and their peculiar religious ideas leading them to a more free and indiscriminate intercourse than is the case with the Hindoos.

A death resulted from the administration by a native of *jamalghota*, or croton tiglium. The man died within 30 hours of his admission, purging sanious fluids. Another patient to whom similar medicine was given recovered.

A second case occurred under circumstances so suspicious as to warrant a diagnosis of irritant poisoning. He died within two hours of his arrival. A *post-mortem* examination discovered an acutely inflamed stomach and small intestines, with the remaining organs healthy. The case is still in the hands of the police. Arsenic was considered to be the poison employed, probably placed in the interior of a piece of meat or prepared ball of food, as no symptoms exhibited themselves till four hours after taking food, and then he died quite suddenly.

Two cases of cholera occurred, which will be noticed presently.

Of the ten cases of scurvy, seven occurred within the first four months of the year, while no cases occurred during the last three months, this being probably due to the abundance of vegetable to be obtained in this town.

11. Twelve deaths occurred, four out of the regimental hospital. Of these, two were from cholera, one from pneumonia, and one unknown. Of the remainder, two occurred with the Left Wing during the absence of the head-quarters in Sukkur, one due to bed-sore in an old and debilitated patient, the other from pneumonia. With the Regiment two deaths resulted from remittent fever; one pneumonia (complete carnification of the whole lung on the tenth day); one peritonitis, cause not stated; one irritant poisoning by croton oil; one acute gastritis diagnosed as poisoning by arsenic criminally administered, but not yet verified by analysis.

12. During the epidemic of cholera which occurred at Sukkur, two cases of the mild type were admitted. Both recovered. The first case in a hospital pupil appeared within five days of the commencement of the epidemic. The second occurred four days later in a sepoy living in a large barrack occupied by some fifty men.

No further cases occurred, though the disease increased and continued among the townspeople for six weeks afterwards. Taking this into consideration, there can, I think, be no doubt that contact with infected persons must have occurred, though both men denied the possibility of it. But two cases occurring so shortly after the outbreak, one with premonitory symptoms dating back almost to the first day of the epidemic, and a complete immunity following, even though the disease among the populace increased in virulence, would seem to imply a probability that the regulations forbidding entrance to the bazaar were at first illicitly broken until experience had taught their value.

13. One primary vaccination took place and 35 re-vaccinations. These numbers are small, because the families of the whole Regiment were left with the depôt at Sholapore, and it was only the fighting men who were operated on.



14. Thirty-two men were invalided during the year. The causes were as follows:—Old Invaliding, and its causes. and worn-out 8, debility 7, lumbago 5, ague 2, scurvy 2, chronic rheumatism 2, emphysema 1, phthisis pulmonalis 1, epileptic vertigo 1, varicose veins 1, and 2 for physical disability. Rheumatic affections were the chief cause, while much of the invaliding for debility was caused by the weakening effects of the fever season at Sholapur last year.

15. A system of surface drainage of the lines is urgently required, the lines being built on rock. The water used for cooking purposes is thrown on the streets and left to soak or dry in the wind and sun. Requirements and recommendations. It is also certain that some bathing occurs in the lines which cannot be prevented, and it is more than probable that every sepoy does not go as far as the latrine to urinate if the night is cold. For these reasons a system of drains is necessary. Should this be executed, I would recommend that the U-shaped drain should be adopted, as being most easily kept clean.

The latrines should be altered. The front and rear walls might be lowered a foot with great advantage to ventilation and no loss of decency. A sufficient number of low openings might be made through the bottom of the front wall, so as to procure a current of air through the lower part of the building, and the screen walls which block up the entrances might be curtailed off 3 feet of their length. The system of oblong pans does not answer with natives, for I am informed by numbers of Pathans that they, like other natives, use the lota when water is procurable, as in this station. A stone placed at a good angle is certainly the best, with a nulla posteriorly so inclined as to quickly run off fluids into a moveable covered receptacle.

The buildings are roofed in, which I cannot believe to be an advantage in a climate where rainfall is the exception. A very high temperature, such as is engendered by the sun's rays, hinders decomposition, with the additional advantage of rapidly drying the excreta. The inhabitants of this town resort to the roofs of their dwellings for the purposes of defecation, with the effect of producing rapid desiccation of the excreta, and causing no nuisance at the time. This is of course a very objectionable plan in other respects, but serves as an illustration.

The drippings from the water hydrant supplying the lines fills a small pond. This water has to be removed occasionally and scattered over the surrounding plain. It would be well if this pond be made permanent, so as to save the water for bathing purposes.

The overflow water from the Indus, which is utilised for nourishing the trees, has also been led into a tank for the sepoys to bathe in. This might still be accomplished by the cutting of a channel to this tank without flooding all the surrounding land. The malarial fever in this station no doubt depends on this water being brought quite up to the Cantonments; and there is, I think, also no doubt that this could be easily prevented by the erection of low bunds in a few well-chosen spots. The trees within 300 yards might not perhaps be so verdant, but this surely cannot be a matter of great importance compared to the evils it would combat. Trees manage to grow on the cantonment level without any annual flooding, while agriculture would not be interfered with, since few fields exist within 300 yards of the Cantonments, and it is not from this form of irrigation that the evil effects arise. The removal of the hospital to a site posterior to its present one, and the raising of it on a better plinth, has been proposed on two or three occasions, the chief objections to it being its low plinth and proximity to the lines.

But the hospital is a good one, in very fair repair, and removal backwards would bring it close to the Sudder Bazaar, besides the expense of the proceeding. The Staff Hospital, to which the soldiers of the Belooch Depôt have had to go for treatment during the past year, is a good pukka brick building placed on an excellent solid plinth. It is on high ground, but requires roof ventilation: it is well removed from the lines and the bazaar, and has more accommodation for the 2nd class hospital servants than the line hospital. Again, it is placed at a distance of more than 1½ miles from syces and Commissariat followers' lines, which is most inconvenient. If the latter used the present hospital of the 3rd Regiment, it would lessen this distance by rather more than a quarter of a mile, while the regimental patients would in the Staff Hospital occupy a better building free from the objection of too close a proximity to the lines.

16. The large amount of malarial fever offered a favourable opportunity for testing the value of drugs, and the following table, drawn up from notes of cases treated during the year, shows the results of three drugs. Special observations in treatment, &c. Only cases treated from the first by the drugs named are included. Thus quinine being a costly drug, few cases were treated primarily by it, and only



in such cases as were of formidable character: the fact that recurrences took place is not therefore to be wondered at:—

*Cases.*

Names of Drugs and Number of Cases treated by each.	No. of recurrence after admission.	Per Cent.	One recurrence.	Per Cent.	More than one recurrence.	Per Cent.	Abandoned for the use of other Drugs.	Per Cent.
Carbolic acid, 360 cases..	122	33·8	92	25·5	103	28·61	43	11·94
Quinine, 21 cases .....	7	33·3	9	42·85	4	19·00	1	4·76
Cinchona alkaloids, 329 cases .....	81	25·81	91	28·43	80	25	68	21·25

Carbolic acid, a drug which does not appear to have attracted great attention as an antiperiodic and antipyretic, yielded most encouraging results. That these results would have been still better I am convinced, had I employed the drug from the first in the manner which experience subsequently pointed out. The doses to be effectual must be full and frequent; ten minims of the carbolic crystals to the ounce of water, and one and half ounce of this mixture repeated six times during the day. I never noticed any bad results under this treatment; no vomiting or dyspepsia, though slight relaxation of the bowels was occasionally experienced. If the smallest fullness or hardness of the pulse was noticeable, an ounce of this mixture, combined with a diaphoretic, was administered a similar number of times, the diaphoresis compelling absorption by diminishing the tension of the vessels. This plan was pursued whether the patient was in the paroxysm or entirely free from it, if the pulse seemed to indicate its advisability.

Eighty-five injections of quinine were performed, but seldom as a primary treatment. I have therefore omitted it from the table. The doses varied from 10 to 40 minims, more than 12 minims never being injected in one place; strength, 1 grain in 15 minims. Three cases of abscess occurred, and chronic localised thickening of the cellular tissue invariably resulted. In a case I have lately seen 4 grains in one spot produced a slough within four hours. Since these cases, even though assisted by the internal administration of "alkaloids," only show a proportion of about 33 per cent. of absolute success, and considering the pain and disagreeable results which may follow, I cannot think this measure will hold a very prominent position as a treatment, except in those severe forms of malarial fever where the stomach resents quinine and rectal administration is objectionable.

The cinchona alkaloids answered well in the milder forms of fever. Much of their non-success is due to their nauseant properties, the dose being frequently vomited up five minutes after administration. That this property is less marked when administered as a draught than as a pill seems certain. Another peculiarity in their action appears to depend on exposure to air and their age. At a time when 20-grain doses were being given thrice daily with little effect, a circular passed round to the effect that 5 to 10 grain doses were frequently successful, and this I certainly found to be true on receiving new supplies; but as each new tin waned, the dose had to be increased, to be again diminished by the opening of a fresh tin. Arsenic was frequently used as secondary to other drugs, and as such the results were satisfactory; seven drops, well diluted, did not appear to cause any inconvenience, though given when food could not have been present in the stomach. Salicine was administered in a few cases in which pyrexia was a marked symptom with the effect of reducing the temperature, but exerting no appreciable influence over the recurrences.

Several cases of Sind ulcer came under treatment, and being novel to me, I employed every form of remedy without much benefit, till, recognising that the ulcer was due to chronic congestion and enlargement of the sudoriferous glands by overwork and some determining irritation, I employed cold and evaporating lotions with good results, the superficial portions exfoliating in a horny mass, leaving a peculiar raw-looking cicatrix behind.

**5th Regiment N. L. I.**

KURRACHEE.—In medical charge of Surgeon-Major R. C. THORP, M.D., &c.

Average Strength.....	780	Deaths in Hospital .....	9
Do. present.....	768	Do. out of Hospital.....	3
Admissions .....	1,060	Invalided .....	36
Daily Sick .....	23·4	Sick Leave .....	8



Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876 .....	Belgaum .....	187.7	3.7	.....
1877 .....	Poona .....	139.7	3.1	0.8
1878 .....	Do. ....	153.3	3.6	0.6
	Average...	160.2	3.4	0.4
1879 .....	Kurrachee .....	138.0	3.0	1.2

1. During 1879 the Regiment had been at Kurrachee. Detachments were sent (1) soon after arrival to Hyderabad; (2) a detachment with the Commissioner's Camp; (3) a large detachment to Sukkur; and (4) a detachment of  $1\frac{1}{2}$  companies to Jacobabad. There were also volunteers sent to the Transport Train.

2—5. The lines and their surroundings, &c., were entered into most fully in the report for 1878, forwarded last year, as was also the conservancy establishment and mode of working. The water-supply, sources, and manner of distribution is unaltered, so the general health and physique of the men of the Regiment will be spoken of, and an account of causes of death and disease given.

6. The men are of various tribes; most are vegetarians, using a large amount of oil and ghee with their food. Only a few are such strict vegetarians that they take no meat whatsoever or fresh fish. Of those admitted for treatment, all were meat-eaters, except five, who never ate meat. This is said to be the truth, but at the same time most of the meat-eaters say that they never bought meat, and only partake of it when at a feast or if it is given to them, so about a fourth part only are in the habit of taking meat as part of their weekly diet. Of those who died reports have been given in the weekly remarks and casualty reports.

7. There has been great difficulty in making the sepoys take food often enough; that is to say, the custom of their caste is to feed only once a day. At that meal the abdomen is filled abnormally to a great protuberance. If the animal is then, like the snake, allowed to rest and sleep till digestion is completed, nature may get accustomed to such mode of nutrition, but if the digestion is disturbed and the sepoy is sent on sentry duty, indigestion (fever), heat of skin, diarrhoea, and subsequent dyspepsia will be the result. This is a great source of sickness. The second great difficulty is in getting the men to buy good, therefore, comparatively in price, expensive, in preference to inferior and cheaper grain and ghee. Thirdly, spending their wages on amusements to the detriment of their bodies. Strongly, therefore, it is to be considered whether a free ration of 2 ozs. of ghee with rice and dhal, salt and spices alternating with seconds flour, and 6 ozs. of meat with spices and salt would not in the results be more satisfactory to Government and for the benefit of the sepoy's health and well-being generally. The size of the men is good. Physique is good and capabilities according to stamina, which is from mode of life.

8. During the year there have been two distinct epidemics of fever, and cholera was prevalent for some time. There has been very little rain. The remains at the bottom of the tanks were most offensive. How can it be otherwise? Although there are nuisance-inspectors, yet there is not a maidan which is not made available for purposes of nature, perhaps to a less degree than in the neighbourhood of towns in the districts, but still they are not free from defilement, and every arch of each bridge is used as a latrine. There the ordure dries, for it is not removed, so far as I am aware of. The first fall of rain washes all this filth into the nearest tank. Is it astonishing, therefore, that fever and cholera were present?



**H. M.'s 27th (or 1st Belooch) Regiment N. L. I.**

JACOBABAD.—In medical charge of Surgeon H. ADEY, M.B.

Average Strength .....	699	Deaths in Hospital .....	12
Do. present .....	689	Do. out of Hospital.....	...
Admissions .....	799	Invalided .....	40
Daily Sick .....	32.1	Sick Leave .....	24

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Hydrabad .....	137.4	5.8	1.0
1877.....	Do. ....	99.8	4.2	0.6
1878.....	Do. ....	151.6	4.4	1.1
	Average.....	129.6	4.8	0.9
1879.....	Jacobabad.....	115.9	4.6	1.7

1. Head-quarters at Jacobabad throughout the year. Large detachments consisting numerically of a wing at Sibi, Thall, and Kushmore. Dépôt remains at Hydrabad.

The lines and their surroundings; present condition, hygienic or otherwise.

2. Those of the 30th Bombay N. I. Detailed description given in previous reports. Lines in fair repair, and accommodation ample.

3. There are no latrines in the lines with the exception of that for the use of the hospital; in this a modification of the dry-earth system is in use. The quantity of water used by natives for the purposes of ablution after defæcation entails a large amount of labour to keep these latrines clean on this plan. The scarcity of water and absence of drainage arrangements prevent the adoption of the wet or flushing system, which would, if practicable, be probably more efficient. The men in the lines proceed to the neighbouring jungle for the offices of nature, and provided they be strictly limited to a suitable distance, there is nothing against this arrangement in a country where surface-drainage and open water-courses are at a minimum. Married men's quarters are supplied with latrines, strict supervision being maintained.

Water-supply.

4. From deep open wells. Quantity sufficient. Quality, fairly good.

5. Food supply sufficient; prices high. Clothing, uniform, neat, and appropriate. It would, however, appear advisable that more stringent regulations be introduced with regard to the clothing of men off duty.

Food and clothing.

It is a matter of almost daily observation to find men with an acute pneumonia or shivering with a fit of ague appearing at the hospital, clothed, indeed, with a blanket round the body, but with little on their legs and nothing on their feet.

6. The duties were those of the usual garrison work. The detachments at outposts having an access of field duty, which appears to have been advantageous rather than prejudicial to health. Games, with a view to muscular development, were encouraged.

Duties, exercise, and amusements; their effect on health.

7. The hospital is a commodious building consisting of two blocks. The larger, which has been lately constructed, is raised on plinths some two and a half feet. It consists of one large ward: length 106 ft., breadth 20 ft., height 21 ft. 5 in., which with 36 beds would give 1,500 cubic feet per patient. Folding doors open at the sides and ends. Shafts are let in on either side at proper intervals to ensure free ventilation. There is a verandah on the southern and northern aspects. The roof is circular. There are two side rooms: the one used as a guard-room; the other for any case requiring isolation. The smaller building, which constituted the old hospital, 30th Rifles, consists of a central ward capable of holding 16 patients, side-rooms, verandah, dispensary, and offices. A post-

Hospital and its surroundings; present condition, hygienic or otherwise.



*mortem* room has also been erected at a short distance. In addition, during the year, an isolated building adjacent to the hospital was used, by permission, for a case of small-pox, and is still retained for the reception of infectious cases. Instead of the usual plan of building a mud hut or of having a tent pitched some distance from the hospital, the use of a suitable building adjacent to the hospital is much to be preferred. A stricter watch can thus be maintained to prevent communication between its occupants and outsiders: an extra guard is not necessary; the advantage to the sick is obvious; and, above all, it is always ready for the immediate reception of such cases.

The hospital wards are heated by large iron stoves; the supply of wood-fuel being abundant, any temperature that is thought advisable can be maintained. This is an advantage of no small consideration in a climate where the contrasts of temperature are so great and sudden.

8. Appears to have been fair; but the average daily sick was 3.3 in excess of the previous year. The men are well proportioned, of good physique, and about the average in height.

9. Rainfall slight; no floods; malaria comparatively decreased. Exposure on out-post duty caused a few cases of insolation. There are no civil arrangements for the suppression of contagious disease in Jacobabad.

10. Total number admitted 799, as compared with 993 in 1878, showing a decrease of nearly two hundred. This was entirely due to the lessened exposure to malaria, the admissions for 1878 showing the large figure of 605 cases of ague as compared with 340 of 1879. Flooding, which was universal in the former year, was absent in the latter. There was a slight increase in diseases of the respiratory system and for blistered feet. Digestive system parallel, and a very marked increase in diseases of the cutaneous system and abscess. The admissions for the three items, abscess, boils, and ulcer, were collectively 130, as against 51 in the previous report. A case of death was attributed to ulcer, but the records do not state its location or nature. Contusions show a decrease of nearly two-thirds.

There were eight cases of sunstroke, none of which proved fatal. Admissions for primary syphilis were double those of 1878. Those for secondary syphilis much less. In all twenty-seven primary and nine secondary were admitted during the year. Out of these it was found necessary to send six on sick leave. The admissions for gonorrhœa were seventeen.

11. Twelve deaths occurred during the year. Three at Sibi outpost from acute bronchitis, fatty degeneration (cardiac), and contusion of head. One at Chigardee of acute bronchitis; and one at Kushmore, disease unknown. The remainder at Jacobabad from febricula, ague (2), dysentery, pneumonia, ulcer, inflammation of submaxillary gland.

Epidemics.

12. None.

Vaccination and re-vaccination.

13. No children were vaccinated during the year. There were 44 re-vaccinations, of which 6 proved successful.

14. Forty men were invalided for discharge. Twenty of these were disposed of as old age and worn-out, four from debility; two each from chronic syphilis, deafness, and varicose veins; one each from chronic bronchitis, division of flexor tendons of three fingers of left hand, eczema of leg and debility, defective vision, incipient cataract, difficulty of breathing, lameness, skin disease, scurvy, and wound of testicle.



## CABUL EXPEDITION.

Average Strength present during the year .....  
 Average Daily Sick per cent. to the Average Strength present.....  
 Ratio of Mortality per cent. to the Average Strength present .....

## Sappers and Miners.

AFGHANISTAN.—In medical charge of Surgeon J. C. LUCAS.

Average Strength .....	301	Deaths in Hospital .....	8
Do. present.....	294	Do. out of Hospital .....	...
Admissions.....	889	Invalided .....	...
Daily Sick .....	22.2	Sick Leave.....	8

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Kirkee .....	46.7	2.0	0.6
1877.....	Do. ....	96.1	3.5	1.1
1878.....	Do. ....	272.1	5.8	1.3
	Average.....	138.3	3.8	1.0
1879.....	Afghanistan .....	302.4	7.5	2.7

- Location and movements. 1. Two companies (Nos. 2 and 5) were in Afghanistan throughout the year, and two (Nos. 3 and 4) proceeded there in October.
- Lines and their surroundings; present condition, hygienic or otherwise. 2. The men have had only the regulation sepoy's pal, which is not sufficient protection from the sun or from the cold of this region.
- Conservancy. 3. Either trenches were dug or the men were allowed to use the fields at long distances to leeward of encampments.
- Water-supply. 4. The water in some places was unwholesome from containing (i.) a large quantity of mineral substance, (ii.) vegetable matter, both suspended and dissolved, and (iii.) excrementitious matter: but in many places the water, with the exception of slight impurities from (i.) and (ii.), is pure enough for drinking purposes, if due care be taken to prevent its being polluted.
- Food and clothing. 5. The companies on service were allowed free of charge the following rations per man :—
- |            |       |            |                   |
|------------|-------|------------|-------------------|
| Atta.....  | 1 lb. | Ghee.....  | 2 oz.             |
| Rice.....  | 1 lb. | Salt ..... | $\frac{3}{4}$ oz. |
| Dhal ..... | 4 oz. |            |                   |

The quality was not good at all times, the different articles being frequently of inferior quality and not without adulteration; by the addition, for instance, to rice of its powder and a quantity of sand and grit, and in ghee of mutton fat and oil of some kind; flour contained at times a quantity of sand and small stones, with a proportion of bran. As for dhal it has been coored, which gives diarrhoea, instead of toor, which the men are accustomed to and like.

Although the quantity may be sufficient and the quality good, still I would beg to point out that the regular and continuous supply of vegetables is a want, and I am of opinion that meat is essential, and should form part of the soldiers' rations.



I think in the hot and scorching months in Afghanistan, the red tunic and blue serge trousers are ill adapted to the requirements. Khakee, as it is in use in these parts, would be most useful, and if of a chocolate colour would not need washing often. In the winter the men should have warm clothes, bedding, &c.

6. In addition to the ordinary military duties, the men of Nos. 2 and 5 companies were employed during the year in making the roads and buildings in the Bolan Pass. As for amusements there has been scarcely any.

Hospital, &c.

7. None.

8. The general health is anything but good; about 50 per cent. are of poor stamina, weakly, and debilitated. The sick rate has been high, and the numbers to be invalided for unfitness for further service will probably be great.

General health and physique.

9. The circumstances which appear to act prejudicially on the health of the corps are: Influence of climate or local (a) food; (b) duties; (c) quarters; (d) dress; (e) water, all of circumstances on health. which have been alluded to in the preceding paragraphs.

10. The most prevalent diseases were ague, of which nearly three hundred cases were treated. Diseases of the lung furnished 55 cases, contusions of the upper and lower extremities gave about 116 cases; muscular and chronic rheumatism, dysentery, and diarrhoea each gave 14, 32, 31, and 59 cases. There were also 5 cases of cholera treated, of which 4 died.

Details of treated.

### H. M.'s 3rd Sind Horse.

AFGHANISTAN.—In medical charge of Surgeon A. W. F. STREET.

Average Strength.....	583	Deaths in Hospital .....	41
Do. present.....	518	Do. out of Hospital.....	6
Admissions .....	655	Invalided .....	5
Daily Sick .....	17.7	Sick Leave .....	16

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Jacobabad .....	218.8	4.5	5.6
1877.....	Do. ....	165.9	3.6	2.1
1878.....	Do. and Afghanistan.	102.7	2.6	1.1
	Average.....	162.5	3.6	3.3
1879 .....	Khooshdil Khan .....	126.4	3.4	7.9

1. The Regiment marched from Quetta on 1st January for Kaudahar, and arrived there on 9th January, accomplishing the distance of 150 miles in nine marches of an average of 16.4 miles each; it then marched on the 14th for Girishk, which was reached on 1st February, a distance of 70 miles. The Regiment left Girishk on the 22nd February and arrived at Goolistan Karez on the 19th March, a distance of about 170 miles, halting four days *en route*. It was encamped at Gulistan Karez until the 1st May, when it marched to Khooshdil Khan, a distance of about 35 miles, where it arrived on 4th May, and has been encamped there up to the end of the year.

During the year the Regiment has furnished detachments to Kelat, Quetta, and Chaman, reconnoitring and foraging parties, and numerous escorts. The depôt has been at Jacobabad during the year.

2. Up to the end of June the Regiment was under canvas; it then went into temporary lines at Khooshdil Khan: the huts are roomy, built in rows, with no partitions, and are open at one side. During the cold

Lines and their surroundings.



weather the openings are closed to a certain extent with salitas, &c. Detachments, &c., have as a rule been in tents.

3. The trench system of latrines has been used during the year, and answers very well; care is also taken that the men do not resort to the surrounding country. Rubbish is burnt.

Conservancy.

4. At the halting places on the line of march the water varied in quality: at most of them it was very good and pure, while at some few others it was somewhat brackish.

Water-supply.

At Khooshdil Khan the water is obtained from water-courses, which run through the camp, and which have their origin some three or four miles distant. During the summer the diarrhoea from which the men suffered was, to a certain extent, attributed to the water; but as far as it was able to be judged, it was free from contamination. If the water was at fault, I think it must have been owing to the mineral matters in it, and also that they may have been in a more concentrated state during this season. It would be an advantage if the water-supply could be obtained from its source.

5. The men of the Regiment serving in Afghanistan have been on rations during the year. The daily rations is atta, 1 seer; ghee, 1 chittack; dhal, 2 chittacks, and salt,  $\frac{1}{2}$  chittack, which is ample as far as it goes; but if an issue of meat and vegetables were added, I think it would contribute to the general state of health of the men, and render them better able to withstand the fatal effects of acute disease. The men as a rule supply themselves with meat and vegetables when they can obtain them, but during the summer months no vegetables were procurable; if meat and vegetables cannot be given as ration, it seems very necessary that some arrangement should be made that the men should always be able to obtain them at a cheap rate; this especially refers to vegetables.

Food and clothing.

The diarrhoea from which the men suffered during the summer was partly attributed to old, coarse, or damaged atta and damaged ghee issued in the rations at various times during that season, and also to the want of vegetables.

The men were well and sufficiently clothed. The Government issue of warm clothing is one blanket, two pairs of socks, one jersey, one pair of putties, one pair of warm gloves, one posteen, one pair of boots, and one water-proof sheet.

This by itself would not be sufficient for so cold a climate as Afghanistan, but as the men have always served in a climate with a marked cold season, and have before served up in these parts, they are well provided with warm clothing of their own. Two jerseys instead of one would be advisable; they require washing, and if a man has only one he has to be without it while it is being washed, and is liable to suffer in consequence. Drawers would contribute to protect the men from cold. The jerseys should be thick, without any opening in front, come well up to the neck, and should be sufficiently long to completely cover the abdomen.

6. The duties have been very heavy during the year. From the 1st January to the end of March the Regiment was constantly on the march, and at the same time was furnishing numerous detachments, reconnoitring parties, and escorts. During the remainder of the year the head-quarters of the Regiment were stationary, with the exception of one march of about thirty-five miles, but was still furnishing numerous detachments, &c.

Duties, exercise, and amusements; their effect on health.

The average minimum nights in bed for the year was  $3\frac{1}{2}$ , and at times the men were very hard-worked, in some weeks only getting  $\frac{4}{5}$ ,  $\frac{1}{2}$ ,  $1\frac{1}{3}$ ,  $1\frac{1}{2}$ ,  $1\frac{3}{4}$ , and  $1\frac{1}{2}$  nights in bed, respectively, and in twenty weeks during the year they were under 3.

The men seem to have borne the hard work of the campaign very well, and the general state of health of the Regiment was good up to about the month of August; they then seemed to be getting very fagged and debilitated, and at this time, out of 252 nights since leaving Jacobabad in October 1878, 109 had been spent on duty.

The duties of the Regiment became somewhat lighter in September, and in October the general state of health of the Regiment became good, and continued to improve up to the end of the year.

7. The sick were treated in tents up to the end of November, when they were moved into a temporary hospital, which gave ample accommodation. Boosa is supplied for the men to lie on, and an issue of firewood is given, and on cold days an extra supply is obtained.

Hospital and its immediate surroundings; present condition, hygienic or otherwise.

8. The general state of health of the men on active service in Afghanistan has been on the whole very good, considering the amount of hard work they have had and the severe climate in which they have served.

General health and physique.



The Regiment marched out of Quetta *en route* to the front on January 1st without a man in hospital, four only being left behind sick, and there were no admissions into hospital up to the time of the Regiment reaching Kandahar. On the arrival of the Regiment there it was medically inspected, and the inspecting Officer remarked "that it was the first Regiment he had ever inspected in which he had not sent men into hospital from the ranks."

From the 1st January to 31st March, during which time the Regiment was continually on the march, and fought an action, and for two weeks during the period had only  $\frac{3}{4}$  and  $\frac{1}{2}$  minimum nights in bed respectively, the rate per cent. of daily sick was 2.2 per cent. The chief causes of admissions during the period were fever, wounds received in action, and diseases of the respiratory system.

From 1st April to 30th June the rate was 3.0 per cent.

From 1st July to 30th September the rate was 5.1 per cent., and during the period fever, diarrhoea, and pneumonia were prevalent, and the Regiment suffered from an epidemic of cholera, and the continued hard work began to tell on the men.

From 1st October to 1st December the rate was 2.6 per cent.

It was only found necessary to send sixteen men on sick leave and to invalid five during the year.

From the above it will be seen that the health and condition of the men were excellent, under the circumstances, up to the end of June. During the month of July, August, and September the health of the Regiment was reduced owing to the prevalence of fever, diarrhoea, and pneumonia, and to the continued hard work it had undergone. An epidemic of cholera also occurred in the month of August. However, during the months of October, November, and December the health of the men greatly improved, and now the men are in capital condition and health.

The physique of the men is good, as I think is clearly shown by the health of the Regiment during the campaign.

9. The climate of Jacobabad, where the dépôt was stationed during the year, differs

considerably from the climate of Beluchistan and Afghanistan, where the majority of the Regiment served during the same period. The former has a very severe and trying hot season, and a cold season of moderate severity, the thermometer rarely falling below the freezing point; the latter have a severe cold season, the thermometer falling nightly several degrees below the freezing point during several months of the year; falls of snow and bitter cold winds occur, and the alternations in temperature are great. The heat of the hot season was not excessive, and the nights very fairly cool. Dust-storms are of frequent occurrence. The climate is dry, the rainfall during the year was 2.65, rain falling on the first six months of the year, the others being rainless.

Jacobabad is well known for its malarious climate. Beluchistan and Afghanistan are not free from this evil, as is shown by the prevalence of fever during the months of August, September, and October.

The following table will show the prevalence of different diseases under the two climates, but at the same time, it must be remembered, that a large majority of the men at the dépôt were recruits new to military life and the climate of Jacobabad, and that those serving in Beluchistan and Afghanistan had been stationed nearly continuously at Jacobabad, and that they were, during the year, on active service and doing very hard work.

*Return showing the rate per cent. to average strength of admissions (total and principal diseases) at Jacobabad and in Beluchistan and Afghanistan during the year 1879.*

	Jacobabad.	Beluchistan and Afghanistan.
Total admissions .....	131.7	125.6
Ague .....	94.1	37.1
Diarrhoea .....	1.2	20.5
Dysentery .....	8.7	8.7
Pneumonia .....	2.5	5.0
Bronchitis .....	...	2.7
Ulcers .....	6.2	2.7
Boils .....	3.7	2.5
Conjunctivitis .....	...	1.1



The unhealthy months in Beluchistan and Afghanistan were July, August, September, and part of October. During these months fever, diarrhoea, and dysentery caused numerous admissions. As soon as the cold weather set in, about the middle of October, the health of the men improved, with the exception that at this time, owing to the sudden alternations in temperature, dysentery—the result, I believe, of chills—is somewhat frequent. During the rest of the year the men were remarkably healthy, except that during the winter they suffered somewhat from diseases of the respiratory system, which, although not so very numerous, were very fatal. Seven cases of pneumonia occurred during the month of August; their cause was obscure.

10. Admissions into hospital, 655; discharged to duty, 550; died, 41; granted sick leave, 16; transferred to other hospitals, 8; sent to the dépôt to be  
 Details of treated.      invalided, 8; disease changed, 20; and 13 remained in hospital at the close of the year.

Of the 655 cases treated, 242 were for ague; pneumonia 24, of which more than 50 per cent. died; dysentery 46, the majority being cases of a mild type, but with a death-rate of 6·5 per cent.; bronchitis 12, with a death-rate of 25 per cent.; cholera 16, of which 56·3 per cent. died; contusions 41; general debility 21; diarrhoea 89; ulcers 12; boils 11; wounds (battle) 10; syncope from over-work 1; and heat apoplexy 1.

The following are the diseases from which the men who were granted sick leave were suffering: syphilis 1, debility, scurvy 1, diarrhoea 6, ague 2, rheumatism 2, and dysentery 2.

In the affair at Khooshki-na-Khud one officer and three sowars were killed in the field, one sowar died within twelve hours, and twenty-one were wounded. Of these eleven were treated out of hospital, their wounds being trivial, and were as follows:—Five were sword wounds of the bridle hand and one a sword wound of the sword hand—(the enemy always tried either to wound the back of the head or else cut the bridle hand)—three were wounds by sword-cuts on the left thigh, one by sword-cut on the head, and one contusion of back from supposed musket blow.

The following were the wounds of the men admitted into hospital:—Three sword wounds of the bridle hand, one sword wound of sword hand, one sword wound of chest, two sword wounds of scalp (bone not exposed); one gunshot wound of elbow joint (non-penetrating), one wound of left foot, and one gunshot wound of chest (penetrating).

In the case of gunshot wound of the chest the bullet entered at the sixth left intercostal space about two inches from the left nipple, and lodged in the chest; the man died within twelve hours of his admission from internal hæmorrhage.

Of those killed in the field one had received eight sword-cuts on the face and head, a deep cut on the outer side of the thigh, and one cut extending through the first four metacarpal bones, and nearly severing the bridle hand from the body. The sword-cuts on the face and head were as follows:—One removing a piece of the lower jaw; another dividing both cheeks and rami of the lower jaw; one penetrating through the nasal, ethmoid and sphenoid bones to the brain; three longitudinal sword-cuts from the frontal protuberance to the occipital bone, and allowing most of the brain substance to escape.

Another had the face completely smashed in, and was most probably first wounded in the face by a sword and afterwards by the butt end of a musket.

Another man was killed by a bullet wound of the neck, the bullet entering just below the thyroid gland towards the right side and passing out behind on the left side between the occipital bone and atlas. There was also a deep wound on the back of the neck from a sword-cut, exposing the spinal cord.

Another was killed by a bullet wound of the chest, the bullet passing through the ensiform cartilage and lodging in the chest.

11. Of the 655 cases admitted into hospital during the year 41 died, and 6 deaths  
 Mortality, and its causes.      occurred out of hospital. The following were the causes of death: pneumonia 13, cholera 9, dysentery 4, bronchitis 3, ague 2, gunshot wound of lungs 2, gunshot wound of neck 1, remittent fever 1, syncope from over-work 1, diarrhoea 1, asphyxia from drowning 1, apoplexy congestive 1, rupture of intestine 1, sword wound of hand 1, no appreciable disease 1, simple continued fever 1, hepatitis with suppuration 1, scurvy 1, sword wound of skull 1, and not diagnosed 1. The death-rate is 8·06 per cent., which is very high, but is not so much to be wondered at during a campaign with plenty of hard work in a severe climate, and with such fatal diseases as pneumonia and bronchitis of frequent occurrence, and also to the fact that during the year the regiment suffered from an epidemic of cholera and lost several men in action and by accident.

12. On 14th August cholera appeared at Khoosh-dil-Khan among the followers of the  
 Epidemics.      2nd Sikh Infantry, and rapidly spread to the sepoys of that Regiment. On 16th August a syce belonging to the 3rd Sind



Horse was attacked, and the first case among the sowars occurred on 25th August. The Regiment was moved into cholera camp on the 24th August, six cases having occurred up to that date; after removal 21 cases occurred, the last case being on 1st September, making a total of 10 cases and 4 deaths among the fighting men, and a total of 17 cases and 10 deaths among the followers. The Regiment returned to its former quarters on the 16th September. Six cases and five deaths occurred among the men, and 3 cases and 3 deaths among the followers on detachment and outpost duty.

13. As the Regiment has been on service during the year no vaccinations have been performed at head-quarters, but vaccination has been carried out at the depôt.

14. Five men were invalided during the year; their diseases were as follows:—Deafness one, lordosis and ankylosis of spine one, general debility three. Invaliding, and its causes. Three were between the ages of 20 and 30, and two between 30 and 40. One was under five years' service and four were between 10 and 20 years' service.

15. A meat and vegetable ration while on service, or that a liberal supply of both should be always obtainable by the men at a cheap rate.

16. During the year the men on service in Afghanistan and Beluchistan have, in a few instances, suffered from a very obstinate form of diarrhœa, for which in extreme cases no treatment except change of air seems to be of any use.

The disease appears to commence with flatulent dyspepsia, which after a time is followed by diarrhœa, the number of motions passed during the twenty-four hours gradually becoming more numerous and liquid.

When the man comes to hospital for relief, it is found that he is passing from four to six motions during the day and night, is somewhat emaciated, and that there is slight jaundice present. The diarrhœa chiefly occurs after food and at night; the stools are semi-liquid, light in colour, and in severe cases contain indigested food. Flatulent dyspepsia is generally complained of.

The majority of these cases recover when they are treated early, but if the diarrhœa becomes established, no treatment seems to have any effect in stopping the disease; the stools increase in frequency, and now almost invariably contain indigested food, the emaciations become greater, and there is considerable loss of strength. This state of things may go on for some months, the diarrhœa may be somewhat checked for a few days, but only to break out again, and the man gradually dies of asthema.

Quotidian ague was the usual form of malarial disease from which the men suffered during the year, and was almost invariably accompanied by slight jaundice. Pneumonia was very fatal, the mortality being 54·1 per cent. Cases occurred in every month of the year, the greater number occurring in the months of January, March, April, August, and December.

### H. M.'s 1st Grenadier Regiment N. I.

AFGHANISTAN.—In medical charge of Surgeon A. DANE, M.D.

Average Strength .....	837	Deaths in Hospital .....	47
Do. present.....	808	Do. out of Hospital.....	2
Admissions .....	2,145	Invalided .....	10
Daily Sick .....	31·5	Sick Leave .....	20

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876 .....	Ahmedabad .....	124·1	4·2	1·5
1877 .....	Do. ....	94·3	3·3	0·8
1878 .....	Do. ....	171·3	3·7	2·2
	Average.....	129·9	3·7	1·5
1879 .....	Afghanistan .....	265·4	3·7	5·8



1. Has been on service all the year. The head-quarters having left Jacobabad in February and the wing Sukkur in March, has been broken up into small detachments along the line of communications from Jacobabad to Quetta, with escort parties in movement all the year. Head-quarters were from April to end of June at Mach; then at Dozan till the end of September; in Quetta during October, and then back to Ser-i-Bolan for November and December. No account can be given of movement of detachments, as there was seldom more than 200 men with head-quarters, the remainder of the Regiment being employed at different parts of the Bolan and Kutchee, and always in movement.

2. The quantity of rations issued to native troops during the present campaign has been fully ample, though in my opinion it should have been of better quality and more varied in character, more especially in the case of the men under my immediate notice, who are always accustomed to the consumption of meat, fish, and condiments. As it was, during the greater part of last year the Regiment was located in the Bolan Pass, where there were no facilities for the men to vary their diet from private resources, and consequently scorbutic affections were greatly prevalent.

I would suggest that in place of the daily issue of 4 ozs. dhal, that 6 ozs. of meat should be given twice weekly and 6 ozs. of dried fish on one day. Also that a small quantity of native condiments should be allowed in the daily ration, and that some anti-scorbutic, such as tamarind, might be given, at least twice a week, in places where vegetables are unobtainable.

If the ration sanctioned for Bombay troops serving at Aden had been issued to the troops in this campaign, I am fully convinced that their efficiency would have been greatly increased, for, putting on one side admissions into hospital from fever and ague, which one must always look to amongst native troops, more than a fourth of the other men admitted were with affections of scorbutic origin. I do not imagine that the Aden ration is much more expensive than the one issued to our men, for the quantity of each article is not so large. Altogether the total quantity in each case is about the same.

I would also suggest that when native troops are largely employed on road-making and field works that a bi-weekly issue of rum or arrack should be made, as the improvement in the health of the Regiment during November and December, when this issue was made, was most marked.

The present system of clothing the Bombay troops is, in my opinion, most faulty, the tight-fitting red tunic and cloth trousers being quite unfitted for the wear and tear of field service, putting out of the question the extra work it entails on the men to keep them in repair and clean.

I would recommend that all troops serving in the field should have two suits of strong khakee or sail cloth, the coat to be made in the shape of a loose blouse and the trousers to be a modified form of knickerbocker, very loose about the hips and thighs, and to button tight from below the knee to the ankle.

The advantages that may be claimed for having the clothes made loose are that the movements of the body are unimpaired, that they are cool in the hot weather, and permit of the wearer putting on all his warm under-clothing in the winter, which the present red coat does not without undue tightness over the chest.

With regard to the different kinds of boots and shoes in use in the Native Army, I consider the English ammunition boots in a modified form to be the best, but I would suggest that a different system should be adopted in their make to suit the native foot, which is broader and lower in the instep than that of a European. I have noticed that those men who have had ammunition boots that fitted properly have suffered less from shoe-bite than any other, as the leather is so superior to any prepared in this country, that the boots do not become hard and unpliant, as those made of country leather do, both during the prevalence of hot winds and wet weather.

The warm clothing issued has been fully sufficient for any cold that has been experienced, but I think that an extra blanket per man should be carried by the Regiment in case of any necessity for camping out or very severe cold being experienced. With regard to the warm clothes issued to the followers, I would state the native cumblees which are given them are, in my opinion, utterly useless, as from the openness of the texture they cannot possibly either keep out the cold or prevent the natural heat of the body escaping. The same remarks also applying to the trousers with which many of the followers were supplied, as from being made of cumblee they were open to the same objections. The wadded coat and trousers were, however, all that could be desired.

I would recommend that all followers should be supplied with stockings similar to the sepoy's, and that more care should be taken in the selection and fitting of the shoes issued, which were in most cases of the very poorest description, quite unfitted to withstand the wear of marching, and falling to pieces in a few days. To show how badly the followers have been treated with regard to the coverings for their feet, I may mention that 35 out of 40 dooly-



bearers with a detachment were admitted into hospital, suffering from frost-bite in a more or less degree after three marches through snow, Government being thus put to the expense of paying and feeding these men, who are laid up for months, which a very small expenditure in the beginning would have avoided.

3. Mostly employed on escort duty, conveying stores, &c., from Jacobabad to Quetta,

*Duties and exercise.* and furnishing the guards at the different posts in Kutchee and the Bolan Pass. About 300 men were employed in connection with the rest of the brigade in making the road through the Bolan, and opening up the surrounding country. The work the men have had to do has been very severe, more especially those on escort and at the small stations, where they had to do sentry duty daily: in fact the average nights in bed have been less than two per week during the year (for the whole Regiment). This amount of work in connection with the indifferent food they obtained has naturally rendered the Regiment very sickly, and the mortality has been very great, though not so large as many of the regiments on this campaign.

4. The physique of the Regiment itself is good, but unfortunately when proceeding on

*General health and physique.* service 238 volunteers from other regiments were sent to make it up to a war footing. Of these some 50 were of very inferior physique, and quite unfitted for active service, and have, in fact, spent the greater part of the year in hospital and have been a very large factor in the number of admissions. The health of the Regiment has been bad, owing, as stated above, to the hard work and bad food, but has much improved during the last three months, since the work has been lighter and the quality of the rations improved. It is now, taken as a whole, in very fair condition, and if a fair supply of vegetables are obtainable in the spring, will most probably quite recover from the hardships of last year.

5. The climate in the upper part of the Bolan is good, but at Mach below, the heat

*Influence of climate or local circumstances on health.* from April to October is intense, and is very trying to men obliged to live in tents. Since October the weather has been quite European.

6. Intermittent fever has naturally given the largest number of admissions, namely,

*Details of treated.* 1,117; remittent fever shows 20, and tertian and quartan ague 2 and 5 respectively. Scurvy and its concomitants, ulcers, and Sind boils come next on the list with 242. Then dysentery, from which there have been 172 admissions and 9 deaths, and simple diarrhoea 128, with 4 deaths. Affections of the lungs have not been very prevalent. Acute bronchitis has given 18 admissions and chronic 17; pneumonia and pleurisy 10, of which 7 have been fatal, and usually very rapidly, other admissions under this class being only 2.

Syphilis and gonorrhoea during the early part of the year, whilst the Regiment was in Sind, gave a good number of admissions, but since May there has not been a case, there being no opportunity for men to contract either. Primary syphilis gave 23 admissions, secondary 5, gonorrhoea 2, rheumatism 5, and iritis 1.

Affections of the eye have been rare, there being only six cases of conjunctivitis and two of ulcer of the cornea. Five cases of nyctalopia were admitted, but of these four were proved to be malingersers, and were punished accordingly. Contusions and sprains, &c., gave 95 admissions, which is not very great, considering the amount of manual labour on the roads and buildings at the different stages. There were 7 admissions under the head of nervous affections; 3 of these were, however, caused by one man having been treated, first for paraplegia and afterwards twice for locomotory ataxy, who will be discharged. Rheumatism and lumbago gave 34 admissions.

These figures do not in any way show the real number of men who have been sick during

*Details of treated.* the year, as owing to the immense number of small detachments, of twelve and six men, it was impossible to find out who were sick or not, so that this return has been compiled from the records at head-quarters and one or two large detachments which were under the care of medical subordinates.

7. The mortality has been very large, namely, 47. Of these 10 were from cholera, 7

*Mortality, and its causes.* from pneumonia and pleurisy, 9 from dysentery, 4 from diarrhoea, 4 from remittent fever, 4 from intermittent fever, 6 from general debility and anæmia, 1 from scurvy, 1 with ulcer, and 1 drowned whilst bathing. Of these deaths only 11 were at head-quarters, the others being either at the dépôt or with detachments, many of these latter nothing being known of the men having been ill until the death report arrived.

8. Cholera broke out in Dadur about the end of May, having evidently been carried by

*Epidemics.* pilgrims from the great Hurdwar Fair, as its progress could be traced from Sukkur shortly after the breaking out of the disease there. No record of the number of men attacked with the detachment then could be obtained,



as there was only a medical subordinate at the station, and he had charge of the whole of the Transport and Commissariat followers, who were dying at the rate of twenty or thirty a day.

There were seven deaths amongst the men of the Regiment at Dadur and the neighbourhood, and one at head-quarters at Mach and two at Abigoom, about seven miles away. The man who died at head-quarters, and who was the only man attacked, had only rejoined from Dadur the very day that the disease broke out there. The two cases at Abigoom occurred amongst part of the detachment which had been at Dadur, and which was being moved slowly up the Pass, the number of men there having been reduced as much as possible.

It was a most wonderful thing that the Regiment had so few cases, as the disease was raging to a fearful extent amongst the Transport Train followers all along the line of communication, and our men were travelling with the daily train of carts and also guarding the stages where the train halted, so that they were in continual danger of being infected.

When the disease broke out at Dadur, I was ordered down the Pass to look after the Transport people, and do what I could for them; but as I had no establishment and no cholera medicines of any kind, in fact hardly any, I could do very little, and as there were strict orders that the daily train of carts with supplies for the front was to move at any cost, it was an impossibility to prevent the disease reaching Quetta and subsequently Kandahar, where its ravages were tremendous.

9. I would beg to call attention here to the almost useless character of the sick carriage of a Bombay regiment. When leaving Sukkur the regiment received 10 per cent. of so-called dandies and dooly-bearers. The dandies are simply a piece of canvas about 7 feet long and 18 inches wide, suspended from a bamboo. This canvas has no sides, and it is very difficult for a man in health to keep from falling out of it when carried over ground at all rough, and consequently far more so for a wounded or sick man, besides being a most uncomfortable means of conveyance, as the weight of the hips and buttocks causes the canvas to bag in the centre with the feet and head at a much higher level than the rest of the body. The only advantage it possesses being its lightness.

The so-called dooly-bearers were simply labourers of all kinds, domestic servants, syces, &c., who for the sake of the good pay and rations enlisted for the campaign, but of the 370 odd men who were sent to the Regiment, I do not think that more than a dozen had ever seen, much less carried, a dooly. Besides, numbers of them were quite unfitted for service, many being old, grey-headed men, and others quite small boys. Also, having been enlisted in a great hurry and sent off in batches to join the Regiment without any proper arrangements being made about their pay or family remittance, they caused an immense amount of labour in the Paymaster's office.

I would recommend that the Looshaie dandy be taken as the pattern, as it possesses all the advantages of the dooly, as far as having an even surface for the patient to lie on; and having four short legs, it can be used as a temporary bed, as it can be easily and quickly detached from its pole, and so does not take up much room in a tent. The Hamilton is the best form of dooly, as it is very light, strong, and packs into a small compass when not in actual use.

With regard to bearers, if Government would only sanction the maintenance of a regular corps, as in Madras, there would not be the same difficulty, as at present, in furnishing sick carriage, nor would the expense be any greater, as the bearers in time of peace would be always of use in the Commissariat and Ordnance Departments, and take the place of other hired labourers, besides being far more effective in time of war than the present system of employing untrained men.

10. Twenty men have been sent on sick leave, most of them suffering from scurvy or anæmia, ten have been pensioned, four of these being men of over 32 years' service; one case of insanity was pensioned from the Lunatic Asylum, and four for general debility; one man was discharged who had never joined the Regiment, only having reached Kurrachee; cause of discharge unknown.

11. No special treatment has been practised, as the only medicines I had were those supplied with the field chests. I would suggest that a liberal allowance of neutral quinine for hypodermic injection should always be supplied, as it takes very little space, and is very effective in treatment.



## H. M.'s 19th Regiment N. I.

BOLAN PASS.—In medical charge of Surgeon-Major W. E. CATES, Surgeon D. A. GOMES, and Surgeon-Major J. ARNOTT, M.D.

Average Strength .....	842	Deaths in Hospital .....	66
Do. present.....	826	Do. out of Hospital .....	3
Admissions .....	1,612	Invalided .....	57
Daily Sick.....	39·4	Sick Leave .....	8

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Sholapur .....	51·6	1·7	0·5
1877.....	Do. ....	117·1	5·2	1·4
1878.....	Kurrachee .....	182·6	3·6	1·7
	Average.....	117·1	3·5	1·2
1879.....	Bolan Pass .....	195·1	4·7	7·9

1. The Regiment was on field service during the whole of the year under report, and at all times detachments of greater or less strength were absent from head-quarters. On the 1st January 1879 the head-quarters were at Jacobabad, and the strength, about 550, with a sick list of 39, of which 19 were cases of malarious fever. Various detachments were sent to work on the road from Jacobabad to Dadur via Bagh, while the head-quarters, numbering a little more than 300 of all ranks, proceeded on January 15th, 1879, via Mussaffur Khana, Shahapur, Chutta, Poolajee, Lehri, Mull, and Mittree to Dadur, where they arrived on Saturday, January 25th, 1879. During this march the sickness was about 5 per cent. of the strength, and about one-half of the cases were ague.

The head-quarters remained at Dadur till February 27th, the men during this time being employed on escort duties and working on roads. The sickness was moderate. On February 27th the head-quarters marched to Kundilani in the Bolan Pass, and on the following day to Kirta, at which place it remained till March 8th. The health during this time was good. On March 9th the Regiment proceeded to Bibinani, and remained there four days. And at Abigoom, the next station, the Regiment remained eight days. At neither of these places was there any unusual sickness. At Mach the Regiment remained from March 21st to April 10th, and was healthy. From Mach the Regiment proceeded to Dozan Nullah, at which it is still stationed.

During May the sick list averaged about 5 per cent. In June there was a great increase of sickness, the sick list running up to upwards of 10 per cent. of strength, and there were 28 deaths, chiefly from cholera and diarrhœa. In July much sickness from hepatic affections and jaundice: 14 deaths, 1 from cholera and 6 from diarrhœa, but towards the end of the month the health improved. In August there was a marked improvement, and only one death. In September and to the end of the year there was a steady improvement, and only three deaths occurred, viz., ague and pneumonia one, ague and congestion of lungs one, and remittent fever one.

2. The country between Jacobabad and Dadur is an alluvial plain, flooded during the rainy season by overflow of the Nari and other rivers and their tributaries. It is, with the exception of the desert between Burshori and Kassim-ke-Joke, more or less cultivated, cotton and jowaree being the chief products, and the waste land has a moderate growth of brushwood.

The water-supply is deficient and of bad quality. At Nihal-ke-Gote the only source up to October last was from some kutchia wells, the surroundings of which were in anything but good sanitary condition, and the water was scanty. At Burshori the water had an offensive smell and taste, but I believe a supply is now obtained by a canal from the Nari. At



Kassim-ke-Joke the supply was by a canal from the Nari, but on the banks on either side is a considerable village not tending to improve the quality of the water. At Bagh and Hajee-ke-Sher the supply was from the river Nari.

I am unable to give my opinion as to the water-supply along the route by which the head-quarters marched, not having seen any of the stations.

Dadur is on an alluvial plain between the Chota Bolan and the Belooch and Murree Hills. It is about two miles from the entrance of the Bolan Pass. The camp consists of a mud enclosure or fort, in which are the Commissariat stores, and adjacent to it transport lines, &c., and a bazaar. At a distance of a mile is a rest-house and camping ground for troops. Between these the ground is intersected by irrigation ditches, and from these the drinking water-supply is obtained. In the absence of sufficiently stringent conservancy rules, any one familiar with the habits of the natives or ignorant people of any nationality will understand how liable such a water-supply is to dangerous pollution.

The Bolan Pass, which extends from Dadur to Dasht, is a deep cleft, the result of denudation through the limestone and conglomerate hills of Beluchistan, and in its bed is the Bolan River, which, rising from a perennial rock spring in the Dozan Nullah, disappears frequently in the deep shingly bed of the upper part of the Pass, but is a stream of varying breadth and depth from Kirta downwards, and at Dadur is about 40 feet broad by 2 feet deep. The Pass varies considerably in width, spreading out into a wide plain between South Kirta and Mach, and again between Mach and Lower Dozan, but the rest is a narrow glen, and in parts between Kundilani and South Kirta, and in the neighbourhood of Dozan, it is of only some 30 or 40 yards width. The scene is generally bleak and barren, for there are few trees on the hills, and no cultivation except at Kirta. The hills, which rise to a height of some 5,000 or 6,000 feet, or even in a few cases up to 10,000 feet above sea level, are rugged, precipitous, and with numerous boulders and shingle, but with a considerable amount of grass. There is but little brushwood, and in this dry climate no rank vegetation which could be a source of malaria. But in most parts of the Pass the ground is cut up by nullahs, a possible source of malaria in wet weather. The topographical features of the country show the action of mountain torrents, which are apparently produced by the rapid collection of the rainfall or melted snow from the steep hill-sides and from the numerous and extensive glens which open into the Bolan. There does not appear to be evidence of a long rainy season, but rather of a brief but heavy fall rapidly running off.

The soil of the Pass consists chiefly of deep gravel beds, with here and there alluvial deposits, and is dry and wholesome.

The climate varies in different parts and at different seasons. In the lower parts it resembles that of Dadur, which is intensely hot in the hot weather, so much so, that I believe the inhabitants generally migrate to the highlands.

At Dozan, which is at an altitude of some 5,600 feet, the heat in tents in the hot weather reached  $112^{\circ}$ , but the nights were cool, and in properly constructed houses the climate would not have been considered very hot. In the cold weather the thermometer falls to some  $15^{\circ}$  Fahr. at nights, and there is a daily range of some 30 or 40 degrees. In November and December the thermometer fell below freezing point on thirty-seven occasions.

The air in the cold weather is generally dry, fresh, and bracing, and hence pedestrian exercise, which in Bombay is a trouble and only performed as a duty, is here spontaneously resorted to. The sun, however, at noon is hot. The water-supply in the Pass is from the Bolan River, a clear sparkling stream of rather hard water, and therefore tending to the development of dyspeptic complaints. The Dozan Nullah branches off from the Bolan Pass at Lower Dozan. At a distance of two miles from this place the nullah widens to about 1,000 yards, and on the western side of this on a slope is the camp of Upper Dozan. The bed of the Dozan Nullah is shingle, and the hills are of the usual barren, stony appearance, with a sprinkling of stunted trees and shrubs. With the exception of the rough and irregular surface of the ground, which in a wet season might retain water and be a possible source of malaria, there is nothing morbid in the situation.

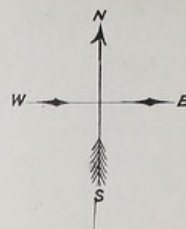
Speaking generally, then, the stations in the Bolan Pass, or at all events those in the upper part, if in well selected positions, should be healthy; there is nothing in the configuration of the country or in the soil to originate disease. The effect of prolonged residence under the condition of soldiers on a campaign will be referred to further on.

The Regiment has been under canvas during the whole of the year. The tents are sepoy's palls, Bengal pattern, and accommodate 44 men. This would be overcrowding but that many of the occupants are constantly absent on guard or other duty. The slope on which the camp is situated has been cut into terraces, and on these the tents are pitched.

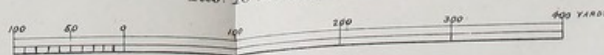
As a protection from the cold, biting winds which blow in the cold season, walls 8 feet high have been built on three sides of the terraces. The subsoil is dry; there is nothing to interfere with the free movement of air, and there is nothing insanitary in the surroundings.



## UPPER DOZAN.



*Yds. 18 Inches = 1 Mile.*



C.R. Philipps, Lieut  
19<sup>th</sup> Regt. Bo. N.1.

January 27<sup>th</sup> 1880.







## Conservancy.

3. Latrines are dug in a deep ravine to the rear and leeward of the camp. They are at a distance of 600 yards from the water-supply, and in a safe position.

## Water-supply.

4. The water-supply is from the Dozan rivulet, which springs from rock some 600 yards up a small nullah, which joins the Dozan Nullah about 600 yards from the camp. From this spot it is carried in a channel in the shingle on the left side of the nullah for some 500 yards, and then by an aqueduct to Lower Dozan in the Bolan Pass. The water is clear and sparkling, but rather hard. A small Brahui outpost of some three or four men occupy a cave—the Dozan or Robber Cave—in the rocks at the entrance of this nullah. But besides these there is no source of contamination except the filthy or careless habits of the sepoys or followers. Very stringent orders have been issued to prevent any one defiling the ground in the nullah, for fecal deposits would certainly be washed into the stream by the first heavy fall of rain. A guard has also been placed over the water. With the comparatively small population now in Dozan I find it difficult to keep the place in good sanitary condition, and when there were several thousand people encamped in different parts of the nullah it must have been almost impossible.

## Food-supply.

5. The sepoys have been supplied with rations by the Commissariat on the following scale: Atta lbs.  $1\frac{1}{2}$ , rice lbs.  $\frac{1}{2}$ , dhal ozs. 4, salt ozs.  $\frac{3}{4}$ , and ghee ozs. 2. There have generally been one or two Baniyas encamped here, but their supplies have been so meagre and dear that, speaking generally, it may be said that the sepoys had nothing but their rations to live on except in the fruit season, when large quantities of fruits, grapes, &c., were brought in from Mustoong and sold at moderate rates. The rations are deficient in anti-scorbutics, and hence, as reported by Surgeon-Major Cates, a considerable number of men and followers became scorbutic, but fortunately the fruits and vegetables brought from Mustoong rapidly removed this taint in most; still nine men and thirty-seven followers were invalided for scurvy, and even now some thirty or forty men show a decided scorbutic taint. The sepoys complained several times that oored dhal caused diarrhoea and indigestion, and asked for toor or moong, which latter is now often supplied. The rations, as I am informed, were of bad quality during the hot weather, and this must have had a bad effect on the health of the men. Soon after I took charge of the Regiment in November I found the flour and rice of bad quality, but recently there have been no complaints.

## Duties, exercise, and amusements, &amp;c.

6. The escort and ordinary guard duties do not appear to have been of such a nature as to be prejudicial to the health of the men. But I find from the monthly report that the work on the roads was very severe, and in the opinion of Dr. Cates injurious to health. On enquiry from the Adjutant, I find that in April and May, when the health of the Regiment, which had been gradually deteriorating, became decidedly bad, the average daily work was eight hours. The nature of the work was laborious, consisting of heavy work in cutting roads on hill-side, carrying stones to build up roads, &c., and it was done at a season of intense heat and without any rest-days until the officer in medical charge recommended a reduction of the hours of labour, and a cessation of work for at least a week. I have not at hand any means of calculating the value of the rations, but if it was constructed to meet the ordinary work of the sepoy soldiers, it must have been insufficient to supply energy for the very hard work I have just alluded to. No addition was made to it by the Commissariat, and, as stated above, there was no local market from which the sepoys could supplement the ration.

The ration contains probably from 270 to 300 grains of nitrogen and upwards of 6,000 grains of carbon. If this is correct, it is not a sufficient diet for men doing so hard work as the sepoys were called upon to do for a prolonged period, and at an exhausting season. The diet should have been made up to nearly 400 grains of nitrogen. It would, I think, be sound economy to allow native soldiers doing hard work under the conditions which obtained last year a ration of meat—8 ozs. would be sufficient. And onions, potatoes, or other anti-scorbutics should also be supplied. It is also worthy of consideration whether the sepoys should not be given firewood. On a consideration of all the facts, it may, I think, be affirmed that the work done by the Regiment was injurious to its health.

## General health and physique.

7. The general health of the Regiment was good at the commencement of the year, and continued so till May, when it began rapidly to fall off, and in June may be said to have been decidedly bad. From August it rapidly improved, the favourable change being due to cooler weather, easier work, and supply of fresh fruits and vegetables from Mustoong. The health is now on the whole good. The physique of the Regiment is about the average. Of the recruits those from the Sind Police are of good physique; some of the others are not of robust frame.

## Hospital.

8. There is nothing to remark about the hospital.



9. Malarial fevers are prevalent in Jacobabad, and probably the whole country thence to Dadur is also feverish after the rainy season. The Regiment marched from Jacobabad to Dadur in January, when probably febrile influences are slight, but nevertheless a large proportion of the sick were cases of ague, of which perhaps a portion were the result of a malarious taint contracted at Sholapur and Hyderabad in Sind. In the Bolan Pass the health was good until May, when the causes above mentioned came into operation. I am unable from personal observation to give any opinion as to the climate of Dozan during the hot weather, but in the cold weather it appears to be healthy. It is not malarious, and the air is pure, bracing, and dry, but in new-comers the usual effects of altitude (as at Mahableshtur) are observable. Europeans here have a fresh, ruddy complexion, favourably contrasting with the washed-out appearance of Anglo-Indians. The jaundice, which gave so many admissions, was probably due to catarrh of the bile ducts, the result, as was also the disorder of the stomach and bowels many of the men complained of, of hard water. There is a constant tendency to the development of scurvy except during the fruit season. On the whole I think that Dozan would be a healthy station for troops if properly clothed, housed, and fed, and if they had some means of amusement.

10. There were 1,612 admissions as compared with 1,244 in the preceding year, when the Regiment was stationed at Kurrachee. Fevers gave 645 admissions, which is less than in the preceding year. Diseases of the digestive system were prevalent, diarrhoea giving 164 admissions, dysentery 113, and jaundice 35. Surgical complaints, mostly of a trifling character, and chiefly abrasions and contusions received on work, gave 143 admissions, and there were 85 admissions for diseases of the respiratory system.

11. There were altogether 69 deaths, of which 4 occurred at the depôt; and of these latter one was a man invalided from Dozan. The most unhealthy months were June, with 229 admissions and 30 deaths, and July, with 185 admissions and 14 deaths. There were 15 deaths from fevers, 10 from cholera, and 18 from diarrhoea. Other causes of deaths were chronic rheumatism (complicated with scurvy) 1, syphilis (with meningitis) 1, phthisis pulmonalis 2, scurvy 1, anæmia 2, bronchitis 3, pneumonia 5, dysentery 2, hæmorrhoids 1, debility 4, congestion of brain 1, contusion of leg (also diarrhoea) 1, and one death occurred at Sukkur of which the cause has not yet been reported.

12. There was a severe epidemic of cholera in June and July, causing 9 deaths. At the same time there were many cases of diarrhoea giving 65 admissions and causing 15 deaths.

Having only joined the Regiment in November, I cannot give a complete history of the epidemic. From inquiries I find the disease first appeared at stations between Jacobabad and Dadur, and that it successively invaded the different stations in the Pass and on towards Kandahar. The climate, meteorology, and geological features of the stations above Dadur are as different as possible from those of countries where cholera is endemic, and inasmuch as none of the stations were permanently inhabited before the Pass was occupied by our troops, it *a priori* appears probable that the disease was introduced from India. Opinions as to the causation of cholera differ. I believe it is caused in the great majority of cases by contaminated water-supply.

Opponents of this theory quote cases in which the epidemic has apparently gone against the current, and the epidemic which swept up the Bolan last year might be adduced in favour of their views. This is a very important point, and I therefore exceedingly regret I am unable to speak from personal observation of the condition of the camps during the outbreak, or of the possibility of the cholera poison having been carried from station to station in the bodies of sick camp followers (transport or other) or Brahois. But a somewhat careful examination of the different stations as I was proceeding to join my Regiment in October last led me to the opinion that there was then nothing incompatible with the view that contaminated water-supply might have been a cause.

It is a noteworthy fact that, as I am informed, the outbreak of cholera at Dozan occurred a few days after heavy showers of rain.

13. There was no vaccination during the year. I have obtained a supply of lymph for the purpose of vaccinating the recruits recently joined.

14. Fifty-seven men were discharged during the year. Of these thirteen were sent down from field service and forty invalided from the depôt. Four men were discharged on completion of 32 years' service. Besides these, eight men were sent down from Dozan for change of air, having become temporarily unfit for active service.



15. On field service a Regiment is much broken into detachments; some increase of the hospital establishment is therefore desirable. When this Regiment was ordered on field service the Medical Officer was ordered to indent for dandies at the rate of 10 per cent. of strength, bearers 4 per dandy, and a certain proportion of muccadums. This amount of sick carriage would not have been superfluous if the Regiment had been sickly on the march or been engaged with the enemy. In a country where local carriage is not obtainable, and where, as for instance when we left Dozan, it may be impossible to leave any sick behind, sick carriage should be provided for at least five per cent. of strength. Dandies, though in some respects and for some cases objectionable, are from their lightness preferable to doolies. The doolies we have weigh about 140 lbs., and I have found that six ordinary bearers will not carry a sick man over a march of ten miles or more in good time; they eventually straggle in, but the sick are on the road without proper food, medicines, or attendance for a length of time, which must be more or less injurious. There should be, I think, eight bearers per dooly, and six per dandy, and 5 per cent. to replace those who may fall sick. The bearers should be carefully selected men. Many of those sent up to this Regiment in December are not strong enough to carry a dooly or dandy.

The field panniers are excellent, but would be improved if iron rings were attached to them, by which they could, by means of ropes, be slung on a mule. The straps and buckles get soon worn out.

I regret the incompleteness of this report, which, however, is unavoidable, as I had not an opportunity of obtaining from Surgeon-Major Cates any details from which to supplement the facts in the hospital records. It has seemed to me right to compile a report, however imperfect, of the Regiment during the year as a contribution towards the medical history of the campaign.

16. The hospital establishment has worked well since I took charge of the Regiment, and I beg to bring to notice the energy and ability of Hospital Assistant Gopal Cuddum.

### H. M.'s 30th Regiment N. I.

QUETTA.—In medical charge of Surgeon K. R. KIRTIKAR.

Average Strength.....	730	Deaths in Hospital .....	40
Do. present .....	723	Do. out of Hospital .....	4
Admissions .....	1,620	Invalided .....	38
Daily Sick .....	62·5	Sick Leave .....	12

Years.	Stations.	Rate per cent. to Average Strength present of		
		Admissions.	Daily Sick.	Deaths in Hospital.
1876.....	Jacobabad .....	248·8	6·0	7·2
1877.....	Do. ....	139·3	4·1	2·1
1878.....	Mitre, Jacobabad, & Quetta.	230·9	5·4	0·5
	Average ...	206·3	5·1	3·3
1879.....	Quetta.....	224·0	8·6	5·5

1. At the commencement of the year 1879 the head-quarters and Left Wing of the Regiment, consisting of 344 men, were at Quetta under canvas. The Right Wing, 260 strong, was at Khelat, and the dépôt, consisting of 97 men, was at Jacobabad. In the months of August and September, small parties of the Left Wing relieved similar parties of the Right Wing till the wings at Quetta and Khelat had changed places. Thereafter the wings remained in their respective places till the end of the year. Both the wings have from time to time furnished treasure, transport, and other escorts between Kandahar and Dadur. Small detachments from Khelat were also furnished during the year as Commissariat guards at Tiri and Mustoong.

2. From the time the Regiment arrived here on the 3rd of November 1878 to the 1st of April 1879, the men were under canvas in the Fort.



The officers' tents were on the *Miri* (citadel) and the men were on lower ground. On the 1st of April the officers and men moved into barracks which they were occupying when the year closed. On the outbreak of cholera in the cantonment in June last, the men left barracks and lived under canvas about 600 yards to the north of the barracks. At the same time the hospital was removed about a mile and a half away from the barracks, in the direction of the Hanna Pass, to good high ground, very near a flowing stream of clear water issuing from the Pass. In September the men returned to barracks after the latter had been thoroughly disinfected and whitewashed. The hospital also was removed into cantonment in October. The barracks are made of *kutch* bricks with mud-plastered walls and roofs. The men's quarters consist of eight separate blocks facing north and south, in parallel rows of four, with a passage 22 feet wide between. Between each block there is a space of 50 feet. Each block is divided into two compartments by a central wall reaching to the roof and has six doors 6 feet  $\times$  3 feet and a verandah with twelve arches on either side. There is no communication between the two divisions. Each division is again sub-divided into two by a massive arch. Each sub-division is 23 feet long, 9 feet broad, and 10 to 12 feet high, and has one fireplace. The cubic space of each block, roughly speaking, is about 10,000 cubic feet. There is a small room at the eastern end of each compartment for a non-commissioned officer. A block and a half on the southern side are used for the hospital. At the western end of each block there are separate roomy, well-ventilated quarters with verandahs and enclosed backyards for native officers. At the southern side of the barracks are two sheds with arches for native followers. The arches are effectually closed against wind by means of mats. The quarter-guard, dispensary, and hospital assistants' quarters are entirely separate from the men's lines, and are situated to the north and south of the blocks, respectively. They are roomy with verandahs and glass-pane windows. The officers' quarters are 500 yards to the south-east of the lines. Each officer has a roomy house or a set of rooms with the necessary out-houses.

The position of the lines is on very low ground. Seen from the Kakur village, which lies to the north, the whole cantonment appears to be situated in the basin of the valley. Coming down from Siriab into the cantonment the descent is notably marked. There is plenty of open space all round the men's lines; ventilation is therefore as free as it could possibly be in lines built on the system of parallel rows of blocks. Near the officers' quarters there is an extensive orchard of mulberries, apricots, and almonds. The ground in the immediate vicinity of the camp is in a satisfactory state; that at the distance of about two miles to the north, by sheer force of unavoidable circumstances, is the graveyard of many a hundred of camels and men. The latter condition requires particular mention on account of the position of the cantonment on low ground, where in times of rain and snow water accumulates, or at any rate passes through. The running *nullahs* under such circumstances act as drains of surface water or sub-soil water permeating the higher burial ground.

3. The conservancy arrangements in the Regiment are carried out by means of sweepers. At one time the dry-earth system was carried out in trenches dug for latrines. Old trenches were filled up with dry earth thrown in daily in measured quantity, and new ones dug as the old ones were filled up. This practice being likely to cover in time a good deal of ground near the lines, was dispensed with before the close of the year, and a conservancy cart carried away morning and evening the collected excreta and sweepings of the barracks and hospital. This rubbish is buried miles away from the cantonment. The stable litter is made over to the P. W. Department for use in lime-kilns, or is burnt near the stables.

There is no drainage system in Quetta. On either side of several roads in the cantonment and civil camp there are deep trenches for carrying away surface water. As a rule these are dry, except when it rains or snows.

Permanent latrines would be a decided advantage if troops are to occupy Quetta for any length of years. No protection whatever from the inclemencies of winter is possible in enclosures of mats far removed from barracks and hospital. The inability of the Commissariat Department to procure earthen *gumlahs* and baskets here has interfered greatly with the conservancy arrangements of the hospital.

4. Water is abundant in running streams and *nullahs*, which come down from the surrounding hills. Between the Kakur village and the lines there is a "karez" (subterranean water-course) running from south-east to north-west. There is a well 30 feet deep near the quarter-guard, from which several men in the lines draw their water, which though muddy is sweet, and clears on standing. This water is safer to a certain extent than the running water from surface *nullahs* as being less liable to contamination. The officers and others who do not object to the *bhistee's* water are supplied with it from a flowing spring issuing from the ground on the south-eastern side of the officers' quarters.

To all external appearance the water is clear, crystal, and sweet. Whence the springs, which are perennial, derive their origin it is not possible to determine. As it flows, it has all



the disadvantages of surface water. It is liable to contamination, especially when melting snow or a shower of rain washes down from the sides of hills all kinds of deleterious matter. Such surface water is rendered still more injurious during the hot weather when evaporation is rapid and increased, and water getting concentrated, is charged with a greater proportion of organic and inorganic and dissolved and suspended impurities. It is on account of this condition of the water, I believe, that in summer catarrhal diseases of the bowels prevail in larger numbers.

I have myself made no analysis of the water, but I have no doubt it contains alkaline and other salts, judging from the thick white efflorescence left on patches of ground where water has collected and dried up. Along the sides of the *nullahs* which pass through the cantonment in various places a thick collection of this saline efflorescence is often noticeable; chlorides seem to be present in abundance, as a weak solution of nitrate of silver produces milkiness in the water.

Another and more frequent source of contamination of the nullah water is the innate desire of all the lower classes of the natives of washing themselves in the streams, whenever and wherever they can do so, observed or unobserved, without the slightest regard as to who the future user of the water will be. In times of epidemics, and in the case of men affected with diseases like dysentery, washing themselves in the *nullahs* after depositing their excreta close by, such thoughtless and culpable fouling of water assumes a very grave aspect. If the purposes of irrigation require the nullahs to be kept up, they should be deep and not quite readily accessible for the purposes of ablution. But by far the best way of storing water to ensure a perennial supply is to dig wells in the vicinity of the streams, and thus effectually stop all chance of fouling.

5. Men draw compensation from Government instead of the rations as per Field Service Food supply. Scale. In a station like Quetta, where provisions are procurable, though at advanced prices, the system of compensation is an advantage, especially as regards *atta*.

The Commissariat *atta* from the very nature of the surrounding circumstances is sometimes very old, and although it may not be mouldy or otherwise injurious, it is often bitterish and oily to the taste. The sepoy prefers purchasing *atta* in the bazaar. The water-mills worked at this station by the natives afford a ready means of obtaining fresh *atta*. With regard to the Field Service Scale of rations it may be remarked that condiments will not be an unwholesome addition to the native scale, whereas occasional issue of meat will counteract the deteriorating effects of hard work in a foreign soil. Fruit is abundant in summer, and is of various kinds, such as mulberries, apricots, peaches, pears, quinces, apples, grapes of various sorts, pomegranates, almonds, &c. Raddishes, carrots, wild onion and garlic, and a variety of spinach, maize, barley, and wheat grow abundantly all round. The soil is so fertile that English vegetables thrive very well. It would doubtless be a very useful recreation for the men to set up a regimental garden. The soil is rich enough to reward any little labour or time expended on it. Vegetables are scarce in the bazaar, except in summer, yet, with a little well-directed labour the men in the Regiment can be supplied with greens at all times of the year by encouraging the establishment of regimental gardens. The willow, the poplar, and the *dalbergia sissoo* grow to a very great height here. Dandelion, varieties of fragrant lilies, and iris, dill, carraway, peppermint, and a variety of thyme grow wild all over the valley.

6. The duties have been very heavy during the year. They consisted principally of Duties, exercise, and amusements. guards in the station and escort between Dadur and Kandahar. Considering the whole regiment as a body, although the number of nights in bed have been shown in the return as 3.5 on an average throughout the year—in itself indicative of heavy duty—the guards' duties, which have fallen to the share of the men at Quetta, have been heavier still. Over a greater portion of the year the number has been less than three consecutive nights in bed at Quetta. The men at Khelat had only four nights in bed, which I consider should be the minimum number in cold weather. The Sindhis and Panjabis are fond of out-door exercise, such as wrestling and gymnastic feats, which they indulge in on holidays. They require encouragement. I have already said above that regimental gardening will be in a station like Quetta both a lucrative and desirable amusement.

7. The general health of the Regiment during the year under report has by no means been an improvement over that of the preceding year. The General health and physique. admissions and the mortality have been higher. The principal cause may be found in the very arduous duties the men had to perform in a climate entirely different from their own in its seasonal changes and severity, not forgetting at the same time the fact that the Regiment belongs to a place already well noted for its malarial influence. The physique of the older sepoys, however, is good; that of the recruits and young soldiers is indifferent, with a few exceptions. Considering that the Regiment has been in Beluchistan



for the most part under canvas since the beginning of 1878, the physique of the men has kept up fairly well.

Hospital and its surroundings.

8. Described under para. 2.

9. The valley of Quetta is situated 5,500 feet above sea level at latitude  $30^{\circ} 10' 50''$  and longitude  $67^{\circ} 2' 51''$ . It extends north to south, and takes a bend eastward near the Fort. It covers a length of about thirty miles, and is from three to five miles broad. The extent of the hills around is from two to eight miles, presenting a bare surface of apparently burnt clay and rock. To the north runs the river Lora, cutting through the western portion of the valley and debouching over the Pisheen Valley. The several nullahs and water-courses in the valley of Quetta empty themselves into the Lora. The climate of Quetta is delightful to those who belong to the temperate zone. To the inhabitant of Hindustan proper and to the Sindhi and Dekkani Maratha it is quite otherwise in winter months. For him the snow, the frost, and the keen cutting winds are too much to bear, especially when on sentry duty.

The thermometer ranged between  $2^{\circ}$  to  $98^{\circ}$  Fahr. during the year, November being the month in which the lowest, and August the month in which the highest temperature was registered. The prevailing direction of the wind during the year was mostly W.N.W., in June it was S.S.W., and in November N.N.W. Small dust whirls and occasionally violent dust-storms prevail at midday and in the afternoon more or less throughout the year. During winter months electric tension is so strong in this valley that brisk rubbing of woollen clothes or dry human hair elicits a series of electric sparks in the dark. Rainfall throughout the year is registered 2.86 inches, lasting twenty-two days between January and June.

The habits of the various classes of natives forming the Regiment are not an unimportant factor in the causation of disease. The Sindhi is proverbial for his filthy habits. Cutaneous diseases are therefore common among Sindhis. Their quarters require rigid and repeated supervision to bring them to the standard of ordinary cleanliness. The Hindu of Hindustan proper has a habit of eating one meal a day, during which he stuffs himself with a large quantity of unleavened bread and *dhal*. This is productive of disturbances of the alimentary canal.

With regard to the influence of local conditions on the men, it may be observed that the Regiment is living here under several unfavourable circumstances. Fuel is extremely dear, and not easily procurable. One rupee and even more per maund is a prohibitive price. Milk, eggs, and meat are not easily to be purchased in the bazaar. This interferes materially with the diet of the sick. They have therefore to be fed at Government expense, where very serious cases require careful and substantial feeding.

Venereal diseases, soft chancre, and gonorrhœa have been contracted here by some of the men. The number of such men is very small, but as Quetta is daily improving, the advent of a few prostitutes follows as a matter of course. As a precautionary measure, therefore, if the Contagious Diseases Act were brought into force it would confer a great boon. I have had opportunities of observing that venereal diseases are largely prevalent among the natives of Beluchistan. It is therefore the more incumbent to protect the sepoy as much as possible.

10. Malaria and its sequela stand pre-eminent in the causation of disease in the Regiment. Out of 1,620 admissions in the year, 624 were for quotidian ague, 1 for tertian, and 79 for remittent fever; 3 were for congestion of the spleen. Thus very near half the admissions were from malaria. Enlarged spleens, however, were diagnosed in several cases admitted for other complaints. Admissions for rheumatic complaints of all kinds were 38. They are generally very trying, and chiefly occur among old and worn-out sepoys. Affections for primary and secondary syphilis were 28; of these some originated here, others came from Jacobabad and Dadur. Twelve admissions for scurvy were registered. Although this looks a small number, scurvy prevails in the Regiment to a very large extent, and complicates several cases in a hopeless manner. Nearly a hundred men have been for some time taking lime-juice freely, and the whole Regiment is inspected every week for scorbutic gums. In the absence of other fresh vegetables, men are strongly recommended the use of onions and potatoes. There is one case of epithemolia of the finger. There were some among them of a typically progressive pernicious nature. There were only 5 admissions for nervous diseases, 2 for epilepsy (the same man admitted twice), 2 for hemicrania, and 1 for sciatica. Twenty-four cases were admitted for eye diseases; of these 19 were for conjunctivitis, 3 for keratitis, 1 iritis, and 1 gonorrhœal ophthalmia. Diseases of the circulatory system have been very few. There was only one case of pericarditis and 3 of varicose veins. There were 100 admissions recorded for lung diseases, of which 15 proved fatal. Pleuro-pneumonia and acute bronchitis have been the chief causes of death in these cases. There were 285 admissions recorded for diseases of the digestive system. Of these 144 were for diarrhœa, the largest



number being between April and September. There were 96 cases of dysentery. Although only one death has been recorded from this affection, many a convalescent from ague, remittent fever, anæmia, or chronic rheumatism has been carried off by dysentery. Liver diseases are rare, there having been only 3 cases of congestion of the liver. There were only 12 admissions for jaundice, yet jaundice has frequently been a complication of catarrhal diseases of the bowels during the latter part of summer. *Tænia solium* is not an uncommon parasite to find in Beluchistan, although there is only one case recorded here. Kidney diseases seem to be rare. There were 10 admissions for gonorrhœa and 7 for orchitis. Eight cases were treated for diseases of the organs of locomotion; 4 for acute synovitis of the knee, 1 for chronic, and 3 for inflammation of tendon. Of diseases of the cellular tissue there were 29 admissions; 2 of these were for inflammation and 25 for abscess of a more or less superficial kind. There were 138 cases of cutaneous diseases admitted during the year. Boils and ulcers, principally of a scorbutic nature, are very common, 44 having been treated for the former and 40 for the latter. Ten were treated for deep and painful fissures of foot, due to cold. A combination of glycerine and cokum oil (*Garcinia purpurea*) is a very soothing and efficacious application. I have used this oil very freely in the cold weather here for chapped hands and lips, and it has been a very favourite application among those whose skin has suffered from exposure to cold. Being solid at ordinary temperature, it is best softened with glycerine. It is thereby rendered easy of application and action, especially after washing the parts in warm water. Two cases were treated for herpes zoster. There were 21 cases of debility following cholera, pneumonia, repeated attacks of ague, diarrhœa, chronic dysentery, &c. Most of them were invalidated by the Annual Invaliding Committee. There were 3 cases of insect bite, followed by rapid and intense œdema; two of these cases had small abscesses formed at the seat of the bite. There were 70 admissions for various injuries. Contusions 43: 1 case of fracture of ribs and 1 of gunshot wound; 9 cases of sprains of the limbs; 11 cases of wounds of the extremities from trivial causes; and 4 cases of blisters of feet after marching, complete the list of injuries. One case of malingering insanity was convicted and punished by the Officer Commanding after trial by summary court-martial about the close of the year. One case is shown as "of no appreciable disease." It was in a man whose left elbow joint was dislocated nine years ago. There was no acute or chronic mischief in the joint, nothing but the subjective symptom of pain. One case is returned as "not yet diagnosed," as the patient came into the hospital on 31st December with febrile symptoms. The diagnosis was reserved till the following day, when he was admitted for quotidian ague.

11. There were twenty-one deaths at the head-quarters, Quetta. Of these I can speak of only four which occurred after I took charge of the Regiment on 25th July 1879. One case was admitted into hospital for ague quotidian and enlarged spleen on 3rd June 1879; while convalescent, he was carried off by chronic dysentery on the 19th of September 1879. Another, admitted for chronic rheumatism on the 24th May, was attacked with dysentery on the 1st of September 1879. The disease ran exactly the same course as in the first case, and carried off the patient on the 24th of September. The third died from acute bronchitis ending in capillary bronchitis, to which the man succumbed in about a week. He died on the 29th December 1879. The fourth died from chronic diarrhœa. Of the remaining 19 deaths at head-quarters, 11 died of cholera in June and July, 1 of dysentery, 1 of ague and ascites, 3 of pneumonia, and 3 of acute bronchitis.

There were eight deaths at Khelat; three from pleuro-pneumonia, two from pneumonia, one from pleurisy, one from enteritis, and one from remittent fever. Five deaths occurred at Tiri from cholera, and two men died on their way from Khelat to Quetta of general debility. There were four deaths at the dépôt at Jacobabad, one from phthisis pulmonalis, one from chronic bronchitis, and one from pneumonia and two quotidian ague. Four died while away on sick leave to their native country. One death occurred among the European officers from suicide by shooting himself through the temples.

12. The first case of cholera in the Regiment occurred on the 17th of June and recovered. The epidemic lasted fourteen days. Twenty-four men were attacked in all, of whom thirteen recovered. The gradual decrease in the severity, except the first day of the disease, was remarkable. It has been already noted that the hospital and barracks were at once left on the outbreak of the disease, and they were not occupied till October and September, respectively, after thorough disinfection. Of the outbreak of cholera at Tiri, where five men died, nothing is known. The last day of the discharge of cholera cases from the head-quarters hospital after recovery was the 16th of July, when seven men were sent to duty.

13. On inspecting the men at head-quarters from time to time in October, November, and December, 175 men out of 377 seemed to require re-vaccination, as 51 of these cases are of doubtful nature and the rest show no marks of small-pox or vaccination. Forty-two native followers also require re-vaccina-



tion. Application has been made to the Deputy Sanitary Commissioner, Sind Division, for the supply of lymph. Even if lymph were available now, the call for duty is so pressing that men will not be easily available for the purposes of re-vaccination. But on opportunity presenting the doubtful cases will be attended to.

14. One subedar-major, two havildars, and fifteen sepoy were invalided at the head-quarters. Of these one was over 35 years' service, two over 21 years', four over 15 years', six under 12 years', and the remaining five under 4 years'. Ten were invalided for general debility following repeated attacks of malarial fevers, chronic interstitial pneumonia, chronic dysentery, and chronic diarrhoea. One sepoy under two years' service was invalided for pernicious progressive anæmia following cholera; one was invalided for enlarged spleen, one hernia, one for pulmonary phthisis with enlarged spleen, one for keratitis, one for chronic diarrhoea, and one for chronic rheumatism. Eighteen men were invalided at the depôt at Jacobabad: seven for debility, two for syphilis, one for hernia, and two for deafness, &c. Two men besides, having been over 32 years' service, were pensioned. Thus a total number of 38 were discharged for permanent unfitness for further active service.

15. The addition of a *dhobie* to the strength of the enlisted followers of the Regiment would be valuable on service, when only a limited amount of kit is allowed to the sepoy. When war service is prolonged and clothes are few, and when the natural tendency of the men is not towards wearing clean clothes, the want of a *dhobie* becomes a pretext for wearing filthy under-clothing. Men are made to wash their own clothes to ensure cleanliness, but such washing must, as a matter of course, be inefficient. The addition of a cook to the hospital establishment is still desirable. In my report of the 19th Regiment for 1878 I have already expressed myself on this subject. For such men as are not allowed "attending men," some one is required to cook. I therefore again request that a cook be allowed on the permanent establishment of the hospital.

This perhaps will be a fit place for making one or two observations on the training of bandsmen with a view to their being able to attend the sick on the field. Compliance with paras. 11 and 12, Section XIV., Bombay Medical Code, on this subject is only possible in regiments that have a band. In a regiment like this, where there is no band, and even in regiments wherein bandsmen are available for being trained for applying tourniquets, the removal of the wounded has to be left to untrained hands. Instruction to dooly-bearers in times of war is necessarily hurried, and it is not every dooly-bearer that is intelligent or willing to benefit by it. A body of trained bearers would be a valuable acquisition to the Field Medical Officer. As regards the construction of permanent latrines I have already observed in para. 3 above.

With regard to the Resolution of Government restricting the supply of quinine, I have this to observe. Malaria is such a prominent factor in the causation and complication of disease, not only as productive of paroxysmal and remittent fevers, but it so often, indeed so almost invariably, complicates pulmonary affections and diseases of the alimentary canal and other digestive organs, that its effects have to be counteracted by quinine when nauseating combinations like the mixed cinchona alkaloids are productive of positive discomfort, slower in action, and otherwise less beneficial than quinine. A large allowance of quinine therefore is essential. Mixed alkaloids and quinidine sulphate (which latter I am now using largely with good effect) are useful in their way for trivial exacerbations of fever, where irritability of stomach is absent. But yet quinine, combined with small doses of arsenic or sulphate of iron or otherwise, holds its own as a more powerful antagonist of malarial poison.

16. Beyond what I have already said in the body of the report I have nothing to add. I have been trying the effects of *mudar* powder in cases of dysentery. Nineteen cases were treated during the year with good effect. I am still engaged in further investigating the effects of this drug in suitable cases.



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STATEMENT.

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Showing the SICKNESS, MORTALITY, and INVALIDING in the

N.B.—The Regiments are placed as they stood

REGIMENTS.	STATIONS.	Movements in the year.	Average daily strength present during the year.	Do. absent do.	Total average daily strength during the year.	Average daily sick.	Admissions during the year.	DEATHS.			Average daily sick per cent. to average strength present.	Ratio per cent. of admissions to average strength present.	RATIO PER CENT. OF DEATHS.					
													In Hospital.	Out of Hospital.	Absent.	To average strength present.	To admissions.	To average strength present and absent.
PRESIDENCY DIVISION, ADEN,																		
Aden Troop ...	Khor Maksar ...	None.	86	14	100	3.5	180	1	...	...	4.1	209.3	1.2	0.5	1.0			
9th Regiment, N. I. ...	Bombay ...	None.	642	51	693	25.0	909	6	...	...	3.9	141.5	0.9	0.6	1.1			
21st do. ...	Do. ...	None.	666	29	695	25.7	1,227	8	...	...	3.8	184.2	1.0	0.6	1.4			
25th do. ...	Aden ...	None.	644	19	663	32.9	584	4	...	...	5.1	78.3	0.6	0.7	1.0			
28th do. ...	Surat ...	None.	625	66	691	35.8	1,489	14	...	...	5.6	238.2	0.9	0.9	2.7			
No. 1 Co., Sappers & Miners.	Aden ...	None.	60	...	60	2.1	4	...	...	...	3.5	80.0	...	...	...			
Total...			2,723	179	2,902	125.0	4,357	33	2	10	4.6	169.1	1.2	0.7	1.5			
POONA																		
2nd Regiment, L. C. ...	Poona ...	None.	445	29	474	19.3	598	2	1	...	4.3	134.4	0.4	0.3	0.6			
Poona Horse ...	Sirur ...	None.	462	31	493	6.5	218	...	...	...	1.4	55.9	0.6	1.1	0.6			
Depôt and 3rd and 4th Companies, Sappers & Miners.	New Jhansi ...	None.	103	...	103	5.8	192	...	...	...	5.6	186.4	1.0	...	...			
4th Regiment, N. I. ...	Poona ...	Record lost in Afghanistan.	648	35	683	23.5	732	4	...	2	3.6	116.0	0.6	0.5	0.8			
8th do. ...	Satara ...	None.	690	25	715	34.8	872	7	...	4	5.5	138.4	1.1	0.8	1.6			
11th do. ...	Poona ...	None.	610	96	706	15.5	639	3	...	3	3.3	104.7	0.4	0.2	1.0			
14th do. ...	Belgaum ...	None.	625	83	708	30.2	792	24	1	...	4.6	125.7	0.8	0.3	3.6			
16th do. ...	Malegaon ...	None.	643	37	680	19.8	617	3	...	1	3.1	95.9	0.4	0.4	0.5			
17th do. ...	Dharwar ...	None.	624	15	639	10.8	545	...	2	...	1.7	87.0	0.3	0.3	0.6			
18th do. ...	Poona ...	None.	596	57	653	40.6	1,343	...	...	1	6.8	235.3	0.3	0.1	0.4			
22nd do. ...	Belgaum ...	None.	639	44	683	21.2	696	...	...	2	3.3	108.9	0.8	0.7	1.0			
23rd do. ...	Ahmednagar ...	None.	...	...	...	...	...	...	...	...	...	...	...	...	...			
Total...			6,025	452	6,477	231.0	7,302	57	9	10	3.9	121.2	0.9	0.7	1.2			
NORTHERN																		
1st Regiment, L. C. ...	Neemuch ...	None.	456	22	478	21.0	621	4	...	...	4.6	136.1	0.8	0.6	0.8			
3rd do. ...	Deesa ...	None.	450	24	474	17.7	677	...	...	2	3.9	150.4	...	...	0.4			
No. 1 Mountain Battery	Rajkot ...	3rds of the strength proceeded to Sukkur in Nov.	107	6	113	8.3	328	1	...	1	7.7	306.5	0.9	0.3	1.7			
2nd Regiment, N. I. ...	Nusseerabad ...	None.	604	84	688	51.9	1,423	12	...	3	8.6	235.6	1.9	0.8	2.0			
6th do. ...	Mhow ...	Not e.	610	57	667	19.4	878	2	...	3	3.2	143.9	0.3	0.2	0.7			
7th do. ...	Bhuji ...	None.	601	92	693	41.1	1,156	10	...	6	6.8	192.8	1.6	0.8	2.3			
10th do. ...	Neemuch ...	None.	617	86	703	46.1	1,444	10	...	1	7.5	234.0	1.6	0.7	1.5			
12th do. ...	Rajkot ...	None.	699	10	709	39.4	1,846	11	1	...	5.6	264.1	1.6	0.6	2.1			
13th do. ...	Mhow ...	None.	633	41	674	13.9	747	4	...	1	2.2	118.0	0.6	0.5	0.7			
15th do. ...	Ahmedabad ...	None.	645	55	700	57.7	1,345	11	...	5	8.9	208.5	1.7	0.8	2.2			
20th do. ...	Baroda ...	None.	673	27	700	58.8	2,067	10	1	...	8.7	311.6	1.4	0.9	1.5			
24th do. ...	Mehidpur ...	None.	670	45	715	28.7	1,623	5	...	...	4.3	242.2	0.7	0.3	0.7			
26th do. ...	Deesa ...	None.	614	45	659	23.5	607	5	...	3	3.8	98.8	0.8	0.8	1.0			
Total...			7,379	594	7,973	427.5	14,793	65	2	26	5.8	209.5	1.1	0.6	1.4			
SIND																		
1st Sind Horse ...	Jacobabad ...	195 in average strength were in Jacobabad and the remaining on Field Service.	522	4	526	16.5	648	15	1	...	3.2	124.1	2.8	2.3	3.0			
2nd do. ...	Do. ...	243 do. ...	462	27	489	17.2	525	12	...	1	3.7	113.6	2.6	2.2	2.6			
3rd Regiment, N. I. ...	Hydrabad ...	None.	669	12	681	61.5	1,839	11	...	1	9.0	274.8	1.6	0.6	1.7			
5th do. ...	Kurrachee ...	None.	763	12	775	23.4	1,069	9	1	2	3.0	138.0	1.2	0.8	1.5			
27th do. ...	Jacobabad ...	245 in average strength were in Afghanistan.	680	10	690	32.1	709	12	...	...	4.6	115.9	1.7	1.6	1.7			
Total...			3,110	65	3,175	150.7	4,871	59	2	4	4.8	156.6	1.8	1.2	2.4			
CABUL																		
Sappers and Miners ...	Afghanistan ...	None.	294	7	301	22.2	859	8	...	...	7.5	392.4	2.7	...	...			
No. 2 Mountain Battery	Do. ...	No report nor return.	518	65	583	17.7	655	41	6	...	3.4	136.4	7.9	6.2	8.0			
3rd Sind Horse ...	Khooshdikhan ...	None.	898	29	927	31.5	2,145	47	...	2	3.7	265.4	5.8	2.1	5.8			
1st Gr. Regt. N. I. ...	Afghanistan ...	None.	826	16	842	39.4	1,614	68	3	...	4.7	195.1	7.9	4.1	8.2			
19th do. ...	Bolan Pass ...	Record lost in Afghanistan.	723	7	730	62.5	1,629	40	...	4	8.6	224.0	5.5	2.4	6.0			
29th do. ...	Afghanistan ...	None.	...	...	...	...	...	...	...	...	...	...	...	...	...			
30th do. ...	Quetta ...	None.	...	...	...	...	...	...	...	...	...	...	...	...	...			
Total...			3,169	124	3,293	173.3	6,921	202	9	6	5.5	218.3	6.3	2.9	6.0			
Grand Total.....			22,406	1,414	23,820	1,107.6	38,216	436	24	56	4.9	170.6	1.9	1.1	2.2			



## NATIVE ARMY of BOMBAY, for the Year 1879.

in the Army List on the 1st of July 1879.

INVALIDED.					Discharged by Commanding Officers at their own request, &c.	Desertion, struck off for bad conduct, &c.	CONSTITUTION OF THE REGIMENT.								Strength remaining on rolls on 31st December 1879.	Average number of consecutive nights in bed.	Number of Recruits joined during the year.	REMARKS.
Invalid for discharge.	Discharged for physical disability.	For change of climate.	Hindus.				Mahomedans.		Christians.		Others.							
			Strength.	Died during the year.			Strength.	Died during the year.	Strength.	Died during the year.	Strength.	Died during the year.						
AND BOMBAY MARINE.																		
1	4	...	1	39	...	61	1	...	...	...	...	100	6.0	3	Includes Det. at Janjeera. Do. on Board the several steam-ships, &c. Do. at Perim.			
23	8	30	7	563	...	96	1	17	...	1	...	677	2.5	122				
49	9	36	...	445	7	223	3	23	...	4	...	695	3.9	83				
28	1	39	...	540	6	92	1	5	...	7	...	644	3.4	...				
36	12	57	...	606	16	98	3	11	...	10	...	725	7.5	85				
6	...	1	...	48	...	3	...	1	...	1	...	53	3.3	...				
143	30	167	7	23	2,241	36	573	9	57	...	23	...	2,894	4.4		293		
DIVISION.																		
44	3	17	...	2	266	3	196	...	7	...	...	469	9.5	46	Includes Dets. at Bombay and Assirghar.			
9	1	5	4	7	97	...	387	3	...	...	...	484	10.7	14				
5	...	...	...	...	50	2	8	...	...	...	5	...	63	4.8		71		
31	...	24	8	4	535	4	105	2	16	...	22	...	678	4.1	56	Includes Det. at Kulladghee. Do. at Tanna.		
53	20	17	1	9	582	7	73	4	1	...	3	...	659	5.9	146			
35	1	14	...	6	563	5	58	2	74	...	16	...	711	5.1	115			
21	5	14	...	9	678	25	93	1	10	...	10	...	791	7.0	137			
24	3	10	...	6	564	4	79	...	18	...	8	...	669	4.8	57			
11	21	8	...	3	639	3	46	1	11	...	9	...	705	4.9	150			
60	1	15	9	8	479	3	90	...	20	...	14	...	693	6.5	122			
14	5	11	...	3	519	6	131	1	19	...	9	...	678	5.7	75			
307	60	135	22	57	4,972	62	1,266	14	176	...	96	...	6,560	6.2	902			
DIVISION.																		
16	3	10	2	3	315	3	159	1	8	...	...	482	9.4	53	Includes Det. at Nusseerabad. Do. Squadron at Enjkat.			
10	...	6	...	3	314	2	163	...	3	...	...	480	5.4	38				
16	...	2	3	1	23	2	9	...	...	...	1	...	33	4.0		5		
29	1	24	3	1	525	14	66	...	17	...	21	...	629	4.8	32	Includes Det. at Dwarka. Do. at Indore. Do. at Sadra. Do. at Angar.		
65	11	18	10	1	493	5	84	...	22	...	6	...	605	5.2	84			
50	1	13	...	2	538	12	109	4	19	...	5	...	671	4.5	61			
43	8	44	1	1	533	8	103	2	13	1	11	...	669	7.6	62			
32	2	3	2	...	541	11	112	1	15	1	31	2	699	5.0	78			
26	11	4	...	8	554	4	83	1	3	...	6	...	651	6.0	69			
34	...	17	1	4	581	15	69	1	12	...	8	...	670	4.5	48			
22	1	35	1	5	604	10	85	1	11	...	3	...	703	6.8	75			
10	5	5	...	8	597	5	91	...	21	...	17	...	726	7.7	74			
21	3	6	4	6	587	6	79	1	13	...	3	...	682	3.6	89			
374	40	187	27	43	6,295	97	1,217	12	157	2	112	2	7,691	5.7	788			
DIVISION.																		
12	2	16	7	8	62	...	473	16	...	...	...	535	4.2	103	Includes Det. at Jacobabad. Do. Depot at Ahmedabad.			
15	7	13	3	2	75	...	400	13	5	...	...	480	4.0	46				
30	2	33	...	...	411	5	151	7	2	...	130	...	694	6.2		40		
25	1	8	...	7	642	2	124	10	7	...	...	...	773	6.5		...		
40	...	24	1	23	160	2	511	10	...	...	...	...	671	4.0		55		
132	12	94	11	40	1,350	9	1,619	56	14	...	130	...	3,153	5.9	244			
EXPEDITION.																		
...	...	8	...	2	435	7	107	1	...	...	30	...	572	*	13	Includes Det. at Jacobabad. Do. Depot at Ahmedabad.		
5	...	16	3	11	170	3	383	44	4	...	...	...	557	3.2	125			
10	...	20	1	9	743	47	109	2	16	...	1	...	860	4.2	31			
53	4	8	...	...	703	62	96	5	33	2	15	...	847	5.6	84			
19	19	12	6	21	343	25	428	19	...	...	...	...	771	3.5	173	Includes Det. at Jacobabad.		
57	23	64	10	43	2,394	144	1,114	71	53	2	46	...	3,607	4.1	426			
1,043	171	647	77	206	17,162	348	5,829	162	457	4	407	2	23,855	5.1	2,743			

\* Information not obtainable.



## Summary of the Statistics for the Year 1879 and nine previous Years.

Years.	Average Daily Strength present.	Admissions into Hospitals	Ratio per cent. of Admissions to Average Strength.	Average Daily Sick per cent. to Average Strength.	Deaths in Hospitals.	Ratio of Deaths in Hospitals per cent. to Average Strength.	Ratio of Deaths in Hospitals per cent. to Admis- sions.	Deaths out of Hospitals and on Leave.	Total Deaths in and out of Hospitals.	Ratio per cent. to Strength of Hindus who died in and out of Hospitals and on Leave.	Ratio per cent. to Strength in- valid for discharge the Service.	Ratio per cent. to Strength in- valid for change of climate.
1879.....	22,406	38,246	170·69	4·93	436	1·94	1·14	80	516	2·02	5·09	2·71
1878.....	23,671	40,012	169·03	4·40	305	1·28	0·77	151	456	1·91	5·51	2·17
1877.....	22,561	25,130	111·38	3·49	215	0·95	0·85	95	310	1·39	4·51	2·03
1876.....	22,583	22,918	119·20	3·79	247	1·09	0·90	49	296	1·14	4·27	2·17
1875.....	22,819	25,475	111·63	3·38	213	0·93	0·83	66	279	1·30	4·27	1·83
1874.....	22,750	26,601	116·92	3·68	176	0·77	0·66	72	248	0·99	4·60	1·73
1873.....	22,967	29,035	126·86	3·82	165	0·71	0·56	81	246	}.....}		
1872.....	22,903	36,209	158·09	4·54	226	0·98	0·62	95	321			
1871.....	22,959	29,733	129·50	4·31	236	1·03	0·79	97	333	.....	3·12	2·10
1870.....	22,715	28,380	139·08	4·33	191	0·84	0·68	95	286	}.....}		



[illegible]



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