

**Sketch of the medical history of the native army of Bombay, for the year 1876. : The regiments are placed as they stood in the army list of the 1st July 1876].**

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THE INCORPORATED SOCIETY OF MEDICAL OFFICERS OF HEALTH

SKETCH

OF THE

MEDICAL HISTORY OF THE NATIVE ARMY OF BOMBAY,

FOR THE

YEAR 1876.

[THE REGIMENTS ARE PLACED AS THEY STOOD IN THE ARMY LIST ON THE 1st JULY 1876.]

Bombay:

PRINTED AT THE GOVERNMENT CENTRAL PRESS.

1877.



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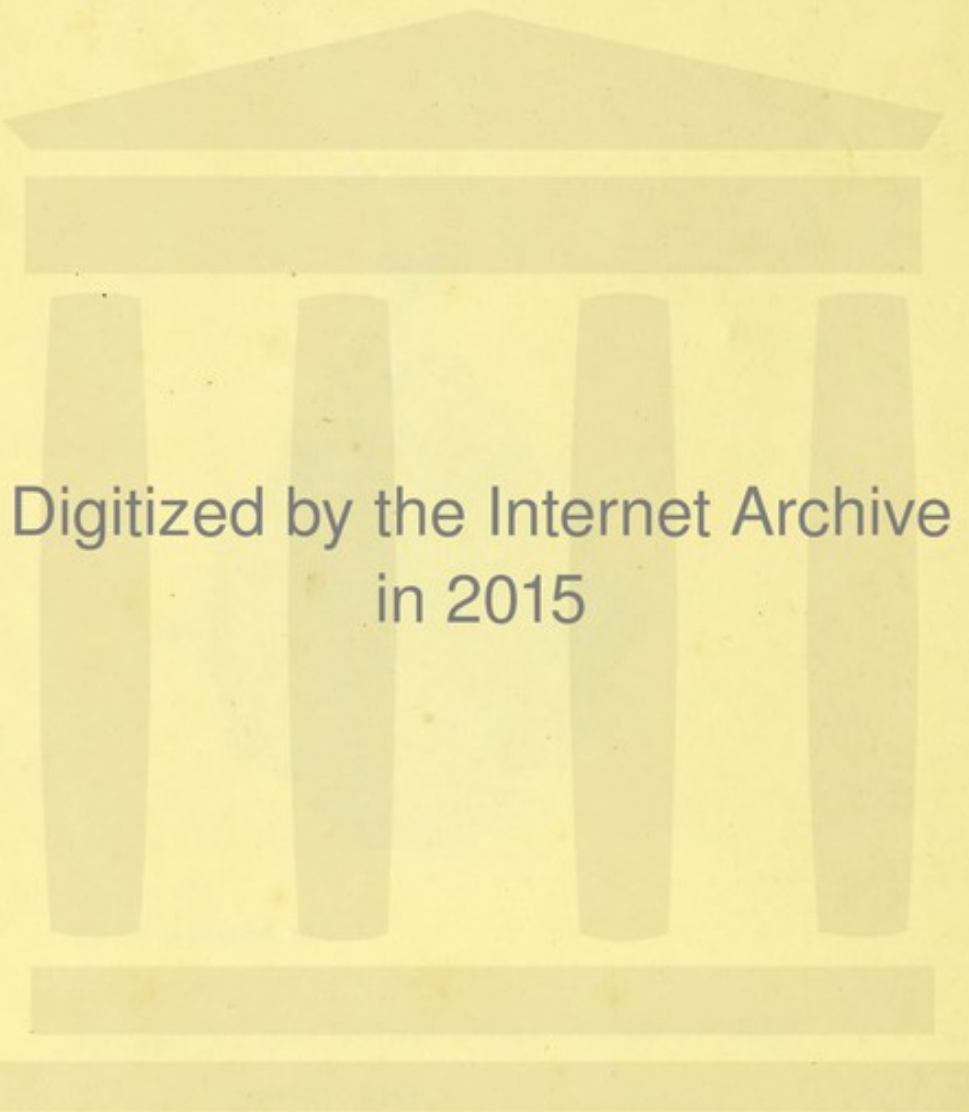
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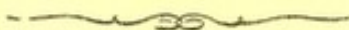
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## MEDICAL HISTORY OF THE NATIVE ARMY OF BOMBAY,

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BRITISH

MEDICAL HISTORY OF THE NATIVE ARMY OF BOMBAY

BY J. J. ROBERTS

(THE REGIMENTS AND BATTALIONS OF THE NATIVE ARMY OF BOMBAY)

PUBLISHED BY THE GOVERNMENT OF BOMBAY

1911

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FROM

THE SURGEON-GENERAL,  
INDIAN MEDICAL DEPARTMENT,

TO

THE SECRETARY TO GOVERNMENT,  
MILITARY DEPARTMENT.

Bombay, 5th June 1877.

SIR,

I have the honour to forward, for submission to His Excellency the Governor in Council, the Medical History of the Native Army of Bombay for the year 1876.

2. The convenient arrangement adopted last year is followed as closely as possible in the present history. In order to avoid useless repetitions the separate reports of the Medical Officers have been somewhat abridged, while all information of importance has been retained.

3. The figures in the margin show that the total strength of the army was 236

*Bombay Presidency.*

Years.	Average strength.	Average daily sick.	Average daily sick per cent. to average daily strength.	Admissions.	Deaths.
1872 ...	22,903	1,040.0	4.54	36,209	226
1873 ...	22,967	876.2	3.82	29,035	165
1874 ...	22,750	835.7	3.66	26,601	176
1875 ...	22,819	772.7	3.38	25,475	213
1876 ...	22,583	856.8	3.79	26,918	247

below the strength for the preceding year. With this diminished strength, however, the average daily sick was 84.1 above the average for 1875, and 28.6 above that for the past three years. A corresponding increase is seen in the percentage of daily sick to average daily strength, while the total admissions have increased by 1,443, equivalent to a percentage on strength of 119.2, as compared with one of 111.6 for the year previous. This increased sickness was principally due to the greater

prevalence of malarious fevers, especially amongst the troops of the Sind division.

4. The total number of deaths was 296, as compared with a mortality of 279 for 1875. Of these 247 occurred in hospital, and 49 out of hospital and on leave; the numbers for the year

before were 213 and 66, respectively.

5. The total number invalided, for discharge from the service, was 1,013, or a percentage on average strength of 4.48; the corresponding figures for the preceding year were 972 and 4.26.

For change of climate 515 were invalided; last year the number was 418.

6. The figures, as they affect divisions, are as follows:— In the Presidency

*Presidency Division and Aden.*

Years.	Average strength.	Average daily sick.	Admissions.	Deaths.
1872 ...	3,297	144.0	4,731	33
1873 ...	3,358	140.2	4,513	28
1874 ...	3,343	133.4	3,861	32
1875 ...	3,288.5	125.4	3,551	36
1876 ...	3,207	128.7	3,363	45

division the average daily strength, as may be seen from the adjoining table, was 3,207, or 81.5 less than in 1875. The average daily sick was 128.7—a slight increase on that of last year. The admissions were 3,363—a percentage on strength of 104.8. The corresponding percentage for 1875 was 107.9. There were 45 deaths, or a percentage to treated

of 1.3, as compared with a mortality of 36 and a percentage of 0.9 for the year before. Eight deaths were due to cholera.



*Poona Division.*

Years.	Average strength.	Average daily sick.	Admissions.	Deaths.
1872 ... ..	8,577	319.7	10,703	51
1873 ... ..	8,209	250.4	7,334	35
1874 ... ..	8,197	241.2	6,855	36
1875 ... ..	8,145.9	224.2	7,607	40
1876 ... ..	7,448.6	220.4	7,249	42

7. In the Poona division the average strength was 7,448.6—a decrease of 697.3 on that of the previous year. The average daily sick was 220.4, and the admissions were 7,249. The percentage of admissions to strength was 97.3, slightly more than that for 1875. There was a mortality of 42, as compared with one of 40 for the preceding year.

8. The average strength of the army in the Northern division was 8,937.3—an increase of 390.2. The average daily sick was 365.5. The admissions were 11,177, or a percentage on strength of 125.1. For the year previous the percentage of admissions to strength was 125.3. The deaths numbered 68, as against 105 for the preceding year, the excess being due to cholera.

*Northern Division.*

Years.	Average strength.	Average daily sick.	Admissions.	Deaths.
1872 ... ..	8,054	427.4	15,735	68
1873 ... ..	8,450	392.9	13,498	52
1874 ... ..	8,362	376.2	12,426	53
1875 ... ..	8,547.1	318.2	10,714	105
1876 ... ..	8,937.3	365.5	11,177	68

9. In the Sind division the average strength was 2,990.4, exceeding that of 1875 by 152.9. The average daily sick was 142.2, as compared with an average of 104.9 for the preceding year. The admissions amounted to 5,129—an excess over those for the year before of 1,526, and an excess over the average for the past three years of 1,545. The percentage of admissions to strength was 171.5, while that for the year 1875 was 126.9.

*Sind Division.*

Years.	Average strength.	Average daily sick.	Admissions.	Deaths.
1872 ... ..	2,975	148.0	5,040	74
1873 ... ..	2,950	92.7	3,690	50
1874 ... ..	2,848	84.9	3,459	55
1875 ... ..	2,837.5	104.9	3,603	32
1876 ... ..	2,990.4	142.2	5,129	92

The deaths numbered 92; last year they were only 32. This increased mortality was due mainly to the outbreak of cholera amongst the troops of the Sind Frontier Field Force, and to the unusually high death-rate for lung disease in the troops stationed in Upper Sind.

10. The general health of the army belonging to the Presidency, Poona, and Northern divisions has been fair. Malarious fevers, however, especially in the regiments at Mehidpur, Nusseerabad, Poona, and Surat, were somewhat more prevalent than was the case last year, but not to such an extent as to lessen in any great degree the average general health and efficiency of the troops in these divisions. The general health of the Sind Army was by no means satisfactory. There was a very considerable increase in the number of admissions for malarious fevers, more particularly at Hyderabad and Jacobabad. At the latter station the amount of sickness must, under existing circumstances, continue to increase annually. It were well did no political necessity exist for the retention of Jacobabad as a station for troops. Repeated reports show its climate to be baleful. On purely sanitary grounds its abandonment is, in my opinion, a necessity. As regards the influence exercised by other diseases on the general health of the army in the three first-named divisions, it does not perceptibly differ in degree from that of last year. In Sind, however, the reverse is the case. A large increase in the number of admissions for rheumatic affections, lung and bowel diseases, and cholera have told adversely on the general health.

11. Amongst the diseases which caused the chief sickness and mortality in the Bombay Army during the year 1876, malarious fevers hold the first place. The total treated for these diseases, out of a strength of 22,583, amounted to 12,528, as compared with a total treated for the year previous of 10,566 in a strength of 22,819. The total treated in the Presidency division, for malarious fevers, was 1,490, in the Poona



division 3,083, in the Northern division 5,111, and in Sind 2,844—the numbers for the year before being 1,280, 2,938, 4,375, and 1,973, respectively. These figures show an increase all round, and a very considerable one, indeed, for the Northern and Sind divisions. The percentage borne by malarious fevers to the total treated for all diseases was, for the Presidency division, 43·0, for Poona 41·2, for the Northern division 44·6, and for Sind 54·0—the respective percentages for the year previous being 35·2, 37·7, 39·7, and 52·8. In the Presidency division the 17th N. I. at Surat, the 20th at Bombay, the detachment of the 21st at Bassadore, and the Aden Troop at Khor Muksar, show the largest proportion of cases. In the 17th N. I., with a strength of 631·6 and a total treated for all diseases of 1,212, the percentage of malarious fevers to total treated was 56·4, and the number of cases 684, including 3 deaths. In the 20th Regiment there were 209 cases in a total treated of 749, in the Aden Troop 98 in 160, and in the detachment at Bassadore 139 in 198. In the Poona division the regiments stationed at Poona have, as usual, suffered the most severely, particularly the 5th and 8th; the former, with a strength of 589, had 784 cases out of a total treated of 1,119, while the latter had 648 cases in a total treated of 1,337. The other two regiments, the 1st Lancers and the 26th N. I., suffered to a less extent. The troops in the other parts of this division have not been affected more than usual. In the Northern division the detachment at Barda Choki shows, as is generally the case, the largest proportion of admissions from fever. The figures for the head-quarters of the 10th N. I. at Mehidpur show forcibly the very malarious conditions existing at that station. With a strength of 378, and a total treated of 1,096, there were 734 cases of fever, equal to a percentage on treated of 66·9, as compared with one of 54·1 for the preceding year. The detachment of this regiment at Agar shows also a very large number of admissions from fever, contracted, no doubt, at Mehidpur. The 24th N. I. at Neemuch, the 16th at Nusseerabad, the 9th at Baroda, and the 1st and 13th at Ahmedabad, were also very considerable sufferers from malarious fevers, the 16th N. I. especially; it shows a percentage to total treated of 65·2. In the Sind division all the regiments, with the exception of the 3rd Sind Horse, suffered more severely from fever than they did in 1875. For the year under report the 29th N. I. at Kurrachee shows 342 cases, the 27th at Hyderabad 594, while the 30th N. I. and the 1st and 2nd regiments of Sind Horse at Jacobabad show 687, 436, and 220 cases, respectively. The corresponding figures for the year previous were 324, 275, 437, 367, and 129. The 3rd Sind Horse had 402 cases, a few less than in 1875. The remarks made in the preceding paragraph regarding the unhealthiness of Upper Sind are amply borne out by the figures given above.

12. During the past year 57 cases of small-pox were treated, as compared with 10 cases in 1875. One death occurred. In the Presidency division there were 12 cases—4 in the 20th N. I., and 1 in the 4th Rifles at Bombay, and 7, with 1 death, in the wing of the 7th at Tanna. In the Poona division 27 cases occurred in the regiments stationed at Poona, 4 in the 13th N. I. at Málegaon, and 1 each in the regiment at Belgaum, Kolhápur, and Dharwar. In the Northern division there were two cases in the 11th at Bhuj, 3 in the 23rd, and 1 in the 25th at Mhow, and 1 each in the wings at Agar and Indor. In Sind there were only 3 cases altogether; they occurred in the 27th N. I. at Hyderabad.

13. This disease appeared in all the divisions; during the year under report 112 cases were treated, 53 of them proving fatal. In the Northern divisions, 120 cases having been treated, with a mortality of 71. In the Presidency division there were 13 cases and 8 deaths—2, both fatal, occurred in the 20th N. I. at Bombay, and 11, with 6 deaths, in the 17th, at Surat. In the Poona division 7 cases, including 4 deaths, occurred. There was 1 each in the Sappers at Kirkee and 2nd Grenadiers at Belgaum; 2 cases, both fatal, in the 12th, at Dharwár; and 3 in the 19th, at Sholápur. In the Northern division there were



24 cases, with a mortality of 6. In the wing of the 13th N. I. at Ahmedabad 12 cases and 2 deaths occurred, and in the 1st Grenadiers at the same station there were 5 cases and 2 deaths. Amongst the troops at Rájkot there were 6 cases and 2 deaths, and in the detachment of the 28th at Dwárka 1 case occurred. The Sind Army, which escaped altogether in 1875, suffered severely during the past year. A fatal outbreak of cholera occurred in the troops of the Frontier Field Force. In the Sind regiments of the force there were 68 cases, with 35 deaths; 33 cases and 21 deaths occurred in the 30th N. I., 26 cases and 9 deaths in the 3rd Sind Horse, and 9 cases and 5 deaths in the company of Native Artillery.

14. An increase is again shown in the total treated for rheumatic affections. For the year under report they amounted to 1,665, as compared with 1,588 for the preceding year; in each year there were 4 deaths. In the Presidency division there were 260 treated, in the Poona division 392, in the Northern division 822, and in Sind 191. The corresponding figures for 1875 were 203, 595, 675, and 115. The percentage of treated to strength for the Presidency, Poona, Northern, and Sind divisions was 8.1, 5.2, 9.2, and 6.3, respectively; whilst the figures for 1875 were 6.1, 7.3, 7.8, and 4.0. The 20th N. I. at Bombay, the 17th at Surat, the 22nd at Baroda, and the 28th at Rájkot have had the largest proportion of admissions from this class of affections. The remarks made at the latter part of paragraph 22 of the History for 1875 apply equally well to the year now under report.

15. It is satisfactory to note a decrease in the total number treated for syphilis. The figures for 1876 and the preceding year are, for the Presidency division 97 and 92, respectively; for the Poona division 193 and 213; for the Northern division 142 and 155; and for Sind 74 and 81; the respective totals for both years being 506 and 541. The percentage of treated to strength for 1876 was for each of the divisions 3.0, 2.5, 1.5, and 2.4, respectively; while the corresponding figures for the year previous were 2.7, 2.6, 1.8, and 2.8. The increase shown for the Presidency division is due to the greater prevalence of syphilis in the regiments stationed at Bombay. In the 21st N. I., for example, the percentage of treated to strength was 5.9; the year before it was 4.1. Although the total treated for the Poona division is somewhat less, yet the number of cases in the regiments stationed at Poona itself has increased. In 1875 there were 88 cases, while in the year under report there were 101. The 26th N. I. shows a percentage of treated to strength of 8.1. The regiments at Sholápur and Ahmednagar show a larger proportion of cases than do those stationed at the other Deccan towns—Poona, of course, excepted. In the army of the Northern division the 11th N. I. at Bhuj and the 10th at Mehidpur had the largest number of cases. In Sind there has been less disease in the 27th N. I. at Hyderabad, but more amongst the regiments stationed at Jacobabad.

16. The total number treated for scorbutic affections is slightly above that for 1875. For the past and the preceding year the figures are 203 and 198, respectively. In the Presidency, Poona, and Sind divisions there has been a decrease. The regiment (6th N. I.) at Aden has, as usual, been the greatest sufferer. In the Northern division the number treated has risen from 82 in 1875 to 99 in the year under report. The majority of the cases in this division occurred in the 7th and 28th N. I. at Rájkot, the former showing 24 admissions and the latter 34. In the preceding year the numbers treated for scurvy in these regiments were 5 and 1, respectively.

17. The total treated for this class of diseases was 1,493, but two more than in the year previous. The mortality has, however, been much greater; it amounted to 55 for the year under report, as compared with one of 43 in 1875. The percentage of mortality to treated was for both years 3.6 and 2.8, respectively. The number treated in the Presidency division has fallen from 320, including 9



deaths, to 123 and 4 deaths. In the Poona division there were 463 treated, with a mortality of 13, as compared with a treated of 443 and 6 deaths in 1875. The 8th and 26th N. I. at Poona, the 14th at Belgaum, and the 3rd at Kolhápúr, had the greatest number of admissions. In the Northern division the total treated for lung diseases has risen from 586 in 1875 to 727 in the year under report; the respective mortalities were 13 and 9. The 24th N.I. at Neemuch and the 25th at Mhow have again suffered a good deal. The two regiments at Ahmedabad show also a considerable number of admissions. In Sind there has been a total treated of 180 and a mortality of 29, or a percentage of deaths to treated of 16.1. This large death-rate is chiefly due to the prevalence of pneumonia amongst the troops stationed in Upper Sind. For 1875 the corresponding figures were 142, 15, and 10.5.

18. For diarrhœa the total treated numbered 779 with 10 deaths, and for dysentery 738 and 8 deaths. In 1875 the treated for each disease was 706 and 635, and the mortality 7 and 2, respectively. The whole of the increase occurred in Sind. The percentage of deaths to treated in the latter disease has risen considerably. In both diseases the greatest mortality was amongst the troops of the Sind division, there having been 7 deaths from diarrhœa and 5 from dysentery, out of a total mortality for the whole Presidency of 10 and 8, respectively. In the Presidency division there were 133 treated for diarrhœa, and 130 for dysentery. In the 17th N. I. at Surat, 76 admissions are shown for the latter disease, and in the 6th at Aden 21. In the Poona Division there has been a very slight increase in both totals. The 15th N. I. at Ahmednagar appears to have suffered most from each disease. In the Northern division the number treated for diarrhœa has fallen, while that for dysentery has risen slightly. The greatest number of admissions from the last-named disease were in the regiments at Ahmedabad and Mhow, and in the 28th N. I. at Rájkot. In Sind diarrhœa and dysentery prevailed most amongst the troops of the Frontier Field Force, and for the whole division the respective numbers treated for each disease were 204 and 123; the corresponding figures for 1875 were 82 and 61.

19. There is a satisfactory decrease in the total treated for this affection. During the past year the number was 136, as compared with 217 for the preceding year. In the Presidency division, out of 16 cases half occurred in the 17th N. I. at Surat, and 3 in the 21st at Bombay. In the Poona division the total has fallen from 130 to 37. The 12th N. I. at Dharwar, which in 1875 showed 64 admissions, had in the past year only 14; in 1874 there were 142 cases. In the Northern Division the treated numbered 66 only—2 less than in 1875. Cases occurred at nearly all the stations. In Sind the admissions have risen from 5 to 17, 9 occurring in the 29th at Kurrachee.

20. There has been a slight decrease in the total treated for injuries—2,984 as compared with 3,073 for the year 1875. The greatest number of admissions occur, as usual, in the regiments engaged at line-building and in reliefs and movements. The first-mentioned cause gave rise to a considerable number of cases of contusion in the 8th N. I. at Poona. With one or two exceptions, all the cases of injury recorded are slight, either from ill-fitting shoes or from the unskilful handling of tools at line-building.

21. The comparative salubrity of the military stations as regards their climate and general surroundings, can be judged to a certain extent from the sickness and mortality returns of the various regiments. The notorious unhealthiness of Upper Sind and Mehidpur has been already fully dilated upon in previous reports. I beg, however, to draw attention to the remarks made by Deputy Surgeon-General Wyllie on the latter station, in his note on the medical report



of the 10th N. I. I am glad to notice that Barda Choki has been abandoned. Surat appears to be an exceedingly malarious station; the 17th N. I. had no less than 684 admissions from fever there during the past year; while in 1874, at Poona, a reputed malarious station too—the number was 390. On the other hand, the fever admissions in the 26th N. I., transferred from Surat to Poona at the end of 1875, fell from 600 at the former to 318 at the latter station. The general health of the 17th, judged by the total treated for all diseases, has deteriorated, while that of the 26th has improved. Surgeon-Major Brown in his report mentions, however, some other causes, besides malaria, which assist in keeping up a high rate of sickness in the 17th. The move from Aden to Belgaum has caused an improvement in the health of the 2nd Grenadiers; the reverse has happened in the case of the 6th N. I., transferred from Belgaum to Aden. The change from Ahmedabad to Kolhápúr has produced a notable improvement in the health of the 3rd N. I., the total number treated having fallen from 1,246 to 567. The above examples well show to what an extent the amount of sickness is influenced by climate.

22. The chief movements that took place were the completion of the reliefs begun in the latter part of 1875, the march to Delhi of two regiments of infantry and one of cavalry, and the expedition beyond the Sind Frontier, in which three Sind regiments took part; many of the ordinary annual reliefs were postponed on account of the famine in the Deccan.

Movements.

23. In all the divisions the arrangements for the cleanliness of the regimental lines have been carefully carried out; there has been no over-crowding; the ventilation, conservancy, and general sanitary state have been attended to as fully as the numerous more or less permanently faulty conditions of the lines will admit of. The improvement most urgently needed is proper drainage. There is little doubt that were a complete system of drainage carried out in the lines and cantonments, the present amount of sickness from malaria would be surprisingly lessened. In the Presidency division the lines of the 20th N. I. at Bombay are objectionable in many respects, especially as regards locality and drainage. The nearness of the Sonapore outlet drain to the lines of the 21st is also objectionable. With the remarks made on this subject by the medical officer, in paragraph 7 of his report, I quite agree. The lines in the Poona division are, as a rule, favourably reported on. Various improvements are, however, still needed. At most of the stations in the Northern division the lines are unfavourably noticed by the medical officer and the Deputy Surgeon-General. In too many instances, particularly in the Mhow division, the drainage is very defective, the huts are small and badly built, and dampness is much complained of. The lines of the 18th N. I. at Deesa are condemned as utterly bad. Those at Rájkot are the best in the Northern Division. The new lines promised for the 22nd at Baroda have not yet been built. In Sind the lines are said to be in fair condition. At Jacobabad the huts are, from special local circumstances, more or less damp.

Lines.

24. As a rule, the water-supply is pronounced by the medical officers to be good and abundant. But few samples have been examined. The necessity which exists for a full and complete standard analysis of the water used at the military stations of this Presidency has been more than once brought to the notice of Government within the last year. That in many cases the water-supply needs improvement is but too evident, and it is hardly necessary to repeat that no rational measures of improvement can be undertaken until the varying conditions of the water itself and of its source are in each case thoroughly investigated. I beg to draw special attention to an account of the water-supply at Asirghar, given in the report of the medical officer in charge of the station. The improvement in the supply at Dharwar has resulted in materially lessening the frequency of guinea-worm in the 12th N. I.

Water-supply.



25. Towards the end of the year the effects of the famine became apparent in raising the price of food at many of the stations in the Poona division. One or two of the medical officers report that sepoy families are obliged to curtail their own allowance; in other instances the quality of the food is said to be inferior. The medical officer in charge of the 15th N. I. at Ahmednagar states that, in his opinion, much of the bowel disease which prevailed in the regiment was due to the consumption of damaged grain. The full effects of the scarcity on the health of the troops will not, however, become apparent till later in the season. In the other divisions food is generally reported as cheap and good. The want of fresh vegetables at Aden is evidenced in the number of men who suffer from scurvy. A similar scarcity is experienced at Rájkot; measures should be undertaken to provide supplies of fresh vegetables or potatoes at both these stations.

26. The annual loss in efficiency from shoe-bite, due to unsuitable and ill-fitting boots, has been frequently brought to notice, and the remedy suggested. As yet, however, nothing appears to have been done towards effecting an improvement in this direction. It would add much to the general health and well-being of the army were the sepoy soldiers possessed of a better supply of warm undress clothing in order to guard against the ill effects of chill when heated after exercise. The Sind troops, who are exposed to greater vicissitudes of climate than those of the other divisions, should be exceptionally well provided in this respect.

27. The duties do not appear to have been heavy, nor have they had any prejudicial effect on the general health. Gymnasia and other means for affording salutary exercise, thus improving the health and physique of the men, are not, in my opinion, so generally available as they should be.

28. The regimental hospitals are, as a rule, favourably reported on, and, with a few exceptions, their ventilation and accommodation are pronounced sufficient. Some necessary alterations and improvements have been carried out, and others will be attended to. At Satara and Sirur new hospitals are required. Deputy Surgeon-General Joynt brings to notice the dampness of the hospitals at Jacobabad, which, he states, is due to defective construction. This condition needs to be remedied with as little delay as possible. At Jacobabad, above all places, a removable source of unhealthiness, like this, should not be allowed to continue.

29. In every regiment vaccination and re-vaccination, both of sepoy soldiers and their families, have been most strictly attended to. Considering what a virulent epidemic of small-pox raged among the civil population of the Presidency during part of the past year, the comparative immunity of the army from the disease speaks well for the manner in which protective measures were carried out by the medical officers.

30. Surgeon MacRury, of the 3rd Sind Horse, gives an interesting and instructive account of the outbreak of cholera which occurred among the troops of the Sind Frontier Field Force. Although the data are not quite complete, there can still, I think, be little doubt that this outbreak was due to the use of contaminated drinking water. Dr. MacRury's remarks regarding the immunity of the troops from cholera while at Khelat and Mustoong, although the disease was everywhere raging around them, are full of interest. He does not attribute this immunity to any special precautions in the way of quarantine, but believes that it was due more to the strict cleanliness which was enforced throughout the camp, and to the protection of the water-supply from contamination. While fully sharing in this opinion, I may take the opportunity of offering some further observations in connection with the subject of quarantine in cholera. The contagion, by means of which a disease like this is spread, is of so subtle a nature, that it may be carried from place to place in



numberless ways ; food itself is not infrequently a vehicle. Therefore, unless all communication of every sort and kind between a body of men and an infected locality is absolutely cut off, quarantine cannot be said to be thoroughly established. It is plain that, in this country at least, the application of quarantine, as described above, is impracticable. Still, though quarantine cannot be established, much may be done to prevent the spread of cholera ; communication with infected places should, as far as possible, be cut off ; but the chief means of safety consists in the strictest attention being paid to the conservancy of the cantonment and its surroundings, while all insanitary conditions, whether existing in the immediate locality or among a body of men, should, as far as practicable, be got rid of. Above all, the water-supply should be preserved from contamination. All precautionary measures should be taken beforehand, and the better the sanitary state of the camp, the less likelihood is there of its being visited by cholera or other contagious disease. In the majority of cases where cholera appears in a camp, I believe that the outbreak is due chiefly to some local insanitary condition, and that its arrest may be attributed more to the renewed and successful efforts to ensure thorough cleanliness than to any precautions that may have been taken in the direction of quarantine. The history of the outbreaks in the 13th N. I. at Ahmedabad and in the 17th at Surat, as detailed in the medical officers' reports, is instructive on these points. In every regiment, when cholera appeared, due precautions were taken to prevent the disease from spreading, and in all cases with success.

31. There are other points on which I am tempted to remark ; but the date is so recent since I took charge of the office of Surgeon-General—barely three months—that I hesitate to commit myself to statements which a further and more extended experience might cause me to regret.

I have the honour to be,

Sir,

Your most obedient Servant,

W. G. HUNTER, M.D.,

Acting Surgeon-General.



A SKETCH  
OF THE  
MEDICAL HISTORY OF THE NATIVE ARMY OF BOMBAY  
FOR THE  
YEAR 1876.

[The regiments are placed as they stood in the Army List on the 1st July 1876.]

PRESIDENCY DIVISION, ADEN, AND BOMBAY MARINE.

Average strength present during the year.....	3,207.0
Average daily sick per cent. to the average strength ...	3.9
Ratio of mortality per cent. to the average strength ...	1.4



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

BOMBAY.—In medical charge of Surgeon-Major G. ASHER, M.D.; strength 594.5.

The regiment has been stationed in Bombay; there is a detachment at Janjira, and interchange of men between that out-post and head-quarters has frequently taken place.

Movements.

2. Statistical information as regards the health of the men on "detachment" duty does not come under my scrutiny; but I am under the impression that the men of the 20th Regiment who are on duty at Janjira

Detachments.

are comparatively less sick than those who have to take part in the heavy garrison work in Bombay.

3. The locality of the lines is very bad; they are situated in the vicinity of a thickly populated district, and on ground occupied in like manner for a long period, and saturated with rottenness: moreover, they are

Lines.

close to an abominable depôt of filth, the effluvium from which is perceivable and most offensive, by times, throughout the eastern division of the lines. Space in, and ventilation of, huts are sufficient; the height of plinth of huts varies; the floors of all are, more or less, damp during the monsoon season. The huts constituting the regimental bazaar present a very dilapidated and unseemly appearance.

4. The surface drainage in the lines is very defective. Gutters carefully constructed have been formed in two of the pathways intervening between rows of huts. None of the drains are trapped at openings, and there is to be seen, and smelt, a mass of seething filth at these

Conservancy and sanitary arrangements.

apertures. As regards house drainage, it is very imperfect; and the very objectionable cess-pool system still obtains in many instances. There are no tanks within the lines. The condition of the ways is excessively bad. Many of the pathways are unsightly, and so rugged as to be dangerous to the very old, or very young, using them.

Water-supply.

5. Water is supplied from the Vehar lake, and no complaint of deficiency has been made.



- Food. 6. Food has been abundant, but not cheap—viewed in consideration of a sepoy's pay.
- Clothing. 7. Clothing is satisfactory, except in the matter of boots—an old story upon which I need not dilate.
8. Duties in Bombay are onerous on sepoys, and tend to making men, who are not given to shamming, resort to hospital as being physically not quite up to the work.
- Duties.
- Exercise, amusement, occupation. 9. Exercise and occupation as usual. For debauchery there are great facility and temptation in Bombay.
10. They are very inferior; no change has been made since last report by my predecessor. The cells are, in my opinion, so deleterious to the health of the unhappy occupants of them, that I have, on a few occasions, felt necessitated, very unwillingly, to interrupt punishment, and to recommend that prisoners be removed to hospital—a proceeding which sometimes entailed the employment of an additional guard, and that brought more work on the men of a regiment, the labour of which is very considerable.
- Lock-up rooms and cells.
11. The hospital is—as regards breeze—well placed, and the accommodation in it is sufficient. The surroundings are very objectionable; there is on one side a drain which, when the atmosphere is still, frequently creates a great nuisance; and there are a filth bin and houses with defective conservancy arrangements in the vicinity of it. The whole place is cramped, and some of the out-buildings are defective in accommodation, construction, and position. The cess-reservoir arrangement which exists is very faulty.
- Hospital and its surroundings.
- Ventilation. Good.
- Over-crowding. None.
- Accommodation and defects. Accommodation is sufficient.
- Conservancy and sanitary arrangements. Satisfactory; except that, as previously reported, the latrine is of faulty construction.
12. Malarious fever, rheumatic complaints, bowel ailments, and contusions, have been the principal causes of inefficiency. Thirteen deaths occurred—2 from cholera (sporadic cases), 1 from tetanus (traumatic), 1 from phthisis, 1 from pneumonia, 8 from febrile and intestinal affections in debilitated men.
- Sickness and mortality.
13. None. The cases of cholera are viewed as having been sporadic; and the cases of small-pox as incidental to living in Bombay.
- Epidemics.
- 14.
- Vaccination.
- | CHILDREN.   |               | ADULTS.     |               |             |               |
|-------------|---------------|-------------|---------------|-------------|---------------|
|             |               | Primary.    |               | Secondary.  |               |
| Successful. | Unsuccessful. | Successful. | Unsuccessful. | Successful. | Unsuccessful. |
| 35          | 1             | None.       |               | 7           | 5             |
15. The general health of the men in the regiment has not been good—*vide* observations in the next paragraph.
16. The work exacted from men in the native regiment not localized in Bombay is somewhat severe. The system of examination of recruits is imperfect; there are men in the 20th Regiment whom I should not have "passed." I have rejected several men presented for examination within the eleven months of the year during which I have had cognizance of the regiment. It will be my duty to point to a few men when under inspection by the Brigadier-General—men whom I
- Special observations.



consider unfit for soldiers' work, and for the discharge of whom this procedure is understood to be right, they having not served for a period entitling them to be invalided with pension.

17. It is believed that the native regiments which are periodically stationed in Bombay always present a larger sick list than the Marine Battalion always in this large city. Some men stint their stomachs and hoard their cash, with a view to furlough leave; others spend their money in indulging passion, the result being a very large taint of scorbutic and syphilitic diathesis. Among the wives and families of the men in the rank and file of the regiment, there has been some considerable sickness from debility. Several children have died, in my opinion, simply from inanition.

#### REMARKS BY DEPUTY SURGEON-GENERAL W. G. HUNTER, M.D.

Visited the hospital of H. M.'s 20th Regiment N. I. two or three times, and also inspected the regimental lines twice from the time I assumed charge of the office of the Deputy Surgeon-General in June to the close of the year 1876. The conservancy of the hospital is satisfactory, and its capacity has not been tested, the number of sick being few. Its surroundings are, however, exceedingly bad; in its immediate vicinity is Sonapore, one of the most unhealthy parts of the city; to its east, distant some 20 yards, is the Scotch Burial-ground; to its west is the sea, and to its exposure to the sea-breeze is in all likelihood to be attributed its freedom from epidemic disease. The sanitary surroundings of the regimental lines are of the worst description. They have, however, been so frequently reported on as not to call for further notice.

The detachment of the 4th Rifles N. I., doing duty in Bombay, is quartered with the 20th Regiment N. I., and their sick are accommodated in the hospital of the same regiment. The general remarks above made apply equally to this corps.

#### H. M.'s 21st Regiment N. I. or Marine Battalion.

BOMBAY.—In medical charge of Surgeon-Major W. DAVEY; strength 568·5.

The head-quarters and main body of the regiment has been, as usual, stationed in Bombay throughout the year; the usual detachments have been furnished in course of annual relief to the Persian Gulf and Indian Government steam vessels as follows:—

Bassadore	...	...	...	...	...	...	12
Bushire	...	...	...	...	...	...	16
I. G. S. S. "Hugh Rose"	...	...	...	...	...	...	10
Do. "Abyssinia"	...	...	...	...	...	...	8
Do. "Magdala"	...	...	...	...	...	...	8
Do. "Dalhousie"	...	...	...	...	...	...	8
Do. "Kwangtung"	...	...	...	...	...	...	8
Yeola	...	...	...	...	...	...	20

The latter detachment is a new call on the regiment.

Conservancy, &c. 2. The conservancy, sanitary arrangements, water-supply, &c., have been as before reported.

3. The drought in the eastern districts of the Presidency had the effect of considerably enhancing the price of all cereals for a time; but the rise in price was not long maintained, and the sepoys' food can now be procured at nearly the usual market rate. Rice forms the staple article of food, but I have reason to think that meat and fish of a very inferior quality frequently supplement their diet.

4. Not heavy, the men having had 5½ nights in bed during the year; but the running or rushing drill which has lately come into practice, commencing, as it does, at the setting in of the cold weather, predisposes the men to chest affection, and serious cases of this class of disease are not infrequent during the drill season.



Exercise, amusement, &c. 5. Cricket and gymnastic exercise are to a very limited extent indulged in.

6. The total number of cases treated in hospital was 299, or 82 less than in the preceding year. Of the total number treated 16 remained on the 31st December 1875 and 283 were fresh cases received during the year. Of the total treated 257 were discharged to duty; 22 sent for change of air, chiefly for debility following serious illness; 6 were invalided from the hospital; 3 died, 2 less than in the previous year; and 10 remain under treatment on the 31st December 1876. These figures compare very favourably with the last or preceding year. The following table shows that the sanitary state of the regiment during the year contrasts very favourably with its condition during the five previous years, and the reduction of the daily number of non-effectives is very noticeable:—

	1871.	1872.	1873.	1874.	1875.	1876.
Average strength of regiment ... ..	575	563	588	564	586	568.5
Number of admissions to hospital ... ..	451	474	458	373	371	283
Daily average number of sick ... ..	20	19	20	21	17.4	12.5
Percentage of treated to strength ... ..	80.8	89.1	80.4	69.8	65.0	52.6
Number of deaths ... ..	8	3	3	7	5	3
Percentage of deaths to strength ... ..	1.4	0.5	0.5	1.2	0.8	0.5
Percentage of deaths to treated ... ..	1.7	0.6	0.6	1.8	1.3	1.0

Three deaths occurred in the hospital during the year—2 from phthisis pulmonalis (consumption) admitted in the last stage of the disease, and 1 from low remittent fever with typhoid symptoms and complicated with double pneumonia.

The following table shows that while 283 cases were admitted during the year, only 217, or 38.2 per cent. of the regiment, came under treatment, the difference being made up by re-admissions of the same individuals for recurrent sickness or other causes:—

2	admitted	four	times	...	8
13	do.	thrice	...	...	39
34	do.	twice	...	...	68
168	do.	once	...	...	168

Total 217

Total admissions 283

Twenty-one men were invalided during the year—6 from the hospital, and 15 from the regiment. The period of service at which these men were invalided is shown below:—

10 months.	10 years.	16 years.	17 years.	18 years.	19 years.	21 years.	22 years.	23 years.	Total.
1	1	1	2	2	8	2	2	2	21

The principal causes of sickness have been, as usual, fevers, to which ague contributes 44 admissions,—a considerable reduction, as compared with the preceding year, when the admissions were 88; but remittent fever, of a low and not unfrequently of a typhoid type, are, I regret to say, largely on the increase, and are due, I believe, first of all, to the inferior quality of meat and fish with which the men are in the habit of supplementing their rice diets, and, secondly, to the closeness to the lines of the Sonapore outlet drain, which becomes most offensive as soon as the northerly and westerly winds begin to set in; and as long as the wind continues to blow from the north of west and east, which brings the lines to the leeward of the drain, these fevers are observed to be most prevalent. Next in order of frequency come rheumatic and syphilitic



affections, 13 of the former and 29 of the latter. I regret to say syphilis of a very bad type is exceedingly prevalent in Bombay, and the men of the regiment of loose morals, who resort to the town, have suffered very severely; not only have the primary attacks been of the sloughing variety of the disease, but nearly all the cases have been affected in quick succession with secondary and tertiary forms of the disease. I believe I am not the only medical officer at the Presidency who thinks this disease ought not to be allowed to reign rampant in Bombay, without any attempt to check its ravages. Eruptive fevers give only 2 admissions for chicken-pox as last year, both mild cases, and calling for no remark; scurvy gives 4 admissions, and these not furnished by the detachments serving in the Persian Gulf or on board the Indian Government vessels, but contracted on shore from low living. This form of scurvy is much more intractable than that contracted on boardship; the men suffer for months before any signs of impaired health become visible, and it is only when they fear to be invalided that those not entitled to pension allow themselves a more sustaining diet, and then begin to improve in health. Local disease contributes 136 admissions, of which the skin, which includes that most frequent disease amongst natives—scabies—gives as many as 45 admissions; but diseases of the more important organs, such as the eye and lungs, have not been infrequent; 14 of the former and 17 of the latter have been treated. And whilst diseases of the eye have readily yielded to treatment, lung diseases, preceded as it often is with remittent fever of a low type, has been found much more difficult to combat, requiring a free administration of stimulants and nourishment. Diseases of another very important organ—the liver—have not been absent, and diseases of the bowels, including diarrhoea and dysentery, have furnished their usual quota. The remainder of this class of diseases call for no remark, unless I except gonorrhoea, to which, however, the men are less exposed than to the more constitutionally destructive disease, syphilis; but amongst ulcers, although small in number, one case of seipigenous ulcer, affecting the back of the elbow, is deserving of notice. The man had recently returned from the Persian Gulf; and I am informed that the disease is not uncommon there, and is ascribed to eating dates. Whatever its origin may be, it is exceedingly intractable, and recurs again and again. As soon as one small spot of ulceration is healed, a small fresh corrosion of the skin takes place, until the ulcer presents a very good specimen of skin-grafting; this ulceration or corrosion in the case, which has more than once come under my observation, is superficial in its character, but affects the true skin, but does not touch the deeper structures. It became necessary to invalid the case in question.

8. One from remittent fever, complicated with double pneumonia, and 2 from phthisis pulmonalis, both cases admitted in the third stage of the disease.  
Principal causes of mortality.
9. Two Mussulmans, or 1.3 per cent. to strength, and one Hindu, or 0.2 per cent. to strength.  
Mortality according to race.
10. Small-pox occurred amongst the families of the regiment; but the cases were early isolated, and no sepoy was affected. There were 9 cases in all, with the result of 1 death and 8 recoveries; the first case occurred in January, and the last in April.  
Epidemics.
11. One hundred and eighteen children were primarily vaccinated—112 successful, and 6 failed; 50 persons re-vaccinated, of which number 19 only were successful. At the commencement of the outbreak of small-pox in the native town in the earlier part of the year, all the women and children were mustered for examination, and 87 doubtful subjects were selected for vaccination or re-vaccination, of which number 68 were successful.  
Vaccination and re-vaccination.
12. The general health of the men has been unusually good, only 52.6 per cent. of strength having come under treatment during the year. Considering the class from which the regiment is recruited, the physique of the men is fair; but they cannot compare in height, breadth of chest, or muscular development, with the sepoys recruited in the North-West Provinces.  
General health and physique of the men.
13. The most noticeable feature in the return is the great reduction which has been effected in the daily average number of sick men. In 1875 these amounted to 17.4, and the average for the previous 5 years amounts to 19.4, while for the year under report the number of daily non-effectives is only 12.5. If it were possible to substitute a more nourishing diet for the sepoys, the men would not be so liable to such low forms of fever complicated with lung and hepatic disease, as they now suffer from, more especially during the warmer months of the year, when the winds are more or less northerly, and the Sonapore drain becomes more than usually offensive, and without doubt assists a spare diet in the production of disease.  
Resumé of the whole.



## REMARKS BY DEPUTY SURGEON-GENERAL W. G. HUNTER, M.D.

Visited the hospital several times, and made a thorough inspection once since June—the date on which I assumed office. The conservancy of the hospital is very satisfactory. Immediately behind the hospital are the lines, and immediately behind them is the Sonapore district of the native town, one of the most unhealthy of places. The medical officer attributes the frequency of the typhoid state noticed in connection with remittent fever to the vicinity of the Sonapore outlet drain, and the seriously defective state of the drainage of the neighbourhood.

## Right Wing, H. M.'s 7th Regiment N. I.

TANNA.—In medical charge of Surgeon J. W. CLARKSON ; average strength, 276.

The military force stationed at Tanna consists at present of a wing of the 7th Regiment N. I., and its duty here is chiefly a military guard over the jail. This wing has been stationed here for the past four years, and there have been no movements since its arrival. The average strength for the year has been 276 of all castes.

2. The wing has been exceptionally healthy, and this is, perhaps, owing to the superior description of quarters in which the men are lodged, and to the excellent system of drainage now existing in the lines.  
General health.
3. The water-supply to the regiment is by means of wells, five of which are within lines, and two on the maidan beyond ; the water is average fair drinking water, but the supply runs short in April. Three new wells have been sunk within the lines.  
Water-supply.
4. The duties in the detachment have been light, and, consist, of guards over the jail, and the necessary drills and parades. Each man obtains a little over four nights in bed in the week ; these duties have exercised a favourable influence on their general health.  
Duties.
5. There were 122 admissions and 49 re-admissions into hospital from all causes during the year. The principal disease was malarious fevers, of which 69 cases were admitted, and 22 re-admitted, making a total of 91, as compared with 143 registered last year. No case of unusual interest occurred during the year. There were 3 deaths—1 from apoplexy, 1 from small-pox, and the third from aneurism ; the latter occurred out of hospital, the patient suddenly dying in the lines.  
Sickness and mortality.
6. There were 24 cases of small-pox admitted into hospital, viz., 7 sepoy, 5 females, 11 children, and 1 follower, of whom 22 recovered and 2 died—1 of the latter being a sepoy, the other a child. Each case of small-pox on its admission was isolated and treated in a separate room or unserviceable tent ; the clothing of each patient was destroyed by burning, his hut in the lines was disinfected and fumigated by sulphurous acid gas and white-washed with lime, the floor was dug to one foot in depth and re-made, and it remained uninhabited for several weeks before it was re-occupied. Every other precaution was taken to prevent the spread of the disease, with satisfactory results. Each case could be distinctly traced to infection from the town of Tanna, where small-pox assumed a severe epidemic form. There were 4 cholera cases (viz., 3 females and 1 follower) ; all did well.  
Epidemics.
7. Vaccination has been carried on regularly ; 35 cases were vaccinated during the year.  
Vaccination.

## REMARKS BY DEPUTY SURGEON-GENERAL W. G. HUNTER, M.D.

Inspected the hospital of Right Wing 7th Regiment N. I., Tanna, in November 1876, and the lines in January 1877. The wing had been stationed at Tanna about four years ; its health was good, though the men are reported to have fallen off in physique. There had been 49 re-admissions out of a strength of 276. The want of accommodation for 2nd class hospital servants was much complained of. There had been an epidemic of small-pox in the lines, which had spread from the town ; 24 persons had been attacked, and 2 died—one a sepoy and the other a child. The lines are well built and drained. The construction of the new ones being very good, and the ridge ventilation giving the new ones an advantage in this respect over the old.



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

**SURAT.**—In medical charge of Surgeon-Major G. F. H. BROWN ; average strength 631·6.

Location and movements of corps.	The regiment has been stationed at Surat during the whole of the current year.
Detachment.	2. There has been no detachment duty, and but little escort duty.
Conservancy and sanitary arrangements.	3. The conservancy and sanitary arrangements are carried on the same as before, and are efficiently performed.
4. Has been abundant and cheap the greater part of the year, but prices have risen latterly, owing to exportation to famine districts ; but there has been an abundant supply, if I may judge by the look of the crops in and around Surat.	
Food.	
Clothing.	5. There has been no change made in this respect.
6. The duties at this station are exceedingly light, which is, perhaps, just as well as regards the health of the men, for the climate here for eight months in the year is very enervating.	
Duties, and their effect on health.	
Exercise, amusement, and occupation.	7. The sepoys are had out occasionally for cricket, but beyond this they are left principally to their own resources.
Lock-up rooms and cells.	8. These are in all respects suitable.
Marches.	9. There has been no marching out during the year.
10. The only point I need notice is, that there has been no over-crowding during the current year ; the leechman and dhoby attached to the hospital having been abolished, the quarters occupied by these men have been used as a cook-room,—a deficiency which had been previously reported upon, but was not supplied.	
Hospital.	
Conservancy.	11. Efficiently carried out in the same manner as last reported.
Hospital water-supply.	12. The water-supply for hospital use is very good ; it is obtained from the best well in camp in close vicinity.
Sickness, mortality, and invaliding.	13. The average strength for the year has been
	... .. 631·6
Daily average number of sick	... .. 35·0
Admissions to strength	... .. 189·0
Treated to strength	... .. 191·8
Deaths to treated	... .. 1·2
Deaths to strength	... .. 2·4
Invalided	... .. 30

Fifteen deaths occurred in hospital—3 from remittent fever, 1 from erysipelas, 1 from scurvy, 1 from valvular disease of the heart, 1 under the head of palpitatio cordis, 1 pneumonia, 1 under the head of ulcers, 6 from cholera ; 5 deaths occurred out of hospital—1 shot himself in the lines, 1 died suddenly from heart disease, 2 died when on medical certificate, 1 from disease of the liver, 1 from chronic bronchitis, and 1 under the head of debility died in Bombay.

The total number of admissions from all causes was 1,194—a great increase over the preceding year, when the regiment was at Poona, when the admissions were 791 ; of these admissions ague gives 655, remittent fever 21, dysentery 74, diarrhoea 46, pneumonia 3, bronchitis 21, rheumatism 83, ulcers 63. These are the principal diseases giving admissions to hospital. Ague, as usual, heads the list ; this was occasionally of a very obstinate nature, ending in splenic



enlargement, and some in chronic diarrhœa, for which cases change of air was absolutely required. The cases of remittent fever, 21 in number, were of the ordinary nature met with in Gujarât; the 3 fatal cases were rapid in their course and termination. The usual treatment was adopted in these cases. The most troublesome case I have had to treat were those of dysentery and chronic diarrhœa. Dysentery frequently terminated in chronic diarrhœa, and the latter disease was a very frequent complication of ague. These cases, for the most part, required lengthened treatment. The plan on which these cases were treated was change of medicine, attention to diet, occasional counterirritants, and when these failed, change of air. The great difficulty in these cases is the diet. Very often the appetite is good, the patients will not attend to diet, and all treatment is useless. I have invariably, when I found a man getting weak, ordered him milk and arrack to be taken together, and advised them to eat rice and milk; but in most cases my advice was not followed, and the result of treatment was in consequence unsatisfactory. However, notwithstanding the prevalence and obstinacy of these complaints, I am happy to say, there were no deaths. Of the admissions from other causes I need say but little. The chest affections for the most part were not of a severe nature, and the rheumatic and ulcer cases were such as are usually met with.

Invaliding. Thirty men were invalided—7 from rheumatism, 1 from ucler, 22 old age, and debility; 28 were discharged on pension, and 2 on gratuity.

14. The principal causes of sickness have been those of a local and endemic nature, with the exception of cholera, which occurred in an epidemic form, the duties in Surat being remarkably light.

15. Exclusive of cholera there have been 9 deaths in hospital, 3 of these being from remittent fever, the fever of Gujarât. There have been no extraordinary causes of death; at the same time I am under the impression that, since the regiment has been in Surat, there has been an increased consumption of spirituous drink. Toddy is plentiful and cheap, and drinking is now-a-days the rule, not as it used to be the exception, in the Native Army. I cannot conceive a worse liquor than bad toddy; and, as a natural consequence, a man who drinks cannot, out of his small pay, find himself in sufficient food. That this state of thing exists I am convinced, and it is one over which there is no control. When the regiment first arrived at Surat there was a good deal of diarrhœa amongst the men, caused, I believe, by the change of water; but having been cautioned not to drink the water much impregnated with saline matter, this soon subsided.

16. The following table shows the mortality for the year, its ratio to strength according to caste as compared to last year:

	Christians.				Hindus.		Mussalmans.		Jews.		Total.	
	Europeans.		Natives.		Strength.	Ratio of deaths to strength per cent.	Strength.	Ratio of deaths to strength per cent.	Strength.	Ratio of deaths to strength per cent.	Strength.	Ratio of deaths to strength per cent.
	Strength.	Ratio of deaths to strength per cent.	Strength.	Ratio of deaths to strength per cent.								
1875 ... ..	7	...	10	...	627	1.1	32	...	4	...	680	0.4
1876 ... ..	6	...	6	...	595	3.1	32	3.1	6	...	645	2.3

17. The total rainfall for the year was 41.61, about an average fall; there was nothing more than usual to notice as to its influence on disease, but a flood of the river took place in September, which probably contributed to swell the admissions from fever.

18. Cholera, which had been raging in the city of Surat in, I believe, a very virulent form at last on the 4th April made its appearance in an epidemic form in the lines of the 17th Regiment N. I. It commenced on the 4th and ended on the 28th of April; during this period 25 cases were admitted for treatment—9 men, 11 women, 5 children. Of these 5 men, 2 women, and 1 child died. The disease first appeared in the right wing; this wing was immediately moved into tents, their



huts purified and white-washed, fires were burnt to windward of the lines, and the same measure was carried out in the left wing. Quarantine was established as much as possible; but this was, of course, most imperfect: the lines are situated close upon the main road of the traffic, and if men were disposed they could evade the picquet, and get into the city, as in fact they did, for I frequently saw them there. However, what promised at first to be a formidable epidemic gradually subsided. After these measures were adopted, the most noticeable feature about this epidemic was the great mortality of the men compared to the women and children; it is, I think, unusual. I have always observed in former epidemics the reverse to be the case. How far this has been influenced by the habits of the men, as noticed in my remarks on dysentery and diarrhœa, is a problem. I am very strongly of an opinion in favour of it, for this reason: the men, women, and children were all exposed to the same conditions, they all came for treatment in all the different stages of the disease, many in a state of complete collapse. The men were doing no work whatever, but the usual guards, so that it is difficult to arrive at any other conclusion than that there must be some especial cause for the great contrast. One man was seized with cholera on the march to Domus in February, and died in a few hours; the other occurred in June, and was cured.

As regards the treatment of this disease, I have nothing new to offer. I think with natives much may be done after all choleraic symptoms have subsided, and the secretions of bile and urine restored by the judicious use of nourishment and stimulants. A native has no idea above conjee in cases of illness, and I feel confident I saved many of the women and children by the judicious use of mist vin gallici made with the whole egg, milk, and arrack, who, if left to their own people, would have succumbed to the after effects. What I mean by the judicious use is that, of course, the medical officer has to look out for secondary fever. Of this, however, I had not one case.

19. Vaccination has been successfully carried on; the lymph good. Re-vaccination has been performed on all unsuccessful cases with, for the most part, unsuccessful results.

Vaccination and re-vaccination.

20. Taking the regiment bodily, I think the general health and physique of the men fair.

General health and physique of the men.

21. Considering the deaths that have occurred from all causes in and out of hospital in the regiment during the year, viz., 20, the mortality has been greatly above the average; the percentage of death has been 3.1 per cent. The cause of this must be attributed to the following reasons:—

Resumé of the whole.

1st.—The year 1876 has been, I believe, in most parts of the country an unhealthy year.

2nd.—The facilities of obtaining drink at Surat are great, and the liquor sold is most unwholesome.

3rd.—The change from a station like Poona, where the climate is invigorating, to a station like Surat, where for eight months in the year the climate is most enervating, must be very trying to some constitutions. These causes, added to the well-known malarious nature of the locality and the inferior quality of the water, have all combined to swell both admissions to hospital, and the death-rate.

How often the pupils have been taught.

22. The education of the pupils has been attended to.

#### REMARKS BY DEPUTY SURGEON-GENERAL W. G. HUNTER, M.D.

I inspected the hospital and lines of H. M.'s 17th Regiment N. I. at Surat on 26th October 1876. The Medical Officer, Surgeon-Major G. F. H. Brown, was absent on a month's privilege leave, his duties being performed by Surgeon-Major Adey, the Civil Surgeon.

The conservancy of the hospital and lines was good. The regiment since its arrival in December 1875 from Poona, had suffered a good deal from malarial fevers, and to some extent from cholera. The former was attributed to an overflow of the river Tapti, in September, which inundated the lines and surrounding country. The latter spread from the city, made its appearance on 4th April, and ceased on 28th idem, during which time (24 days) 25 persons were attacked and 8 died, 5 being sepoy, 2 women, and 1 child.

The hospital establishment was favourably reported on.



**H. M.'s Aden Troop.**

**KHOR MUKSAR.**—In medical charge of 2nd Class Hospital Assistant **SHAIK SHABUDIN** strength 89·5.

- |                                      |   |
|--------------------------------------|---|
| Lines.                               | 1. The lines have been much improved since last year by the addition of cook-rooms, and the space is now sufficient and the ventilation is good.  |
| Amusements.                          | 2. The men of the troop exercise at polo, tilting at the ring, and sword exercise on holidays and on Tuesdays and Thursdays, which appears do them much good in improving their health.   |
| Marches.                             | 3. During the past year the troop with its head-quarter had been on march, patrolling in the Abyan Districts, from 21st October to 3rd November 1876.   |
|                                      | 4. An excellent hospital has been built, but is not yet handed over for occupation ; for the present the dispensary is kept in a thatched hut.  |
| Sickness, mortality, and invaliding. | 5. The strength of the troop at head-quarters was 89·5, percentage of sick to strength 176·5. There was 1 death during the year, caused by calculus. There were 3 men invalided : 2 were hospital cases, and 1 was sent by the commandant of the troop. Of the former, 1 was suffering from ague and enlarged spleen, and the other suffered from chronic affection of the lungs. The latter was an old man of 37 years' service, and suffered from asthma. The 158 admissions to hospital were chiefly cases of ague, exceeding by 2 the number of ague cases during the year 1875. This is almost the only disease for which there has been an increase in the number of admissions. The monthly admissions were as follows :—January 16, February 8, March 10, April 8, May 9, June 3, July 3, August 5, September 4, October 4, November 16, December 12. The majority of the cases were of a mild nature, and in many instances the same patients were admitted several times. |
| Epidemics.                           | 6. Small-pox and other epidemic diseases were absent from this station.   |
| Vaccination.                         | 7. There were 7 children vaccinated during the year, the lymph was good, and the vesicles were well formed. Re-vaccination was performed with success on the commandant of the Aden Troop.  |
| General health.                      | 8. The health of the troop generally remained fair during the year.   |

**REMARKS BY DEPUTY SURGEON-GENERAL W. G. HUNTER, M.D.**

At my inspection I found a hut built of straw which served as a dispensary and residence for the hospital assistant in charge. The troopers when ill either attend at the dispensary or else are visited in the lines by the hospital assistant, all serious cases being transferred to the hospital of H. M.'s 6th Regiment N. I., at Aden, the medical officer of which visits from time to time this outpost. This charge is situated on the desert a few miles from Aden. I was struck with the capital physique of the men, due, in a great measure, to the care bestowed on them by Major Stevens, their commanding officer. Polo, tilting at the ring, and various other healthful out-door recreations and amusements are studiously encouraged. A new hospital had been built, and was almost ready for occupation—a well-built building, with ample accommodation, but defective arrangements, to which I drew attention.

**H. M.'s No. 4 Company, Sappers and Miners.**

**ADEN.**—In medical charge of Surgeon **A. C. DANE, M.B.** ; strength 97·3.

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|------------|---|
| Movements. | The company arrived at Aden in January 31st, 1876, from Kirkee. |
|------------|---|



2. The lines occupied by the Sappers have been condemned, and estimates made for construction of new ones.
3. No changes have been made in conservancy or sanitary arrangements, which continue satisfactory.
4. Condensed water is issued by Government for drinking purposes, and water for ablution is obtained from a well close to the lines.
5. The rations, with exception of the vegetables, are good, and of sufficient quantity. The vegetables, however, that are sowed out during the hot weather, are of very little use as anti-scorbutic agents, and potatoes, limes, and tamarinds ought to be served out during that season.
6. The clothing is the same nearly as that worn by native regiments, but the men are supplied with a suit of blue coarse cloth as a working uniform.
7. The men supply their own guards and a few orderlies, but they have been employed during the greater part of the year in assisting in building the fortifications and making roads. The work does not influence their health unfavourably.
8. I have seen no amusements or gymnastics exercised by the men.
9. There are no cells, but prisoners are locked up in the guard-room.
10. The company has not moved since its arrival.
11. Any sick are admitted and treated in the hospital attached to the native regiment, which has been already described.
12. There have been 43 admissions during the year, and 2 re-admissions. Percentage of treated to strength is 44.1, daily average of sick 2.2. There have been no deaths in hospital; but one man, who was on sick certificate, died at Poona. Eight men were invalided.
13. Ague has given 15 admissions, none of them severe, and yielding easily to treatment. Seven rheumatic affections amongst men who had served sufficiently long to entitle them to pension. Syphilis gave 4 admissions. One infecting chancre brought from India and one non-infecting contracted in Aden, and 2 cases of secondary syphilis, one of whom was sent on sick certificate, and died some time after arrival at Poona. There were 3 admissions from scurvy, and 19 men received lime-juice in the lines. One case of dysentery and 1 of diarrhoea; also 1 case of a large ganglion forming in the sheath of one of the tendons of the wrist which was cured with some difficulty. The remaining admissions were from contusions.
14. There was an epidemic of small-pox in the bazaar, but no cases occurred in the lines.
15. There have been 8 vaccinations, 4 of each sex, on subjects under one year of age.
16. It will be seen from the above, that the company has enjoyed very good health during the year, one reason—perhaps for the small number of admissions—being that the men were drawing extra pay nearly the whole time whilst working at fortifications, &c., but this pay was not drawn whilst in hospital; also the extra pay enables the men to live better than ordinary line sepoy.

REMARKS BY DEPUTY SURGEON-GENERAL W. G. HUNTER, M.D.

Inspected the lines of H. M.'s No. 4 Company, Sappers and Miners, and the military Native General Hospital in which the sick are accommodated, on 26th December 1876. The lines are unfit for habitation; they had previously been condemned, and steps are being taken for the construction of new ones. The hospital is a straw hut, and is, in my opinion, quite unfit for the accommodation of the sick in a climate like Aden. The company arrived at Aden from Kirkee in January 1876; its health is good, the daily average of sick being about 2 per cent. There had been no deaths.



### H. M.'s 6th Regiment N. I.

ADEN.—In medical charge of Surgeon A. C. DANS, M.B. ; strength, 611.

Movements. The movement of the regiment from Belgaum was completed this year, the two last detachments arriving,—one in January, and the other in March.

2. A detachment of 50 men, under the command of one European and one native officer is sent to garrison the island of Perim, and is relieved after two months' residence there. Two companies are also stationed at the Isthmus Position, and are periodically relieved at the discretion of the officer commanding.

3. The lines, with the exception of the building of an armourer's shop, are in precisely the same condition as described by Dr. Peters. The houses, which are well built, and ventilated, have, however, one great drawback, that there is no regular footway in front of the doors, so that in many instances the flooring of the entrance is on a lower level than the roadway, thus rendering them liable to be flooded if there should be any heavy fall of rain.

4. The conservancy establishment is insufficient to perform the duties satisfactorily. The sweepers are called on to clean all the guard-houses occupied by the regiment, whether regimental or otherwise; and as two of these guard-houses are situated at about a mile distant on opposite sides of the lines, a great deal of time is wasted. The latrines are, however, kept in fairly good order; but it would be of great benefit if a larger supply of disinfectants were allowed.

5. Water is served out by Government at a fixed rate of two gallons of condensed for drinking and three gallons of slightly brackish water for washing purposes. Rations are good, and of ample quantity, with the exception of the vegetables, the kinds of which that are served out during the hot weather being almost valueless as anti-scorbutic agents. During the months of May, June, July, and August, potatoes, alternated with limes and tamarind, ought to be issued two or three times weekly, in place of twice a month, as is the present system, and in this way preventing the men having the temptation of selling the potatoes, which they might do if they received a large quantity at a time. Although the expense of serving out a ration of potatoes would be greater than the present one of country vegetables, still most probably the men would be more efficient, and the amount of limejuice that it is now found necessary to issue would be lessened.

6. Although there are a large number of guards to be furnished, still, as there is very little drill during the hot weather, the men do not appear to find the work too hard.

7. Very few of the men appear to practise gymnastics, and there is no regular gymkhana; but many of them are employed as carpenters, farriers, shoe-makers, tailors, &c. A fine armourer's shop has been opened in the lines, and also a karkhana, well supplied with all necessary tools.

8. The only marches have been those performed by the two detachments previously mentioned as having arrived from Belgaum.

9. The hospital has been considerably improved during the year by the floor having been asphalted, which renders it much more easily kept clean; otherwise no changes have been made. The only improvement I can recommend is that a room should be built for ophthalmic purposes, as at present there is no means of making any of the wards dark without completely excluding the entrance of air.

10. There were 412 admissions during the year. Although this appears a very large a number, still the diseases composing it are principally of a slight nature. The percentage is as follows:—

Average daily sick	...	...	...	...	...	...	...	13.2
Treated to strength	...	...	...	...	...	...	...	67.7

The number of deaths was 4 in hospital, showing a percentage of "deaths to treated" 0.96, and of "deaths to strength" .65. One European officer also died whilst on his way to Europe on sick certificate. Ten men were sent from here to India on sick certificate. Twenty men were invalided,—2 being native officers, 4 non-commissioned, and 14 privates.

11. Ague has been the principal cause of admissions during the year, 137 cases having been treated. Most of these, however, were mild cases of the quotidian type, and yielded readily to treatment. Some, however, were more severe, and necessitated the individuals being sent on sick certificate. There was only



one case of remittent fever. Bowel complaints gave rise to 57 admissions, of which 21 were cases of dysentery, mostly slight, and easily cured; diarrhoea 13; the remainder being cases of colic, constipation, and other slight affections. There were 36 cases of contusions, and rheumatic affections gave rise to 27 admissions, which two classes were principally confined to men who had served a sufficient time to entitle them to pension, and who came to hospital making much of slight affections which would otherwise have passed unnoticed; 23 cases of boils; 22 cases of scurvy were treated in hospital, besides about 100 men who had a daily allowance of lime-juice served out to them in the lines as long as they showed any symptoms of the disease. I have already stated that it is my opinion that if a proper vegetable ration was served out, that the admissions from this cause would be very considerably lessened. Diseases of the lungs gave rise to 18 admissions, of which bronchitis was the principal factor with 10, and pneumonia 3, of which one case was fatal in three days. Hepatitis gave 6, and splenitis also 6. Affections of the eye gave 8 admissions; none of them, however, of much consequence. Gonorrhoea gave 4 admissions, 3 of which were contracted prior to arrival in Aden. Orchitis gave 5 admissions, in all cases stated to be the result of injury. Of secondary syphilis there were 3 cases. From mental affections there were 4 admissions; 3 of the cases were, however, only mild, and the men returned to duty. The fourth case, however, is more serious, and the man is to be brought before a committee preparatory to being sent to the asylum. One case of facial paralysis, for which the man was invalided, as he was also suffering severely from gravel, and 4 cases of slight sunstroke, complete the list of principal admissions. The admissions according to caste were as follows:—

Hindus.	{	Mahrattas	...	...	...	...	...	...	220
		Purdasees	...	...	...	...	...	...	69
		Low-caste	...	...	...	...	...	...	84
Mussulmans	...	...	...	...	...	...	...	34	
Christians	...	...	...	...	...	...	...	5	

The admissions according to caste being, in nearly all classes, of equal proportion to strength.

12. The deaths during the year were as follows:—1 from acute double pneumonia supervening on a case of ague; 1 double pneumonia un-complicated, in which case the man was only sick for three days, death apparently taking place solely from the hyperpyrenia; 1 case of peritonitis, coming on in a man who was convalescent after a long attack of intermittent fever, and had not strength to combat the fresh disease. The fourth case was caused by the bursting of a large dilatation of the descending portion of the aorta, which had never been suspected during life, and patient had never complained of any symptoms, although he had been for months in hospital both with intermittent fever and scurvy, and was waiting to be sent to India on sick certificate.

13. 2·7 inches of rain fell during the year. The immediate effect of rain is to cause an increase in the number of cases of ague, and also to cause a most unpleasant smell to be perceptible throughout the whole of the cantonment, most probably from the accumulations of filth that are made on the hillsides being disturbed.

14. There have been no epidemics of any kind amongst the men of the regiment or their families; but small-pox was prevalent in the bazaar, being imported from Jedda by returning pilgrims.

15. Vaccination has been performed in all cases requiring the operation with success. None of the cases have failed. The following table shows the operations according to caste and sex:—

Caste.	Sex.	
	Males.	Females.
Christians ... ..	2	.....
Mussulmans ... ..	2	2
Hindus ... ..	29	2
Total...37		

There were no re-vaccinations.



16. The general health of the men, notwithstanding the trying climate of Aden, may be said to be very fair; the largest number of admissions are amongst the older men of 20 and 25 years' service. The largest number of men are recruits of 2 or 3 years' service, who have not as yet finished growing, and filled out; but in a few years, if scurvy does not weaken them here, there will be a very fine set of men in the regiment.

17. Cinchonidine was tried in the treatment of intermittent fever, but it was found to be of very little use, unless given in very large doses, when it caused bad symptoms of cinchonism. Hypodermic injection of quinine has proved very successful; and although it has been used in many cases, in not one single instance was there any sloughing of integument, or unpleasant result, except in one or two cases where a small hard swelling formed at point of operations, but which rapidly subsided when poulticed. All cases of dysentery were treated with ipecacuanha. A small quantity of Warburg's tincture was obtained towards the end of the year, and was immediately successful in stopping cases of intermittent fever in which it was exhibited.

18. On considering the facts already stated it will be seen that, although there appear to be a large number of admissions into hospital, still, as so many of them are only trivial affections, it cannot be said that the regiment has suffered much from its first year's residence in Aden; and I believe that if some change was made in pension rules, by which men were allowed to retire after having completed a certain number of years on an ascending scale of retiring pension, that the admissions to hospital would be lessened at least one-third.

19. There was only one native pupil attached to the hospital during the year, who was instructed in the practical work in the wards; but owing to the fact that I was performing the civil duties as well as my own for a great part of my time, I was unable to give him much assistance in his reading.

#### REMARKS BY DEPUTY SURGEON-GENERAL W. G. HUNTER, M.D.

Inspected the hospital and lines of H. M.'s 6th Regiment Native Infantry on 26th December 1876, Surgeon Dane, M.B., Officiating Medical Officer. The hospital is a large well-constructed building, with asphalt floors; ventilation good, and accommodation very ample. The quarters in the lines are well built and ventilated; the absence of a plinth is objectionable, as the quarters are liable to be flooded in the event of heavy rain. The latrines are to windward,—a defect which ought never to have been permitted. The conservancy was good.

The last detachment of the regiment arrived in March from Belgaon, where the corps had previously been stationed. A detachment of 50 men, under an European officer, and in medical charge of an assistant apothecary, is stationed at Perim, and is relieved every two months. As the detachment had very recently been visited by the medical officer, I did not think it necessary to inspect it personally. The health of the regiment was good, the daily average sick being about 13; most of the cases in hospital were of a trifling character. A few cases of scurvy had been observed, which might be obviated by the daily issue of tamarinds with the diet. Its spread had been checked by the issue of lime-juice in all suspected cases in the lines. The conservancy of the cantonment was not so good as it might be. The poorer classes resort to the hill-sider for natural purposes, effluvium from decomposing excreta at times being painfully manifest.

(In this report no mention of the numbers of treated, castes &c., of the detachment stationed at Belgaon for two months is made).

#### Out-post Perim.

In medical charge of Assistant Apothecary GILLESPIE; strength 50.

A detachment of 50 men and one European officer are located here for two months—reliefs being furnished at the termination of that period by the Native Infantry stationed at Aden.

2. The barracks are situated in the fort, which have since last report undergone thorough repair, and substantial roofing put on. Ventilation is free all around, but accommodation is insufficient. One large masonry tank, capable of holding 20,000 gallons, exists within the fort, but is never used; probably reserved for cases of emergency. Suitable cook-houses for the lower castes of the troops are very much needed: the present huts are formed by circular piles of loose stones and covered by old matting, which again are kept from being blown away by the wind with large stone weights.



3. A latrine for the troops has been erected on the western side of the fort containing eight partitions, to hold the same number of iron receptacles, and all sanitary arrangements are satisfactory; the excreta being daily removed in closed receptacles and buried to leeward of the fort.

4. The water-supply for drinking purposes is condensed on the island, and is of good quality. The troops receive a liberal allowance, viz., 2 gallons condensed and 3 of brackish or purchased water daily per head, and during the hot months—from May to September—an increase of a gallon of condensed per man, daily, has been sanctioned. With the exception of the officer commanding, the European residents receive a meagre allowance of water, viz., 3 gallons condensed, and 2 gallons purchased or brackish, water daily each; this quantity is insufficient for drinking, ablution, and culinary purposes. The purchased or brackish water is brought in country crafts or buggalows, procured from wells and rivers on the surrounding coasts of Arabia and Africa, according as the winds for sailing permit. It serves the purpose of ablution very well; nay, it is sometimes preferred by the natives of the island for drinking.

5. The troops are supplied with rations by the Commissariat according to the following scale:—Daily per man: flour, 2nd sort, 1 lb.; rice, 2nd sort, 12 ozs.; dhall 4 ozs.; ghee 2 ozs.; salt  $\frac{3}{4}$  oz.; vegetables, country, 7 ozs.; curry-stuff and kokum  $\frac{1}{2}$  oz. of each; firewood 3 lbs.; sugar 1 oz., and 1 drachm of lime-juice;—all are of good quality, with the exception of vegetables, which are invariably of inferior quality, sometimes dry and withered, and consist only of onions and pumpkins, the latter of which are seldom eaten by the men, but are either thrown away or given to the goats on the island. Fowls, fruit, and vegetables in very small quantities are occasionally brought in canoes from the Arabian coast for sale.

6. Cotton and warm clothing, according to the season, are worn when on duty. Duties are light; occasional parades; more frequently employed in making and repairing roads. Exerts no pernicious influence on health.

7. The hospital consists of a spacious room situated and attached to the south-eastern extremity of the fort. It is freely ventilated (except on the side attached to the fort), and capable of accommodating 8 patients. No improvements or requirements can be suggested.

8. The principal admissions during the year have been from ague, dysentery, lumbago, chronic rheumatism, synovial rheumatism, sclerotitis, inflammation of the lymphatics, bronchitis, and incontinence of urine. The case of ulcer shown as remained, was transferred to Head-quarter Hospital, Aden; that of ague was successfully treated with cinchonidine, and of dysentery, which was severe, yielded to the ipecac. treatment. The case of sclerotitis remained long on the list, with little improvement, though every remedy from this dispensary was tried; a relieving detachment arriving opportunely from Aden, the case was transferred to Head-quarter Hospital; those that remained in hospital when relieving detachment arrived, were transferred with the relieved. Owing to the keen and irritating north-westerly winds prevailing during the months of June, July, and part of August, cases of catarrh, bronchitis, and rheumatism occurred. In the month of October, bowel diseases appear to have been greatly on the increase among the troops and civil population, which was attributed to unwholesome flour being issued as rations. Two cases of scurvy occurred among the military, and one in a dooly-bearer of the Commissariat Department, all of which necessitated anti-scorbutics, and were treated as external patients. In the latter case the symptoms were very much aggravated.

The "average daily sick" of the military has been 38, and the "average daily attendance" from colic, diarrhoea, slight dysenteric symptoms, bronchitis, catarrh, rheumatism, dyspepsia, and one case of hæmoptysis (which yielded after a few days' active treatment) was 20.

The diseases among the civil inhabitants have been bronchitis, phthisis, diarrhoea, dyspepsia, ague, constipation, catarrhal ophthalmia, gleet, syphilitic wart, rheumatism, scurvy, worms, teething, complicated fracture of lower end of radius, wounds and contusions, and scorpion stings. That of fracture occurred in a camel-driver of the Commissariat from the bite of a camel, was under treatment for a period of 15 days, and then sent to Aden. The "average daily attendance" has been 1.2.

Two deaths occurred during the year under review: one a child, belonging to a light-house lascar, from chronic diarrhoea; the other, a wife of the water-contractor's, from phthisis.



- Causes of sickness.           9. The principal causes of sickness are due to the north-westerly winds which prevail during the months of June, July and August.
- General health.               10. The general health of the several detachments has been good.
- Special treatment.           11. One case of ague has been successfully treated with cinchonidine, and when scurvy occurs the ordinary anti-scorbutic mixture is resorted to.

I would again draw special attention to the treatment and prevention of scurvy; though a comparatively small number have attended the dispensary during the year under report, some arrangement in the supply of fresh vegetables is very much needed, which would, indeed, be a great boon.

On this subject being referred to at Aden, an extra allowance of vegetables has been sanctioned when essentially necessary, but a corresponding reduction is made in some other articles of the rations.



## POONA DIVISION.

Average strength present during the year... ..	...	...	...	7,448.6
Average daily sick per cent. to the average strength	...	...	...	2.9
Ratio of mortality per cent. to the average strength	...	...	...	0.5

## H. M.'s 1st Regiment Light Cavalry.

POONA.—In medical charge of Surgeon J. MCALISTER; strength 291.

Location and movements of corps. The head-quarters of the regiment have remained at Poona throughout the year.

Detachments. 2. There has been no relief of the squadron on outpost duty at Baroda.

3. No efforts have been made to improve the ventilation of the lines, notwithstanding what has been written and said on the subject in former annual and special reports during the past six years. This point was made the chief subject of criticism by the Sanitary Commissioner at his recent inspection of our camp. At present the huts are equally devoid of the means of assuring a supply of fresh air, as they are of those necessary to get rid of the foul air. The chief fault of nearly all the lines for native troops that have been constructed, whether in past years or more recently, has arisen from an ill-defined idea of the objects to be attained in the construction of such buildings, or at least of the relative importance of these objects. The principal object has been to build permanent lines without due regard to the necessity of having adequate outlets and inlets for air, in order to obtain the largest and most constant interchange between the interior and exterior atmosphere. At present light and air can only enter our huts through the doorway, and this is only 4ft. high and relatively narrow, and the flooring is in very many of them quite a foot below the outer level. These evils might be abated by raising the floors, and causing openings to be made in the walls, and the general introduction of ridge ventilation, so as to afford the inmates a natural ventilation at night when the doors are shut. I would also recommend that the small yards in rear of the huts be removed, as they afford cover for many filthy practices, &c., besides rendering the atmosphere of lines unhealthy by obstructing ventilation. But the most searching sanitary inspection can have only a palliative effect. The evils are of such a nature that nothing but the removal of their causes, which will involve the demolition of these viciously constructed habitations, will produce the desired result.

4. In former reports I have had occasion to notice, with some detail, the defective and insufficient system of surface drainage—if system it can be called—employed throughout the cavalry reservation. Upon only the principal thoroughfares is any attempt made to carry off artificially even the ordinary rainfall, which in very wet seasons like that of 1875, is often sufficient to flood the camp in many places. The gradual slope of the ground from the site on which the lines are built makes thorough drainage comparatively easy, though this advantage is as yet but little improved on. Small and rudely cut surface drains extend between the double line of huts, also in rear of the horse lines; they are constantly filling with the washings of the ground in wet weather, and choked with slops and dirt getting into them from the yards behind the huts of the married men. From the want of sufficient fall their contents, of course, cannot be carried off. In this I think we may find an easy explanation of the rapid spread of malarial disease in the wet season of 1875, '74, '73, and of cholera and the cognate diseases, dysentery and diarrhoea in 1872; to defective surface drainage must be added the decay of vegetable matter as an important factor in the production of zymotic exhalation; particularly is this the case in the horse lines, where the soil gets saturated to a considerable depth by concentrated organic



matter in the shape of new accessions of horse-dung, urine, and silt; these diluted by rain foment and form putrescent organic mire, becoming in course of time a source of noxious miasms. This subject was referred to at considerable length in special reports to the local authorities in 1875, and the suggestions then made may be advantageously repeated in order to bring more directly to the attention of the Surgeon-General the necessity which exists for a good system of paving and perfect surface drainage in order to place our lines in a proper sanitary condition. With the view of remedying these evils, I would beg to suggest that the present gutters in rear of the lines should be paved with flag-stones, as was done in certain places in the Ghorpuri Barracks last year, with great advantage to cleanliness. Glazed tiles would answer the purpose still better. Larger channels should be provided in front and rear of lines for the conveyance of the contents of the smaller gutters to points below the Syce Lines in the line of fall. These should be paved in the same manner as the smaller gutters between the line of huts, and conducted to the nullahs by means of large open saucer drains.

5. The Commanding Officer has directed a constant supervision to securing good sanitary condition of lines and huts at all seasons. The fact has also been recognised that the modifications of infectious diseases may sometimes elude the most vigilant sanitary inspection, and hence the Colonel has considered it desirable that the native officers should consider it part of their duty to give prompt information about any suspicious case of sickness which may come under their observation. The regimental latrines, though constructed after a standard plan, present some well-grounded sanitary defects. Practically, however, they have answered the purpose fairly well. The collection of horse-dung, litter, and lime rubbish has been generally well attended to; an improvement has been noticed during the year in the disposal of the rubbish after collection. Complaint of its non-removal was made by the Sanitary Commissioner at his inspection. Since then people have been found willing to remove it for manure.

6. The water-supply is directly from the Kharakwasla water works, but the well water is largely preferred by many of the men for domestic purposes. The unsatisfactory condition of the stand pipes is now receiving attention, and such action was much needed, as the waste was excessive, and the mire caused thereby very disagreeable. The Kharakwasla water is eminently a pure and wholesome water, and in all respects well suited for domestic purposes.

7. Up to the present time there has been no difficulty in obtaining a sufficiency of various kinds of food in the Poona bazaar, but the prices have risen owing to the famine in surrounding districts.

8. The building and other property at the hospital are in a good condition; very few repairs have been required during the year. The drainage has been very satisfactory since the improvements made in the previous year, and the annoyances which were formerly complained of have ceased to exist. The hospital receives an ample supply of water from the main supply pipe. The dry-earth system has been well maintained in hospital latrines.

9. The year which has just closed has been remarkably exempt from the prevalence of any grave form of disease since the arrival of the regiment in Poona; the rate of admissions for zymotic disease has never been so small as in the past year. With an average strength of 291 there have been 282 admissions, which is rather more favourable than last year, when the same percentage was 310. The great bulk of the admissions have been from malarial fever 116; dysentery caused 14 admissions, ophthalmia 3, syphilis 10, and 73 were from various affections of the surface, wounds, contusions, inflammation and ulcerations, the immediate cause of all of which is connected with the work of the sowar, and the accidents to which his work subjects him. Boils and indolent sores are very prevalent amongst the poorly-fed men.

10. There have been 3 deaths during the year: 1 from abscess of liver, 1 from tetanus, and the third from pneumonia. The particulars of these cases were given in the monthly reports. Twelve men were pensioned during the year,—8 for debility and old age, 1 for rheumatism, 1 for chronic bronchitis, 1 for prolapsus ani, and 1 for fracture of the right forearm of long standing. One short-service man was discharged with a gratuity.

11. There has been no epidemic during the year, and no case of small-pox.

12. Vaccination has been well kept up amongst the men and their families.



13. The health of the regiment has been good, owing, no doubt, to the generally healthy season, and the absence of prolonged heat and moisture in the months of August and September, as ordinarily *Resumé.* owing to imperfect drainage and the want of ventilation, these months have furnished a high rate of admission from miasmatic diseases.

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REMARKS BY DEPUTY SURGEON-GENERAL BEATTY, M.D.

The head-quarters of the regiment has been stationed at Poona since 1875, the 1st Squadron being located at Baroda.

The average strength of the corps at Poona was 291, whilst the total treated in hospital during the year, notwithstanding the improvements made by the cantonment authorities in cleaning out and widening the drains in the lines, was 289, or 99·3 per cent. of the entire strength.

The sanitary condition of the camp and cavalry lines have engaged the earnest attention of the Sanitary Commissioner, whose valuable report on the subject is already before Government.

The hospital itself is admirably situated, and can give accommodation to 29 patients. The latrines were kept perfectly clean, and the whole management of the hospital and establishment was highly creditable to Surgeon Keith, the medical officer in charge at the time of my inspection.

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H. M.'s 5th Regiment N. L. I.

POONA.—In medical charge of Surgeon J. F. KEITH, M.D. ; strength 589.

The regiment has been stationed at Poona during the year. Three detachments were sent to Khair, Junnar, and Karkálla, consisting of 10 privates and non-commissioned officers.

- Location and movements of corps.
2. Rs. 4,264-14-9 were expended for line repairs. A band-room, native officers' library, workshop, and talimkhana have been built by the regiment.
 

Lines.
  3. Kharakwásla water is supplied to the men by three pipes. The water has been analyzed by the Chemical Analyser to Government, details of which analysis have been represented in previous reports. The men also bathe in 2 wells near the lines.
 

Water.
  4. Since the month of July food has been very dear, and many of the men suffered from insufficient nourishment; but now grain compensation has been increased to nearly three rupees per man. It was abundant and of good quality. After the arrival of the regiment, a regimental garden was established, and now from it the men get abundance of fresh vegetables.
 

Food.
  5. The same as last year. A new style of dress has been sanctioned, but not yet issued to the men.
 

Clothing.
  6. Are rather heavy; nights in bed 3½. Although these duties do not seem to have had an injurious effect on the health of the able-bodied and well-fed men, yet weak men who try to live on the least possible amount of nourishment have mild attacks of ague, diarrhoea, and dysentery, from fatigue and exposure.
 

Duties.
  7. The hospital is new; it was built in 1875. Length 96 feet, breadth 22, height of wall 14½ feet, cubic capacity 30,624 cubic feet. Ventilation on the east side by 7 windows and 2 doors; with a verandah in front, measuring length 118½, breadth 9, height 12 feet 1½ inches, cubic capacity 12,931 feet 4 inches; on the west side by 3 doors, the rest being solid walls; one of the doors opens into the room used as an office. On this wall, in the place where the west verandah should be, are placed, 1st, the bath-room; 2nd, passage of one of the doors leading into the hospital; 3rd, dispensary



4th, office; 5th, store-room; 6th, passage into second door; and 7th, room used for the private examination of patients; so that on the west side there is ventilation only by 2 doors in a wall 96 feet long. This is the only fault the hospital has. The hospital assistants' quarters are all that can be desired, if they had liberty to build a small privy. The compound is large, length 122 yards, breadth 80 yards, which gives an area of 9,760 square yards. The site is good, the ground being rocky beneath, without any sub-soil, and slopes towards a small rivulet which runs northwards. The drainage is thus natural and good. The plinth is about 1 foot high on the west side, and  $3\frac{1}{2}$  feet on the east, roof tiled, with Howard's ventilator on the top. There is also a separate ward in the compound 40 feet long, 22 broad, height of wall 11 feet, cubic capacity 9,680, has a plinth of 2 feet, and a verandah of 5 feet all round. The ward is used for surgical cases and cases of ophthalmia, &c., requiring segregation. Ventilation is by three windows on the east, and three on the west side, a door on the south, and a window on the north gable. It is sufficient. For the treatment of contagious disease, as small-pox, there is erected a chupper hut, built on a permanent plinth of about 1 foot in height, and measuring 50 feet in length, 21 in breadth, height of outer wall 7 feet, giving 1,050 square feet and 10,500 cubic feet, but the gables instead of the sides of this erection have been turned towards the direction of the prevailing winds. It has ventilation by two doors on each side.

Conservancy.

8. The system is the same, and the latrines have been kept scrupulously clean.

9. Is Kharakwāsla water, pipes having been laid on since the 8th of October 1876  
Hospital water-supply. Formerly well water was used; it was also good.

10. *Sickness and Mortality.*

Year.	Average strength.	Admissions.	Deaths.	Average daily sick.	Treated to strength.	Total treated.	Admitted per 1,000 of strength.	No. daily sick per 1,000 of strength.
1875 ...	634	407	5	14.4	66.2	420	641.9	227.1
1876 ...	589	1,106	...	22.1	189.9	1,119	1,877.7	375.2

There were 5 cases of small-pox treated. These were of a mild type, having all been previously vaccinated. There were also 9 children and 3 women, the former all recovered; 2 of the latter died. They were also vaccinated. These cases were treated in the chupper ward.

*Admissions for Ague.*

234 men once in hospital	...	...	...	...	...	234
88 " twice "	...	...	...	...	...	176
66 " three times in hospital	...	...	...	...	...	198
26 " four "	...	...	...	...	...	104
8 " five "	...	...	...	...	...	40
2 " six "	...	...	...	...	...	12
1 " seven "	...	...	...	...	...	7
1 " eight "	...	...	...	...	...	8
<u>426</u>						<u>Total... 779</u>

There were thus 163 men of the regiment not in hospital during the year. These cases were all of a mild type, and yielded readily to the usual treatment and change of air. Four men were sent to their homes on this account. One case of remittent fever was sent for change of air for six months. There was one case of mumps treated; the same man was also treated for diarrhœa. There were two very slight cases of erysipelas. One of them was admitted once with sciatica and twice with ague; the other twice with contusion. Eleven cases of chronic rheumatism were treated. All these men have suffered also from various other diseases, such as ague, lumbago, syphilis primary and secondary, dyspepsia, boils, and itch. Of these cases 5 were invalided, and 1 sent for change of air. There have been 6 cases of primary and 1 of secondary syphilis. One of the former suffered also from rheumatism; another suffered also from gonorrhœa, orchitis and conjunctivitis, and a third also from ague, gonorrhœa, and orchitis. The case of secondary syphilis was invalided under lumbago. There were 7 admissions from scurvy, 2 men being admitted twice. The others suffered also from ague and chronic rheumatism. One has been invalided, 2 were sent for change of air, and 2 cases were invalided under the head of debility. Twenty-one cases of lumbago



were treated. These patients came into hospital with pain in the lumbar region. They are men who have been frequently attacked by ague (1 having been attacked seven times during the year) and rheumatism. These are mostly old and weak. One was invalided under syphilis secondary, 3 for old age and debility, and 1 for rheumatism. There were 2 admissions from sciatica; 1 of these suffered also from ague and erysipelas. They were slight cases. One case of dementia from smoking ganja was admitted; symptoms on admission—talking nonsense, insomnia, would take neither food nor medicine. These symptoms gave way to a seeming febleness of the mental powers. His health was otherwise good. He cooked his own food, ate plenty, and talked reasonably with the other patients, but would speak neither to hospital assistant nor to myself. He was discharged cured. Twenty-one cases of conjunctivitis were treated. They were all slight cases, with the exception of one who suffered also from gonorrhœa, orchitis, and primary syphilis. Another case was admitted four times before with this disease. He was admitted also four times with ague. He was in a debilitated condition, and was invalided under this head. There were admitted 16 cases of bronchitis; they were very slight cases; 1 case was invalided under this head. Three cases of pneumonia were treated. These were very severe cases. They were kept in a temperature of from 80° to 90°, saturated with aqueous vapour, and the lungs, skin, bowels, and kidneys kept acting freely. They all made a good recovery. There were 12 cases of dysentery, the same as last year. They were not formidable cases. There was one case of umbilical hernia. He had suffered five years from it. It was becoming larger. He was invalided, as he was generally unfit for military duty. Three admissions from splenitis occurred, 1 man three times. He had enlargement of the spleen, slight pain over the under region of the liver, a general puffiness of the body and œdematous feet. As he is in a very weak state, and making no progress towards recovery in hospital, he will be sent to his home for change of air. Under diseases of the urinary organs, 13 cases were admitted—6 from gonorrhœa, 3 from phimosis, and 4 from epididymitis. None of these cases, with the exception of the following, was severe. It was complicated with orchitis and conjunctivitis; the other 2 with phimosis, for which operations were performed. Under diseases of the cellular tissue there were 11 cases—5 abscesses and 6 guinea-worm (same as last year). These were cured in the usual way. They occurred in Mahrattas from the Konkan. There were 74 admissions from injury, 1 case of wound of the penis caused by shooting at a snake with a gun loaded with water, and not applied to the shoulder as usual. The penis was separated from its upper attachments to the pelvis, but the arteries and urethra escaped. It was returned and kept in its site by stiches and strapping. The patient made a good recovery. All the others under this head and that of contusions were slight cases, and call for no further remarks.

11. Fifty-four were invalided: 40 were invalided from old age and debility, 1 from fever, 5 from rheumatism, 1 from scurvy, 1 from syphilis, 1 from disease of the eye, 1 from asthma, 1 from hernia, 2 from osteal hypertrophy, and 1 from enlargement of the testicle; 11 patients were sent to their homes for change of air.

12. The principal causes of sickness are supposed to be heavy duties and insufficient nourishment, which in men who have acquired the malarious taint would be productive of attacks of ague, under which head the greatest number of admissions have occurred.

13. It has been carefully carried on during the year; the following table will show the result. The lymph has been good; it is renewed when necessary from the staff hospital:—

Vaccination.			Re-vaccination.		
Number of primary operations.	Successful.	Unsuccessful.	Number of persons operated on.	Successful.	Unsuccessful.
101	101	...	104	103	1

13. From the numbers invalided during last year and the year under report, and from the late liberality of Government, the general health and physique of the men will, no doubt, become gradually and generally improved.



15. For slight attacks of ague, cinchonidine is used in place of quinine in small doses as a tonic; but it must be given in large and frequent doses when intended as a substitute for quinine and as an anti-periodic. The cold bath when ague is approaching, or during the cold stage, is a therapeutic agent of great value.

16. The native medical pupils receive clinical instruction, English dictation, instruction in materia medica, the doses of medicine and their therapeutic use and action; but they are changed so frequently that it is impossible to say whether they derive much benefit.

#### REMARKS BY DEPUTY SURGEON-GENERAL T. B. BEATTY, M.D.

Since the arrival of the regiment at Poona its general health has not been satisfactory, the men having suffered severely from fever, which, however, has not been of a fatal form. During the year under report the total number of cases treated in hospital was 1,119, compared with 420 in the previous one, when the regiment was stationed at Belgaum. The number of deaths in 1875 (including 6 from surgical operations) amounted to 10, whilst in 1876 no casualty has been recorded.

The hospital is commodious, being capable of accommodating 30 patients without overcrowding; and at the time of inspection was remarkably clean, and the arrangements for preserving the sanitary condition good.

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

POONA.—In medical charge of Surgeon J. PARKER, M.D.; strength 684.

- The new lines are almost finished; accommodation for one company and a half has yet to be completed. The regiment did not furnish any detachment.
2. The new lines are almost finished; six companies live at present in them.
3. As the roof consists of a single layer of tiles, ventilation, to a certain extent, is carried on through it. In each room a brick window has been constructed for the same purpose.
4. In reference to the bazaar situated in the old lines, I have nothing further to add to what has been stated in previous reports. That of the new lines is to be built between a new road about to be made in the rear of the lines and the nullah.
5. In the new lines it is all surface drainage; the water is carried by open drains to the nullah, towards which there is a fall of ground. I think it would be well, in reference to these drains, to have some precaution taken against soakage. I am informed that at present the intention is to have them dug up at certain intervals; but a good tiled passage is, I think, preferable; the latter is easily kept clean, whereas in the former scheme a certain amount of soakage must take place.
6. Three tanks are to be constructed in the new lines as described by Dr. Sexton in his report for 1874. At present the water is obtained for the new lines from a stand-pipe erected near them.
7. Concerning the old lines, I have nothing new to state. In the new lines temporary privies are in use at present, "the dry-earth" system being adopted. I understand that the Sanitary Commissioner has submitted a new method, which is now under consideration, to be permanently adopted in these lines.
8. Good and abundant, derived from three tanks situated in front of the lines, which are supplied by pipes from the Kharakwásla reservoir. In the new lines, as before stated, three tanks are to be built. One stand-pipe with water-cock was erected a short time ago near the new lines; similar ones, I understand, are to be constructed throughout the lines. These will be supplied by Kharakwásla water.
9. The food is good, and for the latter part of the year, since the appearance of the famine, the price and amount supplied can compare favourably with any other station in the Deccan.



10. The labour to which this regiment has been subjected during the year 1876, in the construction of new lines, no doubt accounts for the large number of admissions into hospital. Although large, they compare favourably with the previous year. The strength of the regiment for the years 1875 and 1876 was almost identical, being, respectively, 690 and 684. The total admissions into hospital for the former year was 1,381, of which 328 were from contusions; for the latter the number was 1,311, of which 187 were from contusions, showing a considerable falling off in the number of admissions from this cause, which, I presume, is to be attributed to the fact that the men are now become more adept labourers at duties to which at first they were comparative strangers.

Exercise, amusement, and occupation.

11. The regiment has been kept fully occupied during the past year in the construction of the lines.

12. Proper to the regiment such buildings do not exist, but when circumstances demand, solitary cells situated near the staff hospital are used. Guard-rooms, lock-up rooms, and cells are to be built in the new lines.

Lock-up rooms and cells.

Marches.

13. None have taken place during the past year.

Hospital and its surroundings.

14. There is nothing further to state under this head than has been already narrated in previous reports.

15. Arrangements in this respect are, in my opinion, very good indeed. The roof is provided with ridge ventilation, and there is always a free circulation of air through the wards.

Ventilation.

Over-crowding.

16. This does not exist; there is at all times ample accommodation for the ordinary sick.

17. The fact of the non-existence of either a dead-house or contagious ward in connection with the hospital has been brought to notice in previous reports. The same state of affairs still exists. I again beg to urge that such requirements are absolutely necessary, the latter not only for the health of the regiment, but for the safety of the surrounding populace.

Requirements.

18. This subject has been fully treated in previous reports. A tiled gutter, as advised by Dr. Sexton, to carry off the liquid portion of the night-soil, would be, indeed, a great advantage, as the soakage of nitrogenous elements adjacent to an establishment for the treatment of disease is not to be desired.

Conservancy.

19. The water-supply of the hospital is obtained from a stand-pipe erected in front of the adjacent staff hospital. It derives its supply from the Kharakwála reservoir. This is the whole source of supply. I understand that a scheme for the supply of the hospital has been proposed, viz., the erection of four stand-pipes, two in front of, and two behind, the hospital; this proposition has not yet been carried out practically. A stand-pipe did exist some short time ago in front of the hospital, by which it was in part supplied, but that has been removed.

Hospital water-supply.

20. The total number of cases of diseases treated in hospital during the year 1876 was 1,337, of which 1,311 were admitted between the 1st of January and 31st December. The total number of patients discharged was 1,325, namely, 1,307 to duty, and 18 otherwise. The total number of deaths was 2. Seventeen convalescents were sent to their homes for change of air. On the whole, these figures show a diminution in the sick rate as compared with last year. Two deaths have occurred in the regiment during the year under review—one from pneumonia, the other from bronchitis. This death rate is almost identical with last year, as the actual number of deaths is the same in both periods, viz., 1875 and 1876. The strength of the regiment for both years was almost the same.

Sickness, mortality, and invaliding.

	21. Disease of heart ... ..	2
	"    of lung ... ..	1
	Fractures ... ..	3
Invaliding.	Debility ... ..	41
	Rheumatism ... ..	6
	Syphilis... ..	3
	Varicose veins ... ..	2
	Total... ..	58



22. Of the total number of admissions into hospital malarious fevers figure conspicuously, ague furnishing 631, and remittent fever 7—in all 638; the greatest number of admissions per individual month being in April, viz., 109; this figure is far in excess of that of the previous year. Only 3 cases of acute rheumatism were admitted during the year. Of chronic rheumatism and lumbago the admissions were more numerous, 47 of the former, and 18 of the latter. Under the heading "Venereal Diseases" 40 cases were admitted; this figure is less than that of the previous year by 2 per cent. of strength. The total number admitted with diseases of respiratory system was 104, of which admissions from catarrh constituted 83, bronchitis 11, pleuritis 7, and pneumonitis 3. The total number of diseases of digestive system was 90, diarrhoea constituting 22, dyspepsia 20, and dysentery and colic 14 each. Under the head of "Injuries" will be found the large number, 199, the origin of the greater number of which is to be attributed to causes connected with the construction of the new lines. This figure, however, is much less than that quoted in last year's annual report of this hospital.

23. One case of cholera occurred towards the end of October. Collapse soon set in after admission; subcutaneous injections of æther were resorted to with the best results, the patient rallying after each injection, and, finally, recovery was complete. Small-pox of a very mild type appeared in the month of January and continued till April, when it ceased, and again appeared in December. Seventeen cases in all were treated, 15 of which were discharged cured, and 2 are under treatment at present. In all cases marks either of vaccination or inoculation were apparent.

24. This has been strictly attended to during the past year.

25. From my short experience of this regiment I have nothing further to add to what Dr. Sexton has already stated in previous reports.

26. In reference to the treatment of malarious fevers with sulphate of cinchonidine, from the short experience I have had of such diseases, I am led to infer that in certain forms of the fever cinchonidine is effectual. I allude to what might be called acute cases of intermittent fever, *i.e.*, when the disease does not exhibit a tendency to run on for any considerable period. On the other hand, when the disease occurs in individuals whose constitution has been weakened by age, frequent attacks of fever or other diseases, and the fever appears to have taken a deeper root in the system; in such cases I think quinine is the more useful medicine.

27. Clinical instruction is daily given to the subordinate medical staff of the hospital.

#### REMARKS BY DEPUTY SURGEON-GENERAL T. BEATTY, M.D.

The high rate of sickness noticed in the last report had continued during the past year.

The strength of the corps remained in both years, 1875 and 1876, 690. During the past year the total number of admissions into hospital was 1,311, compared with 1,381 in 1875.

It may, I consider, be fairly assumed that the constant fatigue which the men have undergone in building the lines, the insufficiency of food commensurate with the labour gone through, aided by climate, have all been instrumental in keeping up the high rates of sickness in this regiment. Two casualties occurred, and 58 men were invalided.

The same remarks, which have been made with reference to clay-washing the floors of the staff hospital, are applicable to this.

The necessity for a contagious ward still exists.

#### H. M.'s 26th Regiment Bombay N. I.

POONA.—In medical charge of Surgeon W. McCONAGHY; strength 598.

During the year the regiment has been stationed at Poona. It arrived on the 15th of December 1875 from Bombay, where it had been quartered for some weeks during the visit of His Royal Highness the

Prince of Wales. For the first four months of the year the general health of the regiment was only reported fair, as ague was more or less prevalent. However, this was to be expected, owing to residence, for the nine previous years, in Baroda, Nusseerabad, and Surat,—stations where all troops are subject to malarious disease. From May the general health of the men began to improve, and though still a number of them were liable to attacks of ague on slight exciting causes, yet the physique and general appearance have considerably improved since their resi-



dence in Poona; and it is to be hoped that a longer stay in the invigorating climate of the Deccan will completely shake off the tendency.

2. The state of the lines and topography of the surrounding country having already been fully reported on by medical officers in charge of the different regiments stationed at Poona, there is nothing further to be added.

3. The following table, contrasting the admission from various diseases during the years 1875 and 1876, clearly shows, as a rule, that the general health of the regiment has considerably improved during the latter year:—

		1875.	1876.
Admissions.	Ague ... ..	591	311
	Contusions ... ..	116	99
	Boils ... ..	80	48
	Bronchitis... ..	87	42
	Syphilis, primary and secondary	25	42
	Rheumatic affections ... ..	53	38
	Gonorrhœa and its complications	7	21
	Dysentery ... ..	24	17
	Conjunctivitis ... ..	28	16
	Scabies ... ..	15	14
	Pneumonia ... ..	16	8
	Splenitis ... ..	18	7
	Chicken-pox ... ..	4	7
	Brow ague ... ..	11	5
	Small-pox ... ..	...	5
	Diarrhœa ... ..	38	4
	Hepatitis ... ..	11	3
	Pleuritis ... ..	9	2

*Ague.*—The admissions from ague were 280 less than the previous year. The disease was most prevalent during the months of January, February, March, April, July, November, and December. The type of the disease was most severe during the month of April, and in a few instances it was associated with bronchitis. The disease was generally quotidian in form; and the ordinary treatment was, as a rule, sufficient to cut short the attacks. Diarrhœa, which was a frequent complication of the disease in Surat, was seldom present, and pain in the spleen was rarely complained of. In only one instance during the month of February was it considered advisable to send a patient for change of climate, and this was done as he was subject to repeated attacks of ague and was in a weak and emaciated condition at the time, and appeared to derive little or no benefit from treatment; he eventually died from the effects of this disease. The treatment by cinchonidine was fairly tried (both hypodermically and by the mouth) during the year; and from further experience I have no reason to alter the opinion I arrived at in my former report, viz., that it is efficacious in cases of a mild nature, but in those of a chronic character, or more severe type, it is generally less certain in its action as an anti-periodic than quinine.

*Bronchitis.*—During the year 42 cases of bronchitis were admitted; some of these were of a severe nature, and it was found necessary to send three patients suffering from this disease on medical certificate for the recovery of their health.

*Syphilis.*—The admissions from syphilis were greatly in excess of those of the past five years. The accompanying table shows the number treated for this disease during the year:—

Disease.	Remaining 1st January 1876.	Admitted during the year.	Remaining 31st December 1876.	Remarks.
Syphilis, primary ... ..	5	11	2	The 26 admissions from secondary syphilis were furnished by 15 patients in the following order:—I admitted four times, 2 three times, 4 twice, and the remaining 8 once. Of the primary admissions, 3 occurred in March, 2 in November, and 1 in each of the following:—January, February, May, June, July, and December.
Soft chancre ... ..	...	1	...	
Indurated bubo ... ..	1	2	...	
Syphilis, secondary ... ..	1	26	2	
Syphilitic iritis ... ..	...	2	1	



A few of the cases were of a severe type, and in some instances the secondary symptoms required a long course of treatment. Six patients who had been in hospital for lengthened periods and were in a weak and debilitated condition from the effects of this disease were sent on sick certificate. The majority of these derived little or no advantage from the change, and it was found necessary to re-admit them on their return. One native was invalided for syphilitic rheumatism, and 5 sepoys who had not served for pension were discharged the service, as they were completely incapacitated for the performance of their duty, owing to the results of this disease. It is very difficult to ascertain correctly from sepoys where they contract this disease; but from inquiry I am of opinion that the majority of cases are contracted in the native city, and not in the vicinity of the lines.

*Dysentery.*—Seventeen cases of dysentery were treated during the year. One fatal case occurred. The patient had been under treatment for this disease in Bombay, and was unable to march with the regiment. After being detained for some time in the hospital of the 21st Regiment he was sent to Poona, and was re-admitted with dysentery on the 21st December, and died on the 5th January. In March a patient who had been 46 days in hospital was sent on sick certificate. The remaining cases were of a mild nature, and required no remarks.

*Pneumonia.*—Eight cases of pneumonia were admitted, and 1 remained under treatment from the previous year; of these 2 died and 2 were sent on sick certificate. The first death occurred in October: the patient, a strong healthy sepoy, was brought to hospital on the 7th, suffering from fever associated with dyspnoea and pain in the chest. The disease was at first confined to the left side, but the right lung subsequently became involved, and the patient rapidly sank and died of exhaustion on the 14th; throughout the course of the disease the temperature ranged from 102° to 104·5°. The second death was in November. From the commencement of the disease the patient suffered much from dyspnoea; temperature ranged from 102° to 105°. One case was 62 days in hospital, and being in a very weak and debilitated condition was sent on medical certificate in February; another was sent in May.

*Small-pox.*—During the year 5 sepoys were admitted with small-pox, and also 2 women and 4 children. The cases were all of the distinct variety, and made a good recovery. The patients were treated in tents which were pitched for their reception a short distance from the old lines of the 8th Regiment. The huts in which cases occurred were carefully lime-washed and disinfected before re-occupation, and the clothes, &c., used by the patients, and those attending on them, were destroyed by fire before their owners were permitted to re-enter the lines. Three cases of hepatitis were admitted; 1 of the cases resulted in abscess, which burst through the lung; the patient was for some time in a dangerous condition, and remained for a considerable time under treatment, but ultimately made a good recovery. The admissions from contusions, boils, gonorrhœa, conjunctivitis, scabies, diarrhœa, chicken-pox, and pleuritis were all of an ordinary character, and require no especial remarks.

4. Two native officers, 28 sepoys, and 1 bhistee were invalided from the following causes, viz. :—debility 14, chronic bronchitis and debility 5, debility and impaired vision 2, chronic rheumatism 2, chronic rheumatism and hæmorrhoids 1, impaired vision 1, syphilitic rheumatism 1, bronchitis and asthma 1, chronic skin disease 1, senile gangrene 1, chronic rheumatism and debility 1, ulcer on outer side of left ankle 1. Nine men who had not served for pension were discharged; 21 cases were sent on medical certificate for periods varying from 8 to 2 months, viz., from syphilis 6, bronchitis 4, pneumonia 2, brow ague 2, and 1 from each of the following diseases :—splenitis, ague, dysentery, hemiplegia, jaundice, ulcer, and chronic rheumatism.

5. Five deaths occurred among those in hospital. The deaths from pneumonia and dysentery have previously been referred to. The death from apoplexy occurred in June; the patient was a havildar who had occasionally been under treatment during the preceding six months for giddiness; he stated that these attacks were generally produced by exposure to the sun. The fatal case of peritonitis was in an old debilitated sepoy who had passed the regimental invaliding committee; he was attacked with the disease on the 18th October, and died on the 20th.

6. The hospital is in a good state of repair, and its sanitary condition carefully looked after. There are two latrines at the hospital, viz., one for the men, consisting of ten compartments; and another for the women, of four. In each compartment there is an iron receptacle which is twice daily cleaned out and the contents removed in a filth cart. Three of the servants' quarters are out of repair; the remainder are in a good condition. There is no cook-room for the patients, and its want is much felt, especially during the rains.



- 7 Owing to the unusually small amount of rain during the months of September and October, a famine occurred over the greater part of the Deccan; and though large quantities of grain, &c., have been brought in from other districts, the food for some months past has been very expensive, and many put to great hardships.
- Food.
- Duties. 8. The duties of the sepoys have not been excessive, and on an average each man has had  $3\frac{2}{41}$  consecutive nights in bed.
- Vaccination. 9. Vaccination has been regularly carried on during the year.

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REMARKS BY DEPUTY SURGEON-GENERAL T. B. BEATTY, M.D.

Since the arrival of this regiment from Surat to the Deccan, the general health of the men, as was anticipated, has become much improved. In the year 1875 and 1874, the number treated was 1,264 and 1,287, respectively, the deaths being 11 and 6. During the past year the total treated was only 827, whilst the casualties amounted to 5.

The hospital, which is built to accommodate 30 patients, was found at the time of inspection clean, and in all respects admirably managed by Surgeon McConaghy, who, however pointed out the great disadvantages of continuing the use of clay-washing for the floors. The latrines attached to the hospital, though carefully attended to, are capable of much improvement as regards construction.

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H. M.'s Bombay Sappers and Miners.

KIRKEE.—In medical charge of Surgeon-Major J. F. STRAKER; strength 360·3.

- Location of the corps. The corps has remained at the new lines across Holkar's Bridge, now termed New Jhansie.
- Movements. 2. One company left on January 16th for Aden, the 5th company from Aden arriving here on the 20th March.
3. The new lines were fully described in the report for last year. The only change has been that the native officers' houses, which were not then finished, have since been completed. The average number occupying the lines has been very nearly the same as for last year, so that the cubic space per man has been about the same.
- Lines.
- Bazaar. 4. The bazaar is slowly increasing by a house at a time, there being now about 6 shops.
5. Conservancy is in the same state as last year, the diminished rain-fall having made it slightly less abominable. Sanction, I believe, has been given to have a proper permanent latrine; but some delay has taken place in beginning this, as the Sanitary Commissioner wished the Crawford pattern of seat to be used, and this has not yet been supplied. From the description given me by the Commissioner at his inspection of our lines, I should say this would be an excellent arrangement. The site of the new latrine, as approved by Dr. Hewlett, is much nearer the lines.
- Conservancy.
6. The water-supply is now entirely from the Kharakwásia Canal, the pipes having been laid down and water supplied since last month; but I regret to add that for some time after that the supply was of a very intermittent character, and the complaints from the inhabitants of the patcheries, the highest and furthest point to which the water goes, were very loud and frequent. Towards the latter part of the year the supply has been more regular. In connexion with this, three dipping tanks of masonry were built in rear of the lines suitable for the different castes, with a raised plinth round each, and gutters to carry off the waste water.
- Water-supply.
7. The food supply was good, and cheap enough till the latter months of the year, when the scarcity of rain not only here, but still more in the surrounding districts, especially to the east, began to be felt, and prices were all raised, but not to such an extent as to cause any actual privation.
- Food.



8. There is no change in the clothing, and I need not reiterate my opinions on that subject, expressed now for some years.
- Clothing.
9. The duties have only differed from last year in there being no line-building, but earth-works instead, with about the same result in injuries generally, but about half as to injuries of the lower extremities.
- Duties.
10. There are no means of amusement, such as a gymnasium or wrestling ground, which, as said last year, would be a very desirable addition to the new lines.
- Means of amusement.
11. Of the hospital I have little to add since last report. Of the five principal defects then enumerated, two have been to a certain extent set right. A temporary building of lath and plaster, containing three small wards, each 10' x 10' x 10', have been erected for cases of contagious disease, and they answer the purpose fairly. A wire fence of very slender proportions has just been erected all round the hospital compound instead of the wall asked for. This answers the purpose but indifferently, as it can be climbed over with great ease; and animals are unable to distinguish the wires, and so are apt to run against it and damage it, as has already happened once. There is a great want of trees round the hospital. I pointed this out soon after we took possession, and the holes for them were made, but no trees have yet been planted.
- Hospital.
12. The conservancy is as before. The water-supply has been happily changed to the Kharakwála system, but it has not as yet been brought into the building; there being two stand-pipes outside. This will, I trust, be some day improved by pipes and taps inside the bath-rooms.
- Hospital conservancy and water-supply.
13. The amount of sickness shows a decrease in the ratio of percentage to strength, which has been 50, as compared to 58·8 last year. The percentage of deaths to strength is the same, 0·8, and of deaths to treated, a fraction higher, namely, 1·6 to 1·3 of 1875. Eight men were invalided—4 at a special committee in April, and 4 at the annual general invaliding committee in November.
- Sickness, mortality, and invaliding.
14. As in former reports I give a short table of the admissions in each class of disease :—
- Principal causes of sickness.

		1876.		
		Admissions.	Percentage of admissions to strength.	Ratio per mille.
General Diseases...	{ Sub-Division A....	46	12·7	127·7
	{ Do. ...	16	4·4	44·4
Diseases of the Nervous system	...	3	0·8	8·3
Do. Eye	...	22	6·1	61·1
Do. Circulatory system	...	1	0·2	2·7
Do. Respiratory system	...	8	2·2	22·2
Do. Digestive system	...	18	5·0	50·0
Do. Urinary organs	...	7	1·9	19·4
Do. Cellular tissue	...	1	0·2	2·7
Do. Cutaneous system	...	19	5·2	52·7
Injuries ...	...	23	6·3	63·9
Total number of deaths...		3	...	...
Percentage of deaths to strength...		0·8	...	...

This shows that out of the total of 169 admissions the sub-divisions A and B give 62 (last year it was 157). Of these, fevers only show 43 cases,—a very great decrease from 127 of last year; and I am inclined to attribute this in some measure to the freedom from malaria of the new lines, though, of course, the very small rainfall has chiefly contributed to this unusual result. The next largest group is that of injuries, which gives 23,—14 of which are those



of the lower extremity, due to the nature of the men's work. The next largest, affections of the eye, 22; of these 20 were conjunctivitis, of which there were only 8 cases recorded in 1875. This would, therefore, be attributable to the much larger amount of dust there has been, owing to the small amount of rainfall. The cutaneous and digestive systems, each with a total of 19 and 18, respectively, form the next largest group. Diseases of the respiratory system, 8, and of the urinary organs 7, follow next. The rest of the classes show only one or two each.

Causes of mortality.

15. The causes of mortality were—

(1) Continued fever, rapidly going on to meningitis; (2) malignant tumour of the mesentery, lasting 34 days; (3) aneurism of the aorta; none of which can be set down as preventible.

The last case was totally unsuspected, there being no symptom whatever which could have led to a correct diagnosis. The man was in hospital for slight cough—so slight that there was a suspicion that he was malingering, but he was luckily not sent out. There was no dyspnoea, no expectoration, and so consequently no examination of his chest was made. On the second night after his admission he suddenly fell backwards while washing his mouth and throat, and was found lying dead, with a quantity of blood beside him, which had been no doubt expectorated. At the *post mortem* examination a very small aneurism was after considerable search found at the back of the aortic arch, opening by a small aperture into the left bronchus on a level with the bifurcation of the trachea.

16. The rainfall was very much below the average—15 inches 97 cents instead of 26 inches and has resulted in so much dust that I believe the increased number of cases of conjunctivitis, as noted above, may be ascribed to it.

Rainfall.

Epidemic.

17. There has been no epidemic.

18. Vaccination has been carried on as carefully as it could be, but the failures seem to have been greater than ever; and no operation seems successful, unless the lymph is used from arm to arm. Whether this is due to any climatic influence, such as the greater dryness which has undoubtedly prevailed, I have not sufficient data on which to form an opinion; but I believe it might have been counteracted had the native vaccinator, on whom we have to rely for our supply of lymph, exercised more care and attention, and some little zeal in his work: if he had tried to keep up the arm to arm supply, which I should think was not difficult in the bazaar, or even if he had sent quite fresh lymph whenever requisition was made on him. What he has sent has in the majority of cases failed; and he seems to have taken no pains to keep up the supply from arm to arm. Twenty-six men were re-vaccinated, of which 17 were successful.

Vaccination.

19. The general health of the corps and its physique has been fairly good; but I have detected latterly a certain amount of slight scorbutic taint, as evidenced by purpleness of gums, for which there can be no cause, except a want of fresh vegetables in the diet, and for which there is no excuse. The worst cases were made to attend hospital and take lime-juice daily; the rest were warned to eat fresh vegetables, especially potatoes, and monthly inspections of the whole corps were ordered, but up to the present there has been but little improvement, and some of the men have been reported to the Commanding Officer for not obeying the instructions as to diet.

General health.

20. There has been no special treatment of disease. I tried salycine for a case of sub-acute rheumatism, but it had no beneficial effect whatever; this was, however, doubtless due to the fact (which was only afterwards discovered) that it was gonorrhœal rheumatism. The man was so long ill with it that he had to be sent to his own country for change. Cinchonidine sulphate has been administered very systematically for the latter part of the year both by mouth and hypodermically, and the conclusion I have arrived at is that for moderately severe cases of ague, or fever, it answers very fairly; but as soon as the case goes beyond that, and becomes at all severe, it is powerless, even in repeated hypodermic doses, given three times a day; whereas quinine given in the same way, and to the same extent, checks the paroxysms in a very short time. The following shows in tabular form the general result:—

Special treatment of disease.



*Tabular Statement of Fever Cases treated with Cinchonidine Sulphate in the Hospital of Bombay Sappers and Miners for the year from 1st January to 31st December 1876.*

	Total number of cases.	Average number of attacks in each case.	Average number of hours of each attack.	Total amount of cinchonidine used.	Average amount in each case.	Average amount given by mouth.	Average amount hypodermically.	Remarks.
				Gr.				
Total number of cases treated ... ..	68	2.4	6.7	3,470	51.0	...	...	This shows that the average given by the mouth is much greater (the average number of attacks and duration of each attack being about the same) than what is given hypodermically, being 70.6 to 9.3 or about 9 to 1. The number of re-admissions were six times greater in cases treated by the mouth (12) than in those treated hypodermically (2); but of this there has hardly been time enough yet to judge sufficiently.
Number treated by mouth	41	...	...	3,148	...	76.7	...	
Do. hypodermically ... ..	27	...	...	322	...	...	11.9	
Number of 1st admissions.	54	2.5	6.9	3,163	58.5	...	...	
Number treated by mouth.	36	...	...	2,913	...	80.9	...	
Do. hypodermically ... ..	18	...	...	250	...	...	13.8	
Number of 2nd admissions	13	2.3	6.1	340	26.1	...	...	
Number treated by mouth.	5	...	...	271	...	54.2	...	
Do. hypodermically ... ..	8	...	...	69	...	...	8.6	
Number of 3rd admissions	1	1	4	3	3	...	...	
Number treated by mouth	...	...	...	...	...	...	...	
Do. hypodermically ... ..	1	...	...	3	...	...	3	

On the whole, my opinion of the use of the drug is that in moderately severe cases of fever it is fairly useful; but that it is powerless in cases of any severity. There were few cases during the period under notice to test this; but in 2 cases I had to stop the cinchonidine, which was doing no good, and to resort to quinine, which in a few doses, administered subcutaneously, checked the recurrence of the attacks.

21. The number of cases of syphilis was unusually large; and in almost every case the man had concealed the disease for a considerable time before applying for admission, and only came to hospital when he could no longer stand, thus, of course, making his symptoms very much worse, and prolonging his stay in hospital considerably. To endeavour to check this, all the cases were reported to the regimental authorities. When this disease seems likely to become constitutional, I generally now prescribe mercury in the shape of the perchloride,  $\frac{1}{10}$  of a grain, combined with sulphate of iron, grains 2 or 3, and a slight tenderness of gums is kept up till all symptoms disappear, iodide of potassium being given at the same time if secondary symptoms appear.

22. Two cases of hemp poisoning were kept for a considerable time in hospital; they were treated with tonics and sedatives, good food and gentle treatment, but showed scarcely any sign of improvement, and so were brought before a committee and sent to the Colaba Asylum. The form of derangement seems to be a chronic melancholy, without any violence as a rule, nor any suicidal or homicidal tendency.

REMARKS BY DEPUTY SURGEON-GENERAL T. B. BEATTY, M.D.

The general health of the corps was good during the past year.

Out of a strength of 360.3, the daily average sick was 7.3, and the total treated 180. Only 3 deaths occurred.

The hospital is remarkably well situated, facing north-east, with clear open spaces on each side. The great objection to the building is its earthen floor, the washing of which with clay had, for the reasons specified by the medical officers in charge of the other Native Infantry regiments in Poona, to be discontinued. A flagged floor should be substituted.



**H. M.'s Poona Horse.**

SIRUR.—In medical charge of Surgeon G. WATERS ; strength 314·5.

- The head-quarters of the regiment never leave Sirur except on exigencies either of active service or escort-duty, and have been stationary since the date of last annual report.
- Location and movements.**
2. A detachment 150 in strength is always stationed at Dhulia, and is at present commanded by a field officer. It is relieved biennially. It would appear that service in Khandesh is more inimical to the health of the troops than here in Sirur, the proportion sent for pension from the detachment being large as compared with that from head-quarters.
 

**Detachment.**
  3. The dryness of the Deccan atmosphere for the greater portion of the year is calculated to engender functional, if not organic hepatic, disorder, yet there seems to be no undue proportion of either of these ailments among the men. I have reason to assert, however, that those who may have spent some time in a moist climate, on first coming here, are liable to suffer from impaired bilious secretion, if not from graver affections of the liver, and such sufferers derive marked and instantaneous benefit from a change to a locality possessing a considerable degree of humidity. Indeed, under the circumstances, this is the imperative and only availing remedial measure.
 

**Effects on climate.**
  4. The condition of the lines has not undergone any change since the date of last report, and is fairly satisfactory in every respect, excepting, perhaps, the back court-yards, which are too much encumbered with sub-divisional mud-walls.
 

**Lines.**
  5. The dry-earth system of conservancy is undergoing trial, the night-soil being transported every morning in carts to a field at some distance to leeward of the camp, where it is in process of utilization as manure: so far I see no objection to this sanitary arrangement.
 

**Conservancy and sanitary arrangements.**
  6. The water-supply continues to be drawn from the river Soreh. The proportion of salts in solution is rather large; but as these are chiefly calcic, no ill-effects have arisen, and are likely to arise, from its use as a beverage during the rains. The solids in solution are, of course, less than at other times, but then the river-water contains a considerable amount of suspended impurities, chiefly, however, of an innocuous nature, and which are mostly removed by filtration and subsidence before the water is used.
 

**Water-supply.**
  7. Ordinary provisions of good quality are always procurable in the bazaar of the contiguous town at moderate cost. At present, owing to the scarcity that has supervened on draught, food is comparatively dear.
 

**Food.**
  8. The duties are light, and such as are more likely to improve than deteriorate the health of the men.
 

**Duties.**
  9. Sufficient occupation for the men is apparently found in the duties which they are imperatively required to perform. Some of the sowars and native officers and a few of the boys have taken to polo as an amusement.
 

**Exercise, amusement, and occupation.**
  10. There are no cells. The lock-up room is dark and badly ventilated, and unsuitable as an apartment wherein to confine a man for more than a single day.
 

**Lock-up rooms and cells.**
  11. In January 133 men marched to Dhulia, in September 53 more, and thence 53 men thus relieved returned to head-quarters. In November a party of 13, all told, was sent to a place 12 miles distant, on emergent duty.
 

**Marches.**
  12. The hospital is badly situated, being, as regards the prevailing breeze, to windward of the lines and leeward of the parade-ground, whence clouds of dust frequently envelope the building; deficient in accommodation, affording scarcely one-half what is occasionally required; improperly ventilated, it
 

**Hospital.**



being impossible to regulate the ingress and egress of air so as to avoid draughts; obviously objectionable in that it consists of one apartment only; and, in short, utterly unfitted as a place for the reception and treatment of the sick.

13. A small but adequate latrine, in which the dry-earth system of conservancy is practised, is the only building appurtenant to the hospital; the hospital water-supply is conveyed from its source, the river Soreh, by a bleestie, specially retained for this purpose; and is ample and fairly good.

Hospital conservancy and water-supply.

14. The total admissions into hospital for the year amounted to 247, being 82·6 per cent. to strength; and the average daily sick 10, being 3·17 per cent. to strength. Most sickness prevailed in July, ague bearing to the maximum of disease a pretty parallel degree of prevalence. Dysentery has been comparatively rare in the regiment, and hepatitis by no means common; only 1 death occurred in hospital, and was due to cholera. The percentage of mortality to strength and treated is thus reduced to ·31 and ·38, respectively. Eighteen men were invalided. To twenty men it was deemed expedient to grant sick leave of absence.

Sickness, mortality, and invaliding.

15. Ague, the principal cause of inefficiency, though amounting only to 92 cases, yet stands pre-eminently the greatest factor in the aggregate of disease. The physical condition of this district is not what is generally supposed to conduce to the generation of malaria, and the comparatively mild phase which ague assumes here would point to the impossibility of malarial virus being present in the atmosphere in anything like a concentrated form. This is the more evident from the fact that those who are careful to guard against sudden chills are seldom or never affected with a paroxysm; indeed, I ascribe fully two-thirds of our sickness from ague to neglect, avoidable or otherwise, of this precaution. I believe that were the men, on coming heated off parade, immediately to change their clothing, wiping the perspiration off their bodies, and replacing the mounted kit by apparel equally warm, intermittent fever would become very rare amongst them. But the meagre pay of a sowar is barely enough for his single maintenance, and it can hardly be expected that he, having himself and, generally, a family to support on, say, on an average eight rupees per mensem, is in constant possession of wherewithal to prevent his suffering from the dangers incident on the sudden cooling of his body; hence he is doomed, amongst other things, to be liable to occasional attacks of ague. And this danger is enhanced by the remarkably dry climate of Sirur, together with its high range of temperature, which sometimes reaches to 38 degrees in the shade. This entails a high measure of evaporation and consequent rapidity of abstraction of heat from all objects subject to its influence. July was the month in which most fever cases occurred. This, I think, may be accounted for by the fact that the greater portion of the rainfall took place towards the end of the preceding month; and as only two inches fell in July, the sun acting on the moist condition of the soil, resulting from what fell in June, gave a greater scope for the generation of malaria, the other necessary element for the production of which, viz., vegetable matter, being also present, in increased quantity, as an additional result of the same cause.

Principal causes of sickness.

16. As stated above, cholera was the cause of the only death that occurred.

Mortality.

17. In June small-pox made its appearance in the adjacent town, but did not affect the troops. In September cholera seized one of the men and carried him off quickly; but this was the only fatal case, indeed the only case that occurred among the fighting men, the few other persons that were affected in the regiment being followers.

Epidemics.

18. Amongst the children of the regiment there were in all 70 primary vaccinations, 3 of which were unsuccessful; and of re-vaccinations 24, only 2 of which produced the vaccine disease. Among the children of followers there were 28 primary vaccinations, 1 being unsuccessful; and re-vaccinations 3, 2 of which proved failures. This makes a total of 97 successful operations for the year.

Vaccination and re-vaccination.

19. The general health of the regiment has been very good, it being in this respect about the most fortunate native corps with which I am acquainted. I am afraid that the minimum standard of chest circumference is not at all universally attained, even by the fully-grown sowars, and I venture to think that the present system of recruiting has not a little to do with this defect. The system I mean is that of confining the field of enlistment to the sons of

General health and physique of the regiment.



those already serving in the regiment. Whilst fully alive to the merits of the time-honoured custom of giving a preference to those candidates for enlistment whose parents are or have been soldiers, I am convinced that the practice, if persevered in much longer, must eventually impair the physical efficiency of the native army. There are, no doubt, many advantages attending extra-regimental enlistment; but, on the other hand, it has its disadvantages also; and chiefest of these is the tendency it has to dwarf the stature of the regiment as a whole, and, at the same time, create diversity of size and inequality of height; for it stands to reason that the male offspring of, say, 400 men are not at all likely to compare well with recruits selected from the flower of the youth of a province. Of course, height is comparatively unimportant; but, except for band purposes, I consider a minimum chest circumference of 32 inches indispensable, even in growing boys.

20. As an instance of special treatment I may mention the marked benefit which, after counter-irritants, stimulants, diaphoretics, and antispasmodics had failed, accrued on the administration of 20 grains of hydrate of chloral, with an ounce of brandy in a little water, in a case of asthma which had assumed the gravest features. The dose was repeated several times on succeeding days, with like effect, and eventually recovery took place, so far as that attack was concerned, and the man continues well. A child 10 months of age was brought to hospital, supposed to have swallowed at least 12 grains of opium, all the symptoms of opium-poisoning being present in a marked degree. The stomach-pump was first used, but failed to act, being out of repair. Mechanical irritation of the fauces produced vomiting, as did also emetics of mustard and warm water frequently administered. Strong ammonia was held to the nose, and the child at intervals shaken with more or less violence, but all apparently to no effect, for the stupor passed irresistibly into coma, too profound to be even stertorous. These measures occupied about two and a half hours. I now injected hypodermically ten minims of the strongest solution of ammonia into the left arm, and repeated the injection, a quarter of an hour afterwards, into the other; and then allowed the child to sleep undisturbed. I had recourse to this treatment, in the hope that during sleep (which in itself facilitates perspiration) the combined effect of the opium and ammonia would tend to unload the system of the former drug by a drastic diaphoretic action, while the stimulating property of the latter would sustain the vital powers. The result was all that could be desired.

21. After all deductions are made from the pay of a private in a native cavalry regiment, some 6 rupees per mensem only remain for the maintenance of himself and family. This pittance is barely enough to meet his every-day wants, and when these are increased by the additional requirements of grave sickness, the chances of recovery become remote. Fortunately, however, the same privilege as regards hospital comforts that other corps enjoy has recently been extended to this, so that the case is not so hard as it used to be. There being no commissariat staff at this station, I asked and obtained, through the conjoint action of my immediate military and medical superiors, the permission of the Commissary General to purchase in the bazaar such articles as are necessary for the comfort and nourishment of the sick. This boon is very much appreciated by the regiment. As regards the sanitary arrangements in use here, I strongly endorse Surgeon Gordon's recommendation, that instead of the sewage being allowed to touch the ground in the back court-yards, as at present, vessels of some sort should be used to contain both liquids and solid matters, which would be emptied, morning and evening, into the night-soil cart, thus obviating the possibility of the formation of cess-pools or even surface moisture. The rules at present in force as regards the means to be adopted with a view to dispensing with the services of a useless man, together with the present scale of service for pension, which makes no difference as regards retiring allowance between those who have served only 15, and those who have served upwards of 30 years, are open to objections, too obvious for me to stop to particularise. At present a man may be physically competent for the duties of a soldier, but so stupid as to be worse than useless in the ranks, and yet, so long as his conduct is blameless, the commanding officer has not the means of getting rid of him. Again, there being no difference between the pension for a service of 15 and that of 30 years, those men who have no prospects of promotion after completion of the lesser period, flock to the medical officer for the purpose of being invalided. And thus the services of many of the most useful men are yearly lost to Government. It must be understood that it is impossible for medical boards to prevent this, it being a very easy matter to see that a man is ill, but by no means so to declare him a malingerer.

The only other observation I have to make is, that I consider it undesirable that there should be no accommodation for the 1st and 2nd class hospital servants, other than such vacant huts as may happen to be available in the lines, and from which they are always liable to ejection.



22. From the foregoing it will be seen that sickness in this regiment is rather under, than above the average, as compared with other corps. The few cases of dysentery that have been under treatment were not of an aggravated type, excepting one, the gravity of which was due to the co-existence of scurvy. Of the latter there was no prevalence to speak of. With reference to the unsatisfactory nature of the lock-up room, I learn that the present hospital was originally intended for a standard guard, and that owing to the building having been appropriated for the use of the sick, a guard-room with appurtenances has long been the second great want of the regiment. The construction of a new hospital would thus meet two great defects, the present building reverting to the purpose for which it was erected.

#### REMARKS BY DEPUTY SURGEON-GENERAL T. B. BEATTY, M.D.

The regiment has been stationary at Sirur since December 1875. The general health of the men has been fair, only one death, and that from cholera, having occurred during the year. The number treated was 260, which gives a percentage of 82.6 to the total strength of the corps, which was 314.5. As far as means will admit of, the conservancy arrangements for the regiment appeared to be good.

Beyond the preparing of plans and estimates for a new hospital, which is badly needed, no further steps had been taken for building one. The site selected by Deputy Surgeon-General Maitland has been objected to by the officer commanding, on the grounds of its being too near the public road, and also being to leeward of the cavalry lines.

#### H. M.'s 15th Regiment N. I.

AHMEDNAGAR.—In medical charge of Surgeon-Major E. P. BURROWS ; strength 584.

Location. The regiment has been stationary throughout the year.

Detachment. 2. Thirteen detachments have been furnished during the year as under :—

Place.	Strength.	Period.
Násik	31	Throughout the year.
Sinnar	18	
Niphád	18	January to May.
Sangamner	28	Do.
Shrigonda	28	} In December.
Newása	28	
Karjat	16	
Jámkhed	28	
Párner	16	
Akola	16	
Sheogaon	16	
Kopargaon	28	
Ráhuri	16	

3. The lines are situated close to the town of Ahmednagar, the nearest building of them, the hospital, being 136 yards from its wall. They are built on a ridge of trap-rock, with good slope for drainage on either side. The surrounding ground is in all directions dry ; there are no depressions in which water collects, and the soil above the rock being but scanty, the surface dries rapidly. To the north-east and south the ground is open ; in these directions are the general and regimental parade-grounds ; beyond the latter, half a mile distant from the lines, is the fort, surrounded by large trees. To the south-west is the town, and on the west the regimental bazaar ; and behind it a walled enclosure 125 yards square, called the Kotlah, occupied chiefly by Mahomedan weavers. Between this building and the town are the regimental latrines. Thus the site of the lines is good as to soil and drainage, but they are unfavourably placed with regard to the breezes prevailing during half the year. The lines were built in 1867-68, on the



standard plan, and are in good order throughout. Some of the pendals are raised on plinths; the floors of others are level with the ground; but from the rocky nature of the site the rooms of none of these are ever damp from soakage from below. The single tiling of the roof, however, lets in a considerable amount of water during heavy rainfall.

4. The roofs have no opening for ventilation, and when the doors of the huts are closed, the interiors are dark; and though the single tiling admits some air (as it does the rain), it is insufficient to render them well ventilated dwellings.

5. The conservancy of the lines, and especially of the married men's quarters, has latterly been much improved. Dammered pans have been substituted for the small chunamed latrine pits formerly found in front of the married quarters for use of young children. The pans are cleaned early in the morning, and left open after 7 A.M. for inspection and report by a responsible non-commissioned officer.

6. The water-supply to the lines is entirely dependent on the Kapurwaree aqueduct, which conveys water collected from springs near the village of that name, situated about four miles to the north of camp, at the foot of a range of hills, which forms part of the water-shed of the district. The springs are reached at a depth of about 30 feet from the surface, and are found in a soft reddish coloured layer of trap, beneath a hard one of gray. The water is of excellent quality, and the supply usually ample; but, owing to the exceptionally scanty rainfall in the past year (8 inches and 44 cents, only were registered at my hospital) the springs are unusually low, and great doubts are felt whether they will last until the next rains. The municipality of the town, in whose charge the aqueduct is, are taking energetic measures by sinking new wells at the source, and cleaning out old reservoirs, to supplement the supply as far as possible.

As is usual in seasons of scanty rainfall and consequent failing of crops, such as has occurred in the year under report in this, and the surrounding districts, much old and damaged grain has been brought into the markets, and which, owing to the greatly increased prices of better sorts, sepoys have bought and eaten. In September, when cases of diarrhœa and dysentery were of such frequent occurrence, several specimens of *bájri* and *jówári*, obtained for examination from patients suffering from these complaints, were found to have been damaged by wet, and worm-eaten. During the last quarter of the year large supplies of good grain were brought in from the Central Provinces.

7. The duties the native infantry regiment has to perform at this station, besides ordinary regimental work, are the furnishing daily guards to the jail, and the treasury in the town, to the fort, and to the sudder bazaar. The consecutive nights in bed for the year average about  $4\frac{1}{2}$ . During December, owing to the great numbers absent on detachment duties, the average of nights in bed was scarcely over 2.

8. A gymnasium has been established, in which many of the younger men of the regiment take much interest, under the superintendence of an European instructor; some of the men have already attained considerable proficiency. The improvement in the physique of the instructed men is very marked.

9. The hospital is on the south of the lines. The compound is well drained, as is the surrounding ground in all directions. The hospital itself is in good repair, is well ventilated, and affords sufficient cubic space for the average sick of the regiment. The building runs north and south, is raised on two-foot plinth, and consists of a large central ward measuring 96 feet by 22, with verandahs on the north, east, and west sides, those on the north and east being closed, and that on the west open. At the south end are the office, dispensary, and store-rooms. There is a good building in the compound for the observation and temporary treatment of cases of infectious disease.

10. Stone-paving should be substituted for the present earth-flooring of the ward, which cannot be properly cleaned. The periodical cow-dunging it now receives is but plastering dirt over dirt. Some better arrangement is required for the treatment of cases of acute lung disease, in which the maintenance of an equable temperature is so important, and from which the mortality in the native army is so great (the deaths from these diseases in the native army during the past five years have equalled those from fever and cholera combined), the treatment of cases of acute bronchitis and pneumonia in a general ward necessarily kept open, and in which the temperature



often varies over 20° F. in a few hours, affords neither patient nor surgeon a fair change of good results. I would suggest the partitioning off of one end of the ward for the treatment of such cases. A light partition reaching to the cross beams would answer the purpose, and if fitted with a broad central door and side windows—to be closed only as necessity required—it would interfere neither with the general requirements of the hospital nor its sanitary condition.

11. The admissions into hospital during the year numbered 396; 23 cases remained at the close of the previous year, making the total treated 419. There were 100 re-admissions, leaving 319 as the number of men sick in the year,—a percentage to strength of 54. The percentage of treated to strength was 68·63. These numbers contrasted favourably with those of the previous year, in which the admissions were 517, and the percentage of treated to strength 87·17.

Deaths. There were 4 deaths.

12. Twenty-four men were invalided—18 as worn out, and 6 disabled by diseases. The cases of the latter were as follows:—1 heart disease (angina pectoris) 1 impaired sight by opacity of cornea from chronic conjunctivitis, 1 weak chest from chronic bronchitis, 1 hernia, 1 confirmed asthma, 1 impaired lung from pneumonia. The length of service of the whole 24 men invalided averaged over 22 years. Three men were otherwise discharged: 1 by court-martial, and the other 2 as bad characters. Nine men were sent for various periods to their homes on sick leave; of these, 5 returned well within the year, and the leave of 4 had unexpired. No deaths occurred amongst men absent from the regiment on sick leave, furlough, or detachment duty.

13. The diminution in sickness compared with the returns for the previous year, appears chiefly under the head of fevers and agues, and doubtless due to the circumstance of the stationary residence of the regiment at this place. As noted in my report for 1875, no less than 98 cases of febricula and ague were admitted in December, when the regiment was under canvas at Poona, and on the march from thence. During the first quarter of the past year the sick list was considerably swelled by re-admissions from these cases. During the latter half of July and throughout August, both diarrhoea and dysentery were prevalent, 20 cases of diarrhoea and 22 of dysentery coming on under treatment during this period, out of a total of 23 of the former, and 33 of the latter admitted during the year. Many of these cases appeared referable to the consumption of unwholesome grain as an exciting cause.

14. Of the 4 deaths, 3 were from remittent fever. In 2 pneumonia was the complication inducing to a fatal result; both of these occurred in the hot season—one in March, the other in May. The third case was in September, the patient was aged, having served in the ranks over 34 years. He died from exhaustion 12 days after admission. The fourth death occurred in November. The man returned from leave in an emaciated condition, and died from exhaustion, consequent on chronic diarrhoea, after 24 days' treatment. His diseased condition appeared to have been induced by a habit of opium-eating.

15. The deaths all occurred amongst Hindus: 1 a Hindustani, 2 were from the Konkan, and 1 from the Deccan.

16. There has been no case of cholera.

A sepoy's child was attacked with small-pox in February. The child had two fair vaccination marks. The case was treated in a tent placed in a suitable position outside camp, and the child made a good recovery, though it suffered severely, the eruption being partially confluent.

17. Weekly vaccinations from arm to arm have been made throughout the year. Every healthy child born in the regiment and regimental bazaar has been vaccinated at an average age of about 2 months; 123 out of 125 vaccinations were successful. The arms of children arriving with men from furlough, &c., have also been scrutinized, and those without satisfactory marks at once vaccinated.

During March and April 185 sepoy's, whose marks were not considered good, were re-vaccinated; 46 of these operations were successful.

18. The general health of the regiment is good, and the physique of the majority of the men of very fair standard.

19. Continued observation of the use of cinchonidine has confirmed me in the belief that, though it may generally be depended upon as an anti-periodic in cases of simple intermittent fever, it has to be used in larger quantity, and is less certain in its operation, than quinine.



## H. M.'s 13th Regiment N. I.

MA'LEGAON.—In medical charge of Surgeon-Major T. MILLER; strength 3483.

1. The wing arrived from Ahmednagar on the 9th of January in course of relief by the 15th Regiment N. I., and has been in camp since that time. Location and movement of corps. Two small detachments, of 18 men each, have been supplied as treasury guards at Sinnar and Niphád. These guards are relieved every month or two.
2. The hot season was rather a severe and long one; it set in about the middle of March, and continued till the 10th of June, and the thermometer stood as high as 108° in the hospital verandah in the shade. The first fall of rain was on the 11th June, and the last on the 27th September, and the total fall was 16 inches 36 cents, which is a good deal under the average of 21 inches. In October the weather was rather hot, but in November and December very cool and pleasant, the thermometer falling as low as 44° in the early morning when placed outside in the open air. Climate.
3. The lines are the same as when last reported on. They are kept in very good repair, and in good sanitary condition. Lines.
4. The trench system of latrines is in use, and seems to work satisfactorily. The trenches are dug in black soil near the lines, and the ground used is put under crop every season. There are 3 male and 1 female sweeper to look after and fill in the trenches. The conservancy and sanitary arrangements in the lines are carried out under the superintendence of the quarter-master. There are 9 sweepers and 1 muccadam employed on the work, and the sweepings are carted off daily. Latrines.
5. The supply of water is generally abundant and of good quality, from wells in the lines and dug out of the trap rock, which crops up almost to the surface. In some of the wells the water is rather hard, containing a good deal of lime. For washing purposes the water of the river Mosam is used, and is very convenient, as it runs at a short distance from the lines, and is dammed up for irrigation purposes. The Water-supply.
6. Supplies of grain, meat, and vegetables generally sufficient. For a month or two back, however, the supply has been scarce, on account of the small rainfall in the districts and the failure of the crops. In many places, supplies have been imported from other places, and the prices are about  $\frac{1}{4}$  higher than usual at the present time. Food.
7. No change has as yet been made in the clothing of the sepoy, and a good many suffer from the badly-fitting boots with which they are supplied. Clothing.
8. These have been the ordinary duties of sepoy, guards, orderly, and escort duties, and may be considered rather heavy, the average number of consecutive nights in bed being only 3 $\frac{3}{4}$ . Duties.
9. There is a regimental gymnasium with a qualified instructor to teach the sepoy, and a good many of them attend and go through the different gymnastic exercises which are taught. Some of the men also take part in games of cricket along with the members of the station gymkhana. Many have also small gardens in front of their huts in the lines, in which they cultivate flowers. Amusement.
10. No alterations have been made since last report. A guard-room for the men of the hospital guard is much required, as they have at present to sleep in the verandah of the hospital, and which I consider to be rather objectionable. The buildings are all in good repair, and kept in good sanitary condition. The water-supply is good. Drainage natural, but good. Hospital and out-houses.
11. The total number of cases admitted during the year was 309, which, with 4 cases remaining from 1875, gives a total of 313 treated. The actual number of persons treated to strength was 282, the percentage of treated to strength 89.9, the deaths to strength 0.6, the deaths to treated 0.6, the number of deaths 2, and the average daily number of sick 7.7. The most prevalent diseases were malarious fevers 83, rheumatic affections 46, contusions and other injuries 51, eye diseases—chiefly conjunctivitis of a mild character—20, bronchial catarrh 13. The number of men invalided during the year was 14, from following diseases: old and worn-



out, 8 cases ; chronic rheumatic affections, ; lung disease, 1 ; and 1 from weakness of eye-sight. Two men were sent on sick leave to their own country and 1 was discharged by sentence of court-martial.

12. There has been no epidemic disease amongst the men or followers. No cases of cholera occurred in camp or neighbourhood. Four cases of mild modified small-pox were under treatment during the course of the year, but it never took an epidemic form.

13. As before stated, the total rainfall was 16 inches 36 cents, the average for some time back being 21 inches. The greatest fall was 2 inches 48 cents on the 28th June. The influence of the rainfall seemed to cause an increase in cases of intermittent fever, the number admitted for the months of July, August, and September, after rain had fallen, being almost double the number of admissions during the hot months, March, April, and May.

14. This has been carried on regularly during the year ; 42 children were vaccinated, and of these 38 cases were successful, and 4 unsuccessful. Re-vaccination was also performed on 119 sepoys ; and of these 84 cases were successful, and 35 unsuccessful.

15. The general health of the wing is very good, and the physique of the men fair ; many of them, however, are getting elderly and worn-out. 25 recruits were enlisted, the average height being 5 feet 5 inches, and their chest measurement over 33 inches.

16. The sulphate of cinchonidine has been chiefly used in the treatment of the ordinary cases of intermittent fever, and found to answer. In many cases I have used it also as a tonic. No other special treatment, except the subcutaneous injection of liquor morphia in rheumatic affections. The injection generally gave great relief.

From what has been stated it will be seen that the general health of the wing has been good, mortality small, and that there has been no epidemic disease in camp ; also that the condition of the lines occupied is good, and the conservancy properly looked to, and a supply of water good and sufficient. With the exception of a guard-room for the hospital guard, nothing seems at present to be required.

#### REMARKS BY DEPUTY SURGEON-GENERAL T. B. BEATTY, M.D.

This regiment had marched from the camp of exercise at Poona in November of the preceding year, and was stationed in Málegaon during the entire of 1876. The general health of the men had been excellent.

Only two casualties had been recorded, and those were from non-zymotic diseases. Surgeon-Major Miller, the medical officer in charge, complained of the want of a guard-room for the use of the hospital guard, who are obliged at present to sleep in the hospital verandah, which, for many reasons, is extremely objectionable.

The water-supply is obtained entirely from wells, and is generally sufficient ; but this year, owing to want of rain, a great scarcity was felt.

The amount of rain registered in 1876 was 36 inches, compared with 91 in the previous year.

The hospital was clean, is never over-crowded, and the arrangements and organization were satisfactory.

There being no regular bath-room attached, patients were obliged to bathe in a corner of the verandah, which practice should be discontinued, and a separate bath-room erected. At the time of inspection there were 10 sick in hospital, but from only trivial complaints. Thirty-eight primary successful vaccinations and 84 successful re-vaccinations had been performed amongst the men and children during the year. A gymnasium is required for the use of the men in the lines.

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

DHULIA.—In medical charge of Surgeon G. BAINBRIDGE ; strength 102.

During the month of January the detachment was away from Dhulia on the march back from Sirur after the Prince of Wales' reception ; this report, therefore, refers to eleven months' sickness only.



2. I reported fully for 1874 on the topography and sanitation of the camp; and I have now only to reiterate my remarks made in the reports for that and several other past years, and again to mention with regret that the building of lines for the detachment has not yet been commenced.

## Epidemics.

3. I am happy to state that no epidemic disease occurred in the camp or neighbourhood during the year.

4. The total treated was 41, all these cases being admitted during the year; 37 men were discharged cured, 1 died, 1 was sent on sick leave, and 2 remained. The only serious or important case was that of

Sickness and mortality. Bangeer Tepal Sing, a man of weak frame, aged 25, who died from remittent fever. He was taken ill on the march up from Sirur in September whilst proceeding to this station with a relief party, and was admitted into hospital on the 24th of that month in a very prostrate condition, having suffered for several days previously from severe fever, and having received no nourishment or medicine. The fever was a good deal subdued under the use of quinine and diffusible stimulants; but the system seemed to have been too much exhausted before treatment was commenced, and the case ended fatally, with cerebral effusion and coma on the 3rd October.

### Detachment H. M.'s 4th Rifles N. I., with Garrison Staff and Details.

ASIRGARH.—In medical charge of Surgeon J. S. WILKINS; strength 1447.

The detachment of the 4th N. I. (Rifles), at present quartered at Assirgarh, relieved the previous detachment of the same regiment on the 18th December 1875, having marched from their head-quarters at Satara to Poona where they remained for one month, and by train from Poona to Chandni, and from Chandni to Assirgarh in a march of about 7 miles.

2. The average strength of the 4th Rifles Detachment from December 18th, 1875, to December 31st, 1876=1447. Average strength of garrison staff and details for the year is 172; that of the European officers 6.

## Average strength.

3. This important topic has been and is at present the subject of a great deal of investigation and the expenditure of a large amount of money. The water-supply in this fortress is entirely dependent on the annual amount of rainfall, which is often uncertain. There are four tanks which supply water to the station, and out of these four only two are at present in use. The tank to the west end of the fort is called the "Sepoy Tank," and is used only for bathing and other purposes, and not for drinking. The water is subjected to a rude filtration into "Jeeras" or small holes dug on the bank of the tank, and into which the water filters. A specimen of this water was sent for analysis to Bombay in May last, and was condemned because of the quantity of albuminoid ammonia it contained, which was 8.400 grains per gallon, or 1.200 parts per million. This tank was cleaned out about 11 years ago at the recommendation of Dr. Leith, the then Sanitary Commissioner. I believe the Executive Engineer has proposed a plan of sinking a well at the western borders of the tank, so that the water should filter through into it, but the scheme has not been as yet taken in hand. The second tank is known as the "Sucker Tank," and is about twenty yards to the east of the former tank, from which it is divided by a broad walk lined with trees. I believe that in former years these two tanks were undivided, but at present there seems to be no communication between the two waters, as the level of the "Sucker Tank" is about 15 feet higher than the "Sepoy Tank." A well sunk at the eastern edge of the tank supplies all the potable water at present obtained. The water filters through natural media into the well, and on the whole is found to be pure and wholesome if we may take the number of cases of diarrhoea and dysentery (which are few in number, and I don't think attributable to this water) as evidence of its impurity. The well is covered over to prevent any impurities from getting in, and the bheesties' bullocks are not allowed near this or any of the other tanks. An orderly sepoy is stationed at the well to see that no one draws more than the quantity allowed, which is at present one or two mussucks, or from 9 to 18 gallons for the officers; 7 puckalls, or about 189 gallons, for the European troops; and one gallon for each of the sepoys. No leather buckets are allowed to enter the well, the water being drawn up in iron ones. In fact, every precaution is taken to prevent the possibility of contamination. Bheesties' bullocks are taken away from the fort and kept outside the gates for the nights; and the mules, at present kept on the hill, will also be taken outside the fort walls and quartered there permanently when not required for use in the fort. These precautions are highly necessary, as a great deal of the excretions from these animals find their way into the ground (notwithstanding the care taken in removing the filth), and owing to the rocky nature of the ground and the

## Water-supply.



little depth of soil are during the rains washed into the tanks and contaminate the water there. The depth of water in the well after the rains was from 18 to 19 feet; this was a small quantity, as compared with some other years, because the rainfall was very deficient. The present depth is 15 feet. The well was cleaned out in 1872, when owing to the extremely small fall of rain in the previous rains (1871) it dried. The nearest houses to this well are the bakery and the post office, both buildings being not very many yards away. The post office is occupied by natives, and being so, I would very strongly recommend its being removed. At the bakery, also, there are natives during the day, and I would recommend the building of latrines for their use. The third tank is called the "Mamoo Banja," and in reality consists of two tanks which are united when the water rises beyond a certain level. This tank was cleaned out during the last hot weather at the recommendation of Dr. Lumsdaine, the Sanitary Commissioner. The cost of cleaning out was, I believe, over Rs. 26,000. Work-people to the number of 2,000 were employed day and night at the works so as to get it completed before the rains set in. The time taken for the whole of the work was about two months. Mud, &c., to the depth of 24 feet was taken out and thrown over the walls at the south-eastern side of the fort. The bed of the tank is stone, and this was, I am told, washed over after the cleaning, so as to ensure the removal of all impurities. The scheme for supplying potable water is as follows: a well is being sunk in a ravine to the south-west of the tank and about thirty yards away. The water from the tank will, on the same principle as the Sucker well, percolate through natural media and filter into the well. About 30 feet of the well has already been sunk, and I believe the total depth will be 50 feet. The amount of water measured in the "Mamoo Banja" tank immediately after the rains was 12 feet. The water has never been used or disturbed since the cleaning. A sample of this water, unfiltered, was sent by the Executive Engineer here for analysis to Bombay, and the following is the result:—

*"Statement showing the result of the examination of the two samples of water from the "Mamoo Banja" Tank, Assingarh, forwarded by the Executive Engineer, Hoshungabad Division, Central Provinces; No. 1, forwarded with letter No. 311 of October 20th, drawn October 1876; No. 2, forwarded with letter No. 374 of the 21st November, drawn November 1876,*

	I.	II.
Total solids—grains per gallon ... ..	12.60	11.90
Chlorine ... ..	1.50	1.93
Free ammonia—parts per million ... ..	.46	1.06
Albuminoid ammonia do. ... ..	.40	.72

"The water has a greenish yellow tint, and a dead leaf odour, sediment slight in amount, and consists chiefly of vegetable fibres and debris, a few monads and paramecida present.

(Signed) I. B. LYON, F.C.S., Surgeon,  
Chemical Analyser to Government."

*Bombay, 9th December 1876.*

From the foregoing analysis it will be seen that the amount both of free and albuminoid ammonia is very large, indicating, in connection with the surrounding circumstances, that the waters are totally unfit for drinking purposes.

I append an analysis of the water of same (Mamoo Banja) unfiltered shortly before the tank was cleaned out, for the sake of comparison:—

	Grains per gallon.
Total solids—dried at about 280° F. ... ..	14.00
Loss on ignition ... ..	2.10
Chlorine ... ..	1.07
Sulphuric acid ... ..	Trace.
Silica ... ..	2.80
Lime... ..	Trace.
Magnesia ... ..	4.34
Hardness by soap test before boiling ... ..	7.70
Do. do. after boiling ... ..	1.75
Free ammonia ... ..	.371
Albuminoid ammonia ... ..	.0420
Oxygen required at 140° F. in presence of acid ... ..	1.624



		Or in parts per million :—			
Ammonia free	...	...	...	...	53
" albumenoid	...	...	...	...	60
Oxygen required at 140° F.	...	...	...	...	9.32

It will be seen from the comparison between the two analyses that the amount of "free ammonia" in the second sample of water at present in the tank is double the amount of the former water, and the "albumenoid ammonia" is also greatly in excess; consequently, the result of the cleaning out, as far as the unfiltered water is concerned, is a total failure. The question as to where this contamination comes from is, I think, naturally enough answered. Within the catchment area of this tank, as in all the others, there are 5 or 6 houses; one of these, which has been for a number of years, and up to within a short time ago, been used as a dwelling-house, is on the western bank of the tank. When we take into consideration, 1st, the amount of impurities which daily find their way into the ground from these houses during the whole year; 2ndly, the number of years previous to this during which the ground has been contaminated; 3rdly, the rocky nature and the small depth of soil; and, 4thly, and chiefly, the lack of drains for carrying off foul water from these and other houses on the fort, it is not to be wondered at that the water is so impure.

The question that naturally enough arises is, why were not means taken to have drains to carry away the foul water and other impurities, before attempting to clean the tank out? A committee was held here to consider this question, and a plan and estimate of the executive engineer here for drains for all the houses sent to Government for their sanction. Dr. Lumsdaine, the Sanitary Commissioner, who was sent here by Government to report on the water-supply and the Mamoo Banja Tank in March 1876, made the following, amongst his other remarks:—"As the conditions of Assirgarh preclude the possibility of sewage contamination, it is very certain that the sources of impurities are on the catchment area and within the tank itself, and this being so, they may be greatly mitigated, if not altogether removed. To this end I would suggest as follows, (a) the very strictest attention should be paid to the general conservancy of the catchment area, more specially in the different compounds."

4. All the excreta from the fortress is lowered down at the south-eastern or seven gates by means of a lift, and from there is carried away and thrown into a ravine about a hundred and fifty yards away to the south of the fort. This plan appears to answer its purpose very well, and no unpleasantness has arisen from the practice.

The conservancy cart carries away, in its rounds every morning, all rubbish from the houses and roads. The dry-earth system of conservancy is carried out here in all the latrines, and by an order lately issued by the cantonment committee, every house latrine for servants has to be supplied with pans of iron, which are to be sunk into the ground; the floor of this latrine is to be made of moorum well rammed. The inhabitants of the bazaar in the fort are obliged to use the native detachment latrines, which are about 100 yards to the east of the native lines, and are divided off for males and females.

The latrines belonging to the hospital are about twenty yards to the east of the building, and afford accommodation for 5 people. Iron pans are provided, and these are about half filled with earth, which is also used to cover the deposit. In front of the pans is a trench built of masonry, which carries off the urine and the ablution water into a receptacle placed outside. This latrine is well deodorized with Macdougall's powder, and always kept clean.

The latrines belonging to the State prisoners, of whom there are 7, are too near the Sucker tank and well to be agreeable. Earthenware receptacles are provided for their use, but I am afraid do not use them very often, but prefer to deposit their excretions on the ground. There is a trench dug which carries away the water into a receptacle. I would strongly suggest that these latrines be removed from their present site, which seems to be well saturated with excreta, and removed to another place. The floor of the latrines in this fort ought, I think, to be always built of material which will not allow of the sinking of water into the ground, but of some resisting material as chunam, for it is an undoubted fact that almost all the filth that finds its way into the soil sooner or later goes into one or other of the tanks.

5. The native lines are situated along the south-western boundary of the fort, and consist of 6 blocks of building, three deep, which face the Sepoy Tank, from which they are divided by a narrow road. They consist of old closed-up pendals, and are built of mud and bamboo. Each block is about 25 yards long, and about 10 yards deep. They occupy a space which, between the Sepoy Tank and the scarp=356 x 156 square feet. They have no verandahs, and space is very deficient. Each man with, in some instances, his wife and family, occupies one room. The ventilation is extremely deficient; they have no windows, and beyond the door there is no means for the air to enter into the huts. The bazaar lines are situated opposite to



the sepoy lines, on the other side of the fort. They consist of a row of houses which have been rented out to merchants, who sell all that is required for the native soldier. The men used formerly to go down into the pettah bazaar to obtain their requirements, but since the partial quarantine which was placed on all people coming from infected districts was put a stop to, they were induced to settle in the fort, and thus save as much as possible communication between the two places; there are two shops on the hill which supply necessaries for the Europeans also.

6. The climate is, on the whole, very healthy during the cold weather. There are more cases of fever; but many of these cases are, I am inclined to think, due to the exposure to malaria in the jungles, where they go to cut wood. It would, I have no doubt, very much reduce the ratio of fever cases if this practice were put a stop to. During the rains there are many cases admitted for rheumatism.

Effects of climate. Food. 7. Food is good and prices moderate. I believe the lack of grain food in the hot months has been felt by the men.

8. The duties during the time that the European Troop were absent were heavy, and they had to supply 14 men as guard for the State prisoners, 7 men as main guard at the south-western gate, a guard of 1 man at the south-eastern gate; but now that the Europeans have arrived, they are relieved from the main gate guard. Average nights in bed: native officers 2; havildars  $3\frac{1}{2}$ ; naiques 4; privates 4. The duties seem to have no injurious effect on their health.

Duties. Exercise, amusements, occupation. 9. The chief exercises and amusements are wrestling, sword exercise, wood-cutting, and card-playing and native music.

10. The hospital building, which consists of the hospital, the hospital assistant, and native medical pupil's quarters, and the doolywallas' quarters, is a long line of buildings (or rather huts) which extend about 50 yards along the south-eastern wall. The hospital is first of the huts in the line, and is small, ill-ventilated, and most unsuited for such a building; there is no dead-house, no operating-room, and the light is very deficient.

Hospital and its surroundings. 11. If the sanction that Government gave for a new hospital is not renewed, it would be a good plan to raise the plinth of the hospital so as to allow more air to circulate, and also have a ventilator at the apex of the roof.

12. An epidemic of small-pox was found out in the pettah about a fortnight ago. The fact of there being small-pox in the pettah was concealed, and it was not found out for some time. Since then, 7 cases have been treated, all being children. The fort has been quarantined, and communication between the two places cut off. The cases have been isolated, and it is to be hoped that the quarantine will be taken off in a day or two. All the children of the detachment 4th Rifles have been vaccinated, and the sepoys also are being vaccinated, the vaccine being diluted with an equal part of glycerine. There have been no other epidemics.

Epidemic. 13. Four deaths during the year, all among the details. Three cases amongst Purwaris, and one Bhil; 2 cases of severe remittent fever, 1 primary amputation of right arm; 1 case of drowning, which occurred here during the cleaning out of the tank.

Mortality according to race. 14. The health has been generally good. No mortality amongst troops.

General health and physique of the men. 15. There were 12 cases sent off before the annual invaliding board at Bombay; out of these 9 were passed, most of the cases being unfit for duty on the score of old age and debility. The number of cases treated for ague were 44 amongst the detachment, and 1 remittent fever; dysentery cases 5; diarrhoea 2. Amongst the staff and details 17 ague; remittent fever 2; dysentery 1; no cases of diarrhoea or hepatitis.

#### REMARKS BY DEPUTY SURGEON-GENERAL T. B. BEATTY, M.D.

This detachment has been stationed at Assirghar during the entire of 1876.

The average strength was 145. The health of the men since arrival had been excellent, no death having been recorded. The men are treated in the same hospital as those of the staff and details, the average daily sick being 5.5.

The water-supply was deficient, and a recent analysis showed that its quality was far inferior to what drinkable water should be. Steps were being taken for cleaning out the tank from which the water for the native troops was supplied, and which, it was hoped, would in a great measure rectify the evil.



**H. M.'s 4th Rifles.**

SATARA.—In medical charge of Surgeon E. COLSON ; strength 322·6.

The head-quarters have been stationed at Satara during the year. The regiment was in orders to proceed to Dharwar, but owing to the famine it was not moved. Detachments, as before, were stationed at Bombay and Assirghar.

Location and movement of troops.

Conservancy and sanitary arrangements.

2. The arrangements for conservancy are those of last year, and no change has been made.

Lines.

3. These are in the same state as that of last year.

4. The total rainfall registered at the Rifles Hospital was 27 inches and 8 cents. That registered at the Civil Hospital was 31 inches. The showers here are exceedingly local, and this, I think, accounts for the difference. In the month of April the three wells supplying the lines were entirely dry, and the sepoys had to fetch their water from the distance of a mile.

Rainfall.

5. The water-supply for a part of the year is certainly most inadequate, and these matters demand the most serious attention. The water itself is impregnated with earthy salts, and goitre and calculus in the bladder are common in this district. I have not as yet observed any of the above-mentioned diseases amongst the sepoys and their families.

Water-supply.

6. Owing to the deficient rainfall, prices have increased, as compared with last year, a hundred per cent. In the month of October jowári and bájri were sold in the bazaar at the rate of 7 seers per rupee. Matters have to this date slightly improved, bájri and jowári being now at 9 seers. Compensation has, therefore, been much increased.

Food.

Duties and their effect on health.

7. Nothing prejudicial has been observed. Average number of consecutive nights in bed was four and half.

8. On the 1st March a larger bungalow, still deeper in the bazaar, was rented; but, as stated in the last report, a properly-appointed hospital out of the bazaar is urgently needed. The following table shows the cubic capacity and superficial area of the rooms of the present building occupied as a hospital:—

Hospital and its surroundings.

Names of buildings.							Cubic feet.	Superficial area.
Central room	...	...	...	...	...	5,256	438	
Rear room	...	...	...	...	...	2,088	174	
Side rooms	...	No.	1	...	...	1,230	120	
			2	...	...	1,230	120	
			3	...	...	1,204	112	
			4	...	...	1,204	112	
Verandah rooms.	...	"	1	...	...	1,071	122½	
			2	...	...	831	85½	

The conservancy and water-supply are good.

9. The number of admissions has amounted to 363, showing an increase of 60 over that of the previous year. This difference is nearly accounted for by the excess of admissions from ague and bronchitis. Many of the fever cases were simple and uncomplicated. These, of course, with exception of one-third part of admissions, in which it was deemed necessary to exhibit quinine, yielded readily to cinchonidine. One case of remittent fever during the year made a slow, but in the end satisfactory, recovery. Thirty-seven cases of chronic rheumatism and 7 lumbago have been under treatment. Most of the cases of chronic rheumatism had a scurvy taint. In these anti-scorbutics were followed by satisfactory result. Two of them were sent on sick leave, and 2 invalided. Three cases of dysentery and 14 cases of diarrhœa, of mild form, were treated, with exception of 1 case of diarrhœa, which was sent on sick leave to his country, as he was much exhausted by disease. Under the head of respiratory system 24 cases of bronchitis were admitted, of whom 1 died. Pneumonic phthisis 2, and pleurisy 1. The sepoy affected with phthisis was sent on sick leave to his native country; the change was of little or no benefit. On his return he was invalided. A case of pleurisy was sent

Sickness.



on sick leave. A case of guinea-worm occurred, contracted, no doubt, in Bombay, where the sepoy had been on detachment duty for two years. One case of hemiplegia occurred on November 9th. The patient was an old sepoy of 38 years' service. Up to the end of the year there was no improvement, the whole of his left side being still completely paralysed. One case of jaundice occurred worthy of remark. The patient was admitted with bronchitis, complicated with jaundice. He was in a critical state for some days, distressing hiccough set in, which lasted for 72 hours, with scarcely an intermission, resisting many remedies. Calomel and opium, tinct. of asafoetida, hypodermic injection of quinine, effervescing draughts, containing hydrocyanic acid, and blister to the epigastrium were tried. The last remedy seemed to check the hiccough. On the 24th March coma set in with hemiplegia of the right side. The right radial ceased to beat from the moment of seizure. The left continued to beat with fulness until within a short period of death. A *post mortem* examination was unfortunately not allowed.

10. Ague and bronchitis were the principal causes of sickness. The mortality which occurred was due to jaundice and bronchitis; the deceased were an Hindu and Parwari respectively.

11. The regiment was unaffected by cholera. This disease, however, attacked one of the women in the lines in the month of July, and proved fatal in eight hours. Immediate steps were taken to disinfect and white-wash the lines, with good result, as the disease disappeared. A grass hut to leeward of camp was erected for the reception and treatment of cholera patients. In the month of April and May among the women and children 9 cases of small-pox occurred; 7 were cured, 2 proved fatal. They were treated in a grass hut situated to leeward of camp. On disappearance of the disease the hut was destroyed by fire.

12. One of the recruits feigned insanity with the view of escaping from service. He was tried as a malingerer by a native district court-martial, and sentenced to be imprisoned with hard labour for one year.

13. Ninety-three children were successfully vaccinated, and 78 men successfully re-vaccinated during the year.

14. General health good. Twenty-eight recruits joined, 7 men were invalided, and 15 sent on sick leave during the year.

15. Four cases of bronchitis, attended with severe fever, were treated with neutral quinine used hypodermically; the result was satisfactory.

#### REMARKS BY DEPUTY SURGEON-GENERAL T. B. BEATTY, M.D.

The site for the lines being on an elevation, with surface drainage running towards a nullah, has been judiciously selected; but the huts for the accommodation of the sepoys are crowded, ill-ventilated, and in so dilapidated a state as to render them wholly unfitted for human dwelling. They should be removed, and proper lines constructed on the same ground.

The commanding officer complained of the inconvenience the men and their families were put to in consequence of being compelled to use the open trench latrines, when covered privies had already been provided. These trenches being dug in a field at a considerable distance from the lines, the inconvenience of going to and fro during the monsoon will be considerable.

The general health of the regiment had been fair: 2 deaths had occurred—one from bronchitis and one from jaundice. Only 7 men had been invalided during the year.

A regimental hospital is much needed; the present house, which is a hired one, being situated in the bazaar, is, from its locality alone, unsuited for the purpose required. It can accommodate 12 patients only. There are no rooms for the hospital assistants, who are obliged to reside at a distance from the hospital.

Vaccination is carefully carried out by the hospital establishment when necessary.



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

**BELGAUM.**—In medical charge of Surgeon C. T. PETERS, M.D.; strength 589.

The head-quarters of the regiment arrived from Aden with the first detachment at Belgaum on the 10th December 1875, the second detachment on the 3rd January, the third on the 23rd February; and the fourth and last detachment on the 25th March, from which time the whole regiment has been stationed in Belgaum.

**Detachments.** 2. There has been no detachment duty performed by this regiment during the year.

**Climate.** 3. The circular belt of hills, by condensing the clouds, helps to increase the rainfall of Belgaum, which becomes less copious as this belt is crossed, whether the traveller is going north towards Kohlapur, north-east towards Kaládgi, or south-east towards Dharwar. But while these hills by such concentration of rainfall cause luxuriance of vegetation and render the climate more equable than other places in Western India, they at the same time cause a heavy mist to overhang the cantonment between sunset and sunrise, and a slight form of malarial fever is present all throughout the year, which increases when this fog is wafted by the strong easterly winds, especially during November, December, and January. Coming into Belgaum from Dharwar in the early morning and looking down from the uplands, the cantonment looks like a vast sea in consequence of this dense fog.

**Rainfall.** The annual rainfall this year has been 33·835 inches, being very far below the mean annual average (52 inches). The largest amount of rain fell in July—20·125 inches. The showers have been scanty in August, and there has been a total absence of the October showers, so that the crops have almost completely failed.

**Temperature.** The mean annual temperature is 75·427° F. The mean of this year has been 75·91°. The maximum temperature was 99° F. on the 19th April, and the minimum 59° F. on the 29th January, giving an annual range of 43°. The greatest monthly range was in the month of March 33° F., and the greatest daily range was reached on the 16th April, when the maximum temperature was 97°, and minimum 70°, giving a difference of 27° in the 24 hours.

**Lines.** 4. The regiment is occupying the lines formerly in possession of the 6th Native Infantry, and there have been no alterations (except the enlargement of the gymnasium) made since Dr. Rogers made his report in 1874. The lines are well kept by the men, and they are, to a certain extent, protected by plants in front of the huts. It was, however, considered desirable to check the growth of plantain trees by thinning them, as they were too bushy, and prevented free ventilation of air. The ventilation is good, and the drainage excellent, as the lines are built on a slope which amounts to about 30 feet from the hospital in front to the nullah, at the rear of the lines, for the right wing; while the ground at the rear of the left wing lines is 13 feet higher than the nullah, and thus allows the water to drain down eastward to the same nullah. The regimental bazaar is pretty well kept, except where the milkmen keep their cattle, and their sheds require constant supervision. There is a large excavation between the lines of the 14th and that of this regiment, which is filled with water during the monsoon,—the water being used for gardening purposes. There are three or four villages in the neighbourhood of the lines, besides the large town of Sháhpur, which is about half a mile distant. In all these places there is very little attention paid to conservancy, and a good many deaths were reported from cholera in some of these villages during the recent outbreak. The open between Sháhpur and the lines is used for burial purposes, and part of it for purposes of cremation. All these bodies are brought from the native State of Sháhpur, and the ground, I believe, belongs to the native State, but they are in too close proximity to the lines, and must exercise an injurious influence over them when the wind blows from the south or south-east.

**Conservancy.** 5. There are four latrines—two latrines for men and two for women. Of these the latrines for the men are provided with 30 seats, and those for the women with 16 seats each. The male and female latrines belonging to the right wing appear to have been recently built, and have the nearest approach to the standard plan; but as the floor and the space in the rear are not flagged with stone, it is impossible to keep them clean. The sewage water sinks into pits and even at the best of times emits a strong ammoniacal odour, while at the lowest part of each latrine the water accumulates to such an extent in a pit that it presents the appearance of a cesspool. Just before the 6th regiment left this station, several cases of cholera were traced to the use of water from a well, situated about 17½ yards from the male latrine, the water having



become contaminated with liquid sewage which found its way by percolation into the well. The well has been closed, but no improvements have been made to remedy the faulty construction of the latrine. Those used by the left wing and the bazaar people are built on the double block system, and an attempt made to assimilate them to the standard plan. They seem to be of very old construction, and the effluvia emanating from them and the adjoining grounds baffle all description. These two latrines, unless broken down and built entirely on the improved plan, will always be a source of nuisance. On the arrival of the head-quarters of this regiment here the subject was reported by me; but my suggestions for improvement were set aside on the plea that the present latrines were built according to the latest "standard plan." However, Dr. Hewlett, the Sanitary Commissioner, who inspected them during the cholera epidemic, has reported against them, and has suggested, if possible, the building of new latrines. It is to be hoped that his suggestions will shortly be carried out.

6. There are six wells in use by the men of this regiment, the water of two of them having been considered suspicious on account of the large amount of oxygen consumed in the permanganate test. I caused a sample of each to be sent to the Chemical Analyser to Government for analysis; the results are given below:—

1.—Well No. 112, distance from the lines 52 feet, used by the Purwaris. Collected 13th August 1876.

Total solid, grains per gallon	...	...	...	...	...	21.00
Chlorine do.	...	...	...	...	...	2.46
Free ammonia, parts per million	...	...	...	...	...	0.03
Albuminoid ammonia do.	...	...	...	...	...	0.11

*Sediment.*—Deposits small ash-coloured flake, partly soluble in acid, without effervescence; solution indicates presence of lime, infusoria absent.

There were leaves and sticks found floating in the well, and these were ordered to be cleaned out. There was one death among the Purwaris from cholera. The deceased was the wife of a sepoy; but as no other case has occurred among this caste, the disease could not be attributed to the use of this water.

2.—Well No. 110, distance from the privy 166 feet, used by the regimental bazaar people. Collected 13th August 1876.

Total solids, grain per gallon	...	...	...	...	...	15.40
Chlorine do.	...	...	...	...	...	1.54
Free ammonia, parts per million	...	...	...	...	...	0.02
Albuminoid ammonia do.	...	...	...	...	...	0.16

*Sediment.*—Copious brick red, consists mostly of vegetable debris, and ferruginous earth mounds one or two paramacia.

This water, when collected, had a reddish colour, owing to presence of the *detritus* of laterite, and being situated in the immediate vicinity of the cattle yards was considered suspicious; but no ill effects have yet been observed among the people who use this water.

7. Abundant supplies of food, such as grain, pulse, vegetables, mutton, eggs, milk, &c., are easily procured here. Till September this year the supplies were more abundant than usual; but owing, to the absence of the latter rains, the prices have risen considerably. A quantity of rice, however, has been brought from other places, and the prices are kept from rising higher. Since the high prices set in, there is an increased scorbutic taint observed among the men, especially among the sepoys whose pay is small.

Clothing.

8. The white tunic has been abandoned since the regiment left Aden.



Duties. 9. The duties have been comparatively light, the sepoy's having on an average  $4\frac{1}{2}$  nights in bed, and the men have enjoyed very fair health.

Exercise, amusement, and occupation. 10. The men attend the gymnasium, the school-room, and the workshop, and some have been practising for the rifle matches during their leisure hours.

11. The 2nd, 3rd, and 4th detachments marched from Vingorla to Belgaum in January, February, and March, and the men enjoyed good health, with the exception of a considerable taint of scurvy, which they brought from Aden.

Hospital. 12. Since Dr. Rogers submitted his report of this hospital in 1874, a new bath-room has been added to the eastern side of the northern verandah. Its capacity is about  $14\frac{1}{2}$  square feet. The hospital is well ventilated. There is room for 20 sick, and this number has not been exceeded. During the month of December the maximum number of patients has been, however, over 20; but the increase being due to chicken-pox, those so suffering were treated in tents. The hospital accommodation for persons suffering from ordinary diseases is very fair; but there is no accommodation now for patients suffering from epidemic diseases, except in tents, which do not afford sufficient protection from the rains, and the difficulty was very much felt during the last monsoon during the cholera epidemic. It would seem highly desirable to build a temporary shed with a well-raised floor flagged with stone for the treatment of such cases,—a temporary shed being preferable to a permanent building, as it can always be renewed when necessary.

Conservancy. 13. Same as in the lines, and ought to be improved.

Hospital water-supply. 14. Is obtained from the wells in the lines.

Sickness, mortality, and invaliding. 15. There were 372 admissions, of whom 247 persons were admitted once during the year, and 125 were re-admissions. There were 5 remaining cases. Total treated 377. The admissions were as follows:—

Chicken-pox ... ..	18	Dysentery ... ..	20
Measles ... ..	3	Diarrhœa ... ..	9
Malarial fevers ... ..	111	Other bowel complaints ... ..	2
Cholera ... ..	1	Diseases of liver ... ..	4
Mumps ... ..	2	"    spleen ... ..	1
Rheumatic cases, &c. ... ..	12	Gonorrhœa ... ..	2
Soft chancre ... ..	1	Bubo... ..	2
Secondary syphilis ... ..	1	Guinea-worm ... ..	4
Scurvy ... ..	6	Gangrene ... ..	3
Nervous affections ... ..	5	Abscess ... ..	8
Conjunctivitis ... ..	23	Skin diseases ... ..	32
Glaucoma ... ..	1	Datura poisoning ... ..	1
Other diseases of the eye... ..	4	Wounds and injuries ... ..	37
Diseases of the ear and nose ... ..	2	Others ... ..	23
Heart affections ... ..	4		
Diseases of the respiratory system..	30		
		Total...	372

The deaths were—from pericarditis 1, remittent fever 1, paralysis 1, cholera 1, total 4. There have been 6 desertions, and 3 discharged by court-martial.

16. Malarial fevers were the cause of 111 admissions; with 2 remained of last year, gives a total of 113 treated, or about 30 per cent. of cases treated. This large number is due to, as I have already remarked, to the peculiar position of Belgaum. The cases, however, were slight, with a few exceptions, where the disease assumed the form of remittent fever, some of them attended with typhoid symptoms, such as diarrhœa, sordes over the lips and gums, a dry tongue, and in two cases complicated with stupor, and when recovering from the fever, with deafness for several days; both these cases had to be sent for a change of air; one has just recently returned quite vigorous, the other is still away on sick leave. One death occurred from remittent fever in a young recruit on the seventh day; the case was complicated with pneumonia. There was 1 case of splenic enlargement, and 3 of hepatic congestion, and 1 of hepatitis which might be attributed, to a certain extent, to malarial influences. Eruptive fevers sent



21 cases, 3 measles, and 18 chicken-pox, out of which 12 were admitted during December; the other cases occurred in January and June, October and November, and measles in May and June; all were slight cases, and were treated in tents pitched in the hospital compound. Rheumatic affections 12; one of these cases was a severe case of acute rheumatism, with great constitutional disturbance, and is alluded to under the heading of special treatment. Venereals: soft chancre 1, secondary syphilis 1; the subject of this was a recruit; he had disease of the palate and nose when he joined the head-quarters of the regiment, and has been discharged from the service since; gonorrhœa 2; bubo 2; in all 6 cases, of whom 5 were contracted in this station. Scurvy: 6 cases were treated in hospital, and 76 were treated in the lines, giving a percentage of 13 scorbutic cases to strength. It is remarkable that as soon as there was a deficiency of food, owing to dearness of grain in August and September, the number of men suffering from scurvy increased, and especially among men who are in the receipt of small pay. Diseases of the nervous system: 5 admissions, of which 1 case proved fatal from hemiplegia, giving a percentage of 1.3 admissions to treated, and 0.26 deaths to treated. Heart disease 4: 1 case of pericarditis which proved fatal (1.06 admissions to per cent. of treated). Diseases of the lungs: 30 admissions and 1 remained of last year, total 31 cases—mostly cases of asthma and bronchitis—giving a percentage of 8.2 to treated. One case of pleurisy, which was subsequently complicated with pneumonia and bronchitis, is now convalescent. Bowel complaints: diarrhœa 9, and dysentery 20. One man suffering from chronic diarrhœa had to be sent for a change of air. Some of the dysentery cases, although severe, readily yielded to treatment with ipecacuanha, bismuth, and opium. Diseases of the eye: 23 cases, mostly conjunctivitis, arising from cold. Surgical cases: there were 37 cases of injuries and 1 remaining of last year, total 38 cases treated, giving the next largest number of admissions after malarial fevers: all these were accidental. In three cases gangrene was the result. The first of these cases occurred in Aden, the patient arriving with the 2nd detachment; the part affected was the toe of the foot. It was in a gangrenous condition when the man arrived here, and the toe had to be amputated under chloroform. The patient has just returned after sick furlough, completely recovered of his injury, which was caused by a splinter of wood. In the second case gangrene had set in on the instep as the result of contusion, causing rapid sloughing of a large surface of the skin, the tendons being exposed; the patient is now convalescent. The third case sustained a contusion of the big toe of the right foot, and the nail had to be taken off; a gangrenous ulcer was the result; and at the present moment the final phalanx is found to be necrosed, which will have to be removed as soon as circumstances admit of it. The first and last case occurred in sepoy who had served in Aden, having very impaired constitutions. The other surgical cases were abscess 8, and ulcers 5. Skin diseases 32, mostly scabies, which was quite unknown in Aden. Poisons 1; this was a case of poisoning by datura, which occurred under peculiar circumstances. The patient was on his way to the weekly market to buy grain, when two men met him, coming from the direction of the town of Shâhpur, and entering into a conversation with him, got him to partake of some sweetmeats; after this the patient began to reel, and feeling that he was becoming incapable of supporting himself, desired to be taken to the lines, when the men volunteered to accompany him. After this he became unconscious, and when he recovered his unconsciousness he found himself on the sand bed of a river lying about 30 miles away on the Vingorla road, whence he eventually found his way home. On his admission, some 30 hours after, his pupils were found dilated and insensible to the stimulus of light. He was very drowsy for a number of days, but has made a complete recovery.

17. There has been a scarcity of rain this year, and much sickness in consequence, such as ague and bronchial affections, owing to the sudden changes in the temperature, and the early prevalence of the east winds, and thus lengthening as it were the autumn by cutting short the period naturally belonging to the rainy season.

18. Cholera has sent in 4 cases into hospital; one of these was a private who had just returned from furlough, and while remaining under quarantine in one of the hospital tents, where there had been no cases of cholera before, he took ill with cholera some 24 hours after his arrival, and it is believed he was infected by it on the way. Being a strong man he ate and drank everywhere on the way; but his companion, who was weakly and did not take his meals as frequently on the way as the other, escaped. The patient died of imperfect reaction 31 hours after the attack. The other fatal case occurred in the month of July; the patient was the wife of a sepoy, and she was in low spirits owing to the death of her child from a chronic complaint while cholera was prevailing in the town of Belgaum. She was a Purwarri by caste, and the well water looking suspicious was sent for analysis; but although a large quantity of albuminoid ammonia was present in it, it is believed to have arisen from the presence of vegetable organic matter, the well being placed close under a tree, and leaves had dropped into it; further, no other case had occurred among those who used this water; consequently, the case could not be



attributed to the use of this water. Two other cases had occurred amongst the followers during the month of April, and both recovered. One other epidemic disease which has sent in a large number of cases into hospital early in the year and during November and December, was chicken-pox; the subjects were mostly children and recruit boys, and 8 privates.

19. There were 60 vaccinations and 90 re-vaccinations, including the recruits recently admitted into the regiment; of the latter 43 were successful; the rest were insusceptible to the influence of vaccination. Of the primary vaccinations 53 cases were successful and 7 unsuccessful, who subsequently took it on re-vaccination.

*Vaccination and re-vaccination,*

20. The general health of the men has improved very much during the year; but the scorbutic taint is so deeply implanted in them, that, directly the prices of grain rose high in September, a large number of men was found to have spongy gums, and at the close of the year about 21 men were on the scurvy list, who all regularly marched to the hospital when off duty to drink lime-juice.

*General health and physique of the men.*

21. Salycilic acid has been given in a case of acute rheumatic fever with swelling of all the principal joints of the body, when colchicum and other medicines had failed, and it had the desired effect. This acid was given in half-gramme (about  $7\frac{1}{2}$  grs.) doses twice or three times daily; the fever, pain, and swelling of the joints all rapidly disappeared under its use. The boracic lint, which is prepared by dipping a piece of lint in a saturated solution of boracic acid, according to Dr. Lister's directions, has been used successfully in the treatment of shoe-bite and other superficial abrasions, and has been found a very successful application in these cases. I believe that it heals the sores more rapidly than carbolic oil, or the other ordinary applications.

*Treatment of disease when special.*

22. It will be observed under the heading of scurvy that there were 6 admissions into hospital (being aggravated forms of this disease), and 76 slighter cases treated in the lines. Three invalided for chronic scurvy, and a few of the 14 invalided for old age and debility being affected more or less with scurvy, the question arises what can be done to prevent so much loss to the service arising from this one particular form of disease in regiments that have served in Aden? The constitution of the Maratha sepoy appears to be ill-adapted to bear the privations arising from a want of the kind of food to which he is accustomed, and to which is superadded the difference of climate; a few months' residence in Aden at once produces a change in the solid elements of his body, which is kept up by the want of nutritious food, fresh vegetables, and I may say (of those who are accustomed to take it) of animal food, since he is not supplied with mutton by the Commissariat, and the high price in the bazaar almost prevents his using it as a daily article of diet. He suffers in consequence, not only while he is serving in Aden, but for years after his return to India. The only solution that appears to my mind is, the Maratha being so ill-adapted for prolonged service in a climate so unlike his own, whether somebody else could be found to do his work; and from my experience of the Beloochee constitution I would not hesitate to say that he is best suited for such service. The nature of his native climate is not unlike that of Aden; in fact, his native soil forms part of that barren arid tract which extends along the sea-coast from the Runn of Cutch to the east coast of Africa. The Beloochee thrives consequently as well in Aden, Muscat, the Meckran coast, and Sind, as in his native country, and I believe there would be much saving to Government if annually or biennially a regiment of Beloochees were sent to Aden instead of the Maratha regiments, and their place in Kurrachee supplied by a Maratha regiment.

23. The health of the regiment has much improved since its arrival in Belgaum from Aden. Although there is still a taint of scurvy among the men in the proportion of 13 per cent., the actual admissions under this head have been about one-sixth; but the cases for malarial fevers have been twice as large as in Aden, and there is a similar increase in the number of skin diseases and also in venereal and eruptive fevers. The men have good lines to live in, the water-supply is good, but the conservancy requires improvement. The rainfall during the year has been below the average, and there has been a consequent rise in the prices of grain; this affected the health of the men temporarily, by increasing the scorbutic taint; and, lastly, that it is believed that there would be much saving of service to Government if, instead of a Maratha regiment, a regiment of Beloochees were to be sent to Aden, and their place in Kurrachee occupied by the former; the Beloochee being well adapted, by the nature of his native climate, food, and habits, to stand the privations to which a sepoy is liable in Aden.

*Resumé of the whole.*



24. There were two senior medical pupils, who used to be taught once or twice a week in medicine, surgery, materia medica, and toxicology, besides lessons at the bedside of patients. These passed the half-yearly examination successfully; and one of them, Eleazer Ezekiel, is now undergoing a course at the Grant Medical College. Two new pupils have been received towards the end of the year; they are now learning to compound medicines and minor dressing, and some elementary lessons from materia medica.

(In this report no mention of the numbers of treated, castes, &c., of the detachment noted in para. 1 is made.)

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

BELGAUM.—In medical charge of Surgeon D. E. HUGHES, M.D.; strength 569-1.

Location and movement of corps. During 1876 the regiment was stationed in Belgaum.

2. The left wing which remained at Kolhápúr awaiting relief by the 3rd Native Light Infantry rejoined head-quarters on the 12th February. A detachment of 149 men, which had been stationed at Kaládgi, arrived in Belgaum on the 23rd February 1876.

Lines. 3. The lines are in excellent order and well laid out.

4. The latrines in rear of the lines are well looked after. It would be as well, however, were some better arrangement made for carrying off the ablution water, which at present is very apt to soak into the surrounding soil.

5. Is drawn from five wells; since 1874 no analysis has been made of the water. Some of the men get their supply of drinking water from the Naghgiri spring.

6. During the earlier months of the year the supply of food was abundant and cheap; but since the failure of the monsoon though grain—thanks to the well-directed energies of the authorities—is abundant, it is dear. The compensation issued monthly renders the high price of grain of little consequence to bachelors, but married men with families feel the rise of prices keenly.

Marches. 7. The regiment did not march during the year.

8. The hospital and latrines have been fully described in former reports. Though cases of small-pox and cholera are best treated in tents or temporary sheds, a ward for contagious diseases is much wanted. In such a ward children suffering from varicella or measles might be treated, and suspicious cases segregated till their true nature was ascertained, and arrangements made for their accommodation. A covered way from the hospital to the latrines is a desideratum.

9. There were 181 cases of ague admitted; most were slight, and readily yielded to the cinchonidine treatment, whilst the more severe required a course of quinine. Pneumonia, induced by exposure to damp and the extreme variation of temperature, furnished 12 cases, all of which were severe, and 1 fatal. Eleven cases of chicken-pox and 6 of measles, all mild, were treated; the patients were all recruits who had recently joined at different times from the Konkan. The greatest number of admissions for the former disease was in March; from the latter in April. There were 12 cases of dysentery which were treated with ipecac. in large doses, followed by ext. belœ. Seven cases of hepatitis are recorded; the actual number of persons who suffered from this complaint was 7. There were 3 admissions for primary syphilis, 8 for venereal bubo, and 1 for gleet and gonorrhœal rheumatism; the disease in the last case was undoubtedly contracted a year ago in Kolhápúr. Conjunctivitis of a mild nature furnished 31 admissions. The largest number of admissions (9) was in July. There were 4 deaths: 1 from pneumonia, 1 from pyœmia following a slight injury to the hand, 1 from phthisis, and 1 from peritonitis. One man (Mussulman) was killed by lightning while on sota piquet. All the men who died in hospital were Hindus by caste.

10. The rains being practically over in September, the greatest number of admissions for ague was in September, and not, as usual, in October.



11. Cholera was prevalent during the year throughout the districts, and also in the town and Sudder Bazaar. It was, therefore considered, advisable to keep all men returning from leave or furlough with their families in quarantine in the hospital compound for three days. In the month of May, 2 children and 2 women were attacked with cholera while detained in the quarantine tents. There was 1 death; but the disease never made its appearance in the lines.

12. Vaccination and re-vaccination have been assiduously carried out. All recruits are vaccinated as soon as possible after enlistment, and the sepoys who are not scarred with small-pox are being gradually protected by vaccination. Vaccination—37 successful, 7 unsuccessful; of re-vaccination 38 were successful and 26 unsuccessful. Twenty-eight men were invalided and 2 men discharged with gratuity. The principal causes of invaliding were bronchitis and rheumatism. Nine men were allowed leave on medical certificate for varying periods. The diseases from which they were suffering were sciatica, bronchitis, Bright's disease, dyspepsia, acute rheumatism, and phthisis.

General health and physique.

13. The general health and physique of the men are good.

14. Having used chloral hypodermically in many cases of cholera, both in the regimental and civil hospitals, I have come to the conclusion that the procedure, though not by any means a cure for the disease, is still a very valuable adjunct to its treatment. The hypodermic injection of chloral speedily relieves the cramps, allays pain, and in many instances produces sleep, thus preserving the strength of the patient; it also mitigates the severity of the retching, and enables the stomach to retain small quantities of nutriment and diffusible stimulants; I have not noticed that it in any way checks the diarrhoea. Unlike opium and chlorodyne, chloral subcutaneously used, while it gives relief, and even sometimes temporarily restores the pulse in the stage of collapse, does not appear to aggravate the head symptoms during the secondary fever.

### H. M.'s 3rd Regiment N. L. I.

KOLHAPUR.—In medical charge of Surgeon-Major C. JOHNSON; strength 547.

H. M.'s 3rd Regiment Bombay N. L. I. arrived in Camp Kolhápúr on the 4th February 1876, having left Ahmedabad by wings on the 10th and 12th January *via* Poona, which was reached on the 11th and 13th, the regiment marching again on the 19th January from the above-mentioned station. The regiment was remarkably healthy on the march. One man, however, died of bronchitis on the 2nd February, three days from Kolhápúr; this man was much debilitated from previous illness.

2. A detachment of one company marched on Kaládgi on the 6th February 1876, and was reinforced by another company under command of an European officer on the 14th November 1876, where they are still doing duty.

3. The lines which are well situated are not well built; they are placed on a ridge towards the east of the cantonment, with a foundation of moorum overlying trap rock. The ventilation and drainage are good; the bazaar is tolerably well supplied; many of the men prefer to get their supplies from the city, about two miles off, where they get them a trifle cheaper. Vegetables, and occasionally fish, can be obtained, and beef and mutton of fair quality.

4. The water in the lines is very far from the surface, as they are built on a ridge of trap rock. In the wells from which the water is drawn, 43 feet from the surface, the water is good; but from the continued demand becomes rather scarce, sometimes, during the hot weather; another well in the vicinity of the lines would be of great advantage. There is no appreciable impurity. The wells are well protected by a low wall, and flagged with stone all round the surface. I should recommend the digging of one new well and deepening the other during the end of the hot season.



5. The food is good and wholesome, but since the arrival of the regiment has been very expensive, more especially since the districts have been afflicted with famine. The amount of grain compensation has latterly been increased to the troops with marked good effect, and there is now no reason to complain of any great hardship on this account.

6. The duties are moderate, though rather more severe since the famine commenced, as the regiment has had to take the jail and residency guards to allow the Kolhápúr Infantry to be employed on out-post all throughout the famine district. This does not seem to have had any bad effects on the health of the men, who are remarkably healthy, though the number of nights in bed at present is only two.

7. The men have their native gymnastics and amusements, and their military duty gives them plenty of occupation.

8. Are well adapted for the purpose; are lofty, well built and ventilated, and roomy.

9. There has been no over-crowding, the hospital accommodation being ample, and the best I have ever seen for native troops. The conservancy and water-supply are good.

	10. Average strength .....	547	
Sickness, mortality, and invaliding.	Percentage of {	Treated to strength.....	103.6
		Deaths to strength .....	0.36
		Deaths to treated .....	0.35
	Average daily sick .....	16.0	
	Invalided 10, percentage .....	1.8	

11. Bronchitis and malaria.

12. The rainfall during the past year has been much below the average, being only 22 inches 42 cents, the effect of which has been to increase the price of provisions all over the district, and create a famine in some parts. The rain, as well as being scanty, was not well distributed over the season.

13. There has been no epidemic in the regiment.

14. Vaccination has been thoroughly carried out in the regiment. The total number of vaccinations being 153,—primary 110, and re-vaccinations 43, the former being infants, and the latter adults. Shortly after the arrival of the regiment, I, with the kind assistance of Mr. Sinclair, the Civil Surgeon, started animal vaccination with most beneficial results; at present there is no one under age unprotected in the regiment.

15. Since our arrival here there have been several cases of syphilis. I obtained the sanction of the officer commanding for an examination of the bazaar twice a month, which has had a beneficial effect. The general physique of the regiment is very good.

16. Intestinal worms are very common in Kolhápúr, and very frequently occur in the form of lumbrici in cases of fever and diarrhoea, to which I believe they are frequently the predisposing cause, the symptoms in many cases resembling true cholera in all its signs. Children under treatment for fever are always much relieved by the administration of santonine at the commencement of their treatment, and frequently recover after voiding large quantities of round worms.

17. The condition of the sepoy has been reported on so often, that it is unnecessary for me to enter into any details. The fitting of boots and improvement in clothing are matters to be thought of. The revision of pension rules would be of the greatest benefit to the whole native army. The condition of the regiment under existing circumstances could not be better than it is.

18. Are instructed in dispensary and making up medicines in the laboratory; in clinical medicine, and surgery, in the wards; and reading during their leisure time.



**Detachment H. M.'s 3rd Regiment N. L. I.**

KALA'DGI.—In medical charge of Surgeon F. C. BAKER, M.D.; strength 89·8.

A detachment of one company of the 3rd Regiment N. L. I., from Kolhápúr, relieved the detachment H. M.'s 14th Regiment N. L. I., at Kaládgi, on the 16th February 1876, and was reinforced by an additional company on the 24th November 1876.

2. The present strength is 306, including women, children, and officer commanding; and of these 180 are fighting men; the balance, 126 women and children.
 

Present strength.
3. Latest marches from Kolhápúr ending on dates of arrival above named.
 

Marches.
4. The lines are calculated to accommodate one company only, and thus are adapted for only half the present strength; tents are pitched to lessen over-crowding.
 

Lines.
5. The trench system of conservancy is now, on account of the reinforcement, still more a desideratum; but there is no establishment to carry it out.
 

Conservancy of lines.
6. The well-known scarcity of food at the present time needs no remark.
 

Food.
7. The hospital being, as before, the civil hospital, is less than ever sufficient for its requirements, as both civil and military patients have now increased, and over-crowding is a frequent evil on account of want of accommodation.
 

Hospital.

Ventilation.                      Ventilation can still be kept sufficient through the windows and roof.

Accommodation, that afforded by a single ward, about 66 × 16 feet, to meet the following requirements:—sick of police, 158 strong at head-quarters: military, 305; civil, as many as come.

Accommodation.

Conservancy.                      Hospital conservancy consists in the use of a trench dug at a convenient distance from the hospital.

Water-supply.                      Water-supply continues good and sufficient.
8. Ordinary fever caused the bulk of admissions, amounting to 41; dysentery next, 6; diarrhoea and colic 3 each; orchitis 2; double pneumonia 1; and other causes 7; total admissions 63. Six were sent on sick leave. None were invalided; and there were no deaths.
 

Sickness and mortality.
9. No marked cause of sickness prevailed to any great extent; additional guard duty may have been the cause of some of the ephemeral fevers which compose so large a proportion of causes of admissions, and the diminished rainfall may account for dysentery, through a scorbutic condition, which largely prevails through the district during the present dearth.
 

Special causes of sickness.
10. The detachment did not suffer, although cholera prevailed badly in the district.
 

Epidemics.
11. Four children were vaccinated, and one re-vaccinated.
 

Vaccination.
12. General health and physique of the men are good.
 

General health and physique.

**H. M.'s 19th Regiment N. I.**

SHOLA'PUR.—In medical charge of Surgeon-Major W. E. CATES; strength 631·5.

- 1 Regimental head-quarters returned from Poona on the breaking up of the camp of exercise, by special train, on 1st January 1876, reaching Sholápúr early the next morning, and no more movements have since occurred.
 

Location and movement of corps.



2. Two or three small parties, under non-commissioned officers, have been detached into the districts for the purpose of guarding treasuries; with these exceptions there have been no detachments from head-quarters.
- Detachment.
3. There has been a very marked deficiency of rain during the year, only about a third of the average fall having been gauged, and the climate has, therefore, been unusually dry. The heat during April and May was very great, and during the monsoon months the temperature was higher than usual owing to the want of moisture. During the last two months the cold has been greater than I have ever previously experienced in Sholápur, and strong, dry, easterly and north-easterly winds have prevailed.
- Climate.
4. The available space has been found quite sufficient during the year.
- Lines, available space.
- The nuisance complained of in former reports, viz., that of the people resorting to a nullah in dangerously close proximity to the lines for purposes of nature has been almost entirely put a stop to during the past year, peons having been placed at various points by the municipality to prevent the practice. The general sanitary state of the Sudder Bazaar is fairly satisfactory; but no public latrines have been erected, though plans and estimates for them have been prepared, and sites chosen. I trust that in my next report I may be able to say that this want has been remedied.
- Neighbouring village.
5. There has been no change made in these arrangements during the year. The lines are kept scrupulously clean, and the latrines regularly cleaned out, and the nightsoil removed in closed carts and buried at a distance. The Sanitary Commissioner, at his recent inspection, expressed an opinion that the latrines, especially those for the women and children, were too far from the lines; but I do not think they could safely be brought nearer, and, even as they now are, I believe the water in one of the line wells, which is situated almost immediately below the male latrines, is very liable to be contaminated through soakage from them. The latrines are not free from odour, but I believe it to be unavoidable, owing to their construction and the use of water for ablutión purposes.
- Conservancy.
6. Notwithstanding the very scanty rainfall, no inconvenience has been felt in the matter of water-supply during the greater part of the year, which has been, in great measure, owing to the completion of the new well alluded to in last year's report, which has yielded an ample supply of, apparently, excellent water, and has been a great boon to the sepoys. The well used by the Parwári sepoys dried up towards the close of the year, and the Executive Engineer has been requested to have it cleared out. I have lately received the necessary apparatus, but have not yet had time to analyse the water of the different line wells, but hope to do so shortly.
- Water-supply.
7. Food of good quality is generally abundant and cheap in Sholápur; but during the last three months, owing to the failure of the crops, the price has risen something like 300 per cent., and the quality of the grain imported is not, I fear, of the best. Compensation is given by Government; but I fear those of the sepoys who have large families to maintain are obliged to curtail their allowance of food, though I have not as yet observed any injurious effects on their health in consequence. It was, I believe, in contemplation at one time that the sepoys in this and other stations situated in the districts afflicted with scarcity, should be provided with rations by the Commissariat Department, but no such arrangement has as yet been carried out here.
- Food.
8. I would beg to refer to remarks made in previous years' reports on this subject, to which I have no further addition to make.
- Clothing.
9. These have been the ordinary duties of a native regiment in cantonment. Latterly the guard duties have been heavier than usual, a regimental guard having relieved the police one at the treasury. No injurious effects on the health of the corps have been apparent; indeed, as will be seen under the appropriate heading, the health of the regiment has been remarkably good during the year.
- Duties.
10. With regard to these points, I can only repeat the suggestion made by me last year as to the desirability of constructing a gymnasium in the lines of every native regiment, and the introduction of regimental gardens. Cricket has been much encouraged in this regiment by the Adjutant, and many of the sepoys have frequently played during the last season. They seemed to take great interest in the game, and many of them acquitted themselves most creditably.
- Exercise, amusement, and occupation.



- Marches. 11. There have been none during the year.
12. The only addition made to the hospital during the year has been a bath-room. A ward for contagious diseases and a dead-house are required. Hospital. Owing to the diminished number of sick, as compared with previous years, the accommodation has been ample.
- Over-crowding. 13. There has been none at any time during the year.
14. The additions alluded to in Section 12 are all that are now required to render the hospital in every way suitable for the wants of a native regiment. Accommodation.
15. There is no special water-supply for the hospital, its wants being supplied from the line wells and tanks. Water-supply.
16. The improvement in the health of the regiment, which was so marked in 1875 as compared with the two previous years, has, I am glad to say, continued during the year just past, in which the sickness has been less than for some years previously. This will be shown at once by a glance at the following table, which gives the rates of sickness for the three years during which the regiment has been stationed at Sholapur :—

	1874.	1875.	1876.
Admissions ... ..	950	625	326
Total treated ... ..	975	646	338
Percentage of treated to strength...	149·5	97	52
Average daily sick ... ..	27	14	10·7

This decrease has been very marked in the case of ague, the numbers of treated for that disease having been less than a third of the number treated in 1875, and only a little more than a sixth of those in 1874; but it is by no means confined to that disease, being more or less marked in almost every class, thus showing a decided improvement in the health of the corps.

Three deaths have occurred during the year, showing a percentage of deaths to strength of 0·47, and of deaths to treated of 0·88. These are in excess of those in the previous year. Mortality.

One native officer, 4 non-commissioned officers, and 6 privates were sent before the general invaliding committee on 1st November, the whole of whom were passed. The majority of them were old, worn-out men, and one, who was discharged with a gratuity, suffered from ocular tumour, which incapacitated him for the duties of a soldier. Invaliding.

17. The most prevalent disease was, as usual, ague, though very much less so than in previous years, the cases constituting, instead of more than half the total sickness, rather less than a third. The total numbers treated was 103, against 345 in 1875, and 597 in 1874, and only 1 case remained on the sick list at the close of the year. I attribute this immunity from fever chiefly to the scanty rainfall and consequent dryness of atmosphere, but believe that something is also due to the generally improved state of health of the men rendering them less susceptible to the effects of malaria, or whatever the real cause of intermittent fever may be. The cases that occurred were mostly of a very mild type. Principal causes of sickness.

The remaining cases under this heading comprise 1 case of remittent fever, and 3 of malignant cholera, of which one proved fatal. General diseases—A.

This class comprises in all 40 cases, of which 7 were due to chronic rheumatism, 5 to primary, and 13 to secondary syphilis, 1 to diabetes mellitus (which ended fatally after a very long illness), 1 to scurvy, and 13 to lumbago. Most of these show a decided decrease as compared with the previous years, and the decrease is specially marked in the case of primary syphilis, though there was General diseases—B.



a slight increase of secondary syphilis. The cases of lumbago also show a marked decrease. The fatal case of diabetes is the same that was alluded to in last year's report. He returned from sick leave in the early part of the year, and I recommended him for discharge at the time of the yearly inspection of the regiment; but the General directed him to be kept on until the annual invaliding committee was assembled. Before that time, however, he had succumbed to disease.

Only 3 cases of disease of nervous system have been under treatment, of which 1 remained from the previous year. They comprised 1 of hemiplegia, 1 of cephalalgia, and 1 of pleurodynia, the two former occurring in the same individual, a young soldier, the subject of constitutional syphilis. He was admitted into hospital on two occasions suffering from intense headache, and a certain amount of obtuseness of intellect. He improved considerably under the administration of bromide and iodide of potassium, and was discharged to duty, but ultimately was attacked with left hemiplegia, and well-marked aphasia. He was again put upon large doses of iodide of potassium with perchloride of mercury, and by degrees has regained a certain amount of power; but the aphasia still continues, and there is considerable tendency to rigidity of muscles, so that he will, probably, not be fit for the duties of a soldier, and will have to be discharged.

These comprise 17 cases, against 21 in 1875, and include 12 of conjunctivitis, 2 of sequelæ of iritis, 2 of impaired vision, and 1 ocular tumour. The latter was the case referred to at some length in last year's report, and the man was sent before the general invaliding committee on 1st November, and is charged the service with a gratuity, not being entitled to pension.

Two cases of simple inflammation of the external meatus were treated during the year.

This class also gives 2 cases, 1 of which was a case of most obstinate chronic inflammation of the inguinal glands (non-specific), which necessitated the man being sent away on sick leave.

This class of diseases shows a considerable reduction as compared with the previous year, only 17 cases having been treated, against 31 in 1875. They included 9 cases of bronchitis, 2 of asthma, 1 of pneumonia, 1 of pleurisy, 1 of chronic pneumonic phthisis, and 3 of bronchial catarrh. One of the cases of bronchitis proved fatal, but I can give no details concerning it, as it occurred during my absence on leave. None of the other cases call for special remark.

Of "diseases of the digestive system" 38 cases have come under observation, viz., 3 of gum-boil, 1 of ulcer of tongue (syphilitic), 1 of quinsy, 1 of tonsillitis, 1 of enlarged tonsils, 10 of dyspepsia, 1 of enteritis, 15 of dysentery, 3 of diarrhœa, 1 of worms, 1 of enlargement of liver. It will be seen from the above that liver affections were very rare, and there was not a single case of splenic disease, clearly pointing to the improved state of health of the men, when one considers the great prevalence of ague in the two previous years. The cases of dysentery were mild, and quickly yielded to large doses of ipecacuanha followed by castor oil, and an occasional enema. The cases of diarrhœa, too, were mild, as well as rare.

These account for 19 cases, viz., 11 of gonorrhœa, 4 of bubo, 1 of gleet, 1 of paraphimosis, and 2 of stricture, none of which presented any features of special interest.

Three cases were treated, viz., 2 of orchitis and 1 of epididymitis, precisely the same as in the previous year.

Under this heading appear 2 of acute and 3 of chronic synovitis; of the latter 1, an old non-commissioned officer, was invalided, and 1 sent on sick leave.

These include 1 of inflammation and 1 of guinea-worm.

These account for 42 cases, comprising 2 of erythema, 4 of psoriasis, 2 of impetigo, 8 of ulcer, 23 of boil, 2 of whitlow, and 1 of fissures. These do not call for special remark.

Under this head are included 2 cases of debility, following sharp attacks of fever.



- Lastly, under the head of "Injuries," come 39 cases of various kinds, chiefly the result of slight accidents on parade, or in the lines during dark nights, all of which were of a trivial character, and not requiring special notice.
- Injuries.
- Only 11 minor operations were required during the year. Not a single European officer has been on the sick list during the year.
- Operations.
18. The 3 deaths which occurred were due, respectively, to cholera, bronchitis, and diabetes mellitus.
- Causes of mortality.
19. The 3 men who died were all Hindus from the Konkan.
- Mortality according to race.
20. The regiment did not quite escape unscathed this year from the cholera epidemic which prevailed in the city of Sholapur and the surrounding districts in the monsoon months, notwithstanding that the usual precautions were taken to prevent, as far as possible, communication between the lines and cantonment and the affected localities. The first case occurred on the 23rd July and the last on 26th August, after which the disease disappeared. Three men were attacked, of whom 1 died; also 1 woman and 1 child, of whom the former died, and the latter recovered. At the same time a great many cases of severe diarrhœa, almost approaching cholera in the intensity of the symptoms, occurred amongst the women and children, due, in almost every case, to lumbrici, similar to the cases reported by Surgeon-Major Day, 5th Regiment N. L. I., in last year's report, and which quickly recovered after the expulsion of the worms. When cholera first made its appearance, every block of huts in which a case had occurred was at once vacated, their occupants being located in tents pitched about three-quarters of a mile to windward of the lines, and before being allowed to return to them the floors were dug up and re-made, the huts were well fumigated with sulphur, and the walls white-washed. I should have mentioned that the cases sent to hospital were treated in old tents which were, I believe, afterwards destroyed, and the clothing of every patient was thoroughly boiled and disinfected before he was permitted to return to the lines. These precautions proved quite efficient in preventing the spread of the disease.
- Epidemics.
21. Vaccination has been carefully attended to during the year. The primary vaccinations amounted to 105, of which 90 were successful. Of re-vaccinations there were 21, with the following results, viz., 11 successful, and 10 unsuccessful. At the close of the year only 14 remained unprotected, all children under 3 months old.
- Vaccination and re-vaccination.
22. These may, I think, be considered very satisfactory, and there has been a progressive improvement during the last two years. At the close of the year only 6 men remained on the sick list.
- General health and physique of the men.
23. I have no special novelty in the way of treatment to record during the year. The cases treated have been, as a rule, of a very mild character, and there has been no great scope for trying the effects of new or heroic remedies. I have used cinchonidine in the slighter cases of ague; but, as previously reported, have a very poor opinion of its value as compared with the sulphate of quinine.
- Treatment of disease when special.
24. With reference to my remarks under this head in last year's report, I wish to express my great gratification, which will, I think, be generally felt by all medical officers in charge of native troops, at the boon granted by Government, on the occasion of the assumption by Her Majesty the Queen of the title of Empress of India, to the native army in the shape of a gratuity of Rs. 30 to every recruit on enlistment, towards purchasing his kit. This will almost entirely obviate the evils then pointed out.
- Special observations.
25. This may be very brief, as the remarks previously made, and the returns which accompany this report, clearly indicate the steady, progressive improvement in the health of the corps during the past year. From a physical point of view the regiment is now in a most efficient state, and fit for any duties it may be called upon to perform.
- Resumé.
26. The native medical pupils attached to the regiment have received constant clinical instruction in the wards, and their general education has been carefully supervised.



## REMARKS BY DEPUTY SURGEON-GENERAL T. B. BEATTY, M.D.

This regiment has been stationary since the commencement of 1876, and during this period the general health of the men has been, on the whole, satisfactory. Out of an average strength of 631, there were 338 treated in hospital, with 3 deaths—1 being from cholera, from diabetes, and 1 from bronchitis. No epidemic had occurred.

At the time of my inspection in February the scarcity of water which has prevailed over the Deccan during the past year was particularly felt at Sholápur. Drinking water which, under ordinary circumstances, is obtained from wells in the lines, had this season to be conveyed from long distances, which occasioned great inconvenience.

The hospital, which can easily accommodate 20 patients, was clean and well managed. A bath-room, however, is required for the use of the patients.

## H. M.'s 12th Regiment N. I.

DHARWAR.—In medical charge of Surgeon-Major C. F. OGILVIE, M.D. ; strength 642·8.

Location and movements.

The head-quarters of the regiment has been stationary.

Detachments.

Kaládgi and Bijápur	... 174
Kálghatghí ...	... 23
Ranibennur ...	... 23
Gadag ...	... 23
Ron ...	... 22

2. Detachments have been furnished to the places noted in the margin. These detachments are, I believe, performing duties which are usually executed by the police, the services of the latter being required elsewhere in connection with famine relief works.

3. An analysis of the drinking water derived from two wells was given in my last year's report, which showed that it is a fair specimen of potable water.

Water-supply.

4. The food chiefly used by the sepoys during a great part of the past year has been very scarce and dear, and, as is always the case in seasons of scarcity, a great quantity of inferior grain, which had evidently been buried for some years, was thrown into the market, and offered at a cheaper rate to tempt (and too often with success) poor people to purchase it. The highest rate paid by Government to sepoys for dearth of provisions during the year has been Rs. 4-15-2 in December. The lowest rate was 6 annas and 9 pies in February. In January the rate was 10 annas and 5 pies. In February, March, and April it was under 8 annas. In May, June, and July it ranged from 11 annas to 14 annas and 7 pies. In August it was Rs. 1-1-6; September 14 annas and 11 pies; October Rs. 2-7-9; and November, Rs. 3-14-3.

Food.

Duties and their effect on health.

5. The duties of the regiment at head-quarters have been those of the ordinary parades and guard duty. The average number of consecutive nights in bed has been 9½.

6. When not otherwise engaged, some of the men occupy themselves in the workshop, at carpentry, smith's work, tailoring, boot-making, &c. Others amuse themselves at the talimkhana, and I should much like to see a gymnasium introduced for the native troops. I am convinced it would be much resorted to by the men, especially the younger sepoys, and would be followed with much benefit to their health and improvement in physical development. During last monsoon I noticed with pleasure that some of the sepoys were always to be seen at the gymkhana on Saturdays, and were very glad to join the officers and other gentlemen at cricket, when invited to do so.

Exercise, amusement, and occupation.

7. The new hospital has been occupied since the beginning of last monsoon. It is built on the revised standard plan, and consists of two wards, communicating with each other by an arch. At the end of each ward is a door. The ground on which it is built has a gradual slope, so that the plinth is considerably higher at one end than the other. There is a verandah on every side, and at each corner of the verandah there is one room. These four rooms are each 12 × 12. One is used as the office, the opposite one as a dispensary, and the other two I have used as separate wards for the treatment of lung and eye diseases. For the latter disease the ward is not suitable, there being no venetian shutters outside the windows or door to darken the room. This I recommend should be done to both these

Hospital and its surroundings.



small wards, and it would be a great comfort to the patients if they were supplied to all the windows and doors of the hospital, especially in the hot weather, to keep out the glare, there being no trees near the hospital, and, indeed, scarcely any in the cantonments.

The dimensions of the wards are  $78 \times 20 \times 18\frac{1}{2}$  and  $72 \times 20 \times 18\frac{1}{2}$ , giving a superficial area of 1,560 feet and cubic space of 28,860 feet for the larger ward, and a superficial area of 1,440 feet and cubic space of 26,640 for the smaller ward. The larger ward is intended for 26 beds, the smaller one for 24 beds; so that each bed has a superficial area of 60 feet and cubic space of 1,110 feet. The building is well situated with an open space on all sides, and faces S. S. W.

Ventilation.

Ventilation is ample, being derived from opposite doors and windows, and by 5 ventilators in the roof of the building.

There has been no over-crowding during the year under report. At each rear corner of

Over-crowding.

the hospital there are two washing rooms and a privy; they are connected with the rear verandah by a covered passage; each privy contains three receptacles for dampered iron pans. To the north-west of the hospital are the quarters for the hospital assistants and native medical pupils. The occupants complain that the quarters are too small, and that there is no place for them or their families to bathe. This could be provided at a very slight cost to Government, and I would recommend that the accommodation be given them. Near this building is a privy and cook-room for these subordinates; but the cook-room is not used, because different castes cannot cook in the same place.

To the north of the hospital is the cook-room for the patients and the quarters for the 2nd class servants. These are very good.

There are two wards at some distance from the hospital for the treatment of infectious diseases. There is also an out-door lavatory at a convenient distance from the north end of the hospital.

A dead-house is about to be built.

I think the mud floor to the hospital objectionable, and would recommend that a wooden one be supplied.

Hospital conservancy.

The excreta are removed twice a day, or oftener, if necessary, to the filth cart (which stands some distance from the hospital in receptacles, dry earth being placed in the latter as often as is required) in which they are taken to the trench latrines. There is no wall built round the premises. This should be done to keep out cattle and people who have no business there, also to prevent patients leaving without permission. If a wall will not be allowed, an aloe hedge might be planted during the next monsoon.

Hospital water-supply.

The water is derived from the nearest well which is in the officers' lines, and this is between 800 and 900 yards from the hospital. In my last report I recommended the construction of another well near the hospital, and the Deputy Surgeon-General, Doctor Maitland, concurred in this opinion. It has not yet been commenced, although I believe the Public Works Department is estimating the cost of one on a site recommended by me.

8. During the past year there were 303 admissions, 2 being for cholera, out of an average strength of 613.6. Of these 4 died. Of the fatal cases 2 were from cholera, 1 from pneumonic phthisis, and 1 from bronchitis. The ratio per cent. of admissions to average strength was 47.1. The average daily number of sick was 13.6. The percentage of treated to strength was 60, deaths to strength 0.6, deaths to treated 1.4. Twenty-seven men were sent before the annual invaliding committee at Belgaum, 15 of whom were passed. One of the men was returned to his duty with the remark that "change of air might be tried." This was a case of constitutional syphilis. The man had been one year in hospital at various times during the past two years; and I stated that, in my opinion, he would never be of any use as a soldier. Shortly after the man returned to the regiment, his old syphilitic ulcers began again to trouble him, and he was admitted into hospital, where he remained until a few days ago. In accordance with the recommendation of the annual invaliding committee, Belgaum, at my recommendation he has been sent to Bombay to be placed under the medical officer of the Marine Battalion, to be reported upon by that officer at the end of three months; but, in my opinion, to keep such a man in the service is a useless expense to the State.

Sickness, mortality, and invaliding.



9. From ague there were 61 admissions, most of them yielding to treatment with cinchonidine, after the usual emetic and purgative on admission. In 3 cases cinchonidine seemed to have no effect, and I was obliged to have recourse to quinine. From rheumatism there were 19 admissions, 2 of them being of the acute form. Only 1 case of primary syphilis and 4 of secondary syphilis were admitted.

*Diseases of the eye.*—Of these 16 cases, 1 was for ulcer of the cornea, and 15 were for conjunctivitis, most of them yielding readily to treatment.

*Diseases of the lungs.*—From bronchitis there were 12 admissions, 3 of which were of the acute form. In these 3 cases both the lungs were considerably affected, and I feared they would terminate fatally; but 2 of them recovered. The case which terminated fatally occurred in a man returning from Hindoostan, whither he had been on furlough. I am surprised he reached Dharwar, for he had no warm clothing with him; and when I first saw him I felt assured the case was hopeless, he having acute bronchitis in one lung and pneumonia in the other. He died the day after he was admitted. One case of phthisis pulmonalis was admitted in a very weak state, and, as I predicted, terminated fatally after a short residence in hospital.

*Diseases of the intestines.*—There were 26 admissions—17 being for dysentery, 7 for diarrhoea, and 4 for colic.

*Diseases of the liver.*—Of these, hepatitis gave 4, and jaundice 10, admissions. One of the cases of hepatitis was a very serious one, and has been under treatment since 29th October. I had no idea this man could possibly recover, but I am glad to say he is now convalescent.

*Diseases of cellular tissue and skin.*—Twenty-four cases of disease of the cellular tissue were admitted; 14 of these were for guinea-worm. This number contrasts most favourably with the admissions from this disease in 1875, viz., 64, and in 1874, when there were 142 admissions. In my last year's report I expressed a hope that the admissions from the disease would be considerably decreased, as the whole of the regiment would be able to use the well-water in the new cantonment. It will be very interesting to observe the admissions from this disease in the new cantonment of Dharwar during the next few years. Eleven cases of abscess were admitted; 21 cases of diseases of the cutaneous system were admitted, of which 6 were for psoriasis, 4 for ulcers, 8 for boil, 1 for scabies, and 2 for roseola (annulata).

*Injuries.*—Thirty-two cases of injury were admitted, 22 being contusions of the lower extremities, 6 for contusions of the upper extremity, and 1 for an injury to the back, caused by a fall from the top of a wall of about 15 or 20 feet high.

10. Two out of the 4 deaths occurred from cholera, 1 from pneumonic phthisis, and the other from bronchitis. All were Hindus.

11. The rainfall during the year is the least that has been known in Dharwar during the past 21 years, only 17 inches and 52 cents having been registered. Of this quantity 2 inches 87 cents fell in April, 7½ inches in July, and 2 inches and 8 cents in September. In June only 79 cents, and in August only 77 cents were registered. The average rainfall during the previous 20 years, viz., from 1856 to 1875, was 31 inches and 49 cents; the largest quantity registered was in 1874, viz., 49 inches and 56 cents; the smallest during the same period having occurred in 1865, when 22 inches and 29 cents were registered. The effect of the small quantity of rain during last year has been to cause all grain to rise to famine prices. The want of water has been severely felt already in some parts of the districts. Cholera prevailed to a considerable extent in some villages, and I should fear we may have a return of it before next monsoon, unless we get a considerable fall of rain within the next few weeks.

12. There has been 6 cases of epidemic disease during the past year in the regiment. One case of modified small-pox occurred, the patient being a sepoy. Two private followers were attacked with small-pox. In 2 of the cases the throat was affected; with this exception, the disease ran its course without a bad symptom. Two sepoys were attacked with cholera, both of whom died; one was attacked in the month of July, the other in the month of December. One woman was attacked in December, which also terminated fatally.

13. Vaccination has been most carefully attended to. There were 49 operations, 33 being males and 16 females; all of them were successful. Re-vaccination was performed eleven times, the subjects being recruits, and they were all successful. I can safely say there is not a child, in good health, in the lines, above the age of 3 months, who is not vaccinated.



General health and physique of the men.

14. The health of the regiment has been tolerably good during the year, as will be seen from the following table :—

	Average strength.	Total admissions.	Admissions from guinea-worm.	Daily average number of sick.	Treated to strength.	Deaths to strength.	Deaths to treated.
1874 ... ..	678·	616	142	30·8	91·	·6	·6
1875 ... ..	685·	363	64	18·3	54·7	·6	1·6
1876 ... ..	642·6	303	14	13·6	60·	·6	1·2

Notwithstanding the number of admissions from guinea-worm in 1874, the total number of admissions this year is 171 less than in 1874; deducting the number of admissions in 1875 from this disease, there are 21 less during the past year than there were in 1875. This may, to some extent, be accounted for by detachments (numbering 260 men) having been sent on duty from head-quarters. This also will account for the higher percentage of treated to strength during the last year over that of 1875. The physique of the men might be better than it is. They worked very hard during 1874 and 1875 when building the new lines, taking all guard duties as usual, during which time they received neither rations nor money for this increased labour, and which, in my opinion, all regiments during line building should receive. These two years, followed by one with food at famine prices, has been very trying to the men, especially to the married sepoys.

15. Cinchonidine has been used as a substitute for quinine in the treatment of intermittent fever, and answers very well in cases of mild type; but, in my opinion, quinine is the only remedy which we at present possess for severe cases of this disease.

16. Until 15th November there was only one native medical pupil attached to the hospital during the year. He has received clinical and other instruction at the patients' bed-sides during my visits at the hospital. He has been also regularly instructed in the routine duties of the hospital.

17. In conclusion, I would observe that the burial-ground for natives dying in cantonment limits, which was formerly in dangerous proximity to the regimental bazaar, has been removed to a considerable distance in cantonment from the sepoys' lines; but its position is still very objectionable, from the fact that the dead must be carried along the road facing the officers' bungalows. It is situated at the extreme end of camp towards the S.E., while the hospital is situated at the other extreme end of camp towards the N.W. The Sanitary Commissioner recommended at his recent inspection of this cantonment that detached lavatories for the sepoys and their wives should be constructed. Estimates for them have, I believe, been prepared by the Public Works Department, and I hope that these works, especially the hospital, will be speedily completed. The order prohibiting washing near the wells has been given.



## NORTHERN DIVISION.

Average strength present during the year ... ..	8,937.3
Average daily sick per cent. to the average strength...	4.1
Ratio of mortality per cent. to the average strength ... ..	0.7

## H. M.'s 1st (Grenadier) Regiment N. I.

AHMEDABAD.—In medical charge of Surgeon-Major G. YEATES HUNTER; strength 660.

- Location and movements of corps. 1. The regiment was located at the camp at Ahmedabad during the entire year.
- Detachments. 2. A detachment was stationed at Sádra, 24 miles distant, every two months alternately with a detachment of the wing, 13th Native Infantry.
- Soil, water, and drainage of the cantonment. 3. The camp is about three miles distant from, and to the north-east of, the city of Ahmedabad, and is situated near the left bank (south) of the river Sábarmati. The site is on a sandy plain containing probably much organic admixture, the decomposition of which may account for the malarious fever which is so prevalent. There is, however, considerable depth of sand, 20 feet or more before the alluvium is reached, far enough below the surface to ensure good natural drainage through the sand, and thus prevent the ground immediately underlying being saturated with moisture, although the nature of the soil lower down is favourable to the retention of water. With regard to vegetation, there is no brushwood, plenty of herbage, and numerous fine trees in great variety; near the lines the sand is bare, which adds to the heat, and the sand is less as the ground slopes down to the river, which may increase the moisture (I had a hole dug 10 or 12 feet deep, and the sand was certainly damp about 4 feet below the surface; still, as it was just after the rains, this was to be expected). The sub-soil drainage is entirely natural, and looking at the depth of sand is doubtless good. The water is from wells, and is good and abundant.
- Effect of climate. 4. The general effect of the soil, as above described, would be to make the climate hot and malarious from decomposing vegetable matters and perhaps from soluble salts in addition, more especially near the river, where the lines are placed. The climate is certainly relaxing, and in consequence convalescence from sickness is often tedious. I have noticed that the principal complications of remittent fever (which is frequent) are affections of the lungs and brain; the men come in with ague, which assumes in many cases a remittent type in two or three days. The temperature is high, and owing to the lateness of the monsoon (usually the beginning of July) June is a peculiarly hot and trying month. There would seem to be nothing remarkable in the rainfall.
- Lines. 5. The lines extend east and west, and are divided into 16 streets, and are sufficiently spacious for the accommodation of the men and their families. Were more space required, there are 8 streets between the 16 allotted to the 1st Regiment, and the 8 occupied by the wing of the 13th, which could be made available; but there would seem to be no occasion for their occupation; on the contrary, it would appear an advantage, from a sanitary point of view, that there is this unoccupied space, which prevents the regiment and wing being crowded together. I may add that the buildings generally, quarter guard, &c., are well adapted to their purpose.
- Ventilation. The ventilation of the above 16 streets is good; the streets run north and south, are 28 feet wide, and open lengthwise and crosswise. The huts have no roof ventilation, air gaining access through holes in the walls near the door, and under the eaves; but they are well elevated, and the cubic capacity both for native officers and privates is sufficient.
- Bazaar. The Sudder Bazaar was swept away in the flood of 1875, but has been re-built; and the new is said to be a great improvement upon the old one, the houses being of a better description. The bazaar lies between the lines and the river, its main street is wide, and every attention seems to be paid to ensure cleanliness and to keep it in a good sanitary condition generally. The flood does not appear to have exercised any marked prejudicial effect upon the health of the inhabitants.



There are small villages within two miles all round the camp both on this side of the river and on the other, viz., 1 to the north, 2 to the south, 2 to the east, and 3 to the west; but there is no village near enough to exert any evil influence upon the health of those in the lines or bazaar, supposing it to be in an unsanitary state.

The natural drainage I consider fairly good; as regards artificial drainage, I wrote in and recommended that the main open drain running down the centre of each street should be deepened and sloped gradually down towards the river, so that the water might run off with greater facility, and that the sub-drains running from the huts towards the main central drain should be carried quite up to it and be regularly well flushed and disinfected. Previously the main drain had not a sufficient incline towards the river; indeed, in some cases it sloped in the wrong direction, and the house drains did not extend to the main one. I also recommended that hollows should be filled in. This recommendation was made, because I found that water lodged at certain points.

6. The system of conservancy adopted in the regimental lines is that of pukka built latrines (4 in number, viz., 2 for males and 2 for females); all care is taken that they are kept in a clean state: dry earth is thrown down, disinfectants are used, and from frequent personal supervision I am able to testify to their good sanitary condition. As many cases of fever occurred during and after the rains, I made several suggestions; amongst others, that the huts should be white-washed both inside and outside, that moorum should be laid down to make the ground level and so obviate the collection of surface water, that the bathing stones in front of the huts should all be lifted up, as in one instance a cess-pool was formed under one of them close to a hut in which cholera had occurred, and that the floors of the huts should be raised a few inches, with, perhaps, a two brick floor to ensure a dryer state of flooring than obtains now in the rainy seasons. The cubic capacity of the huts is enough to allow of this being done without unduly encroaching upon the space.

7. The water-supply is from wells built with pukka walls, and covered in; and although it contains chlorides, they are not in such proportion as to make it unwholesome. It may be described as of good quality, and in sufficient quantity.

8. The quality of the various foods is good, and supplies are abundant, except in the important article of green meat; but prices are high, indeed all grain is dear, and latterly, since the famine commenced, very dear, which to the sepoy, with his not large pay, is a serious point. Considering that the scorbutic taint is so prevalent among the men of this regiment, since they were quartered at Aden, it is a matter for regret that vegetables are not more plentiful and cheaper; there is no public garden, and I think it would be a great health gain if a piece of ground near the lines could be cultivated, so that a better supply of esculents might be forthcoming, and at the same time the men have healthy occupation. Family men certainly do not live well enough, nor do recruits, who are cut rupees 2 for 21 or 22 months on account of their necessaries, and have, therefore, during that period only Rs. 5 or grain compensation to live on, and amongst the Deccanis and Konkanis they are often family men.

I may add that 4 bad cases of fever of a very low type among recruits were under treatment; the lads were fine young fellows to look at, but perhaps insufficient food may have impaired their strength.

9. As clothing is a very important branch of military hygiene, I venture to offer a few practical remarks on certain articles of dress. Suitable clothing where soldiers are concerned, means freer use and easier play of the limbs, increased quickness of motion, better health, gain in comfort, and greater efficiency in every way. As the main essential of success in campaigning is the facility of making long and rapid marches, it becomes absolutely necessary that the infantry soldier should be well shod. I proceed, therefore, to make one or two suggestions as to the best method, in my opinion, of protecting the feet, which has been so long a vexed question with those upon whom the clothing of our troops devolves; I do this with all deference, and shall be glad if I can give a useful hint or two. The boot, as at present issued, is of inferior leather, clumsy, too heavy, hard, and spoils by water,—to say nothing of the bad smell characterizing shoe-leather which has been worn for any length of time in this climate; a substitute is accordingly recommended, consisting of a stout sole, with a broad low heel, made of good English hide as used in the manufacture of shooting boots, the "uppers" being made of brown canvas, well



shrunk, and doubled at the toes, with strong elastic let in on each side of the instep. The advantages of this shoe would be lightness, durability, and enhanced comfort; it would not gall,—so common an evil with the boot now in vogue, and so frequent a cause of admission into hospital; nor would it require to be taken off in fording rivers, &c.

The shoe, to be worn with a gaiter, to commence about three inches below the knee, and to come well down over its top to keep out sand and protect the foot from injury by thorns, or otherwise. The gaiter should also be made of brown canvas, fastened on the outside of the leg, above and below, by two elastic steel bars (galvanized) which, running the whole length of the gaiter, slide one into the other with slight pressure, and are so readily adjusted that the gaiter can be put on in less than half a minute, whilst it can be taken off in even less time, to the saving of trouble to the tired soldier. Some such contrivance would obviate the necessity of buttons, might even prove a protection to the outer part of the leg, and would certainly be a support in marching. Sporting men will readily understand the kind of article meant. The boot now in use by mounted infantry officers might be replaced by this shoe and gaiter, more especially as in the present mode of warfare they must be dismounted when in action.

In place of the present trouser it is suggested that breeches, quite loose and comfortable above the knee, but tight below and coming half way down the calf, to fit under the gaiter, might be tried, which could be made of the same colour and material as those now in use, only with greater attention in order to secure a good fit. The coat ought to be loose round the chest and over the shoulders; and if it were cut in the fashion of the well-known "Norfolk," but without collar of any sort, it would be a great improvement on the present pattern, both as to health, comfort, and appearance.

For the rains and cool weather one coat of serge and a second of cloth for full dress should be supplied; whilst in the hot months white coats and breeches of American drill, similar in cut to the darker suits, would be advisable.

10. Although the duty is not light here, I am given to understand that it is far less heavy than the regiment had at Aden and Poona. In my opinion, the marching of guards to and from the city, 3 miles off, Duties and their effect on health. accounted for many cases of sickness, several men having been admitted into hospital from this duty; again, the principal guard-room at the jail is like an oven in the hot weather; it is not ventilated, and has no verandah, so that the sun shines right into it up to 12 o'clock.

11. The Punjaubis and Hindoostanis are taking more to gymnastics here than at Poona. The commanding officer tells me that with a few exceptions he has never known the Deccanis or Konkans go in for them. The principal amusements and exercises are wrestling and gymnastics. There were the usual number of competitors at the soldiers' exhibition in Poona. The men have enough occupation, though they would consider it a boon if they had a plot of ground to cultivate. Exercise, amusement, and occupation.

12. Lock-up rooms are 4 in number, of ample cubic capacity, and in every respect adapted to their purpose. Lock-up rooms and cells,

13. Marches none, except to relieve detachments at Sádra, and a few escorts to Mysána and Wadhván. Marches.

14. The hospital is situated to the north-east of the camp, not far from the lines, and there is nothing to object to in its surroundings. The natural drainage is good, the ground sloping down towards the river. Hospital and its surroundings. The building is substantial, placed within an enclosed compound on a plinth raised enough to ensure dryness, with wide verandahs open in one side, shut in on the other, and is altogether excellently adapted to the purpose. The cubic capacity of the larger ward allotted to the regiment is 25,410 feet; by placing the beds between the windows 22 can be accommodated, giving each man 1,150 feet; this is not enough. But when the whole hospital is given back to the regiment, there will be 38,654 feet, and ample accommodation for the sick in the two wards they will then have.

The ventilation of the hospital is satisfactory (roof). Ventilation.

There had not been much over-crowding until September, when I found it necessary to report that, in consequence of the prevalence of choleraic diarrhoea, ophthalmia and fever, the hospital was over-crowded, when open tents were pitched in the compound, and all was done to remedy the defect that was practicable. I may mention that in consequence of the European hospital having been swept away in the flood, one of the two hospitals previously allotted to Native troops was given up to the European, and since that time the sick of the two Native regiments have been Over-crowding.



treated in the same building. It is expected, however, that the new European hospital will be soon ready, so that the Native one, which has been diverted from its legitimate purpose, may be set free for the reception of the sick of the Native wing.

As before remarked, the building was not at all times sufficiently roomy for the accommodation of the sick of both regiments. The larger ward, which is allotted to the 1st Regiment, is capable of accommodating 22, and the smaller ward, which is reserved for the wing, 12. There is one small room, which is usually occupied by females or cases requiring isolation.

## Improvements.

The dead-house, which was asked for by my predecessor is now completed.

A separate building at some distance from the hospital for the isolation and treatment of contagious and infectious cases, and a female ward, are great desiderata. Privies and cook-houses are also required for the hospital assistants.

## Requirements.

The hospital latrine is conveniently near and well ventilated; at my suggestion it has been partitioned into 5 compartments, the central one having 3 seats, two on either side 2 seats, and the two corner ones, 1 seat each—9 in all; this was done in consequence of the men complaining of want of privacy. Every attention was paid to cleanliness; disinfectants and dry-earth were freely used, and the night-soil carried away and deposited in trenches 2 miles off.

## Conservancy.

The water-supply of the hospital is from a well just outside the compound, and is good and abundant. A suggestion was made to store the water for daily use in a water-cask instead of a badlah, but it fell through on account of caste objections.

## Water-supply of the hospital.

15. The total number of cases treated in hospital was 846, against 798 in 1875, of which 18 remained from the previous year; the total number discharged was 743 to duty, and 75 otherwise; the total number of deaths was 11 in hospital, and 1 in the lines in February, that of a sepoy who put his gun to his mouth and blew the top of his skull away. Sixteen men were sent away for change, and 62 invalided. None were discharged by court-martial or otherwise.

## Sickness, mortality, and invaliding.

The average daily sick was 28·79, against 24·6.

The percentage of treated to strength, 128·18, against 126·77.

The percentage of deaths to strength, 1·67, against 0·48.

The percentage of deaths to treated, 1·50, against 0·38.

The percentage of daily average of sick to strength, 4·36, against 3·91.

The above figures contrast unfavourably with those of last year, the difference being probably due to this climate being hotter and more malarious than that of Poona.

Distinct small-pox of a mild form made its appearance on 20th March among the regimental followers, and all the instructions laid down in para. 10 of G. O. C. No. 239, dated 25th March 1863, were fully and carefully carried out, and a site for the treatment of this, and any other cases that might occur, was selected by me in conjunction with Surgeon-Major McGrath, R.A. Two more cases of a confluent type occurred soon after among the followers, but all three recovered, and the slight outbreak ceased, the tent which had been used for them being destroyed in my presence. The disease was probably imported along the line of rail from Bombay, where it was then epidemic. The three cases bore marks of vaccination.

## Small-pox.

I had previously commenced re-vaccination of the officers, men, and families of the regiment, and in a short time all who had not been re-vaccinated during the last five years were thus protected; a similar precaution was adopted in the case of those who returned from leave.

Ague of a mild type was the principal cause of admission into hospital, 400 in all having been treated. The disease, as a rule, readily yielded to 10 grain doses of quinine internally in the more severe cases, and 2-grain doses, subcutaneously administered, in the milder, the solution of the neutral sulphate being used for the latter. Ague was very prevalent during, and just after, the rains, then abated for a month or so, but towards the end of October became again very prevalent, so much so, indeed, that I wrote in recommending various sanitary measures.

## Ague.

Five cases only are shown, but several admitted under ague assumed later the remittent form, and a few ran into continued. Three deaths occurred from remittent fever, in two instances complicated with pneumonia, and in one with cerebral effusion. All these cases were of a very low type calling for decided stimulating treatment.

## Remittent fever.



On 24th May the first case of malignant cholera in a private was admitted into the hospital 1st (Grenadier) Regiment N. I. ; the patient was isolated, and all needful sanitary arrangements were made, and precautions against its spread adopted, both in the hospital and in the lines ; the case recovered. In August another case occurred, which ended fatally, and in September a third, which also died, and it was found necessary on 3rd September to move part of a company into camp ; the men, however, were brought in again after a few days, and no more cases occurred. I may mention as a curious fact, for which I am indebted to the Deputy Surgeon-General, that when cholera occurred in the camp it ceased in the city for a time, re-appearing in the latter as it died out in camp. This coincidence was noticed on two occasions. There were 2 cases of choleraic diarrhœa among privates and 5 others, one of the latter being that of hospital assistant Balloo Lingoo ; all recovered.

**Malignant cholera.**

Rheumatism. Rheumatism was a frequent cause of admission in old-service men ; of the 47 cases treated, 4 were invalided. The case of acute rheumatism was discharged cured.

Lumbago. Lumbago accounted for 20 admissions, of which 2 were invalided.

Syphilis. Only 3 cases of primary syphilis applied which were successfully treated by mercurial vapour baths.

Scurvy. Although a very common cause of cachexia among the men, gave only 5 admissions, 4 of which were invalided.

Three cases occurred, 1 being a sepoy of 18th Regiment N. I., who was admitted when *en route* to Deesa to rejoin on his return from sick leave ; all was done in the way of diet and medicine to save him, but he sank after six weeks' treatment in hospital.

Phthisis pulmonalis.

Sun-stroke. This man came off the jail guard, and was admitted in an insensible state ; cold douche and ram brought him round, and he soon recovered.

This case occurred during the rains, and was idiopathic, or perhaps it would be more correct to say that no cause was discovered ; he was ill for over a day in the lines before applying for treatment. Cannabis indica in 5-grain doses was given repeatedly, chloroform inhalation and chloral, and strong soup and stimulants, but all failed, and he sank on the second day after admission, and third after attack.

Tetanus.

This was an interesting case. He was admitted into hospital in March 1876 on his return from sick leave, and remained under treatment until he was invalided in November. There was a history of malarious fever, and quinine in large doses was tried internally and sub-cutaneously injected in the arm affected (right). At one time there seemed to be a slight improvement, but it was only temporary ; a variety of drugs were tried—chloral, bromide of potassum, tinc. of belladonna, tincture of nux vomica, tonics, ammoniated sulphate of copper at the suggestion of the Deputy Surgeon-General, electricity, hypodermic injection of morphia, good diet, counter-irritants to spine, but nothing gave any permanent benefit.

Shaking palsy.

One case of mania was under treatment. The symptoms set in suddenly. Some said he was a ganjah smoker ; but this he persistently denied. He appeared to improve under iodide and bromide of potassium, chloral at night, quinine, good diet and blistering, and he was eventually invalided.

Mania.

Conjunctivitis of a mild character was very prevalent, 55 cases having been treated ; they all, however, recovered rapidly. Lead and opium collyria were used, the lids outside painted with tincture of iodine, and quinine was administered internally at the suggestion of Dr. Wyllie, whose experiences of disease at this place had led him to regard most of these cases as of malarious origin. I must say that the treatment was eminently successful.

Conjunctivitis.

Bronchitis was a common cause of admission, 57 cases in all having been treated ; 1 died, who was old and broken down, and 7 were invalided. Treatment was generally stimulating expectorants.

Bronchitis.

Asthma. Of the 2 cases of asthma, one was discharged to duty, and the other sent away on sick leave ; they were both cases of functional disorder.

Asthma.

Pneumonia gives 4 cases ; 1 of these occurred in a recruit from the Konkan. Of the 4 cases, 1 ended fatally ; all were of markedly low type, and called for decided stimulation.

Pneumonia.



**Emphysema.** The case of emphysema is a bad one; the man broke down suddenly at the "double," and is now under treatment.

Twenty-seven cases were treated, some of them showing very acute symptoms; however, as usually obtains, large doses of ipecacuanha controlled the disease, and all recovered. In 2 cases of tedious convalescence the men were sent away on sick leave.

**Intussusception of the intestines.** This case of intussusception occurred in a regimental bheestee, admitted with pain and tumour in the right iliac region, extending into the umbilical. While drawing water the above symptoms suddenly appeared, and he said he suffered so eighteen years previously. He was treated with castor oil, opium, morphia, gentle manipulations and kneading, warm injections thrown high up; but all was useless, and he sank seven days after. A *post-mortem* examination revealed an intussusception of the ileum into the cæcum, and above that point, for 4 inches or so; the intestine was completely twisted; the part intussuscepted was gangrenous.

**Diarrhœa.** There was nothing in the cases of diarrhœa calling for special notice. They were all simple cases depending upon improper food, weak digestion, or climatic changes.

**Fistula in ano.** This case was brought in from Sádra in a very bad state. He had been operated on in an incomplete way, and the operation had to be again performed. He was naturally weak, and after some time, under good diet and tonics, recovered.

Not one case of hepatitis was treated.

**Jaundice.** One fatal case of jaundice occurred; the man had starved himself for some time, and was in a very weak state of health.

**Splenitis.** Two of these were very aggravated cases, returned from leave, and subsequently invalided.

**Guinea-worm.** Five cases occurred. One man had the remarkable number of 15 taken away.

**Eczema.** The case of eczema is in a long-service man of bad constitution and scorbutic. The disease has attacked the right leg, and is getting better under blistering.

**Ulcers.** One man, an old syphilitic and scorbutic case, was treated for an obstinate ulcer near the external malleolus. Everything was tried: opium in large doses, mercurial vapour bath, red precipitate ointment; but he had to be invalided. There was a curious case of ulcer behind both hips (almost symmetrical) in a syphilitic subject; he came back from sick leave with sinuses on both sides, which were freely opened; but his constitution was broken, and it was necessary to invalid him.

**Contusions.** Of the 47 cases entered as contusion, 41 were of the lower extremity, and as usual were due to badly-fitting shoes.

**Mortality according to race.** 16. Mortality according to race was as follows:—1 Mus-sulman and 10 Hindus.

**Epidemics.** 17. The only epidemic during the year was cholera.

**Vaccination and re-vaccination.** 18. The total number of primary vaccinations was 63, and of re-vaccinations 239. The quality of lymph was good, and vaccination was performed thirty times during the year.

**General health and physique of the men.** 19. The men, as a rule, are scorbutic, and a large number of them have also the syphilitic taint. The previous history of the regiment shows that there have been causes at work to deteriorate their health: for example they were at Aden for three years, and there got saturated with the scorbutic taint; thence they went to Belgaum, where line-building seems to have neutralized the benefit that good climate might otherwise have effected; their next station was Poona, where they had heavy duties in furnishing guards; and at their present station I do not consider they are fortunate in the climate. Although a very large number—71—were taken before the invaliding committee, of whom 62 were invalided, still the regiment requires further weeding, to a great extent, to make it, in my opinion, an average regiment as regards its effectiveness, and ability to undergo a campaign, for example. It has frequently been remarked to me by the officer commanding that on parade a large number of men fall out; and if they are kneeling to fire, recover themselves with great difficulty, and the poorness of their physique has been often commented on.



20. Looking at the previous history of this regiment, and the present condition of the men, I do not think a prolonged residence in this climate advisable. The regiment is largely tainted with scurvy. That they are not a healthy-looking corps, has been a subject of frequent comment on the part of those qualified to give an opinion. I have noticed, too, that severe cases either sink rapidly, or, if they rally, convalesce very slowly.

*Resumé of the whole.*  
The lines are spacious, and well laid out, and with huts better than at most places, but still the site is old. Malarious fever has prevailed to a great extent among the men, and cholera, which appears to be an annual scourge, carried off 2 men in the regiment (and 7 persons in the wing). It may, therefore, be worth considering whether the present site is not unhealthy, and a new one desirable.

I have made many sanitary suggestions during the year; amongst others to raise the floors of the huts, to improve surface drainage, to search for and fill up old cess-pools—one having been found under a bathing stone near a hut in which cholera occurred, &c., some of which have been acted on, and others probably will be in time.

The cultivation of a vegetable garden, I think, would be advantageous.

Clothing, in my opinion, requires modification in almost every particular to render the men more efficient, if sent on service.

The duties seem to me almost too heavy for the strength of the troops located here; the men who furnish the city guards have to march three miles, and several have come into hospital from this duty.

Although the hospital is well situated and is a good substantial building, still it is not sufficiently roomy for the sick of the regiment and wing; therefore, the sooner the other Native hospital now appropriated for the use of Europeans is given back, the better, as overcrowding occurred during the year. I hope, also, that a building, a little distance off, for infectious cases and a female ward may be sanctioned.

The sickness, as in past years, has been raised by cholera, and there have been many cases of malarious fever and malarious ophthalmia.

Invaliding was heavy; 62, out of 71 taken before the invaliding committee, having been pronounced unfit. It was necessary to weed the troops; but, I regret to say, another large batch remains to be got rid of.

When small-pox was raging at Bombay I re-vaccinated the whole regiment—officers, men, and families; and I am happy to state that, although the disease reached this place, only 3 cases occurred in the lines, and they recovered.

Instruction. 21. Has been regularly given to the pupils, and the medical subordinates have taken an interest in my daily remarks on disease and its treatment.

In conclusion, I beg to state that 3rd class hospital assistant Gopal Rao Sinday has done his duties satisfactorily, and takes every opportunity of improving himself.

#### REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

This regiment, which has just completed a year in Guzerat, has not had more than an ordinary proportion of hospital admissions, but mortality has been relatively high (cholera, however, contributing), and invaliding far in excess of average, consequent on numbers of the men being prematurely broken down from the effects of scurvy, ascribed chiefly to former residence at Aden. Lines and remediable health surroundings all satisfactory. Hospital accommodation proved inadequate in autumn, when tents were required, owing to the sick of the 13th Regiment Native Infantry occupying one of its two wards, the hospital of that corps being in temporary possession by the Royal Artillery. Vaccination was exhaustively carried out, both among men and families. The jail guard-room, complained of at paragraph 10 of the report, is a recent adoption; its ventilation will, as far as practicable, be remedied immediately. As respects the large number of 61 invalids, it may be remarked that on the assumption of a Native soldier's service being on a mean equal to 20 years, which at present is, perhaps, rather above than below the fact, I find, on referring to the records of lapses in the corps by invaliding, death, discharge, and desertion during the previous eight years, that the number under the first of these heads has been materially below average, and that the excess now referred to only restores an ordinary mean on the above premise.



## H. M.'s Left Wing, 13th Regiment N. I.

AHMEDABAD.—In medical charge of Surgeon-Major G. YEATES HUNTER ; strength 291·2

- Location and movements of corps. 1. The left wing of the 13th Regiment was located at the camp at Ahmedabad during the entire year.
- Detachments. 2. A detachment was stationed at Sádra, 24 miles distant, every 2 months, alternately, with the detachment of the 1st Grenadier Regiment N. I.
- Duties and their effect on health. 3. The duty is not so light here as in Málegaon. The marching of guards to and from the city, 3 miles off, seemed to account for some cases of admission into hospital.
- Exercise, amusement, and occupation. 4. The Punjabis and Hindoostanis, as a rule, practise gymnastics ; a few Konkans also do so. The chief amusement and exercise are wrestling and gymnastics.
- Marches. 5. Marches none, except to relieve detachment at Sádra, and a few escorts to Mysána and Baroda.
- Hospital and its surroundings. 6. The hospital is situated on the north-east of the camp, and is at some little distance from the lines of the wing. A small ward of the 1st Grenadier regimental hospital has been lent for the accommodation of the sick of the wing. The cubic capacity of the small ward allotted to the wing is 13,244 feet, and, by placing the beds between the windows, 12 can be accommodated with comfort.
- Overcrowding. There was not much overcrowding, except once or twice, when ague was prevalent, and at pension time.
- Accommodation. Insufficient. A separate building for contagious and infectious cases and a female ward are great wants.
- Sickness, mortality, and invaliding. 7. The total number of cases treated in hospital was 438 ; the total number discharged was 407 to duty and 22 otherwise. The total number of deaths was 3 in hospital, 13 men were sent away on sick leave, 30 were invalided, and 1 was discharged the service by court-martial. The average daily sick was 1·25, the percentage of treated to strength 150·38, the percentage of death to strength 1·03, the percentage of death to treated 0·68, the percentage of daily average of sick to strength 41·2. Ague of a mild kind was the principal cause of admission into hospital : 166 cases were treated in all ; the disease, as a rule, readily yielded to 10-grain doses of quinine internally in the more severe cases, and 2-grain, subcutaneously injected, in the milder.
- Remittent fever. Three cases were admitted into hospital during the year ; all recovered, treated with large doses of quinine and stimulants.
- Malignant cholera. Cholera broke out in the wing in the month of June 1876. Thirteen cases of cholera were admitted into hospital, of which 4 were privates, 5 females, 4 children. Out of the total number 7 died ; 1 private, 3 females, 3 children. The patients were isolated, and all needful sanitary arrangements were made ; but so serious was the outbreak considered, that on July 1st the company in which the cases occurred was moved into camp to leeward of the station, and on a well-selected site. I suggested that large fires should be lighted between the lines and camp ; and as all the cases had taken place on one side of a line of Native huts, I suggested it should be destroyed, or, at all events, no longer occupied. In this line the commanding officer, with whom I was at that time, discovered a large stinking hole under the stone used for knocking washed clothes on, in front of one of the huts, which may have been used as a cess-pool ; orders were at once issued to search for any others there might be with a view to checking such an unsanitary practice. It was found necessary on 1st September to move part of the company into camp ; the men, however, were brought in again after a few days, and no more cases occurred.
- Choleraic diarrhoea. In the month of May, 6 cases of choleraic diarrhoea occurred, one of which ended fatally ; this case was broken down in constitution by bad habits, smoking ganjá, eating opium, and drinking liquor ; 2 other cases subsequently occurred and recovered, making 8 cases as the total.
- Chronic rheumatism. Forty-two cases of chronic rheumatism in long-service men, of weakly condition, were treated, of which 7 were invalided and 3 were sent away on sick leave.
- Lumbago. Twelve cases of lumbago were treated.



- Syphilis. Seven cases of primary syphilis occurred, which were successfully treated by mercurial vapour baths.
- Scurvy. One case of scurvy was admitted, and was sent away on sick leave.
- Phthisis pulmonalis. Three cases occurred; 1 proved fatal; he was much emaciated, and had been ailing for the last three years; 2 were sent away on sick leave.
- Neuralgia. Seven cases were treated, of which 1 was invalided; he had frequently suffered from neuralgic pain, having been more or less under treatment for the last eight years. His father and brother died from the same disease. He was treated with hydrate of chloral, chloroform, poppy seeds, oleum cinnamomi, potassæ bromide, but with no marked benefit; and as his health was completely undermined by the attacks, he was invalided.
- Conjunctivitis. Fourteen cases, treated with lead, opium, collyria, and quinine
- Bronchitis. Seventy-eight cases of bronchitis in long-service men of bad constitution were treated. Indeed after ague this disease was the most frequent cause of admission. Thirteen were invalided, and 5 were sent away on sick leave.
- Asthma. One case was admitted with functional disorder, and sent away on sick leave.
- Dysentery. Nineteen cases were treated, some of these showing very acute symptoms; but large doses of ipecacuanha controlled the disease, and all recovered. One case of tedious convalescence was sent away on sick leave.
- Diarrhœa. There was nothing particular in the cases of diarrhœa; they were all mild, depending upon improper food, weak digestion, or changes of climate.
- Hepatitis. Only one case of hepatitis was treated during the year; it was chronic. His health was broken down by syphilis and scurvy. He was treated with ammonia hydrochloras, taraxaci, nitro-muriatic acid, and stimulants internally; externally turpentine stupes and counter-irritants.
- Ulcer. One obstinate sloughing ulcer in the sole of the left foot was treated with opium and recovered.
- Principal causes of mortality. 8. Malignant cholera 1, choleraic diarrhœa 1, phthisis pulmonalis 1.
- Mortality according to ratio. 9. Mortality according to ratio was as follows: Hindus 2, Mussulman 1.
- Epidemics. 10. Cholera was the epidemic from June to September.
- Vaccination. 11. The total number of primary vaccination was 52 and re-vaccination 335. Lymph was good during the year. Vaccination was performed twenty-five times in the whole year.
- General health and physique of men. 12. The health of the sepoy of the wing has been good; indeed, take them altogether, they are a healthy body of men, are well set up, and there are a good many athletics among them who go in thoroughly for gymnastic exercises.
13. The men of the wing are, as a rule, a healthy body; with the exception of cholera there has been little serious sickness during the year. With reference to cholera I can only repeat what I have said in the case of the 1st Grenadier Regiment N. I., that the lines are spacious and well laid out, and with huts better than at most places, but still they are old. Malarious fever has prevailed to a great extent among the men, and cholera, which appears to be an annual scourge, carried off 9 persons. It may, therefore, be worth considering whether the present site is not unhealthy, and a new one desirable. The duties seem to me almost too heavy for the strength of the troops located here: the men who furnish the city guards have to march 3 miles, and several have come into hospital from this duty. Although the hospital is well situated, and is a good substantial building, still it is not sufficiently roomy; therefore, the sooner the other Native hospital, now appropriated for the use of Europeans, is given back, the better,
- Resumé of the whole.



as overcrowding occurred during the year. I hope, also, that a building, a little distance off, for infectious cases and a female ward may be sanctioned. Invaliding was heavy, 30 out of 33 taken before the invaliding committee having been pronounced unfit.

When small-pox was raging at Bombay I re-vaccinated the whole regiment and wing. I am happy to state that, although the disease reached this place, only 3 cases occurred in the lines, and they recovered.

I wish to express my entire approval of the very satisfactory manner in which 3rd class hospital assistant Shaik Ameen has performed his duties during the year. During cholera, and when much sickness was prevalent, he was untiring in his exertions.

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REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

Health, as tested by treated, was only indifferent, admissions showing considerably in excess of average. But there was little serious sickness, except the occurrence of cholera in June. Bronchitis, however, and rheumatism figure unduly in the returns. Mortality moderate. Surroundings fairly good, unless that the sanitary condition of the huts, particularly the lines in which cholera happened, proved unsatisfactory. They have adequate cubage, are comparatively modern, and had previously been healthy. But they are altogether exceptional in possessing ridge-ventilation, and the frequency of the latter-named ailments would suggest that this may possibly, under certain conditions, be in excess of requirements. Sick accommodation throughout restricted, and occasionally straitened, as referred to in the report; but the new hospital, Royal Artillery, will now soon be ready, and that of the corps made again available. Re-vaccination was exhaustively carried out among the men, and vaccination in the families.

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H. M.'s 1st Squadron, 1st Lancers.

BARODA.—In medical charge of Surgeon-Major H. A. LEWIS, M.D.; strength 144·8.

Location and movements of corps.	1. The squadron has been stationed in Baroda during the past year.
Conservancy and sanitary arrangements.	2. The latrines belonging to the 22nd Regimental hospital are used. The sanitary arrangements in the lines are properly conducted.
Water-supply.	3. The water-supply is obtained from the Native Infantry wells.
Sickness, mortality, and invaliding.	4. There were 205 admissions from all causes; 95 of the number were from fevers, chiefly ague; 26 from contusions, 17 from chronic rheumatism, and 21 from conjunctivitis. There were no deaths. Six men were invalided.
Vaccination and re-vaccination.	5. Fifteen children were vaccinated in the lines and 13 were re-vaccinated.
General health and physique of the men.	6. The health of the men is fair, and their physique good.
Resumé of the whole.	7. The year, on the whole, has been favourable to the men in the squadron, there having been less sickness as compared with last year.

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REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

The men continue to occupy a part of the Native Infantry lines. The accommodation is old and very indifferent, cubage of each hut but 650 feet, and drainage defective, the ground being nearly a dead flat. Sick are accommodated in the hospital 22nd Regiment N. I., a building objectionable in site and surroundings, and deficient in out-offices. But present arrangements are not likely to prove protracted. There was sufficient room, unless in autumn, when the verandahs were occasionally occupied. Service and equipment satisfactory. Health, as tested by treated, although better than in previous year, still compares unfavourably with that of the infantry; but admissions from injuries go far to account for the difference. Here, as in the 22nd, ophthalmia, chiefly of malarious origin, was relatively very prominent in the rains. Vaccination was efficiently conducted.



## H. M.'s 9th Regiment N. I.

BARODA.—In medical charge of Surgeon H. P. ROBERTS; strength 662.

- Location and movements of the corps. 1. The regiment has been stationed at Baroda during the year.
- Detachment. 2. A bi-weekly detachment of 50 men furnish a guard in the city.
- Hospital and its surroundings. 3. At the beginning of the year a bath-room was constructed, and fitted with tub, gurrals, &c.
- Overcrowding. There has been no over-crowding.
- Accommodation and defects. The quarters for the Native medical pupil and 2nd class hospital establishment are deficient.
- Sickness, mortality, and invaliding. 4. The total admissions have been 452, deaths in hospital 2; out of hospital 3; 36 men were invalided, and 2 were discharged by courtmartial.
- Principal causes of sickness. 5. The principal causes of sickness were—ague 220, bronchitis 40, contusion 36, chronic rheumatism 23, conjunctivitis 23, dysentery 12, and boil 12.
- The deaths in hospital were from phthisis pulmonalis 2; out of hospital, 1 from ague, 1 from drowning, and 1 from phthisis pulmonalis.
- Mortality according to race. 6. In hospital, Hindus 2; out of hospital, Hindus 2, Christian 1.
- Epidemics. 7. No epidemics.
8. Vaccination has been performed partly by myself and partly by the public vaccinator (in the city of Baroda): 53 children were vaccinated, and during the epidemic during the hot months of the year in Bombay and elsewhere the whole regiment was paraded for examination, and those who exhibited no scars of former vaccination were vaccinated; 87 men were protected in this way.
- General health and physique of the men. 9. The physique of the men is about the average; but the last five years in Guzerat seems to have tested their health considerably.

10. The following observations were made on 130 admissions for intermittent fever commencing on the 1st June up to the 31st December. The treatments were principally of five kinds:—1st, by moderate doses of quinine; 2nd, by carbolic acid internally; 3rd, by eucalyptus globulus; 4th, by cold baths; and, 5th, by the expectant method. Of the third and fourth methods a sufficient number of cases have not already been treated to warrant any expression of opinion. To render the results as equal as possible, such circumstances as might have affected the subjects under treatment one way or another, viz., the temperature of the atmosphere, and diet, were noted, and apparently had no appreciable effect either on rendering the medicines administered more or less effective. The temperature of the climate during the months of these observations gave the respective averages:—

Months.	Temperature.	Admissions.	Rain.	
			Inches.	Cents.
June ... ..	89°	21	2	91
July ... ..	83°	27	14	14
August ... ..	81°	30	14	75
September ... ..	79°	65	10	43
October ... ..	81°	95	...	...
November ... ..	76°	68	...	...
December ... ..	71°	44	...	...

The number of admissions only appear to bear out the usual observations of malaria being more prevalent as moisture is extracted by great heat from the soil. The diets of the patients were weighed before being cooked, amongst those whose caste would allow this; amongst the others the amounts had to be estimated by the eye and former experience. Amongst the Europeans the diet was according to the hospital scale. In all cases amongst Natives the amount of food consumed was much lower than the average amount allowed for a man at rest and in health (Parkes). In the cases of the largest eaters the food alone did not seem to benefit them, as in some cases the largest diet on one day was followed by the highest temperature on the succeeding day. The average diet taken from 10 cases at hap-



hazard, and extending over 40 days, gave only from 80 to 90 grains of nitrogen, and 2,050 grains of carbon as the amount consumed daily. The largest diets were composed of

1.—Rice ... 11 ounces.	2.—Bread. ... 10 ounces.
Bread ... 10 "	Rice ... 10 "
Dhall ... 4 "	Dhall ... 4 "
Ghee ... 2 "	Mutton ... 2 "
	Ghee ... 1 "
—	—
Total solid... 27 "	72 "
	—

These would represent about 145 to 162 grains of nitrogen, and 4,200 to 4,147 grains of carbon, respectively. The lowest diet consisted only of, perhaps, 4 ounces of rice, or 8 ounces of milk. Some latitude must necessarily be allowed in calculating the diets, as the actual weightings of the food could in some cases only be guessed. But the whole question of diets and temperature was a relative one. The first 75 cases admitted after the beginning of June gave these results :—

	A.	B.	C.	D.
	Previous days of fever.	Average temperature on admission.	Treatment.	Number of subsequent attacks.
13 cases (Europeans) ...	?	Normal.	Quinine 10—15 grains daily.	None.
3 cases (Natives) ...	?	104°	8 grains quinine daily.	None.
14 cases ,, ...	2	102°	None.	1—2
5 cases ,, ...	?	101·8	None.	{ in 3 cases, 4 ;
18 ,, { Natives and } { Europeans } ...	?	101·1	15 grains quinine daily.	{ in 2, 5 times.
22 ,, Natives ...	2·4	101·2	None.	{ 3—4 None.

Column A, to be more precise, might be passed over, this allowance being made for incorrect statements by patients themselves.

Column B, however, renders it evident that (except in the 13 cases of Europeans) there was a decided state of pyrexia when application for admission was made.

In these cases the expectant treatment seems most favourable, for not only did the 22 cases require no treatment, but the 18 who were treated with quinine had in no one case less than 3 fever days afterwards. Balancing against this might be shown the 13 cases of Europeans who had no subsequent fever, but here there was, at any rate, some doubt possibly as to their statements. The cases favourable to quinine were 3 amongst natives, and negatively, also, the 14 cases which had no quinine, and had a return of fever.

I think there can be no question that, as prescribed by Professor Maclean, quinine, to be valuable, must be given in large doses. The hypodermic method is far better ; but this method I did not feel justified in pursuing in the regiment, owing to fatal results apparently following the use of the syringe, which occurred last year (*vide Lancet*, July 1st, 1876). There is also this to be said, that were I to have given large doses to all admissions for intermittent fever, as recommended, 30 grains to be taken between the attacks, I should have used more than 2 lbs. weight of quinine since the 1st June. It is, therefore, advisable to see if the attacks of intermittent fever are amenable to a less expensive treatment. This is, of course, a secondary consideration, but still a useful one.

The next 50 cases were treated with carbolic acid : internally 12 grains were dissolved in 1 drachm of glycerine, the dose being 15 minims 3 times a day.

	Average temperature on admission.	Treatment.	Subsequent attacks (average).
11 cases (Natives) ...	101· (nearly)	Carbolic acid, grains iii, three times a day.	None.
21 ,, ,, ...	101·5	Do.	1
12 ,, ,, ...	102·2	Do.	2
6 ,, ,, ...	101·4	Do.	5



These results are not so satisfactory; an antiseptic remedy does not appear to nullify the malarial poison. In the *Practitioner* for June 1873, carbolic acid was spoken of (page 394) as being successful in 3 to 7-grain doses; also  $\frac{1}{4}$  minim injected hypodermically; but the above cases do not seem specially favourable. I have noticed, too, that several of these cases were re-admitted after the interval of from a fortnight to three weeks. The number of cases treated with *Eucalyptus globulus* have only been five. No. 1, quartan ague: 2 previous attacks, tinct. eucalypt. glob. 1 teaspoonful three times a day; no return. No. 2, quotidian: admission temperature, 104.2; same treatment, no return. No. 3, quotidian: admission temperature 97.2; first day 1 teaspoonful, afterwards 2 teaspoonfuls three times a day; fever recurred three times; then 20 grains quinine for three successive days; the fever recurred twice, and then did not return. No. 4, quotidian: admission temperature 97.1. The treatment as above for three days, during which the attacks recurred; afterwards quinine for three days in 20, 15, and 20-grain doses, respectively; fever did not return after first dose of quinine. No. 5, quotidian: admission temperature 97.3. *Eucalyptus globulus* as above for nine days; the attacks recurred every day; on the tenth 20 grains quinine were given; no recurrence of fever. The cold baths were used in 2 cases of a more remittent than intermittent type, and owing to strong objection on the part of the patients they were not continued. The temperature of the baths could not be altered conveniently to the degree required as in cold climates: thus 85° to 81° here the coldest that they could be made; the patients were immersed at a temperature of from 98° to 100°, and then the baths cooled as low as possible. The temperature ran down at once from well-marked pyrexia (104—105) to a little above normal 100°, and where there had been sleeplessness before the patients sank into a doze so that the relief temporarily was great. High temperatures succeeded certainly, but then the treatment was not to be persevered in.

*Resumé of the whole.*

11. Everything satisfactory as regards the hospital and regiment. Latterly, however, the men appear to be feeling the effect of six years' service in Guzerat.

12. One medical pupil was attached until October last, when he was sent to Grant Medical College. He learnt the names and doses of most of the medicines, and was supplied with minor books on bandaging and materia medica.

Instruction to native medical pupil.

REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

This regiment, which has completed five years in Guzerat, was the healthiest in the circle; the percentage of admissions to strength was only 68.28, and the mortality as low as, 43. Unless in some increase in admissions from ague, there is nothing in the sick returns to indicate that climate and residence are beginning to tell on the men, as suggested in the report. The lines are of a temporary kind, of wood and split-bamboo construction, very suitable, having excellent ventilation. Water-supply fair and sufficient; but drainage inadequate in heavy rains from want of natural surface slope; trench latrines. Hospital, inspected 22nd December, has suitable and sufficient accommodation, and its equipment is satisfactory. A bath-room has been recently added, but the out-offices are still incomplete. Vaccination and re-vaccination were carefully attended to and systematically carried out.

H. M.'s 22nd Regiment N. I.

BARODA.—In medical charge of Surgeon-Major H. A. LEWIS; strength, 647.

- Location and movement of corps. 1. The regiment has been stationed in Baroda during the past year.
2. There have been no alterations in the lines since the last report. In some of the huts the ground was found moist and damp at the depth of less than one foot. The ventilation throughout the lines is very defective. To improve it, the branches of the numerous trees (whose foliage almost conceal the men's huts) have been lopped off to the extent of ten feet from the ground.
3. The trench system is still adopted. The trenches are to the north-east of the lines, and distant less than 150 yards from the nearest well, which supplies drinking water. The drains in the lines are kept in a sanitary condition.
- Conservancy and sanitary arrangements.



4. The water-supply is from wells. It is of fair quality and sufficient in quantity, except during the hot months, when some of the wells fail in the supply.
- Water-supply.
5. The meat is indifferent in quality. Country vegetables have been abundant and cheap this year.
- Food.
6. The duties have not been heavy. The average number of nights in bed  $6\frac{3}{4}$ .
- Duties and their effect on health.
7. The men are exercised at athletic sports. There is a "talimkhana" attached to the lines. Some of the sepoy are occupied in carpentering, shoe-making, and tailoring.
- Exercise, amusement, and occupation.
8. The lock-up rooms and cells are kept clean and well ventilated.
- Lock-up rooms and cells.
9. There were no marches during the year.
- Marches.
10. There is no over-crowding in the hospital, except after the rains, when the increased number of sick were obliged to be accommodated in the two verandahs.
- Over-crowding.
- A bath-room, dead-house, and a contagious ward are required.
- Accommodation and defects.
- The latrines, which are distant 112 yards from the hospital, are kept clean and in good order. The iron pans in use are emptied twice daily, and their contents are carried away to some distance from camp.
- Conservancy.
11. The following tabular statement shows the number of admissions to hospital, deaths, and the average strength during the past two years :—
- Sickness, mortality, and invaliding.

Years.	Average strength.	Deaths.	Average daily sick per cent. to daily average strength.	Admissions.
1875 ... ..	639	6	4.1	739
1876 ... ..	647	6	3.4	634

Twenty men were invalided during the year, 6 were discharged by court-martial, 1 was discharged at his own request, and 1 for desertion.

12. There were 246 cases of fever treated during the year; of this number there were from eruptive fever 13, simple continued fever 52, malarious 199; total 264.
- Principal causes of sickness.
13. Of the 6 deaths, 2 were from remittent fever, 1 from phthisis, 1 from peritonitis, and 2 from rheumatism. Of these 2 cases, 1 was that of a sepoy, who had been under treatment at different times for syphilitic rheumatism; in the second case death was sudden. At the *post-mortem* examination the heart was found enlarged and fatty.
- Principal cause of mortality.
- Mortality according to race. 14. Mahrattas 3, Purwaree 1, Mochees 2.
- Influence of rainfall. 15. 44 inches and 66 cents of rain were gauged during the year. The fall does not seem to have influenced either the sickness or mortality.
- Epidemics. 16. None.
- Vaccination and re-vaccination. 17. There were 71 children vaccinated with success; in the lines 61 sepoy were re-vaccinated.
- General health and physique of the men. 18. The general health and physique of the majority of the men is good.



- Resumé of the whole.* 19. On the whole there has been less sickness than last year, but with new lines for the men the number of admissions to hospital would decrease.
- Education of medical pupil.* 20. The native medical pupil who has lately joined the regiment is making satisfactory progress. He is daily instructed in materia medica and dispensing.

REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

Health was better than in previous year, and ague less notable than ordinary. Syphilis also shows a large decrease. Unless in autumn there was no pressure on hospital accommodation. Lines old, defective, and in poor repair: too much overshadowed by trees for due perflation. This, it appears by the medical officer's report, has since been remedied. Trench latrines in use, but objectionably near to hospital, and apt to prove a nuisance when winds are northerly. Hospital site bad—just within cantonment limits, and only some 24 paces from a native village, in which numbers of cattle are kept. The building is also defective in the want of adequate and requisite out-offices. Existing arrangements are, however, understood to be merely provisional; and probably the necessity for occupying the present accommodation will cease some two years hence.

H. M.'s Squadron 2nd Regiment Light Cavalry.

RA'JKOT.—In medical charge of Surgeon-Major H. R. McDougall, M.D.; strength, 145.

1. *Location and movements of corps.* The 1st Squadron was stationed at Rájkot from the 1st January to the 15th November, when it marched for Deesa, having been relieved by the 3rd Squadron. The 2nd Squadron, which had been relieved by the 1st Squadron on the 1st January 1876, remained here until the 17th January, when it marched for Deesa.
2. *Detachments.* No detachments have been furnished during the year.
3. *Lines.* No change has been made in the lines since last report. There has been no overcrowding; the huts were thoroughly cleaned and purified on the occurrence of some cases of cholera in April, when the corps was marched out into camp.
4. *Conservancy, sanitary arrangement, latrines.* The conservancy is still carried out as in former years. The latrines (pucka built) are considered to be too far from the lines, and there is a difficulty about keeping them as clean as desirable, owing to the one filth cart of the station being unable to perform all the work allotted to it. The conservancy of the lines themselves appears to be well attended to.
5. *Water-supply.* Water for drinking is obtained solely from wells, which contain a pure supply of good water at present, but it is beginning to fail, and, owing to a deficient rainfall, is likely to prove a source of anxiety before next monsoon: water for ablution can be procured from the river about  $\frac{1}{4}$  a mile distant, and, if necessary, the horses can also be watered there. The wells are protected from all source of contamination except such as are common to all uncovered wells.
6. *Food, quality of, and whether abundant and cheap.* Food is abundant but dear: prices have risen of late owing to a large exportation to famine districts. Vegetables are very scarce and dear, apparently at all times.
7. *Clothing.* No change has been made in the clothing during the past year.
8. *Duties and their effects on health.* The duties of the men are light, and have not apparently had any ill effect on their health.
9. *Exercise, amusement, and occupation.* The men have no particular occupation or amusement for their leisure hours.
10. *Lock-up rooms and cells.* There is one lock-up room attached to the quarter-guard; its superficial area being 64 square feet and cubic capacity 720 feet.



11. The 2nd Squadron marched for Deesa on the 17th January, having been relieved by the 1st Squadron; the 3rd Squadron arrived from Deesa on the 13th November and relieved the 1st Squadron, which marched for Deesa on the 15th November.

12. The hospital, which also accommodates No. 1 Mountain Battery and a Wing of the 7th Regiment N. I., together with the Staff, is a comfortable airy building on a good open site; no alterations have been made in it during the year.

The accommodation for the hospital assistant is of an inferior description, and that for the 2nd class servants is merely an open pendal. The hospital latrine should be removed from its present site; the walls of the building and the ground are impregnated with impurities, and it is in close proximity to the well, which, as it usually contains a fair supply of good water, is much frequented by those living near it.

A station dead-house has been erected during the year near the hospital.

Conservancy. The conservancy is as well attended to as possible. More frequent visits of the night-soil cart would be desirable.

Hospital water-supply. The water-supply is obtained from a well close by; the supply is fair at present, and the quality good; as has been already mentioned, it is exposed to the danger of contamination from the proximity of the hospital latrine.

13. During the past year the average strength of the squadron was 145, the admissions were 98, giving, with 3 remaining from the previous year, a total treated of 101: of whom 1 died, 91 were discharged to duty, 4 were otherwise discharged, 2 were transferred to other hospitals, and 3 remained under treatment at the end of the year. Of the 4 otherwise discharged, 1 obtained sick leave, 1 was entered under another heading, 2 were sent before the invaliding committee; the 2 transferred to other hospitals belonged to the 2nd Squadron, and marched with it to Deesa.

The daily average number of sick	was 3·97
Percentage of treated to strength	... 69·65
Deaths to strength	... .. 69
Deaths to treated	... .. 99

showing a decrease in the percentage of treated to strength of 15·28 as compared with last year. One death occurred in the month of February from pneumonia; the man, an emaciated subject, was admitted with rheumatism with cardiac complications; pneumonia supervened and carried him off. Febricula gave 2 admissions, and ague 30, against 26 of the former and 16 of the latter in 1875—a discrepancy probably due to record of the disease by different observers. Cholera gave 1 admission, terminating in recovery. Rheumatism gave 7 admissions against 6 last year, and lumbago 4 against 2. Scurvy gave 2 admissions, there having been none last year. Disease of the lungs gave 2 admissions with 1 death against 1 admission last year. Dysentery gave 6 admissions only against 18 last year: 3 of these took place in September. Diarrhœa gave 3 admissions against 6. Hepatitis gave 1 admission, the same as last year. Gonorrhœa gave 5 admissions—an increase of 4 over last year. Guinea-worm gave 1 admission, the same as last year. Contusions and sprains gave 17 admissions against 20 last year. Five men were sent before the invaliding committee; 2 were hospital cases; 4 of them were pensioned, and 1 was remanded to head-quarters. One man was sent on sick leave for debility.

Principal causes of sickness. 14. Fever caused the greatest number of admissions; it was probably due to local causes.

Mortality according to race. 15. One death only occurred; the man was a Hindustan Hindu.

16. Cholera broke out in the Cavalry Lines on the 27th April, two days after its first appearance in the town; 1 male follower, 3 women, and 2 children were attacked in that month; of whom the man, 2 women, and a child died. In the month of May a sowar was attacked and recovered.

Vaccination and re-vaccination. 17. Seven persons were primarily vaccinated: all were successful. There were no re-vaccinations.

General health and physique of the men. 18. The general health of the men has been good, and their physique is of a normal standard.



19. The 1st Squadron was relieved by the 3rd Squadron in November. The whole squadron has been stationed at Rájkot during the year. The amount of sickness has been below that of last year. One case of cholera occurred amongst the fighting men, in May; the man recovered. Six cases with 4 deaths occurred amongst the followers. One death from pneumonia took place in hospital. The lines are in good order, and sanitation as well attended as was possible. The hospital accommodation has been ample.

*Resumé of the whole.*

#### REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

Sickness was very moderate, and materially less than in previous year. Cholera appeared in the lines at the close of April, and the squadron was promptly moved out of cantonments, remaining under canvas till May 6th. Only 1 sowar was attacked, but there were 4 deaths among followers. The huts were meanwhile thoroughly cleansed and purified. The lines are in good order, have much more than average room, and their sanitation is properly attended to. Among defects it is complained that there is some difficulty respecting the efficient conservancy of the permanent latrines which are in use, as referred to by the medical officer, and that the water-supply is apt to prove short in summer when the wells are mostly very low. Hospital has good and sufficient accommodation, which is shared by the sick of the head-quarters wing, 7th Regiment, N. I., No. 1 Mountain Battery, and Staff. The position of its latrine within some 20 paces of the well is unquestionably objectionable,—not, as I think, from suspicion of pollution by soakage, which the character of the ground seems to forbid, but rather from the possible risks of contamination by the absorption of foul gases. The difficulty, however, would be to find a suitable site for the latrine, the position of existing buildings regarded.

#### No. 1 Mountain Battery.

RA'JKOT.—In medical charge of Surgeon-Major H. R. MACDOUGALL;—strength, 120.

1. The battery has been stationary at Rájkot throughout the year.
2. No detachments have been furnished.
3. During the past year new lines on the standard plan have been completed for the battery; the dimensions were given in last year's report; the lines are clear, neat in appearance, and roomy; the drainage surface appears sufficient; there is no bazaar attached to the lines, and no villages or tank in the immediate vicinity.
4. The conservancy arrangements remain the same as in former years; the men use pukka-built latrines at a convenient distance from the lines. Some difficulty is experienced in removing accumulations, owing to there being only one station filth-cart.
5. The water-supply is fairly abundant at present, but shows symptoms of failing, and will probably do so before next monsoon, owing to a scanty rainfall. The wells have been deepened and cleaned during the year. The mules are taken to the river, about half a mile off, to be watered.
6. Food has been expensive, but less so than in the previous year; vegetables are at all times scarce, and at times hardly procurable. The amount of compensation was Rs. 1-14-0 against Rs. 2-1-0 in 1875.
7. The men were employed line-building for the first three months of the year; the ordinary battery duties are not severe, and do not affect the men's health injuriously.
8. The hospital, which is a roomy building on an open site, is common to the battery, the 3rd Squadron, 2nd Regiment Light Cavalry, 7th Regiment N. I., and Staff; it is in good repair, and the ventilation, which is by side doors and windows, is sufficient. It has been found sufficient for the wants of the battery, and there has been no over-crowding.



There is accommodation for six beds for the battery in the hospital, and the verandah could be utilized, if necessary; no improvements have been carried out in the building during the year. I have no recommendation to make regarding the building itself, but the latrine should be removed to a greater distance from the well, and the quarters for the hospital assistant might be improved, and better accommodation supplied for the 2nd class servants.

The conservancy is attended to as well as possible, but there is sometimes irregularity in the latrine accumulations being removed, in consequence of the amount of work required to be done by the one cart.

The water is obtained from a well close to the hospital; the water is good, and the supply, as a rule, sufficient; but the well is open to contamination from the proximity of the hospital latrine.

9. The return for the past year shows that, with an average strength of 120, there were 84 admissions, being the total treated during the year, there being none remaining from last year: of this number 1 died, 78 were discharged to duty, 2 were otherwise discharged, and 3 remained in hospital at the close of the year.

Sickness, mortality, and invaliding.

The average daily number of sick	...	...	...	3.0		
Percentage of	...	{	treated to strength	...	...	70.00
			deaths to strength	...	...	.83
			deaths to treated	...	...	1.19

showing a slight decrease as compared with 1875. Ague gave 24 admissions, against 32 last year. No cases are entered under febricula, for which there were 19 admissions last year. There was one case of remittent fever, which recovered. A case of cholera recovered. Rheumatic affections gave 11 cases, one of which was of gonorrhoeal origin, against 6 last year. Primary syphilis gave 3 cases; conjunctivitis gave 2 admissions against 4 last year. Diseases of the respiratory organs gave 2 admissions against 3 last year; dysentery gave 2 cases against 6 in 1875; contusions, sprains, &c., gave 17 admissions against 18 last year; none of them were severe.

10. One death took place in August from enteritis, caused by injuries received at gymnastics: the man died the day after his admission. A *post-mortem* showed the usual appearances of enteric inflammation, also an enormously enlarged spleen and liver. Of the two men entered as "discharged otherwise," one went on sick leave, the other was invalided. Three men were invalided; one of them was a hospital case.

Principal causes of sickness. 11. Ague, due to climatic causes, gave the chief number of admissions. Injuries, mostly of a slight nature, gave the next principal item.

Mortality according to race. 12. The man who died was a Marwaree Mussulman.

13. The rainfall, which was below the average, viz., 19 inches 45 cents, instead of about 26 inches, does not appear to have had any particular effect on the health of the men.

14. Cholera broke out in cantonments at the end of April, but did not make its appearance in the battery until the 9th of July; 1 man was attacked but recovered. Six cases occurred amongst the families and followers, viz., 1 man, 3 women, and 2 children, of whom 2 women died; the rest recovered.

Vaccination and re-vaccination. 15. Fourteen persons were primarily vaccinated successfully; 10 persons were re-vaccinated; 3 cases were successful, and 7 unsuccessful.

General health and physique of the men. 16. The general health of the men has been good.

#### REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

Health was good throughout; percentage of treated to strength only 70, as against 85.48 in previous year, the difference being due to fewer fevers (as in the 28th Regiment N.I. and Squadron), probably from small rainfall. One death only, the result of an accident. New lines on the standard plan have been completed, and are in all respects satisfactory; other conditions sanitarily favourable, excepting that the remarks made regarding conservancy and water-supply of the cavalry apply also to this charge. There was ample hospital accommodation, and vaccination was properly attended to.



### H. M.'s 7th Regiment N. I.

RAJKOT.—In medical charge of Surgeon W. A. BARREN ;—strength, 280.

1. The head-quarter wing of H. M.'s 7th Regiment N. I. has been at Rájkot for the past four years. On the 1st of November 1876 we left this station for Baroda, but having been recalled by telegram, we managed to return on the morning of the 7th. A detachment of 86 men proceeded to Burda Chokey on the 1st March 1876, but was recalled on the 17th October 1876, on account of the indifferent state of health of nearly every man of the detachment.

Detachment. 2. The left wing, with 2 European officers, has been at Tanna during the period under review.

Available space. 3. There is no available space in the lines, which have been built to accommodate two companies only.

Ventilation. 4. Ventilation imperfectly effected through the doorways and the roof.

5. The bazaar, consisting of two rows of houses, is situated in the immediate vicinity of and separates the 7th lines from those of the Cavalry. The residents include grain merchants, butchers, regimental followers, &c., and number about 100.

6. There are two latrines, 563 yards to the left front of the lines, one for males and the other for females. The former contains 19 and the latter 9 seats. The permanent latrines have been preferred to the trench latrine system, as there is no available ground near the lines. The rubbish collected from the lines and the latrine accumulations are buried in pits to the north of, and at some distance from, camp. No latrine pits for children are allowed in front of any of the huts occupied by sepoys and their families. There are bathing-places in the verandah of the huts. The bathing-water is conveyed away from the vicinity of the huts by "kutch-built surface drains."

7. Drinking water is obtained chiefly from the well, situated about 300 yards to the north of the 7th lines. The supply is ample, and each man is allowed to draw as much as he requires. The high and well-built surrounding walls, and the absence of drains from the immediate vicinity of the well, account for the excellent quality of the water.

Food. 8. Bájri is cheap and abundant. The mutton sold at the bazaar is rather inferior.

Duties and their effects on health. 9. The duties consist of parades and guards; several of the men, especially those who were on detachment duty at Burda Chokey, were not able to perform their duties efficiently.

Exercise, amusement, and occupation. 10. Music and singing are the chief amusements. There are a few men in the regiment who spend a portion of their time at the workshop.

Lock-up rooms and cells. 11. There are four rooms situated near the Commissariat Agent's Office, which are used by the several regiments when required.

12. The head-quarter wing of H. M.'s 7th Regiment N. I. left this station for Baroda on the 1st November 1876, but were recalled by telegram on the 4th of the month.

13. The average strength of the head-quarter wing, H. M.'s 7th Regiment N. I. from the 1st January to the 31st December 1876, was 280.

The number of admissions from all causes into hospital is 375, and the total treated 384.

Average daily sick	...	...	...	...	...	...	12.5
Percentage of	...	{	Treated to strength	...	...	...	137.14
			Deaths to strength	...	...	...	0.36
			Do. treated	...	...	...	0.26

The chief diseases during the year were ague, bowel complaints and lung diseases. During April, September, October, November and December, the admissions from ague numbered 15, 20, 43, 37 and 28, respectively. The 20 cases treated at the hospital in September took the disease at this station, and were well soon after admission. About 40 of the



43 entered in the register during October were Burda Chokey men, who returned to headquarters greatly debilitated by malaria. In several of these cases diagnosed as ague, scorbutic symptoms were apparent. There were 11 admissions in October and 9 in November, and 3 in December, of scurvy, chiefly from the Burda Chokey Detachment. The ipecacuanha treatment proved successful in every case of dysentery. As the medical officer in charge of the regiment for the greater portion of the year has not as yet supplied me with a report of the hospital-work carried on during his tenure of office, I cannot enter fully or to my satisfaction into the history, &c., of the diseases treated by him. Twenty-four men were invalided during the year, principally on account of old age and length of service; 1 was discharged with a gratuity, and 1 was dismissed by court-martial.

14. The chief causes of ague are exposure to wet, damp and malaria, which is supposed to exist especially at the end of the rainy season. Ague at Burda Chokey is said to be brought on by drinking well-waters, which, during and immediately after the rains, contain a peculiar brownish oily liquid. The cause of lung diseases and bowel complaints may be traced to the constant and sudden changes of temperature. Colic is frequently produced by the consumption of half-baked wheat and bájri cakes. The want of a sufficient supply of fresh meat and vegetables at Burda Chokey has helped to increase the number of scurvy cases.

Principal causes of mortality. 15. One death from compound fracture of the vault of the skull without depression, caused accidentally by a fall into a deep well.

Vaccination and re-vaccination. 16. There were 19 successful cases of vaccination. No cases were re-vaccinated during the year.

General health and physique of the men. 17. General health and physique of the men, No. 8 Company excepted, are good.

18. The Burda Chokey Detachment (No. 8 Company) consisting of 86 men, suffered severely during their stay at that very unhealthy station from fever and scurvy. Very few of these have regained their former stamina and fitness for work, their constitutions having been completely undermined by malaria and scurvy.

#### REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

The sick were materially in excess of average, ague and scorbutus figuring unduly mostly referrible to detachment duty at the very malarious post of Burda Chokey—a locality from which troops have now happily been withdrawn. Otherwise, the medical history was ordinary enough, and its chief incidents were a solitary admission from cholera, with only 1 casualty for the year, and *that* the result of accident. The huts are smaller than average, and are of the ordinary defective construction; but they have not been insanitary. Other conditions generally favourable to health with comparatively light duties. The sick have suitable accommodation, and there was sufficient room throughout; equipment and service all satisfactory, saving occasional delay in the daily visit of the conservancy cart. I saw at hospital a number of men debilitated and broken in health by the effects of ague and scurvy contracted at Burda Chokey, who were on the eve of leaving for Tanna to join the other wing in view to benefiting by change, the necessity for which in their case I fully realized.

#### H. M.'s 28th Regiment N. I.

RA'JKOT.—In medical charge of Surgeon-Major H. R. McDougall, M.D.;—strength, 508.

Location and movements of corps. 1. With the exception of a detachment, 83 strength, at Dwárka, the whole regiment has been stationed at Rájkot during the year.

2. A detachment, strength 83, was sent to Dwárka on 15th January 1876; another detachment, strength 85, was stationed at Burda Chokey from 1st January to 9th March 1876.

3. The lines appear in excellent order; the huts are clean, lofty, and well ventilated. Each of the eight rows of huts consist of four blocks, each of which contains 22 houses, 11 on each side; the space between the rows is ample; each side of these streets is planted with trees, to the roots of which waste



water is allowed to run. The native officers' houses are placed at each end of the rows of huts. Ventilation is by the doors, and probably to a considerable extent through the tiled roof; it appears sufficient. There is no regimental bazaar, and no villages in the vicinity of the lines. The town is nearly a mile distant. Drainage is natural surface drainage only; it appears to be sufficient. There are no tanks in the vicinity.

4. During the monsoon months, permanent pukka-built latrines are made use of. There is reported to be a difficulty about removing the accumulations, owing to a deficient station conservancy establishment. During the dry season, trench latrines, enclosed by mats, are made use of, and, though not in favour with the men, are found to succeed.

Conservancy and sanitary arrangements.

5. Water is obtained from three wells chiefly, two in front of the lines and one on the right flank; the quality is good, and the supply at present is abundant, but it is apt to fall short in the hot weather, after a scanty rainfall. A new well has been dug on the left flank of the lines, and is nearly ready for use. The wells are not exposed to any source of contamination, except from substances being blown or dropped into them.

Water-supply.

6. Articles of food are, as a rule, abundant and of good quality; but the prices generally run high. There is a great want of fresh vegetables, which are at all times scarce and expensive.

Food.

7. The duties of the men, consisting of ordinary guard and parades and a few escort parties, are light, and in no way injurious. The Dwárka detachment usually suffers in health, and gives a large proportion of admissions on its return.

Duties and their effect on health.

Exercise, amusement, and occupation.

8. There are no particular occupations or amusements.

Lock-up rooms and cells.

9. There are no cells; the lock-up room in the quarter-guard is spacious and airy.

Marches.

10. No marches were undertaken during the year, except by the detachments above noted.

11. The hospital is a roomy building, on an open site; it is in good repair. The accommodation for the hospital establishment is very defective; that for the hospital assistant is cramped. There is none for the apprentices, and the 2nd class servants have merely got an open shed. A station dead-house has been built at a short distance from the hospital. Ventilation is abundant; that afforded by the doors and windows has just been supplemented by nine iron ridge-ventilators. There has been no over-crowding during the year.

Hospital and its surroundings.

Accommodation and defects.

The hospital accommodates 30 beds. The floor, which is arthern, requires re-laying in places. Ridge-ventilators have been fitted during the year.

The latrine is old, and the ground somewhat soaked with sewage; but it is kept clean, and free from smell. There is occasionally some difficulty about getting the filth receptacles emptied, as the conservancy cart has more work to do than it can perform.

Conservancy.

Hospital water-supply.

Water is brought from one of the wells in front of the lines; it is of good quality.

12. During the past year, out of an average strength of 508, there were 514 admissions from all causes, giving, with 13 remaining at the end of the previous year, a total treated of 527. Of this number 7 died, 444 were discharged to duty, 63 were otherwise discharged, and 13 remained under treatment, at the close of the year.

Sickness, mortality, and invaliding.

The following table shows the comparative sickness during the three years the regiment has been stationed at Rájkot:—

Year.	Strength.	Admissions.	Average daily sick.	Treated to strength.	Deaths to strength.	Deaths to treated.
1874	475	623	15.2	134.9	.63	.46
1875	523	517	14.99	98.12	1.69	1.7
1876	508	514	17.79	103.74	1.38	1.33



Febricula and ague gave, respectively, 17 and 159 admissions, against 6 and 204 in the previous year; remittent fever gave 4 admissions, 2 of which terminated fatally, against 2 cases only in 1875. Cholera gave 3 admissions, with 2 deaths; there were no cases in the previous year. Rheumatic affections gave 64 admissions, against 53 in 1875. Syphilis shows an increase of 3 cases. Scurvy gave 29 cases, against 5 in the previous year. Conjunctivitis gave 11 admissions only, against 29 last year. Disease of the respiratory organs gave 48 admissions, of which 1 case of pneumonic phthisis terminated fatally, against 20 cases, of which 2 of pneumonic phthisis and 1 of pleurisy died, in the previous year. There were 29 admissions for dysentery, being 12 more than last year. Diarrhœa gave 3 cases less. Contusion gave 37 admissions—32 being of the lower extremity, against 59, of which 40 were of the lower extremity in 1875. The case of gunshot wound of the lower extremity was a slight one; a man received a few pellets of small shot in one of his legs during some gymkhana sports. Of the 7 deaths, 2 were from cholera; 1 took place in June in eight hours, the other in July after four days' illness; of the remaining 5, 1 took place in January from remittent fever, accompanied with severe head and lung complication. One occurred in July from congestive apoplexy; a second case of remittent fever died in August; a case of melancholia died in September, and one of pneumonic phthisis in the same month. Twenty-six men obtained sick leave during the year, 16 of them on account of scurvy. Thirty-four men were sent before the invaliding committee at Ahmedabad in November; of these 24 men received pension, 2 were discharged with gratuity, and 2 without, and 6 were remanded to the regiment. Nineteen out of the 34 were hospital cases; of these 4 were remanded. There were, therefore, 28 men invalided in November, and 1 native officer, by special committee, in August, or 29 during the year. One man was discharged by court-martial during the year, and 1 man deserted.

Principal causes of sickness. 13. The bad climates of Dwárka and Burda Chokey are reported to contribute largely to the sick return both by ague and scurvy.

Principal causes of mortality. 14. Cholera caused 2 deaths; 2 more were due to remittent fever; a fifth was caused by apoplexy; a sixth by phthisis; all these terminated within a short period 1 to 5 days after admission, and may be put down to local causes. The sixth death was from melancholia, after an illness of more than seven months.

Mortality according to race. 15. Of the 7 men who died, 6 were Hindus from the Konkan; the seventh was a Hindustani Mussulman.

Influence of rainfall. 16. The rainfall, which was 19 inches 64 cents, somewhat below the average, does not appear to have had any particular effects on the health of the men.

Epidemics. 17. Cholera appeared in cantonments on the 27th April. The first case occurred in the lines on the 27th April, when a woman was attacked and died, and a sepoy was attacked on the 30th and recovered. Five cases in all occurred, of which 3 were amongst the fighting-men, 2 of whom died; the third recovered. One of those who died was reported to have recovered from two previous attacks of the disease; of the 2 women attacked, one died, the other recovered. The first case occurred on the 27th April, the last on the 16th July. There were no cases of small-pox during the year.

General health and physique of the men. 18. The health and general appearance of the men appear good; those who have been on detachment duty are the only ones who seem to have suffered much from climatic causes.

Resume of the whole. 19. The average daily number of sick during the past year shows a slight increase over that in the two previous ones; the percentage of treated to strength is somewhat higher than in 1875, but considerably below that of 1874. The percentage of mortality, even including 2 cases of cholera, is a little below that of last year; excluding the cholera mortality, it is a little above that in 1874. The general health of the regiment appears to have been fair; those who were on detachment duty at Burda Chokey and Dwárka suffered from ague and scurvy. Cholera made its appearance on three occasions, attacking three men, and proving fatal to two of them. The lines are well situated and laid out, and the huts roomy and comfortable. The hospital accommodation is good. The water-supply is good and apparently sufficient. Food is abundant, but rather dear; fruit and vegetables scarce. The duties of the men are light.

Instruction of medical pupil. 20. The medical pupil has been instructed, as a rule, three times a week.



## REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

Scorbutus is of common occurrence in the detachments that have served at Burda Chokey and Dwárka, and particularly at the former. Thus a good many of the men are tainted, and 30 cases required hospital relief, while the wing 7th Regiment N. I. had relatively more; the two contributing nearly double the number of cases that occurred in the rest of the native force within this circle. Otherwise, health was tolerably good, and the only unusual incident was the occurrence of cholera in summer, from which there were 2 deaths. The lines, of recent construction, are the best I have seen; and collateral conditions are all sanitariously favourable, unless that here, as at Bhuj and in the stations of the Mhow command, vegetables are scarce and dear. Ample hospital accommodation; but the building is not in good repair, and quarters for establishment are very defective and insufficient, a shed open on all sides being all that is provided for 2nd class servants. Iron ridge-ventilators have been added during the year. Conservancy scarcely so efficient as it should be, the medical officer remarking that there is occasionally some delay and difficulty in getting the filth receptacles emptied, the conservancy cart having more work to do than it can well perform. The same complaint of delay has from time to time been made by his predecessors.

(In this report no mention of the numbers of treated, died, &c., of the detachment stationed at Burda Chokey from 1st January to 9th March 1876, is made.)

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

BHUJ.—In medical charge of Surgeon-Major P. W. COCKELL;—strength, 678·2

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| Location and movements.                | 1. The regiment has been stationed at Bhuj during the past twelve months.  |
| Detachments.                           | 2. With the exception of small recruiting and escort parties, and men on furlough, the whole strength has been at head-quarters during the above period.   |
| Soil, water, and drainage.             | 3. The drift of sand from high winds was even greater this year than last. The rainfall being again scanty, growth was slight, the country consequently remaining very bare and bleak. The larger of the two tanks outside the town was well filled, thanks to heavy rain in the southerly range of hills, and to some engineering operations which had been carried out; but the smaller tank on the east of the town received a very scanty supply of water. The natural drainage of camp is rapid and efficient, so that there is no lodgment of water.   |
| Climate.                               | 4. The climate during the year has been decidedly drier and better than last year. There was more wind in spring and less in autumn, and hot winds lasted rather longer.   |
| Lines.                                 | 5. No change has been made in the lines; the usual repairs have been carried out. There has been no overcrowding. The lines, though old and below the standard measurement, do not seem to have affected the men's health in any way. There are not any drains; all effete matters are removed daily. The sub-soil water stands at a depth of 42 feet, and there is at present 8 feet of water in the well in the lines.   |
| Conservancy and sanitary arrangements. | 6. The trench system of latrines is still in use, the position and arrangements being the same as in former years. No part of the ground used has been cultivated, as it could not be carried out so as to prove remunerative. The system is good so far as it goes, but it seems to be in less favour than ever with the men; for reasons formerly stated, all who can, appear to resort to the open country outside camp. Conservancy throughout camp limits has been well attended to. There was no over-growth of vegetation this year. Many of the old trees in camp died this year, apparently from prolonged want of moisture; and the growth of the young ones is very slow.                 |
| Water-supply.                          | 7. The water-supply is drawn exclusively from wells, of which some are so brackish as to be used only for washing; the water in the drinking wells is clear and pleasant to drink, but hard; it has been good, except on two occasions, once in May and once in October, when a well had to be closed for a week, the water having become offensive from some undiscovered cause, possibly a small turtle having died. The wells were all drawn and cleaned out before the monsoon, and the parapets were thoroughly repaired. There are no local sources of contamination, nor of pollution, except from matters getting accidentally blown or thrown in; most of the wells stand on an open plain. |



8. The supply of grain has been fair, and the quality good, though little rain fell in the vicinity of Bhuj. The fall in other parts was ample to raise fair crops; the average amount of grain compensation for the last twelve months has been Rs. 3-13-4 against Rs. 3-14-2 for the same period in 1875. The supply of vegetables has, as usual, been scanty, and the variety limited: fresh fruits are, as a rule, not obtainable by the men.

Food.

Duties.

9. The duties of the men have been light, not sufficient to harass them at all; the parades just afford healthy exercise.

10. The gymnasium was rather more patronized than last year, a stimulus being afforded by prizes being subscribed for amongst the officers, at the suggestion of the commanding officer. The men have no occupation beyond their duties and occasionally repairing the lines, butts, &c. There is not sufficient inducement to practise any trade; some extra occupation was afforded this year in the workshop, during the process of rebrowning the rifles.

Exercise, amusement, and occupation.

11. The hospital and attached buildings have been thoroughly repaired during the year. The tiles were removed and repaired, and new matting placed under the tiles. No alterations or additions have been made. The building affords accommodation for 32 beds without overcrowding, and with the exception of a few days during the past month, when fever was prevalent, that has been found ample. The ventilation of the building is amply provided for by side doors and windows and three large roof-ventilators. The conservancy is attended to by two sweepers, one of whom is always present. The conservancy cart attends daily. There are two bheesties who bring drinking-water from a well about  $\frac{3}{4}$  of a mile distant. A well, 120 paces to the rear of the hospital, supplies ablution water. The water is at a distance of about 45 feet from the surface, and the well at present contains 10 ft. 6 in. of water. A meteorological observatory having been lately sanctioned for Bhuj, a shed has just been erected in front of the hospital for the instruments; it will in no way interfere with the ventilation of the building.

Hospital and its surroundings.

12. During the past 12 months 485 cases have been admitted, making, with 14 remaining from last year, a total treated of 499; of these 452 have returned to duty, 1 went on furlough, 2 on sick leave, 10 were sent before invaliding committee, and 2 died. The daily average number of sick has been 19.2. The percentage of treated to strength, 73.59; of deaths to treated, 0.40. One case of chronic diarrhoea with scorbutic symptoms terminated fatally in February, and a man who had been several times under treatment for congestion and finally abscess of the liver, succumbed, in September, to dropsy, diarrhoea and erysipelatous inflammation of head and neck. Two cases of small-pox occurred in May in two recruits who had just arrived from Bombay; one, who presented small-pox scars, had a very copious eruption, but recovered without any untoward symptoms. The other presented no marks of vaccination or small-pox, was vaccinated the day before the eruption appeared, and had the disease very mildly. A case of snake-bite, which presented no general symptoms, was admitted in June. In July a case of well-marked inflammation of the epiglottis was admitted; the man recovered well after some hours' severe distress. Four cases of cholera occurred in the lines amongst the women and children of D and E Companies in the end of September; 2 women died. Two cases terminated fatally in hospital; one death occurred in the lines. A Punjabee discharged his rifle at his abdomen; the bullet wounded the transverse colon, left lobe of liver and left lung, laid open the descending aorta, and finally made its exit through the 6th and 7th dorsal vertebra. One man, who was sent on sick leave in November 1875 for debility after remittent fever, was reported in February to have died. Fourteen men were sent before the invaliding committee; 10 of these were sent from hospital; of those sent 9 were invalided; 4, all hospital cases, were remanded, and, 1 a short-service man, was sent to the Ophthalmic Hospital at Bombay for treatment. Two men have been sent on sick leave, 1 man discharged by court-martial, and 2 at their own request.

13. Fever, which has been more prevalent during the last month, was caused probably partly by alternations of temperature, partly by malaria generated by a late rainfall. Cholera has been more or less prevalent throughout the country during the past year, and had been present in the city for nearly two months before the cases occurred in the lines. The two cases of small-pox evidently brought the disease with them from Bombay when it was prevalent at the time.

Principal causes of sickness.

Causes of mortality.

14. Diarrhoea with scorbutic symptoms (due probably to local causes,) caused one death; a second was from old-standing liver disease.

Mortality according to race.

15. The two cases that terminated fatally were both Hindu-Konkanis.



16. The rain fall during the past year (5 inches 66 cents.) does not appear to have influenced the men's health, unless the last fall has caused the recent fever.  
Influence of rainfall.
17. Cholera was more or less prevalent in various parts of the country from January to September. Some cases of whooping cough were met with in the lines and suddur, during the hot season.  
Epidemics.
18. As in former years, all Kunbi recruits on joining, and families on arriving from their country, are examined, and all doubtful cases re-vaccinated. Vaccination is steadily carried on amongst the children born in the lines. The results obtained during the past 12 months are as follows:—62 persons were re-vaccinated by 85 operations, of which 27 were successful and 58 unsuccessful; 90 persons were vaccinated by 102 operations, of which 90 were successful and 12 unsuccessful.  
Vaccination and re-vaccination.
19. The general health of the regiment still continues good, and the men do not appear to have suffered in physique during their three years' stay here. The recruits, who joined during the year, appeared to be a promising lot, with one or two exceptions.  
General health and physique of the men.
20. The regiment has been stationed at Bhuj during the whole year; the men appear still to retain their good health. Two cases of small-pox were imported from Bombay. The water-supply continues ample and good, notwithstanding a rather scanty rainfall, and the price of grain has not varied much. The lines are well placed, and open to the prevailing wind. The huts are none of the best, but appear to answer well enough for health, though perhaps hardly for comfort. The duties of the men are light; there is a lack of occupation for their leisure time, which was, however, somewhat remedied this year. The death-rate has not been high, nor has there been much invaliding or sending on sick leave.  
Resumé.
21. The medical pupil is instructed on an average three days a week and examined three times weekly on the subjects embraced in the half-yearly examinations, and the hospital assistants are instructed and examined as opportunities present themselves.  
Medical pupil examination.

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REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

This regiment was the healthiest in the circle during the two previous years. It now takes second place, chiefly through increased incidence of autumnal ague—a matter less dependent here on local rainfall than on flooding of the Runn by its northern affluents. Nothing unusual occurred; the mortality was very moderate, and the only feature for comment in the hospital history is the prominence of syphilis, of which there were 20 cases, showing an excess over other corps. Lines old, dating back to first occupancy of cantonments: cubage of huts by much the smallest of all; but they have not been insanitary. The only drawback to site is that sweet-water wells are distant some half a mile. Other remediable conditions all sanitarily favourable. Trench latrines, which although somewhat far, are said to answer well. Hospital, inspected January 17th and 18th, is one of the best in the division, and has sufficient room for all ordinary wants, with the abatement, however, that its ridge-ventilation is complained of as excessive in the cold months, supplementary buildings adequate, and all arrangements good. Vaccination and re-vaccination were efficiently conducted.

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H. M.'s 2nd Regiment Light Cavalry.

DEESA.—In medical charge of Surgeon A. BARRY, M.D., F.R.C.S.;—strength, 287.

1. The regiment has been stationed at Deesa throughout the year. The 3rd Squadron marched for Rájkot on the 26th October, and the first returned to camp on the 4th December without any sick.  
Location and movements of corps.
2. The 1st Squadron was at Rájkot till the 16th of November. A party of 15 sabres, relieved monthly, were on out-post duty at Pálanpur.  
Detachments.



Hospital.	3. No alteration since 1874; buildings and arrangements leave nothing to be desired.
Sickness, mortality, and invaliding.	4. The great cause of inefficiency was malarial fever, of which 47 admissions were cases of ague and 2 of the remittent type. The cases of remittent were characterized by an intense hot stage, violent headache, severe gastric irritation followed by great depression of the nervous and ganglionic systems. In one case delirium set in, which under careful treatment soon passed off. Both were discharged to duty. These were 2 cases of measles of the variety "morbilli mitiores." In one case bronchitis supervened, but after a few days' treatment convalescence was established. There were 10 cases of rheumatism, bronchitis 6, dysentery 4, colic 21, hæmorrhoids 5, jaundice 1, gonorrhœa 3, orchitis 2, abscess 6, guineaworm 2, psoriasis 1, scabies 1, boil 4, phthisis pulmonalis 1, carbuncle 1, whitlow 2, general debility 3, contusions 58. In January a sowar, aged 36, who was nearly 14 days on the sick list, died of phthisis pulmonalis. He was ailing for more than one year; but being a hard-working, steady, pay orderly, he was reluctant to go to hospital. In June a native whilst out shikaring sustained a gun-shot wound of the chest. A slug about the size of a pea entered half an inch below and to the outer side of the left nipple, perforated the pleura, grazed the pericardium, and lodged under the integument over the angle of the sixth rib on the left side. An incision was made and the bullet easily extracted. Localized pneumonia and pleurisy ensued, but in twenty-one days convalescence took place. He is still troubled with cough, especially on exertion. Thirteen men were invalided, 4 of which were discharged with gratuity. The chief causes of invaliding were syphilitic rheumatism, hæmorrhoids, old age and debility; 2 men were discharged by court-martial, and 2 deserted.
Principal causes of sickness.	5. The chief causes of disease were malaria, vicissitudes of temperature, falls and kicks from horses, inadequate clothing during the cold season.
Causes of mortality.	6. Phthisis pulmonalis of twelve months' standing.
Mortality according to races.	7. The sowar who died was a Musalman.
Epidemics.	8. No epidemic.
Vaccination.	9. Fifty-three children were successfully vaccinated and 11 recruits were successfully re-vaccinated.
General health and physique.	10. General health very good; physique good.

10. In reviewing the medical history of the year it will be seen the health of the sowars was good; that, contrasted with 1875, there was a diminution of admissions to the extent of 6 cases. The admissions were 45 less than in 1874 and 76 less than in 1873. The daily average sick was 6.51 compared with 9.4 of 1875. The average strength was 287, admissions 217, and the proportion of admissions to strength per cent., 75.61. A sowar died in hospital, 2 men proceeded on sick leave, 42 obtained furlough, 2 discharged the service by court-martial, 2 deserted, and 26 recruits enlisted. The chief causes of admission were paroxysmal fevers, contusions, and bowel complaints. The greatest daily average sick was in September and October, especially in the latter, when the diurnal range of temperature is greatest. The days very hot, and the mornings comparatively cool. The health of the European officers has been excellent.

#### REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

The sanitary history of this corps for the year is fully satisfactory, the returns showing a very moderate number of admissions, and only one death. Surrounding conditions are all favourable, and the duties were light. No change in the lines, which, although old, have sufficient accommodation, and the huts adequate cubage. For some months past sewage from family quarters has been collected in vessels placed outside the huts and daily removed by pucksals. This is the only instance within either division in which any organized arrangement exists for the removal of sullage from native lines which is elsewhere left to soak and pollute the ground, and the example is commendable and decidedly deserving of imitation in the interests of health. Hospital excellent and commodious; its arrangements all good. No alterations or additions during the year, and none required; vaccination was fully carried out among the families.

(In this report no mention of the numbers of the treated, died, &c., of the detachment, stated in para. 1, is made.)



**H. M.'s 18th Regiment N. I.**

DEESA.—In medical charge of Surgeon-Major A. N. E. RIDDELL ;—strength, 627.

- Location and movements of corps. This corps has been stationed in Deesa the whole year.
- Detachments. 2. A detachment of 57 of all ranks arrived here from Sadra on January 25th.
- A detachment of 42 of all ranks went to Mount Abu, December 1st, where it now is.
- Lines. 3. These are old, ruinous, and past repair. Have been annually condemned for several years.
4. In the dryweather the trench latrine system is in vogue, the latrines being situated in the sandy bed of the river. In the rains the latrines are on the river-bank. The sandy soil seems suited to this form of latrine. The usual staff of sweepers keep the lines clean and remove dirt.
- Conservancy and sanitary arrangements.
- Water-supply. 5. Sufficient; drawn from six wells in the lines and one in the hospital compound.
- Food. 6. Is abundant and tolerably cheap, and good vegetables are procurable, but not abundant.
7. The usual clothing is in use. It is the same in the hot as the cold weather, in the dry as in the rains. In a climate like that of Deesa a lighter style of clothing for the hot weather would, I think, be a real boon to the sepoy. There is no question but that they suffer very much on parade in the hot weather from their unsuitable dress.
- Clothing.
8. The ordinary garrison duties and escort parties. There were 37 escort parties during the year, and 252 men were employed on them. I do not find any bad effects from these duties on the health of the men.
- Duties.
9. The various drills, parade, and working parties give the men sufficient exercise.
- Exercise, amusement, and occupation.
- There is no gymnasium. Occasional sports take place on some of the native holidays. Some of the men follow occupations they have been brought up to, such as carpenter, blacksmith, &c. There are not, however, many of them.
10. Are the same as have been already reported on. A latrine or urinal in the vicinity of the cells would be an improvement. Prisoners in the cells have to be marched to the hospital latrine, distant nearly 300 yards.
- Lock-up rooms and cells.
11. Excellent in every way. It is the best native hospital I have yet seen in India, and might serve as a standard model for other hospitals. The site is well chosen, and there is sufficient clear surrounding space.
- Hospital and its surroundings.
- Over-crowding. There has been no over-crowding.
- The hospital latrines are built of masonry; disinfectants are freely used, and I have not been able to detect any bad smell from the building. The excreta are removed by the sweepers into receptacles which are taken away every night in the filth carts.
- Conservancy.
- Hospital water-supply. There is one well in the hospital compound. There has been no deficiency in the supply. The quality is fairly good.
- Sickness, mortality, and invaliding. 12. The health of the corps has been good during the year. The average strength of the regiment was 627.

Total of admissions into hospital	...	...	...	...	508
Total treated...	...	...	...	...	531
Deaths during the year	...	...	...	...	3
Invalided	...	...	...	...	46
Dismissed by court-martial...	...	...	...	...	3
Treated to strength	...	...	...	...	85.1
Deaths to strength	...	...	...	...	0.4
Deaths to treated	...	...	...	...	0.5



The principal diseases in the order of frequency of admission were—ague, 83; contusions, including "shoe-bites," 72; rheumatic diseases, 61; diseases of the lungs, 49; diseases of the eyes, ophthalmia, and conjunctivitis, 47; diseases of the stomach and intestines, 34; cutaneous diseases, 52.

There were 3 deaths in hospital; 1 from phthisis pulmonalis (caste Purwarree), 1 from disease of aortic valves (caste Purwarree), 1 from diarrhoea (caste Mahratta). One man committed suicide in the lines by shooting himself (caste Bramin). Two men died whilst absent on leave.

Principal causes of sickness.	13. Malaria and vicissitudes of temperature.
Epidemics.	14. There have been no epidemics, no small-pox, nor cholera.
Vaccination and re-vaccination.	15. These are carried out carefully and according to regulation.
General health and physique of the men.	16. General health has been good.

Average height of the regiment 5 ft. 6½ in. I do not think the corps equal to what it was some years ago just before the Abyssinian campaign.

17. I am convinced that a different system of pensioning would produce a marked effect on the number of admissions into hospital. The present system seems to offer a premium to malingerers and to others to make the most of every trivial malady.

18. The corps has, I consider, enjoyed very good health during the year. Especially has there been a great decrease in the amount of fever.

19. There is only one medical pupil. He has only joined quite recently. I instruct him at my own quarters twice every week or oftener, besides imparting information in the hospital wards.

#### REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M. D.

Health was good throughout, the returns of sick showing a large decrease in ague as compared with previous year, the admissions under that head aggregating only 85 as against 278. No opinion is expressed by the medical officer in explanation of the difference, but in the 2nd Cavalry also the admissions from this cause were exceptionally small. The lines are old and dilapidated, and have been repeatedly condemned; many of the huts are leaky, and all are damp in the rains, the floors generally being below ground level; sanitary conditions otherwise favourable. No permanent latrines, but trenches are well suited to the locality and better adapted here than elsewhere, as the ground admits of their being within convenient distance, while at the same time they are out of reach of observation from the lines. Hospital very suitable, and but for some deficiency in plinth it would be the best in the division; it is, however, inconveniently far from the lines. Accommodation ample with all needful supplementary buildings complete and in excellent order. At my inspection, November 10th, I was well satisfied with all arrangements.

#### H. M.'s Regiment 23rd N. L. I.

MHOW.—In medical charge of Surgeon D. A. PATTERSON;—strength, 501·9.

The head-quarters, consisting of the left wing of the regiment, was here during the month of January. On 31st January the right wing arrived from Nusseerabad. The whole regiment was stationed in Mhow until the 12th July, when the left wing marched to Indore, where it is still stationed.

The lines are single-tiled huts with small verandahs. They are low and not raised on plinths, and are only kept habitable by continual repairs. The streets are narrow, rough, and uncomfortable to walk upon, and slope from the houses towards the centre, where there is a gutter.



- Space. Is sufficient.
- Ventilation. Is only such as can take place through the doors and roofs.
- A new regimental bazaar has lately been built to the south of the lines, and the old one, which consisted of a few very dilapidated-looking huts removed, as it was situated exactly in front of the quarter-guard of the 25th Regiment. The effect of this is to open up the whole front of the lines, and is a decided improvement.
- Bazaar.
- Drainage. The lines being situated on the northern and eastern slopes of a slight ridge, allows of free drainage. The soil, however, as stated above, is black and, therefore, somewhat retentive of moisture in the rains.
2. The system of trench latrines is in use for the sepoy. The trenches are used for the greater part of the year ; but during the rains permanent latrines are used, a crop of grain being grown on the trench ground, the filth being at this time carted away and deposited in large trenches with the rest of the night-soil of the station.
- Conservancy and sanitary arrangements.
3. Is derived from wells occurring at short intervals all round the lines and throughout the station. The quality, so far as I can judge, is good, and the quantity sufficient. I am given to understand that a scheme for collecting and storing water in the hills a few miles to the south-west of Mhow, for the supply of the whole cantonment, has been sanctioned by Government ; and I believe that preliminary steps in the undertaking have already commenced. This scheme, it is thought, will do away with all present imperfections in the water-supply.
- Water-supply.
4. The several articles of a sepoy's diet are obtainable in the Mhow bazaar, of good quality and quantity. The sepoy gets on an average about Rs. 1-1-4 grain compensation every month.
- Food.
5. The boots are a general source of complaint, and some change is necessary that would lessen or do away with the large amount of inefficiency caused by injuries to the feet from ill-fitting boots.
- Clothing.
6. The ordinary parades, guards, and occasional escort duty. They have exercised no bad effect on the health of the men.
- Duties.
7. The time not employed on duty is by the majority of the sepoys spent in idleness. A few employ themselves in trades. There is a horizontal bar upon which some men are very fair performers ; these men also indulge in other athletic exercises, such as wrestling and club exercise.
- Exercise, amusement, and occupation.
8. There are two cells, 10 feet by 10 feet square and 12 feet high. They are well ventilated, but are very hot during the day-time in the hot weather.
- Lock-up rooms and cells.
9. During January the Right Wing was on the march from Nusseerabad : nothing of importance occurred. On 12th July the Left Wing marched to Indore. Since that time, owing to the fact of there being no range at Indore, the wing has been marched in by companies for ball practice. This has tended to increase the number of cases of foot-soreness.
- Marches.
10. The regimental hospital is a large building, strongly built with arched roofs. It is well adapted for a hospital for native troops. There is an open space all round the building. There is a separate contagious diseases hospital about 150 yards to the north-east of the main building.
- Hospital and its surroundings.
- Ventilation. Is free and satisfactory by the doors, and by openings in the roof.
- Overcrowding. On no occasion has there been any overcrowding.

The accommodation is ample, consisting of two large wards placed side by side, with small rooms at the ends of each suitable for cases requiring quiet.

Accommodation and defects. There are two verandahs. The one to the east is blue-washed on the inside and is used for cases of eye diseases. At the four corners of the building are small rooms used as office, dispensary, store-room and bath-room : all are complete in their arrangements. The contagious diseases hospital consists of two wards.



The dead-house has been much improved during the year by being floored with asphalt, and by having a sink for water built, and by being furnished with a leaden-topped table for dissections.

Improvements.

The hospital is in a satisfactory state and may be said to be complete.

There are two latrines in the hospital compound, one for the use of the patients and the other for the hospital staff and their families. The pans are emptied into closed receptacles threetimes daily, and carted away and buried at night.

Conservancy.

Is obtained from a well in the hospital compound. For the greater part of the year there is a sufficient quantity; but during the hot weather the level of the water is very low, there being only a few inches in the well.

Hospital water.

11. Total treated 714, of whom 17 remained over from last year; died in hospital, 4; invalided, 46; discharged by court-martial, 2; discharged at their own request, 1; deserted, 2. Of the causes of admission the following are the chief:—

Sickness, mortality, and invaliding.

Intermittent fever gave 254 admissions; 5 cases remained from last year. Of these 259 cases, 254 returned to duty, 3 were granted sick leave, 1 was invalided, and 1 remained in hospital on the 31st December.

Fevers.

Remittent fever gave 4 admissions; of these 2 died, 1 with symptoms of a low typhoid character, the other from pulmonary congestion; the third case was granted sick leave, and the fourth was cured. Small-pox has appeared in the lines twice during the year: first, 1 in May there was 1 case—a sepoy; secondly, in November, 2 sepoys were attacked and 1 woman. The cases were mild and recovered completely. The woman who suffered had only arrived in the station seven days before developing symptoms of the disease; she was unvaccinated. The men were all vaccinated. Five cases of chicken-pox were recorded; they were mild, and do not call for special remark. Two cases were admitted with badly inflamed arms from re-vaccination. One case of mild erysipelas occurred.

Gave 46 admissions, resulting in 12 being invalided. As is usual, this complaint was seen in men who had just served long enough for their first pension.

Rheumatic affections.

Twelve treated, of whom 4 (2 of bubo and 2 of soft chancre) remained from last year.

Syphilis.

Two of bubo, 2 of chancre, and 4 secondary syphilis were admitted. Scrofula gave one admission; numerous abscesses formed at the upper part of this man's chest and at the root of the neck; he was allowed sick leave as his only chance of recovery, but I am afraid he will have to be invalided.

Five cases were treated, of whom 3 returned to duty cured; one was granted sick leave, and one died from lung complication.

Scurvy.

Gave 12 admissions, viz, sciatica, 4; neuralgia, 1; brow ague, 4; pleurodynia, 2; hemiplegia, 1. Of these all returned to duty except 1 case of sciatica invalided. One case of disorder of the intellect occurred in a young soldier; he was discharged by a medical committee and sent to Colaba Lunatic Asylum. The man had, I think, always been of weak intellect.

Diseases of the nervous system.

Diseases of the eye.

There were 16 cases of conjunctivitis, all of whom recovered; one ulcer of cornea also recovered.

There were 6 admissions from palpitation; 4 discharged to duty and 2 invalided.

Diseases of the heart.

Two admissions for valvular disease of the heart; of these 1 returned to duty and was subsequently invalided. The other case terminated in death, after a prolonged stay in hospital. The man at the end had general dropsy, and on *post-mortem* examination the aortic and mitral valves were found much thickened. The liver and kidneys were the seat of amyloid degeneration.

Nineteen cases of bronchitis and 1 of bronchial catarrh were treated; all returned to

Diseases of the lungs.

duty, except 4 cases of chronic bronchitis invalided. One case of pneumonia remained on 1st January, and 3 others were admitted: all recovered.

The chief of these were dysentery—18 admissions, and diarrhoea—28 admissions. Three cases of dysentery were granted sick leave and 1 remains in hospital. Of the diarrhoea, 2 were invalided and 1 remains. Two cases of simple enlargement of the liver were admitted; one returned to duty, the other was granted a change of air.

Diseases of the digestive system.



Ulcer gave 21 admissions ; 18 were cured and 3 remained.

For boil there were 24 admissions : all recovered.

Under this head there were 109 admissions ; 3 remained from last year, making the total treated 112. Of these 109 returned to duty, 1 was discharged

otherwise, and 2 remain for treatment. Of these 112 injuries no less than 78 were returned as contusions of the lower extremity,—that is, were cases of foot-soreness the result of badly-fitting boots. A severe case of injury to the eye was admitted—a tile fell from the roof of one of the huts upon a man who was in bed inside, and resulted in a contusion with hæmorrhage into the globe of the left eye ; the final result is almost total blindness of that eye.

Forty-six men were invalided during the year ; they were:—Old age and debility and worn-out, 21 ; rheumatic affections, 12 ; sciatica, 1 ; imbecility, 1 ; palpitation, 2 ; chronic bronchitis, 4 ; chronic diarrhœa, 2 ; ulcers (of leg), 1 ; tumour of chest, 1 ; loss of hearing, 1.

## 12. Principal causes of sickness :—

Year.	Eruptive fevers.	Malarial fevers.	Scurvy.	Rheumatic Af-fections.	Diseases of the cutaneous sys-tem, including boil and ulcer.	Injuries chiefly of the feet.	Diarrhœa.	Dysentery.	Total admissions	Daily average sick.	Invalided.	Died.
1876	10	258	5	46	62	109	28	18	697	30.7	46	4

The above table shows the principal cases of admission during the year, the average daily sick, invaliding, and deaths in hospital.

## Mortality.

13. Four men died in hospital during the year. Two were cases of remittent fever, 1 of scurvy, 1 of valvular disease of the heart.

## Mortality according to race.

14. Three Hindus and 1 Mussulman.

15. The rainfall was less than the average, the rain gauge in the hospital compound having registered only 26 inches 46 cents ; it, however, filled the wells, and the surrounding districts appear to have had a larger amount than was registered in the station. The influence was not marked by any increase of disease.

16. The slight appearance of small-pox already noticed, and its existence in the bazaar in a scarcely epidemic form, is all that occurred during the year.

17. Has been carried out by the hospital assistant and myself. Primary vaccinations : 42 persons were vaccinated by 44 operations—33 successful, 11 unsuccessful. Re-vaccinations : 14 persons were operated on 16 times—6 successful and 10 unsuccessful.

18. Has been, on the whole, good, though there was some increase in the amount of sickness over the preceding year. The physique of the men is good ; the recruits of the year were up to the average ; 1 recruit was rejected, having been found quite unfit by reason of weakness of the intellect.

19. Under this head I should like to bring forward the results of a tolerably extended trial of the treatment of intermittent fever by the sulphate of cinchonidine. From the 29th May to the end of the year 141 cases admitted for ague were treated by the administration of cinchonidine : of these cases there were :—

Admitted once	96	giving	96	admissions
” twice	15	”	30	”
” three times	5	”	15	”
	116		141	



The dose in nearly every case was grains 10, given during the intermission. The average amount administered in each case was 47.75 grains. The largest amount given to any one case was 140 grains; the smallest, 15 grains (this was the case of a recruit boy). The average number of days in hospital was 4.75 days. The longest stay in hospital was 15 days; the shortest, 2 days. The patients in all, except 11 cases, were sent back to their duty cured. In 4 cases the drug failed to make any impression upon the disease (in one case during three days, in the second during four days, in the third during ten days, in the fourth during five days) quinine being afterwards administered with satisfactory results. In the other 7 cases not sent back to duty the fever was cured, but the patients were retained in hospital; 3 for anæmia and debility were treated with tonics, 1 for lumbago, 1 for inflammation of the ear not caused by the cinchonidine having existed previously, 1 for chronic bronchitis, and 1 for diarrhœa. The ague from which these men suffered has been generally of a mild type and free from visceral complication. In considering the above, I think I am at liberty to conclude that cinchonidine has marked antiperiodic powers in ordinary uncomplicated ague. It does, however, fail in some cases, apparently from no assignable cause. I have, I think, also observed that, after some days' treatment with cinchonidine, quinine appears to exert a quicker and more certain effect; though upon this subject I cannot at present give a decided opinion, as my notes are not sufficiently extended, as only 4 cases failed and required the administration of quinine, and 1 of these cases was subsequently sent on sick leave. Another point brought to notice in this experiment, was the fact that cinchonidine appears to give rise to more headache than does a similar amount of quinine.

*Resumé.*

20. I would first call attention to their low and unsatisfactory condition, and would suggest that new lines are much required in this station.

I am of opinion that the system of trench latrines is open to objection, chiefly because many men do not use the trenches, but go abroad into the fields and nullahs, and because this large cantonment is gradually being surrounded by a zone of latrine ground.

The health of the regiment has been, on the whole, good during the year under review, though the admissions, average daily sick, and deaths in hospital have all been in excess of 1875.

21. The medical pupil has for the greater part of the year been instructed, for two hours four times a week at my house, in the subjects required at the half-yearly examinations. At hospital he has been instructed clinically, and in the office and dispensary. Being the only available subordinate, his instruction has been interfered with considerably of late by his having to attend at the range during ball practice.

#### REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

Health was tolerably good, although less so than for previous year. The men's lines are unsatisfactory, particularly in the exceptionally narrow streets; and the huts have the usual defects of want of plinth, inadequate ventilation, and restricted cubage; the floors are damp in the rains. Other surroundings fairly favourable, unless that most of the wells run very low in summer; duties generally moderate, and food supplies, excepting vegetables, abundant. Hospital accommodation good and ample, out-offices complete, appointments and service satisfactory and efficient, conservancy good. The returns show, as usual at Mhow, a large number of admissions from bowel complaints, and there is an excess from injuries, chiefly by ill-fitting boots, as explained by Dr. Patterson, whose report is precise and careful. Vaccination was attended to.

(In this report no mention of the numbers of the treated, died, &c., of the Right Wing stationed at Nusseerabad, in January last, is made.)

#### H. M.'s 25th Regiment N. L. I.

MHOW.—In medical charge of Surgeon D. N. PARAKH;—strength, 496.

Location and movement of corps.

1. No movements of head-quarters.

2. Left half battalion at Indore from the 16th of July 1875 to 12th of July 1876. A detachment proceeded on the 18th of October 1876 to Mehidpore to relieve the head-quarters of the 10th Regiment proceeding to Neemuch. It is still stationed at Mehidpore.

Detachments.

3. The following table shows the depth of the sub-soil water, the amount of water in the well, and the rainfall of each month since January 1876; also the admissions from ague during each month:—

Sub-soil water.



Locality or designation of the well.	Depth of water.	Date and hour of measurement.	Distance of sub-soil water from surface.		Rainfall since last measurement.	Admissions from ague during each month.
			Ft.	In.		
Regimental Well No. 3, outside the Lines and about 100 yards from them.	Ft. In.		Ft.	In.	In. C.	
	11 6	15th of January 1876, 5 A.M. ...	26	6	.....	2
	10 6	" February " " ...	27	0	.....	8
	9 0	" March " " ...	29	0	.....	2
	8 0	" April " " ...	30	0	.....	23
	5 6	" May " " ...	32	6	.....	23
	5 0	" June " " ...	33	0	1 4	27
	4 6	" July " " ...	33	6	7 57	31
	4 6	" August " " ...	33	6	9 55	26
	5 0	" September " " ...	33	0	10 24	38
	11 6	" October " " ...	26	6	0 10	33
	11 6	" November " " ...	26	6	.....	27
10 0	" December " " ...	28	0	.....	13	

4. These are situated at the northern end of the camp. The site is good. On the whole the huts have not been in good repair during the year. Walls occasionally fell during wet weather. One pendall was recently vacated because the central wall was cracked and dangerous. The huts are low and single-tiled, and built of mud and sunburnt bricks, without plinths, and on black soil. Hence during the rains the walls and floor get very damp. The roofs are not very waterproof, and so there is an additional source of dampness. Cubic space in each hut is barely enough. Ventilation is defective, the door and the crevices in the roof being the only inlets and outlets for the air. There is very little light in the huts, and this circumstance cannot be without some effect on the health of the men. The means of disposing of the foul water from the hut is defective; all the dirty water is thrown out round about the hut; the permanent latrine, which is opened only during the rains, being too far from the lines, and there being a general dislike to the trench system.

5. From the beginning of the year up to the 1st of August the trench system of latrines was in use. I have very little experience to say much of its merits or demerits; but I submit it as my impression that it cannot be quite safe, unless the following conditions are fulfilled:—(a) that wells and other sources of water-supply are not near the trenches; (b) that the ground in which the trenches are dug is not limited in extent; (c) that the same ground is not repeatedly used for the purpose; (d) that early and repeated cropping of the ground is insured; (e) that the trenches are so situated that the wind blowing over them does not blow in the direction where the lines and officers' bungalows are situated; (f) that sepoys, and particularly their women, are absolutely prevented from trying to avoid using them and causing nuisance elsewhere in preference.

These conditions, I don't think, are completely fulfilled here. Moreover, the system is hated by the sepoy, and particularly by the women, and their feelings on this point deserve consideration. The permanent latrines situated to the north of the lines are well adapted for the sepoy; they work well, and are kept clean; powdered earth is used in them; the excreta are promptly carted away, and the establishment of the sweepers is quite sufficient and their work is efficiently supervised. The only drawback is that they are too far from the lines.

6. It is derived from three wells belonging exclusively to the regiment, and a fourth well, which is used by men of both the native regiments. They are all situated between the lines and the permanent latrines. One of the three wells is used by Mochees, one by Parwarees, and the third by the higher class of Hindus and the Mussulmans. The Mochees' well is very near the latrine of the 23rd Regiment and furthest from the lines, and does not yield very pure water. The Hindoo and Parwaree wells are nearer the lines and furthest from the permanent latrines, though the latter well is again very near the hospital latrine. The officers get their supply from a guarded well near the new 23rd Regiment bazaar, which yields very good water. The possible sources of impurity are, as in the case of the Mochees' and Parwarees' well, the vicinity to the latrines, and the dirtiness of the water-drawing utensils. The supply from wells is just sufficient, and so a tank close to the camp or other sources of water-supply are a great desideratum in such a large military station as Mhow.



7. At the regimental bazaar different kinds of grain, indifferent mutton, and indifferent common variety of vegetables were sold. The demand was little, and so the supply was very limited. The sepoy preferred, except in cases of emergency, to buy his provisions in the sudder bazaar, where he had a greater variety of them to select from, and greater scope for the exercise of his peculiarly well-developed faculty of buying them at the cheapest possible rates, totally regardless of their quality and altogether mindful of their quantity. As obtained from the sudder bazaar, the food was of good quality, and (except for a period of one or two months; when the famine in the Decean exercised its injurious influence on the market) could be had moderately cheap. Vegetables were rather scarce and dear.

8. Most of the cases entered as "contusion" were cases of shoe-bite. In a few cases they were due to neglect in keeping the boots well greased and soft; in others to the bad make of the boot; but in most cases I believe they were due to the necessary amount of friction which the skin in place of the sock had to bear. Hence, I think nothing short of supplying the sepoy with coarse and cheap socks and well-made English ammunition boots could prevent the great disability caused by shoe-bite.

9. There are no gymnasia, reading nor recreation rooms in connection with the regiment. The officers have been recently thinking of having some parallel bars put up for the men. They occasionally play at cricket.

10. There are two cells, and they are in a good sanitary condition.

11. The left half battalion marched from Indore to Mhow, and a detachment of two companies marched from Mhow to Mehidpore during the year. Nothing unusual happened on the line of march or otherwise to call for any remarks.

12. No changes have been made in the hospital buildings during the year, save sundry repairs to the roof and windows, and whitewashing. The ventilation was, in fact, too good; so much so, that I was inclined to attribute not a few intercurrent attacks of lung and bowel complaints that occurred in cases admitted from other diseases, to the unpleasantly perceptible movement of the cold air in the wards during the rains and the cold weather; and that I was compelled to remove the bad cases to an isolated room at the back of the hospital, where alone I could regulate the temperature and movement of the air to the requirements of the patient. The hospital assistant's quarters, on the other hand, are defective in ventilation. There was no overcrowding in hospital; the accommodation was ample, the verandah space being taken into consideration. The dead-house had a sink and a trough added to it, and the floor was made of asphalte. An impervious leaden or other covering is required for the dead-house table to prevent its getting impregnated with organic matters by soakage. A separate ward to treat eye cases, with appliances to darken it, is very much wanted. Filters are very much needed in hospital, at least for purifying the water wherewith the medicines are made. The cook-house is kept nice and clean. The hospital latrine is kept clean and well disinfected by McDougal's powder and carbolic acid, and works well. The water-supply for the hospital was derived from one of the best regimental wells. The water was brought by bheesties, whose mussaks were carefully looked after as to their cleanliness.

13. The improvement in the health of the regiment, alluded to by Dr. Heffernan in his report for 1875, is still kept up, I am happy to say. The average strength of the corps during the year amounted to 496; the total number of admissions into hospital is 722; the total number treated is 732; the daily average of sick is 26.30; the proportion of sick to strength per cent. 5.9; the proportion of admissions to strength per cent., 145.57; the proportion of treated to strength per cent., 147.58; the percentage of deaths to strength, .20; the percentage of deaths to treated, .14.

These stand præeminently as the great cause of sickness and the cachexia resulting therefrom that of invaliding. There were 253 admissions from ague, 17 from simple continuous fever, and 4 from remittent fever. The year before,—*i.e.*, in 1875—there were 147 from ague, 173 from simple continued fever, and 1 from remittent fever. Though the total number of fever cases is less in 1876 than in 1875, there is an excess in the year under review of cases of ague, which is very difficult to account for, unless, indeed, it be that cases like those admitted in 1875 under the head of simple continued fever were admitted by me under ague. I found in all the cases I have admitted under this head the rigors and the characteristic recurrence of the fits after the apyrexial period. The largest number of ague cases occurred in September and October.



Most of these cases were complicated with bronchitis. Often, after the fever had left the patient, the bronchitis continued and gave rise to emphysema, as in many of the cases invalided. I often noticed a regular alternation of dysentery with ague, the fit of the latter being replaced by an attack of the former. The 4 cases of remittent fever were all complicated with severe bronchitis. In all these the severe gastric irritability was most painful to witness. The only case of death that occurred in hospital was a case of remittent fever complicated with extensive bronchitis. The patient, a naik, when admitted was very much emaciated and weak, according to his account, from having taken some native medicine from a quack. The fever, the headache, and the incessant vomiting were so severe, that in spite of stimulants both internal and external, enemata, &c., he had not the power to expel the increased and morbid secretions in his bronchi, and he died half exhausted, half suffocated.

Twenty-four cases of chronic rheumatism, 1 of gonorrhœal rheumatism, and 11 muscular rheumatism were admitted. One of the cases of chronic rheumatism was dangerously complicated by intense mercurial cachexia, brought on by the injudicious use of mercury which the patient was persuaded to take for an attack of venereal disease by a native quack. The agony and pain and the fearful swelling of the mouth, gums, and face, the distressing salivation, &c., due to the mercurial poisoning were added to the symptoms of chronic rheumatism.

Primary syphilis, 1 admission; secondary, 3; soft chancres, 5. All were simple cases, and cured.

One case of paralysis, 1 of facial palsy, 1 of idiopathic tetanus, and 7 cases of neuralgia were admitted under this head. The case of paralysis was due, I believe, to sub-acute myelitis, most probably syphilitic in its origin. The case of facial paralysis occurred in a native officer who had a rheumatic diathesis. It was brought on by exposure to cold. The case got rapidly well under blistering, endermic application of strychnia and internal administration of alkalies with colchicum. The case of idiopathic tetanus was diagnosed by Dr. Patterson while I was away on duty. When I saw the case I was quite convinced it was a genuine case of the disease. There was not a single wound healing or healed, and not a single recent scar. The causes, apparently, were exposure to cold while he was at stool, and sudden fright, the patient on the night imagining he saw a fierce wild animal when it was only a dog. The case was tedious, but fortunately it yielded to large doses of chloral and bromide of potassium and frequent nourishment. All the symptoms of the disease, including the very high temperature, were well marked in this case.

Fourteen admissions from catarrhal ophthalmia (admitted as "conjunctivitis") were all discharged cured. The ordinary cases were cured by cleanliness, alum and zinc washes, and weak solutions of nitrate of silver. The severer cases required belladonna fomentations, stronger solutions of nitrate of silver, and even in some cases leeches and scarification. Internally tonics and aperients were given. One case of syphilitic iritis is under treatment now.

Sixty-nine cases of bronchitis were admitted, of which three-fourths nearly were discharged cured, 13 invalided, and 4 sent on sick leave. Most of these cases were very obstinate and often incurable without quinine, thus showing their relationship to malarious fevers. One case of pneumonia, which ended in resolution, was treated with acetate of ammonia, digitalis and stimulants, and discharged cured. One very bad case of pneumonic phthisis was with difficulty brought round with cod-liver oil and iron, and astringent and antiseptic sprays to the throat, and inhalations, and was granted sick leave.

Fourteen cases were admitted. Most of these occurred in July and August; the exposure to cold and wet and the dampness of the huts were the causes. Several infants in the lines were with difficulty saved, and 1 died in spite of all efforts, the diarrhœa being complicated with severe convulsions. The cases of the sepoy were all cured by simple treatment.

Twenty-seven cases were admitted. Most of these cases were severe; in 1 case the exhaustion, consequent on the frequent and copious hæmorrhage and the discharge of shreds of mucus membrane, was so great that it was with difficulty brought round by stimulants and nourishment. The treatment followed in these cases was the use of ipecacuanha at first, and when the acute symptoms had abated, the liquid extract of bael and perchloride of iron tincture were given until the patient got perfectly well. The severe case is sent on sick leave a few were invalided, and all the rest discharged cured.

One case of simple congestive enlargement of the liver was cured by chloride of ammonium, and nitro-muriatic acid with taraxacum.



Diseases of the spleen. Three cases of splenitis; 1 was invalided and 2 were discharged.

Eight admissions. All were Deccan Mahrattas, some of whom had recently been to the Deccan on leave, where they contracted the disease and brought it here.

Seventy-nine cases of contusion, of which most were from shoe-bite; 1 case of sprain of the shoulder-joint; 6 cases of sprain of the knee; 2 punishment cases; 1 synovitis; and 1 periostitis. All discharged cured, except 2 cases of shoe-bite which are now in hospital. Five cases of injuries from thorns were cured. Burns and scalds furnished 5 cases, all cured.

Mortality. One death occurred in hospital, 1 in the lines, and 2 out of Mhow in cases sent on sick leave.—(Vide 15.)

Thirty-two were sent before the annual invaliding board; all were invalided. The invaliding was principally caused by chronic bronchitis, and the results of malarious fevers. Two were discharged the service—1 for deafness and 1 for rheumatism, the shortness of their services not entitling them to a pension. Eighteen were granted sick leave.

14. Malarious fever and bronchitis being the prevailing diseases, their principal causes were, malaria and cold acting on under-fed, badly-housed, overheated, and over-exhausted (as in the cases of tile-turning and lines-repairing), and, lastly, badly-clothed men.

15. The only death that occurred in hospital was caused by remittent fever complicated with bronchitis. Three deaths occurred out of hospital, 2 of which were in men sent out on sick leave convalescent—1 from remittent fever and the other from bronchitis, and the third occurred in the lines from suicide. This man, without any known motives, shot himself dead with his rifle. The bullet entered the abdomen at the epigastric region, wounded the liver, the left lung and the diaphragm, bruised the stomach and intestines, comminuted the spine from the 12th dorsal to the 3rd lumbar vertebra, and after filling the abdominal cavity with blood, and pushing the numerous loose fragments of the fractured spine before it, lodged finally between the skin on the back and the spine in the midst of a considerable extravasation of blood.

16. The hospital case was a Hindu (Thakore and Chhatree). The suicide case was a Mahomedan. The rest were Konkani Mahrattas.

17. The total rainfall was less during the year than in 1875. In September it was the heaviest, and the largest number of admissions from ague occurred in that month. In January, February, and March and in December, the ague cases were very few. Cases of bronchitis also increased during the rains. During the continuous fall of nineteen days after the break in August there were 27 admissions from fever; whilst during the break there were only 11. Diarrhoea amongst the children increased in July and August.

18. I am happy to say there was not one case of cholera during the year. There were some cases on the Indore and Oojin line during the rains; but happily no cases occurred in Mhow, at least none amongst the troops. There were 3 cases of small-pox admitted during the year, of which 1 was discharged cured, and the other 2 are now quite well, but are detained in the contagious ward because they are not yet free from infection. The first case occurred in a sepoy's wife who seems to have caught it at Khandwa, where she was exposed to the infection, and from whence she had recently arrived in Mhow. When admitted into the lines she was free from any sign of the disease. Four days afterwards she sickened with it. The case ran its typical course. It was modified and semi-confluent. She was protected by vaccination, having 3 faintly-marked cicatrices on the left arm. The second case was that of a private who was admitted into hospital with doubtful fever which turned out to be small-pox. He was already isolated from the other cases, but no sooner did the disease declare itself than he was removed to the contagious ward. He probably caught the disease from a female relation of his who was admitted into the 23rd Regimental Hospital with small-pox. The disease was very mild in this case, and, though no vaccination marks were discernible, I believe the man was protected. The third case was a sepoy's son, and quite unconnected in any way with the other two. He was well protected by vaccination, having 2 well-marked cicatrices on the left arm, and 1 on the right. All these cases were promptly removed to the contagious wards, and their huts and the huts adjacent to theirs were cleaned and



disinfected in the usual way. The members of their families are protected. There were 4 admissions from chicken-pox during the year. These cases were all protected by vaccination.

19. This was carefully done. Thirty-six cases of primary vaccination, of which 32 were successful and 4 unsuccessful. Twenty-three cases of re-vaccination, of which 6 were successful and 17 unsuccessful. The recruits could not be spared from ball practice, for vaccination, until very recently. Most of them are now fully protected, as are all the sepoys at head-quarters.

20. The general health of the men has been, on the whole, good. The recruits were tolerably well made, and possessed the requisite amount of intelligence; but I confess I did not admire their physique. They are principally Konkani Mahrattas and Mahomedans from the Bombay side of India.

21. Cinchonidine was tried by me in this hospital. It seemed to me to be useful in mild cases and in 1st or 2nd attacks of quotidian ague if given in large doses; but I hardly think it can even replace quinine in the treatment of malarious fevers. Having seen the almost magical powers of the nitrite of amyl in cases of angina pectoris, asthma, and in vasomotor disturbances in women suffering from uterine disease, and having heard that a medical officer of the British Army had been trying the drug in ague with great success, I was induced to give it a trial in the latter disease. I have given it in the cold stage in doses of from 1 to 3 minims held on sugar. In all the cases this stage, which, there was reason to believe, would have lasted for upwards of an hour, was cut short within 10 minutes, in most cases within 4 minutes; the patient experiencing the grateful sensation of warmth, throwing off his numerous bed-clothes, and perspiring pretty freely. The subjects chosen for experiment were free from heart disease or arterial degeneration. Beyond flushing of the face and quickening of the pulse nothing occurred to cause the slightest anxiety. The temperature was at first raised a little, but subsequently lowered by the drug. In only two cases out of several so treated was the disease cut short and the patients discharged. In all the rest the cold stage was cut short, and the other stages subdued, but the fits recurred. Hence the amyl administered internally only relieved a symptom, and so far proved itself a valuable drug. I have not given yet the inhalation a trial in ague. It and the ipecacuanha-wine spray were found useful in the dyspnoea of bronchitis. In severe cases of ague, and in ordinary cases of remittent fever, I gave at first the tincture of aconite in doses of from 1 to 2 minims repeated every hour for 6 or 8 hours to reduce the temperature, or, failing that, placed the patients in warm baths, gradually cooling down to several degrees below the temperature of the body. After the excessive temperature was reduced, I gave a purge, and then catching the apyrexial interval of ague or the fleeting period of remission in remittent fever, administered one full dose of quinine. This formed the main treatment; but symptoms as they arose were combated, *e.g.*, the nitrite of amyl was given to cut short the distressing shivering fit, ice internally and endemic application of morphia to relieve the troublesome retching and vomiting, and so on. In protracted cases, and where quinine was rejected, and also in a few ordinary cases, the hypodermic injections of quinine were used with very great success. A clean needle and pretty sharp, a small bulk and perfect clearness and perfect solution of the neutral sulphate, and suitable temperature of the fluid, are the great secrets of success in this plan of treatment.

The extract of bael was found to be very useful in the later stages of dysentery. A case of diarrhoea was successfully treated by large doses of the liquid extract of ergot. The application of carbolized oil to the surface in cases of small-pox seemed to relieve the burning pain very well, and prevent any foul smell emanating from the discharges. Skin-grafting was successfully tried in the case of bed-sores already described. The grafts were applied after the sores were brought to the healing condition; and after they had taken root, the sores healed very quickly.

22. The principal points on which I have remarked are—that the regiment has been in good health; the climate of the place has been very good; the physique of the men was fairly good, though a better class of recruits would improve the regiment; the huts were damp during the rains, and deficient in ventilation, cubic space, and light; the trench system of latrines is not quite safe; the water-supply was barely sufficient, and would get scarce in the ensuing hot weather; that certain drugs were found to be very promising in the treatment of disease; and, lastly, that a few detached huts should be constructed for those who are kept under observation to enable the surgeon to certify that they are free from infection, and fit to be admitted into the lines.



23. The medical pupils had instruction imparted to them, whenever they were free from ball practice and other duties, in arithmetic, elementary anatomy, materia medica, and in the English language. As cases occurred in hospital which were considered fit for clinical demonstration, they were taught medicine and surgery at the bed-side.

REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

There is little room for comparison between the past and previous year, for the aggregates of admissions to treated closely correspond; average health was fairly maintained, and the only notable features are relative excess in bowel complaints and increase in ague, the latter explained by decrease under continued fever. Lines much in the same unsatisfactory state as before, and there is the same common complaint of dampness in the rains from want of plinths, and resulting predisposition to disease. Remedy is perhaps more called for here than at Deesa or Baroda, in so far as at no other station are streets so constructed and confined, and perflation concurrently so imperfect. In any reconstruction permanent latrines should be located within reasonable distance; at present they are so inconveniently far as to be practically unavailable for families after dark,—a common defect at stations of the Mhow Division. Hospital, inspected December 8th, has ample and good accommodation; wall ventilation, however, complained of in cold weather, requires to be controlled. Subsidiary buildings sufficient, and mortuary completed since last visit; equipment, conservancy, and service satisfactory and efficient. The mortality was the lowest of any, and I was pleased with all I saw. Surgeon Parakh's report is painstaking and creditable.

(In this report no mention of the numbers of the treated, died, &c., of the detachment, stationed at Mehidpore from 16th of October last, is made.)

Wings of H. M.'s 25th and 23rd Regiment N. L. I.

INDORE.—In medical charge of Surgeon E. BURROUGHS;—strength, 224·6

1. The left wing of the 23rd N. L. I. is at present stationed here, having arrived on July 15th 1876 to relieve the wing of the 25th N. L. I., which had been stationed here for twelve months.

Detachments.

2. There are no detachments detailed from the wing.

3. There is plenty of room for new lines, which are greatly needed. The blocks of pendals are five in number; they are far too close together, and the height of the plinth is not sufficient: I may say they are in a most unsatisfactory state.

Lines.

The native officers' dwellings are very good; but as they are situated to the west and close to the sepoys' huts, they prevent the current of air to a great extent from passing down the lines. There are five native officers' houses.

Ventilation.

The ventilation in the lines is not good.

The bazaar

Is situated about half a mile from the lines, and is clean.

Drainage

Is tolerably good during the wet season.

Tanks.

There are none in the immediate proximity of the lines.

4. The latrines for men are situated about two hundred yards to the north-east of the huts: the pans are eighteen in number. Those for the women are to the south of the men's latrines: there are ten pans. Lately carbolic acid and MacDougall's powder have been issued to the sweepers every other morning. The sewage is buried to the north of the latrines in pits.

Conservancy and sanitary arrangements.

5. Is furnished by two wells, one close to the hospital and another to the south of the lines, in close proximity to a large ditch which receives a portion of the drainage from the lines, and which during the

Water-supply.







Sickness and mortality and invaliding.

The following are the diseases that occurred in both wings during the year :—

Disease.	25th Regiment Native Light Infantry.	23rd Regiment Native Light Infantry.
Syphilis, primary ... ..	3	3
„ secondary ... ..	1	.....
Contusion, lower extremity ... ..	5	6
„ upper „ ... ..	.....	7
Intermittent fever ... ..	20	55
Rheumatism ... ..	2	7
Dysentery ... ..	2	16
Diarrhœa... ..	3	16
Acute synovitis ... ..	1	.....
Scabies ... ..	1	9
Varicella ... ..	2	.....
Colic ... ..	2	8
Wounds punctured ... ..	1	.....
Pneumonia ... ..	2	.....
Ophthalmia ... ..	1	2
Bronchitis ... ..	1	5
Abscess ... ..	2	6
Variola ... ..	1	.....
Sprain ... ..	1	.....
Gonorrhœa ... ..	.....	5
Ulcers ... ..	.....	2
Furunculus ... ..	2	5
Tinea tonsurans ... ..	.....	1
Impetigo ... ..	.....	1
Hernia ... ..	.....	1
Hordeolum ... ..	.....	1
Hæmorrhoids ... ..	.....	1
Pterygium ... ..	.....	1
Condylomata ... ..	.....	1
Totals...	53	159

There were no deaths and no invaliding in either wing during the year.

14. The amount of rain that fell during the year was 36 inches 29 cents. Towards the latter part of the rainy season the sickness was slightly increased.

Influence of rainfall.

15. Cholera was prevalent in the city only. One case of variola appeared in the wing of the 25th Regiment under Surgeon-Major Beaumont.

Epidemics.

16. Is performed by the district vaccinator, who attends at the hospital when required. There were 11 successful primary vaccinations : there were no re-vaccinations.

Vaccination and re-vaccination.

17. The health of both detachments has been good : the men of the 23rd Regiment, who have been enlisted for the last two or three years, bear no comparison with those who come from the northern stations ; they are neither so robust nor so smart.

General health and physique of the men.

18. In nearly all the cases of diarrhœa and dysentery in the wing of the 23rd Regiment the men were found to be scorbutic on admission, and not till they were cured of this did the fluxes cease.

Treatment of disease when special.

19. The number of sick are so few that there is no field offered for any kind of special treatment.

Special observations.

Intermittent fever in both wings was the principal cause of illness ; the admissions were one-third of the other ailments classed together. All the cases were treated by the hypodermic injection of quinine, followed up by quinine administered internally by mouth.



## REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

The station was healthier than in previous year. Bowel complaints still show unduly ; but under other heads the admissions were moderate, and comparatively few of the cases were serious. There was no mortality. Line accommodation indifferent ; but other conditions generally favourable to health, excepting that natural drainage is defective, and that storm-waters lodge on the adjacent ground, as its fissured appearance sufficiently indicates. Flatness of surface, however, renders remedy difficult; vegetables are scarce, and indications of incipient scorbutus are noted as not infrequent. Hospital, inspected December 9th ; its accommodation suitable, although limited, but, saving some crowding in autumn, hitherto adequate ; establishment and equipment complete ; conservancy efficient.

## H. M.'s 10th Regiment N. L. I.

MEHIDPORE.—In medical charge of Surgeon-Major F. R. O'KEARNEY, M.D. ;—strength, 378.

1. During the past year the head-quarters of the 10th Regiment N. L. I. were stationed at Mehidpore from the 1st January to the 28th October, when they marched on Neemuch and arrived at this station on the morning of the 7th November, where the head-quarters were stationed for the remainder of year occupying the lines used by the 24th N. I.

Locomotion and movement of corps.

Detachment.

2. The wing while at Mehidpore was relieved by companies from Agar in the months of February and March.

3. With reference to the climate, it may be well to state, that previous to departure the troops appeared to suffer from considerable sickness and general debility due to protracted malarious influences in (particularly for native) a most unhealthy climate where troops, as already suggested, should not be stationed beyond, as a maximum, two years, including annual reliefs by companies from Agar.

Climate of Mehidpore.

4. No change since last report, excepting that the trench latrines at Mehidpore, which were in too close proximity to the lines, were removed to a more reasonable distance, and the ground taken up by the former let out and cultivated by the inhabitants of the town of Mehidpore. The temporary covered latrines at Mehidpore were, as usual, used during the rains. The open pukka-built latrines used by the 24th N. I., at Neemuch, have been used by the 10th N. L. I. since arrival. The trench system is not practicable at this station, owing to proximity of drinking water and danger of possible pollution.

Conservancy and sanitary arrangements.

5. The sources are the same as last reported both at Mehidpore and Neemuch, respectively. The well sunk close by the river Seepra at Mehidpore, (though built just before the rains,) was never used ; it was covered by an overflow of the river in the month of September, and rendered practically useless for the time the regiment remained at Mehidpore, but was being cleared out before their departure. At Neemuch the supply is by wells ; the water is considered good and potable, but the quantity during the hot weather is said to be limited, especially during seasons of drought.

Water-supply.

6. The supplies, especially at Mehidpore, were dear and limited during the rains, owing to the deficiency of a well-made road from Mehidpore and Oojein. During the hot weather vegetables were said to be scarce, an item of native diet which might perhaps with advantage be supplemented by the Commissariat. The supplies at Neemuch appear generally cheaper and more satisfactory.

Food.

7. No change in this particular since last report. The want of properly-made English boots is much felt, and is the cause, both on the march and in quarters, of considerable inefficiency. The sepoy also, especially during the rains and cold weather, is badly clothed ; he should at all times be warmly clad, according to season, and his bedding and clothing improved, particularly when discharged from hospital after a protracted illness, and where the use of warm flannel clothing may have been afforded while in hospital ; but when the use of this is suddenly discontinued, he naturally becomes, (except in the case of very strong constitutions,) liable to colds, cough, fever, rheumatism and several other complaints tending often to much inefficiency and ultimately invaliding.

Clothing.



8. The duties at Mehidpore were moderate and not otherwise than beneficial. Those at Neemuch were rather more than usual and more trying, owing to the absence of the other wing and another regiment from the station. The average number of nights in bed while at Mehidpore was  $4\frac{1}{2}$ . The average at Neemuch was  $2\frac{1}{2}$ . The average for the whole  $4\frac{1}{2}$ .

9. The amusements have been few during the year, the men apparently being so weakened from effects of the climate of Mehidpore as to feel little inclination for exercise.

The usual trades of shoe-making, tailoring, lithographing, bookbinding, carpentry, &c., have been carried out, and as usual those having trades being excused guard duties but not the usual parades.

10. The only movements which took place during the year were the relief of the head-quarters wing by companies from Agar. The head-quarters marched from Mehidpore on the 28th of October, and reached Neemuch on the morning of the 7th November.

11. At Mehidpore these buildings remain as given in former report; another building, accommodating 8 patients, in a centre ward, with 4 small rooms for one patient each, was added during the year, and a contagious disease ward for 3 patients, with latrine complete, was being erected; a bath-room and dead-house are still required at Neemuch. The hospital accommodation generally is good, as used by the 24th N. I., and no change has been made since last report, with the exception of a modification of the floor-ventilators (originally planned for Europeans) being provided with boarded doors to regulate the draught, which for native troops was found at times, and especially in the cold weather, excessive.

The want of air, light, and adequate ventilation, are much felt in the hospitals at Mehidpore, as has already been suggested. The ventilation of the hospital, at this station, is in every respect satisfactory, particularly since the floor-ventilators, previously alluded to, have been introduced since the arrival of the regiment.

At Mehidpore overcrowding, due to want of space, has been frequently unavoidable both during and after the rains, owing to an increase of sick, many of the patients having been accommodated in the verandahs, which were fitted with chinks and mat-frames for the occasion. The additional new ward has, to some extent, relieved the overcrowding; but the accommodation is still insufficient, especially on occasions of much sickness, when the men in excess had sometimes to be treated both in their lines and verandahs of the hospital. At Neemuch no overcrowding whatever has occurred, for the accommodation was adequate, as far as it refers to the strength present at head-quarters; probably when the regiment is all together, the other block adjoining may be required. It is now used by the regiment as a school-room, tailors' and band-room.

The hospital accommodation has been so far satisfactory with the exception of defects at Mehidpore, already mentioned. Since arrival here a considerable improvement has been effected, in the ventilation of the wards, by the addition of boarded doors fixed to the entrance outlets of the lateral floor-ventilators, which are now so adjusted that, by closing or opening, the draught is moderated or accelerated through the wards almost at pleasure. During the cold weather these ventilators have been found by me too uncomfortable and overdraughty for native troops, and being now somewhat modified are kept, as a rule, constantly closed, especially at night and during the early morning. A contagious disease ward and a dead-house are much required here and have been recommended. Quarters complete for the 1st and 2nd class hospital assistants and medical pupils; that for the former is deficient chiefly in a bath-room, but for the latter there seems no accommodation whatever, as these boys are obliged to live in the lines, far away and inconveniently removed from their duties.

With the exception, at Mehidpore, of the latrine trenches, which were too close, having been removed to a more reasonable distance from the lines, no change has taken place at either station, and under this head all remains in *statu quo*.

The hospital water-supply remains the same as given in last year's report for both stations, respectively; that at Mehidpore is very defective both as to quantity and quality. This was already unfavourably reported upon by the Chemical Analyser to Government, and in the hot weather the dipping-wells do not contain more than a foot or two of water, and that either brackish



or of most indifferent quality. During the period the river water is preferably taken and considered more potable and of better quality, though doubtless liable to considerable sources of contamination, from the number of towns, villages, and herds of cattle situated or encamped, at that period, along its fertile banks. The water-supply at Neemuch is chiefly from wells; it is generally abundant, (except during seasons of drought, which are rare,) and of good quality.

Sickness, mortality, and invaliding.

12. From the accompanying table will be seen much of what is required to be given briefly under this head:—

Abstract.	1874.	1875.	1876.
Average strength ... ..	366	361	378
Average daily sick ... ..	27.7	24.3	33.2
Sick to strength per cent. ... ..	7.56	6.73	8.78
Admissions... ..	953	858	1074
Admissions to strength per cent. ... ..	260	237	281.5
Percentage of treated to strength ... ..	263.1	242.38	289.95
Deaths in hospital ... ..	.....	25	3
Percentage of { deaths to strength ... ..	.....	6.93	0.79
{ deaths to treated ... ..	.....	2.86	0.27
Invalided ... ..	47	26	21
Percentage of invalided to strength ... ..	12.8	7.20	5.55
Men recommended change of air on sick leave ... ..	17	21	8
Percentage of men who obtained sick leave to strength... ..	4.64	5.82	2.12

From the foregoing abstract it will be seen that the record of sickness for the past year, with an average strength of only 378 at head-quarters, has furnished a much heavier list of admissions (1074) than either of the two previous years. The mortality in hospital was also greater; and with regard to invaliding (21), though it was less, it must be remembered that during the two former years while at Mehidpore most of the sickly aged or otherwise "unfit" were carefully selected and weeded out of the regiment, leaving few belonging to the above category, and those comparatively young or middle-aged men of short service, who were considered unlikely to follow in the way of their pensioned comrades, as invalids for the next year. The number of invalids (21) for this year was, therefore, naturally less, 5.55 per cent., and at the rate of 12.8, 7.20, and 5.55 per cent. of strength for 1874, 75 and 76, respectively. If then the total given of invaliding during the three trying years the regiment spent at this highly malarious station be added up, it will be seen how excessive and alarming is the proportion of "invaliding," viz., 25½ per cent. to average strength 368; and this in a measure irrespective of the baneful after effects (I will say both physical and moral) produced, on a regiment, by a too protracted residence in such a low-lying, fever-stricken locality. I do believe that were the troops to remain much longer exposed to, and quartered in, this hotbed of malaria, with the health of men so long suffering and persistently bad, the result would have been most disastrous to the well-being and efficiency of the regiment, and have led ultimately to much further dangerous sickness and loss of life and considerable invaliding. As it so happened, the troops fortunately, owing to the earlier demand for reliefs at Neemuch (the 24th N. I. and 3rd Q. O. L. Cavalry being *en route* to Delhi) were prematurely, as it were, removed to this station—not, however, without losing one young native commissioned officer from remittent fever, attended for some days with considerable cerebral disturbance and delirium and towards the end violent intestinal hæmorrhage; also one sepoy suffering from general debility and asthma the sequel of fever, and another man who succumbed to a bad attack of remittent fever complicated with pneumonia and extensive capillary bronchitis immediately after his arrival at Neemuch. This shows to some extent the deep and, in many cases, fatal grasp malarious disease, persistent and endemic to this locality, had taken of the troops. It is now much to be feared that the present general debility, more or less engendered, may lead in many to serious impairment of constitution and ultimately lay even in comparatively young men of short service the foundations of organic affections of the lungs, liver, spleen, stomach, intestines, &c., and thus lead more particularly in a light infantry regiment to considerable future inefficiency, sickness, or invaliding. The change to Neemuch, though not sufficient in the case of a regiment so circumstanced, may doubtless to some extent prove salutary; but it is not to be expected that troops, deeply sunk and strongly saturated with malarial poison, could



readily recover health, vigor and stamina in a climate such as Neemuch. I am of opinion, that the troops, after being quartered for two years at Mehidpore, should equally with those from Aden be sent to a good, healthy and non-malarious station. I would, therefore, again strongly recommend that no troops, in future, be allowed to remain beyond two years, under any consideration, in that (more especially for natives) highly malarious locality, which, despite every sanitary effort made in the direction of general surface drainage, roads, lines, food, water, removal of over vegetation, &c., it must be said continues still a very focus and hotbed of malarial disease; and I would respectfully add, that should Government feel it requisite to retain the station as a permanency, that the present lines should, without hesitation, be removed to a better chosen and more elevated site, adjoining the old Cavalry lines, which in every respect seem comparatively good, healthy, and more eligible for a camp, and where open, raised, and healthy ground is available, with deep and good wells already provided, the water of which seems to be both good, potable and much more abundant than that of the lines. On this site a few of the Irregular Cavalry are always stationed, and I find they seldom or never complain of fever, and seem to enjoy and speak highly of the salubrity of the place comparatively with that of the present low-lying Infantry lines, situated close to and between the main nullah and river Seepra, which, during heavy rains, is liable to overflow, swamping the parade-ground, lines, and officers' quarters. This year, the married people and families had to vacate the lines, as a precautionary measure, and seek, by boats, a hasty shelter outside the cantonment or elsewhere.

The general total number of cases treated during the past year was 1,096; of these 22 remained from the year 1875. 1,074 were admitted; 3 died, 1,012 were discharged to duty, 34 were discharged in column "otherwise," 17 were transferred to Agar in February and March with the relieving detachment, and 30 were remaining in hospital at the close of the year. Of the 34 men discharged "otherwise," 18 were hospital cases invalided, 8 were sent on sick certificate, and 8 men were detained in hospital at Mehidpore, being unable to march, viz., 4 ague, 1 remittent fever, 2 ulcers, 1 lumbago; these latter have since rejoined. Besides the above, there were 4 cases of minor surgical operations, viz., one reduction of inguinal hernia and the radical cure of hydrocele; these 4 cases occurred to 2 individuals operated on twice in succession. The largest number of admissions and treated, as usual, appears under the head of general diseases, especially ague 720 and remittent fever 14, giving a ratio of 194 per cent. of treated to average strength. Nine cases of chicken-pox are recorded, viz., 7 in April and 2 in June, with 21 cases of mumps occurring chiefly both during and after S. W. monsoons, and due, in a great measure, to the depressing effects of climate with cold, damp, and general debility combined; 16 cases of rheumatism, of which 3 were acute, caused in the rains by cold, damp, and over exposure at night. Ten cases of lumbago are recorded, chiefly occurring during the rains from similar causes, together with general debility combined; most of the above cases were mild and amenable to ordinary treatment, with the exception of one man, who had to be invalided, from liability to frequent attacks of this disease. Fifteen cases of soft chancre and 4 of secondary syphilis were treated, giving the large ratio of 5 per cent. to average strength; all were contracted in the adjoining filthy large native town, where syphilitic disease, in its various forms, is rampant, and seems to reign uncontrolled in the absence of a lock hospital or other medical institution. One case of true leprosy, admitted in December 1875, was invalided in March after 17 years' service; 5 cases of scorbutus are recorded, apparently the result of climate and malaria, together probably with indifferent food, clothing, and other imperfect hygienic conditions; they were all, however, mild in character, attended with some congestion and sponginess of gums and general debility, but all were, in due course, discharged to duty. The case of dementia occurred to a short-service man, having only 10 years' service; he was invalided by special committee and discharged the service with a gratuity. Under diseases of the respiratory system were 12 of bronchitis, of whom 6 were invalided and 6 discharged to duty; 3 of asthma, of whom 1 died, 1 invalided, and 1 returned to duty. There were 4 cases of bronchial catarrh, which were treated and duly discharged to duty. Most, if not all, of the above affections of the lungs were either caused or aggravated by the persistent effects of malaria in constitutions already debilitated from constant attacks of ague, together with the cold, damp and general discomforts incidental to the rains in that unhealthy locality. One case of pleurodynia accompanied with chronic dyspepsia was treated; but when somewhat improved had ultimately, owing to extreme general debility and suffering, to be sent on medical certificate for 12 months to his native climate, Madras.

Of dysentery 10 cases are recorded, due chiefly to repeated attacks of ague and probably some malarial cachexia. Most of these cases were severe and protracted; 9 were discharged to duty, and 1 sent on sick certificate to the Konkan. The treatment chiefly consisted in *gr. xv. ipecacuanha* moderated by *ms. x. tinct. opii*, sinapisms to epigastrium, fomentations, and an occasional dose of *pulvis creta aromatic*, with or without opium. The case of hernia inguinal, owing to abnormally patulous ring, together



with chronic hydrocele (operated on twice), was discharged the service with gratuity. Eighteen cases of diarrhœa and 18 of colic, occurring chiefly during the rains and on the march, were treated and discharged to duty. None of these cases were much worse than mild, presenting only the ordinary symptoms of these diseases, as generally found among natives. Hepatitis 1 case, which occurred in February, was, when improved, finally transferred to Agar to his own company. Simple enlargement of the liver, 1 case in a young sepoy, the result of constant ague, had ultimately to be discharged on sick certificate to the Konkan. Jaundice 5 cases, due chiefly to climate, malaria, and frequent derangement of hepatic organs from ague; 4 of these were discharged well to duty, but 1 man had to be sent on sick certificate, owing to protracted general debility, consequent on the passage of a gall stone, the intense spasms produced being instantly controlled by the administration of the bromide of potassium in full doses *grs. xv.* Hydrocele, 2 cases treated for radical cures with the tincture iodine injected, undiluted, but were ultimately recommended to be invalided, as never likely to be fit for active service. One of these was pensioned, the other discharged with gratuity. Orchitis, 4 mild cases quickly returned to duty. Synovitis, 3 cases treated in 2 individuals; these cases were all tedious and chronic, requiring repeated blisters and counter-irritation with tonics, but were, in every case, ultimately discharged well to duty. The case of periostitis recorded was, I believe, transferred with the relieving detachment proceeding to Agar in the month of March. Guineaworm, 8 were admitted; these cases were contracted, either by young sepoys or recruits from the Konkan; all were finally discharged well to duty. Under diseases of the cutaneous system, those chiefly requiring notice are 23 boils and 10 scabies which, especially the latter, appear endemic to a degree at Mehidpore and due, the former, apparently to debility with bad and impurely potable water, and the latter, to want of personal cleanliness; this latter complaint is, especially at Mehidpore, highly infectious, having many severe varieties of the disease, and seems to pervade the native community, both great and small, most of whom appear affected.

Debility, 9 cases reported, of which 8 were discharged, but 1 man of over 30 years' service was invalided. Contusions 61; of these mostly all refer to the lower extremities, and were due to shoe-bites while either in quarters or on the march. Dislocation of hip, 1 produced by violent wrestling, and having been reduced, after prolonged detention in hospital, was discharged well to duty. All the other few cases remaining, and not given in this report, were mild and in due course discharged to duty.

The number of men who proceeded on sick certificate was 8, viz., 2 for ague, 2 for chancre 1 dysentery, 1 jaundice, 1 enlargement of liver, and 1 pleurodynia with dyspepsia. The number invalided was 21, viz., 5 for general debility, 6 bronchitis, 1 asthma, 1 remittent fever, 1 ague, 2 chronic rheumatism, 1 lumbago, 1 true leprosy, 1 dementia, 1 hydrocele, 1 inguinal hernia; 18 of these men were treated in hospital; the other 3 were taken from the lines as "unfits."

13. The chief causes of sickness were due to climate and malaria, especially during and after the rains. These co-operating with over-exposure to cold, wet, damp low-lying lines badly built and badly situated, together with water of bad quality, with clothing and perhaps food indifferent in kind, (the latter also together perhaps often badly cooked,) appear to have been the chief factors under this head. I have no doubt that a considerable amount of preventable disease is produced by the almost total absence of warm flannel inside clothing.

14. One native officer died from remittent fever accompanied with much delirium and intestinal hæmorrhage. One death was from asthma and general debility, and the third was from remittent fever complicated with pneumonia.

Mortality according to race. 15. One Mussulman and 2 Hindus.

Epidemics. 16. None at either station this year.

17. During the year there were 62 primary (in children of lines) and 77 re-vaccinations in recruits; the primary were all successful, and 18 out of 77 re-vaccinations were unsuccessful; the quality of lymph was generally good.

18. The general health has been most unsatisfactory throughout the year, for the reasons already adduced, chiefly referrible to soil, climate, and malaria. The general physique is, for the most part, good.

General health and physique of the men



19. The treatment with cinchonidine has not been a success. This drug appears unfit to grapple with the confirmed local miasmatic fevers. In mild cases it has been found occasionally useful, but more particularly as a tonic or an adjunct to the febrifuge action of quinine. The hypodermic injection of 5-grain doses of neutral sulphate quinine, dissolved in water with citric acid, and carefully filtered, was found almost in every case successful both at Mehidpore and Neemuch. This injection was only used in those cases where the use of quinine in 3 ten-grain doses up to 30 grains and over daily was found ineffectual. The bromide of potassium was administered with marked effect to a patient long suffering from jaundice and intense pain with violent tetanic-like spasms (opisthotonos), apparently the result of the passage of a gall stone. The spasms seemed effectually controlled by the action of the remedy, given in full doses gr. xv.

20. From the foregoing it will be seen that the general health and sanitary state of the head-quarters while at Mehidpore was most unsatisfactory,—conditions due, more or less, to a protracted stay in a highly malarious and unhealthy climate; that the accommodation in the hospital has been improved by the addition of another building, but that overcrowding, especially in the rains, still exists; that there were no epidemics, and that vaccination and re-vaccination have been successfully carried out during the year.

21. The medical pupils are daily instructed in the uses, doses, and therapeutic application of medicines; in writing, copying, and framing returns, and in the general routine duties of the hospital. The present Instruction of medical pupils. lads have only recently joined. The former medical pupil, Gumbeer Sing, General Number 712 (being declared fit), was sent to the Grant Medical College, Bombay, in October last.

#### REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

Health has been most unsatisfactory, the percentage of treated to strength (289·95) being nearly double that of any other corps,—a matter referrible to lengthened residence in the very malarious cantonment of Mehidpore, and to the extreme frequency of ague concurrently resulting; mortality, however, was exceptionally low, and confined to 3 casualties for the year. Since arrival on 7th November, sickness has mainly abated; but some time, I apprehend, will be required to restore a fair standard of health. Of local insanitary influences at Mehidpore the more notable are lowness of site, bad drainage, bad water, and dearth of the staple food (bājri) of the Bombay sepoy. The lines are fairly average, with plinths; and proper ventilation is feasible, as they are not back to back. Dr. O'Kearney refers to the old Cavalry lines as being healthy and eligible as a site. I have not seen them, but consider that data on this subject might be desirable. The Neemuch lines are inferior, and duties at present heavy; but in all other sanitary surroundings, as in climate, the regiment greatly profits by the change. The Mehidpore hospital is insufficient in accommodation. That at Neemuch adequate, but deficient in supplementary buildings. At my visit (November 28th) I found the wall ventilation excessive, and complained of; this defect has since been remedied, and the floor lateral ventilation is now under control; all else was satisfactory: vaccination was duly carried out among the men and families.

#### H. M.'s 3rd Queen's Own Regiment L. C.

NEEMUCH.—In medical charge of Surgeon-Major C. J. F. MACDOWALL;—strength, 324·4.

Location and movements of corps.

1. The whole regiment marched to Delhi on the 9th of November from Neemuch, and was very healthy during the march.

Detachments.

2. No change since last year. There is a squadron at Nusseerabad.



3. The following are the analyses of the military (most used) potable well waters, &c., as examined by the Government Analyser :—  
Water.

## MILITARY WELLS.

*Analyses by Government Analyser.*

Cholera year 1875.	Grains per Gallon.		Grains per Gallon.	
	Total Solid.	Chlorine.	Free Ammonia.	Albumenoid Ammonia.
Royal Artillery, Well No. 1	39.20	3.97	.0065	.0021
Do. do. No. 2	76.30	12.42	.0009	.0042
Do. do. No. 3	42.70	5.46	.0018	.0063

These waters were all considered to be good in the Government Laboratory, Bombay, and at Neemuch itself. The bazaar wells and river water were considered to be only fair, and to require filtering. Yet the regiments (European especially) suffer much more in proportion and in severity from cholera (every 3 to 5 years) than the inhabitants of the bazaar. An exception has occurred in the 3rd Light Cavalry, which has not lost a single man during two epidemics, though close to the Royal Artillery, which suffered so much last year.

I have now to state, as summarily as the subject will admit of, the advances in sanitation, (and which directly or indirectly affect the health of the regiment) which have been made. The extensive system of drainage which I recommended some years ago, but which was in abeyance, on account of the serious expense which it entailed, has at last been commenced in earnest, instead of the partial measures which were formerly resorted to. This system comprises the drainage of all the black soil about camp (especially below the tank and about the barracks), into the two nullahs which skirt the cantonment. These nullahs have been straightened and cleared to some extent already, and wide cuttings have been made, sloping towards them, instead of the semi-stagnant rivulets, which were in many cases quite inefficient. The trap tufa, on which the cantonment is situated, has also been drained, on the surface, by open ditches of sufficient depth, especially near the European barracks. They all lead to the larger cuttings, which, by their regularity and smooth slope, traverse the parade-grounds not only without injuring these, but actually improving their condition,

In the bazaar, lateral or central saucer drains, wherever the width of streets allow, are being substituted gradually for the square deep stone ones (as being a better system). A proposal to cover some large rain-water outfalls was negatived by the Cantonment Committee, and I think, properly so. Some further alterations of a sanitary nature were carried out, both in the cantonment and the lines. In the cantonment a cesspool, outside the Commissariat slaughter-yard, was replaced by iron receptacles for receiving the blood and flushing water. In the bazaar, several small cesspools were treated in the same way. As sanitary officer, I found some private wells in small courtyards not far from privies belonging to the same enclosures. These were directed to be carefully paved, and the water in such wells recommended not to be used by the owners.

All the public wells were recommended by me to be covered in, and to be flagged or reflagged round their circumference. Saucer drains were recommended as very emergent in the neighbourhood of all such wells. All these measures have been begun.

4. In the 3rd Cavalry lines, minutely described last year, the huts are altogether too small and low; a committee recommended the raising of the flooring of some of them, as water actually seemed to rise from the ground. These huts are the property of the regiment, but it is impossible for men out of their pay to build new ones. They are miserable as dwelling-places, and are eminently unsanitary, as described in former years; as also were the ventilation, bazaar, neighbouring villages, surface drainage, and tanks.

5. Described last year. Sweepers are not numerous enough, perhaps, but I could not get their number increased, nor that of the conservancy carts.

Conservancy and sanitary arrangements.



Food, quality of, and whether abundant and cheap.

6. The food has been abundant and cheap.

7. The clothing is of excellent European cloth. The boots and buckled shoes, of Cawnpore make, cause frequent sores, over the instep, &c., which is at least curious, as there is little foot duty.

Clothing, &c.

Duties and effects on health.

8. The men's health does not suffer from the nature of the duties they have to perform, save by horse-riding accidents.

Marches.

9. To Delhi.

10. There has been scarcely any difference in the relative numbers of fever cases during the present and last year (the rainfall having been almost identically the same in amount).

Sickness, mortality, and invaliding.

Dysentery was almost double in frequency. There was only one death, in all, this year; it occurred as follows (from dysentery):—A man convalescent from this disease got leave to stay in, and continued to receive treatment in the lines, for a few days, on account of family matters. He afterwards confessed that he had his abdomen violently kneaded for hours consecutively, with a view, as he said, of completing the cure. He died with every symptom of perforative peritonitis, but his friends would not allow of a *post-mortem* examination. Affections of the liver were also more numerous this year. One of these cases (abscess bursting into the lung) made a good recovery under treatment by nutriment, tonics (and stimulants, especially). He was, however, invalided as unfit for cavalry duty. The number of invalids was the same, and as small and unimportant as last year.

Sickness, mortality, and invaliding for the years 1875 and 1876 :—

Diseases.		1875.	1876.
Fevers	...	144	138
Rheumatic affections	...	27	21
Syphilitic affections	...	6	3
Scorbutic affections	...	6	1
Local Diseases.	Diseases of the Nervous System	6	1
	Insanity	2	...
	Diseases of the eye	9	16
	Do. of the heart	2	...
	Do. of the lung	12	3
	{ Bronchitis	1	...
	{ Pneumonia	...	2
	{ Pleurisy	3	2
	{ Diarrhœa	6	11
	{ Dysentery	8	8
	{ Others (colic, hæmorrhoids, &c.).	1	5
	Diseases of the stomach and bowels.	1	...
	Diseases of the liver	6	2
	Do. of the spleen	4	...
	Gonorrhœa	43	55
Ulcers	...	2	
Skin diseases	15	14	
Abscess	5	...	
Other diseases of this class	54	109	
Debility	...	361	393
Injuries	...		
Total			
Number of men invalided	...	12	11
" of deaths during the year	...	1	1
" of men discharged by court-martial	...	1	...
" of men discharged by invaliding committee	...	1	None.

11. The rain commenced this year on the 26th of June. Last year the monsoon burst on the 8th June. There were, moreover, two days of rain in May. The rainfall itself appears to have had no real effect in the



causation of cholera or typhoid, as the same and almost average amount produced very different effects ; thus—

Rainfalls compared :—

	Inches.	Cents.
In 1875...	...42	66 (Cholera.)
In 1876...	...42	76 (No cholera, but typhoid fever up to November, when the regiment left for Delhi.)

The following table shows the varying levels of the sub-soil water in different parts of camp. It will be noticed that the wells in the lower part of camp, near the bazaar and Cavalry lines (these include the old Royal Artillery lines, which are within a few yards of the Cavalry,) fall and rise much more markedly than the wells near the European barracks and on the different parade-grounds. These last are excavated in the trap ; whereas the bazaar, Cavalry and old Artillery wells are on a much lower level, and in the beds and course of the natural underground streams which feed them. The platform of trap tufa, on which the European barracks are built, retains, in fact, the water more ; but the wells are less fed from underground springs than the ones situated on a lower level near the bazaar. The differences are so great that the total direct rainfall (44 inches) is but a feeble factor in the rise and fall, except in the rock platforms. The other wells are all locally fed by underground percolation or springs. In years of drought (below 25 inches of rain) almost all the wells, save those near or in the river run dry. That the rainfall has apparently nothing to do with cholera is apparent from the fact, above noted, that with a precisely similar and almost average fall of rain (inches 42·76) we have had none, whereas in 1875 (42 inches 66 cents) we had a very severe form of the disease.

*RETURN of Observation made at 3rd Queen's Own Regiment, Bombay Light Cavalry Hospital, at the Station of Neemuch, to ascertain the Mean Level of the Sub-Soil Water for each month of the Monsoon 1876.*

Distance of Water-level from the surface.

Date and hour of measurement.	Rainfall from last date of measurement.	Distance of Water-level from the surface.										
		1 Well near eastern river-bed.	2 Cavalry Musjeed Well.	3 Regimental Bazaar Well.	4 Covasjee's Well.	5 Eddaga Well.	6 Mhow Road Well.	7 Hospital Well.	8 Near old barrack well.	9 Hospital 68th Regt. Well.	10 Patcherrey 68th Regiment Well.	11 Regiment Well on the parade ground 24th N. I.
Before the rains—	I. C.	F. I.	F. I.	F. I.	F. I.	F. I.	F. I.	F. I.	F. I.	F. I.	F. I.	F. I.
20th June 1876, 6 a.m. ...	0 9	15 6	31 1	32 6	38 11	21 9	21 0	21 31	18 6	18 1	22 4	12 4
After first fall (20th June)—												
15th July 1876, 6 a.m. ...	16 19	14 1	28 6	29 6	29 5	20 3	19 8	19 0	14 4	15 1	18 1	11 1
15th August 1876, 6 a.m. ...	10 32	10 1	19 8	17 8	17 6	10 0	9 0	18 0	12 9	8 0	13 8	8 8
15th September 1876, 6 a.m. ...	16 16	4 1	4 1	3 8	4 0	4 1	5 5	4 5	3 5	3 8	3 3	4 1
15th October 1876, 6 a.m. ...	....	5 4	5 2	4 8	6 3	5 3	6 3	5 8	4 2	4 2	4 4	5 3
Total ...	42 76											

12. In the regiment there was no epidemic, at least no death (although almost continued fever accompanied by diarrhoea was not uncommon) from the typhoid which prevailed in the Royal Artillery close to this regiment.

Epidemics.

A typhoid, however, of an undeniably characteristic and severe type (thermometric range, ulceration of small intestine, rash infection, &c.) appeared in the Battery Royal Artillery close to the regiment.

Upwards of 9 cases died \* (one an attendant on his comrade), being nearly half of the cases. In consultation with the senior medical officer, British Troops, it was recommended that the healthy men should be transferred to the nearly finished new barracks of the Royal Artillery, and the sick treated in tents. All the men had come from one single barrack only, and used the same latrine, in which the pans leaked.† The battery had not been long in the station, however. The disease seems to have been imported (?). The malady also soon ceased to spread. A suspicious and fatal case of remittent fever, with ulceration of the cæcum, &c., occurred in the Native Infantry Regiment.

\* Up to the time when this regiment left for Delhi (November 9th).

† This bare fact will scarcely account for the origin of the fever. The latrines of the Royal Artillery were too close to the barracks. Besides, some cases were admitted from the patcherries.



In spite of police and commissariat precautions, unhealthy milk, from foul-feeding cattle was, or might have been, an item in the etiology of the outbreak. The men, however, it was said, used chiefly goat's milk. Certain it is, however, also, that the regiment, which is the subject of this report, escaped the epidemic (which raged close by) with only the occurrence of some cases of feverish diarrhœa. Luckily we had (two years ago) removed some masonry latrines which were close up to the Cavalry lines and to the Royal Artillery, or the fever might have been attributed to them.

13. Thirteen men were vaccinated and 5 re-vaccinated, as during the last few years  
 Vaccination. and since the visitation of 1873 every man has been reprotected.

14. The general health has been excellent, but the physique of the men, since only a  
 General health and physique. small percentage of up-country recruits almost are allowed, has visibly deteriorated.

15. A liver abscess was twice evacuated (with Dieulafoy's Pneumatic Aspirator) by me.  
 Treatment of disease when special. The man, a follower, ultimately died after 3 weeks, when I was confined to bed with guinea-worm. Another large abscess was found posteriorly, as also multiple abscesses scattered through the whole parenchyma. Amongst the followers also a sequestrum was removed from the lower jaw; a large varix (aneurismal) inside the cheek was with difficulty tied, on three occasions, through its broad base and much diminished size, the facial artery being at the same time ligatured. Numerous sword cuts, fractures, and bullet wounds were also treated by me. Coroner's inquests had to be frequently attended also during the year. The above, combined with my duties as sanitary officer for the cantonment and as staff surgeon, including the arsenal and commissariat charges, must be my excuse for the hurried appearance of my report, which has, moreover, been hastily written under canvas at Delhi.

Special observations. 16. The immunity of the regiment from the epidemic of typhoid above noted, was remarkable.

17. In conclusion, it may be said that many sanitary reforms have been proposed and  
 Resumé. carried out this year in the cantonment, as well as, or in addition to, the commencement of larger schemes of drainage, &c. (recommended by me as sanitary officer for some years past), directly affecting the troops. The regiment has profited by the general sanitary improvements (but the huts and their small courtyard need to be much enlarged). It has, however, been healthy. Diarrhœa and dysentery showed some increase in frequency. New masonry latrines, neither so close to the lines as the old condemned ones, nor so far off as the present buildings, but somewhere on the ground now occupied by the Royal Artillery, (when these last shall move into their new barracks) are recommended earnestly, as the men have scarcely time to reach the present privies before accoutring themselves and horses for parade. The nature of the rocky soil precludes the possibility of earth trenches. With regard to the thermometric and barometric range, there was scarcely any difference between this and last year's. The rainfall also, as pointed out, was the same. It has been remarked above, that the regiment was very healthy during the march to Delhi. Soon after entering the sandy district beyond Nusseerabad, cases of dysentery began to occur, and, since the arrival at Delhi, increased in number. As fever was not common, it becomes a question (possibly a fanciful one) whether, as malaria was not marked, the enormous quantities of silicious dust (under the microscope are seen needle-like and angular particles) swallowed with the food and saliva on very windy days, does not play to some extent a role in the causation of some forms of diarrhœa and dysentery. These have ever been essentially diseases of camp life and out-door cooking. Early in my service I noticed the occurrence of dysenteric diarrhœa when marching with Europeans through a quartz district and when the winds were high. The whole theory bears, however, as I hasten to confess, an air of being far fetched. It cannot apply to all forms of dysentery, and, save as pointing to precautions in sheltering camp cooking-houses and utensils, is of little practical import. A general tendency to relaxation or rather irritation of the intestinal and other mucus membranes\* has prevailed both amongst officers and men of the regiment without their going on the sick list since we entered the district of finely disintegrated quartz, &c., &c., &c. This is a fact which is incontestable. Larger courtyards to the married men's huts I look upon as the most important desideratum in the lines. Such courtyards are necessary for the purdah females, it appears,† and nothing but size can make them sanitary. The regiment has been not unhealthy, it is true; but fever showed a tendency to be accompanied with looseness of the bowels and to assume a continued type. The sickness and mortality amongst the women and children are greater, and typhoid fever broke out close by. Next to the enlargement of the courtyards the raising of the flooring of the huts is an important, if indeed it be not a more important, measure yet to be carried out.

\* Upwards of a hundred cases.

† For bathing, &c.



## REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

This regiment was stationed at Neemuch up to 9th November, when it marched for Delhi. I had thus no opportunity of seeing it. Health satisfactorily maintained throughout, the percentage of hospital admissions to strength 121·15 to 114·24 in previous year, the return shewing decrease in rheumatism, scorbutus, and other zymotic heads, with increase under dysentery, conjunctivitis, and injury, the latter large. Only 1 death as in 1875, and the lapses by invaliding and discharge, in close approximation for both years, were only 11 as against 13. The defective state of the lines, as adverted to in the report, has its counterpart at every other station. The very inconvenient distance of the permanent latrines is also a source of common complaint in the Mhow Division. It is to be hoped, however, that when the Artillery move to their new barracks, this matter may have remedy, in so far as it is more pressingly required at Neemuch than elsewhere, trench latrines being inadmissible by reason of rocky ground.

(In this report no mention of the numbers of the treated, died, &c., of the Detachment stationed at Neemuch for November and December last, is made.)

## H. M.'s 24th Regiment B. N. I.

NEEMUCH.—In medical charge of Surgeon J. C. LUCAS; strength, 648.

1. The regiment was stationed at Neemuch, whence on 10th November it marched on Delhi, arriving on 16th December 1876 to take part in the Imperial Assemblage.  
Location and movements of corps.
  2. Concerning these I have to state that they are bad in every respect. The quarters for private and non-commissioned officers are small, ill-ventilated, dark—in short, I may express them as inferior in sanitary as well as in architectural points. The bazaar is small, and there is no village in its immediate neighbourhood. On the subject of drainage especially here I cannot also speak very favourably.  
Lines.
  3. These are the same as described in the last report. They are situated at about quarter of a mile or more from the lines. The water used for drinking and washing purposes for the sepoy and their families is derived from wells in the lines and a few in their vicinity. Its supply as derived from those sources is ample and the quality good, judging from the ordinary physical characters.  
Conservancy and sanitary arrangements.  
Water-supply.
  4. Though food at Neemuch is tolerably cheap, vegetables by no means scarce still native soldiers, especially those of Hindoo castes, seem to me to be here, as everywhere else, ill nourished; and the *causa vera* of this is the small pay they get, from which there are so many cuttings that it leaves very little for maintaining themselves and families in anything like a proper manner.  
Food.
  5. The boots worn by the sepoy are by no means good; they are wretched, unsightly, and ill-fitting, shoe-bite being in consequence a frequent cause of admission into hospital.  
Clothing.
  6. The duties are the ordinary routine of infantry.  
Duties and their effect on health.
  7. The soldiers, as a rule, seldom take to much in the way of exercise except gymnastics, but occasionally they are induced to take part in the gymkhana sports and rifle matches; and some sepoy, to augment their scanty income, take to different occupations, as carpenter, &c.  
Exercise, amusement, and occupation.
  8. The accommodation in the hospital is good, consisting of a long building which formerly was barrack quarters for British troops. There is another separate building, a portion of which is in use as the Native Infantry boys' school, and the rest I used, when required, as wards for women and children and obstetric cases. There is, however, no provision for the admission of cases of contagious affections, nor is there any kitchen or dead-house.  
Hospital and its surroundings.
- The ventilation in the hospital buildings is good; the average cubic space even in the rains, when there is the largest number of admissions, is adequate. But I regret these remarks cannot be applied in regard to the ventilation in the regimental huts: the apertures for the entrance and exit of air are indeed very small, and these are not unfrequently and through ignorance stuffed up by straw and grass, and the breathing atmosphere is not only rendered impure from this cause but also from the smoke and gases of cooking. To this I beg to invite attention.
- During the time I have been in medical charge of the Native Infantry hospital at Neemuch there has never been anything approaching to overcrowding.  
Overcrowding.



The accommodation, as above said, is ample, but the following may be enumerated amongst the principal defects; the want of a suitable broad verandah on the south-west side of the building renders the latter excessively hot in the summer months when temperature averages a maximum of degrees 91. There is no dead-house, and this I consider a no little deficiency in an hospital, not only for the removal of the dead but likewise for the performance of autopsies.

The hospital latrines are at a desirable distance from the hospital, and built of permanent masonry; receptacles are provided for the reception of the excreta, which are removed daily; deodorization and disinfection are properly carried out. A small urinal placed in or near the hospital will prevent the frequent practice of sepoy and others in hospital voiding urine on the ground surrounding it.

The water from the hospital well is good, the sub-soil depth of which and the influence of rain-fall on it is shewn in the subjoined table :—

Locality or designation of well.	Date and Hour of Measurement.	Distance sub-soil water below surface of ground.		Rainfall from last date of measurement.	
		Feet.	Inches.	Inches.	Cents.
Hospital well No. 14 perennial supply.	15th January 6 A.M. ... ..	13	5	.....	.....
	15th February do. ... ..	15	1	.....	.....
	15th March do. ... ..	16	5	.....	.....
	15th April do. ... ..	18	2	.....	.....
	15th May do. ... ..	19	8	.....	.....
	15th June do. ... ..	21	8	.....	.....
	15th July do. ... ..	19	.....	12	54
	15th August do. ... ..	18	.....	5	95
	15th September do. ... ..	4	5	24	20
	15th October do. ... ..	5	6	3	75
	15th November do. ... ..	.....	.....	.....	.....
	15th December do. ... ..	.....	.....	.....	.....
				46	44

9. The sickness during the year under consideration and its comparison with that in the preceding year will best be seen from a glance at the undermentioned table :—

Sickness, mortality and invaliding.	Remained under treatment, 1st January 1876	...	...	...	25
	Admissions during the year	...	do.	...	780
	Total treated during the year	...	...	...	805
	Do. do. do. do. ... ..	...	1875	...	1,035
	Difference	...	...	...	230

The following are the result of the cases :—

Discharged to duty.	...	...	...	757
Sent for change of air on medical certificate	...	...	...	5
Transferred to other hospitals	...	...	...	16
Died	...	...	...	7
Invalided	...	...	...	16
Remained under treatment on 1st January 1877	...	...	...	20
Average daily sick in 1876	...	...	...	18.4
Do. do. in 1875	...	...	...	23.2
Percentage of treated to strength in 1876	...	...	...	124.23
Do. do. do. in 1875	...	...	...	166.40
Percentage of deaths to strength in 1876	...	...	...	1.08
Do. do. do. in 1875	...	...	...	1.77

Among the deaths was a case of remittent fever in which both the symptoms during life and the *post-mortem* appearances simulated those of a case of enteric fever. In this case the morbid appearances anticipated during life were verified at the *post-mortem* examination. There were altogether 405 cases of malarious fevers treated during the year, being a percentage of 50.31 against 55.56 per cent. of last year; and, with the exception of the case of the remittent fever which terminated fatally, the majority of cases were of an intermittent character of generally a mild quotidian type and uncomplicated with organic disease of the abdominal viscera. I found these mild cases readily amenable to the antiperiodic influence of sulphate of cinchonidine in doses of from grs. iii. to grs. v., especially if in combination with some ferruginous preparation and vegetable tonics. In cases of severer type, in order to avoid risks of experiments, I resorted to quinine, or to larger doses of from x. to xl. grs. of



cinchonidine or the two drugs combined, in the proportion of from 3 to 5 of the former to from 10 to 20 or 30 of the latter. In several cases of simple febricula cure was effected in a few days by a little aperient medicine. The admissions and re-admissions from dysentery numbered 20, being a percentage of 2.48 against 15, or 1.45 percentage last year. The treatment adopted was what is now well established, viz., by large doses of ipecacuanha. I am in the habit of prescribing in cases of genuine dysentery that drug in doses varying from 15 to 50 grains of the powder either alone or combined with opium, and either by mouth, or the former administered half an hour or thereabouts after an enema of the latter drug, not only to prevent the ipecacuanha from being ejected but likewise to allay the pain, tormina, tenesmus, and other distressing intestinal symptoms. Hepatitis gave 8 admissions, or percentage 0.99 against 5, or 0.48 per cent. of last year. The majority of admissions of inflammation of the liver were subacute or chronic. Rheumatic affections gave 27 admissions, or percentage 3.35 against 27, or 2.61 per cent. of last year.

Syphilis, admissions 19, (inclusive of phimosi and bubo, which were symptoms), being a percentage of 36 against 9 admissions, or 0.87 per cent. of last year. Of these cases there were 14 of what may be designated primary infection and 5 secondary or constitutional syphilis. Gonorrhœa, admissions 2, being a percentage of .25 against 3 admissions of last year; orchitis, 3 admissions. Among the diseases of the circulatory system I may here note an interesting case of aneurism of the abdominal aorta. This man has been invalided. The symptoms at first slight, in the absence of careful physical examination, were very obscure and, I may state, puzzling. The differential diagnosis from gastric or neurotic disorders or from a tumour situated over the aorta presented some difficulty. Scurvy gave admissions 7, or 0.87 per cent., against 13 or 1.25 per cent. last year. The cause of such a large number of admissions from this affection goes to demonstrate the deficiency of nitrogenous and saccharine aliments, more especially of vegetables and meat in the diet of the men. Of the disease of the respiratory system there were 90 admissions, or 11.18 per cent., against 66, or 6.38 per cent., of last year.

Diseases of the cutaneous system gave 43 admissions, or 5.38 per cent., against 56 or, 5.41 per cent. of last year.

Eight cases terminated fatally, 2 from remittent fever. One man was murdered by four comrades with whom he indulged in alcohol. The circumstances of this murder, beyond the fact of death having been caused by strangulation, was not clearly proven.

One morning at Delhi, when the temperature in the open was about 38°, a man who was at the time on guard duty was brought to hospital in a dooly in a collapsed condition, with all the outward visible aspect of a corpse, with the exception that circulation and respiration were very feebly carried on. This was fortunately at the time of my visit, and being on the spot, warm diffusible stimulants were repeatedly administered, warmth resorted to, the patient being well covered with thick blankets, and first made to lie and afterwards to be held in the erect posture before a large fire. The temperature of the body was very soon raised to the normal standard by working the flexor and extensor muscles of the extremities, which likewise had its physiological beneficial effect on circulation and respiration. The man was completely brought to in about half an hour or forty minutes.

10. Under this important heading I have to mention the diet of the sepoy, its quality and quantity, which predispose him to disease, to which from want of much stamina he so readily succumbs.

The next cause to which I beg to be permitted to invite attention is also with reference to hygienic principles, namely, clothing; and in addition to what I have stated in a previous paragraph, I may here remark that in the cold weather the poor sepoy is, indeed, very little protected from cold; he cannot afford to provide himself with under-clothing or plain clothes, and thus the affections—pulmonary, intestinal, &c., &c.,—arising from chill are accounted for. I have no other or special remarks to offer here, with the exception of malingering, on which subject I have to observe that it is resorted to from one or both motives—of shirking duty or to obtain pension.

11. The principal causes of mortality is shown in the subjoined table:—

Ague complicated with bronchitis	...	...	...	...	1
Ague, afterwards bad remittent fever, and died of congestion of the lungs	...	...	...	...	1
Bronchitis	...	...	...	...	1
Pneumonia	...	...	...	...	1
Remittent fever	...	...	...	...	2
Tetanus	...	...	...	...	1
					<hr/>
				Total...	7



- Mortality according to race. 12. Hindus ... .. 5  
 Mussulmans... .. 2
13. The rains commenced somewhat unusually late on the 7th July 1876. Total rainfall 46 inches and 44 cents. The effect was to increase the number of admissions from ague and bowel complaints.
- Influence of rainfall.
- Epidemics. 14. No epidemic disease came under observation.
- Vaccination and re-vaccination. 15. Vaccination was efficiently carried out by 2nd Class Hospital Assistants Reuben Samson and Heera Swamee; there were 17 operations performed.
16. The physique of the men of this regiment is not what it might be. A certain proportion—roughly estimating, from those that come daily under my observation, at about 30 per cent. strictly speaking, under circumstances of field service as fighting-men—should not be allowed to continue in the ranks. Their general physique, configuration of the chest, muscular development, &c., &c., which when taken into consideration with the quality and quantity of food they take are not such as to render them thoroughly efficient soldiers. This statement, I beg to state, is well supported by their physical powers of enduring fatigue as demonstrated in the march from Neemuch to Delhi, and at the latter place on parades, reviews, and guards of honour. On the day on which all the troops were drawn up along the streets in honour of the arrival of the Viceroy, several men had fallen out, and one was conveyed to camp insensible and collapsed, but I am glad to say was brought round: and again partly on account of being insufficiently clad, they readily contract catarrhal affections, particularly pulmonary, to which they soon succumb. From the same causes above described they have very little power of resisting or overcoming disease. During the year, 30 recruits joined the ranks; of this number 4 belonged to the regiment. The class of recruits that apply for enlistment is, indeed, inferior. The great majority of them are small in height as well as in chest measurement and muscular development; they are ill-nourished and cachectic in appearance.
17. I have nothing novel to offer here. In the treatment of ague the salt of cinchonidine proved (in ordinary cases) efficacious as a febrifuge. In genuine tropical dysentery large doses of ipecacuanha are resorted to with advantage and tolerance. I mention this simply because I still observe the drug occasionally prescribed in useless and wasteful small doses, ipecacuanha being as much a specific for dysentery as quinine is for ague.
- Treatment of disease when special.
18. I have had the medical pupil at my house twice a week, and have instructed him by making him write and study from dictation the preparations, doses, and properties of drugs, the symptoms and treatment of ordinary diseases, as well as of common poisoning, besides clinical instructions in the hospital wards.
- Instructions to Native medical pupils.

## REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

I had no opportunity of inspecting this charge, as the regiment had left for Delhi some time before my arrival. Health, however, was fairly average, the hospital returns comparing very favourably with those of previous year, particularly as showing a large reduction in sickness, and notably in admissions from ague.

(In this report no mention of the numbers of the treated, died, &c., of the portion of the regiment that was at Neemuch, for November and December last, when the head-quarters had gone to Delhi, is made.)

## Squadron 3rd Queen's Own Light Cavalry.

NUSSEERABAD.—In medical charge of Surgeon J. P. GREANY, M. D.; strength, 1064.

1. No relief took place during the past year between the squadrons at this station and Neemuch. On the 21st of November the squadron marched to Delhi to be present at the Imperial Assemblage.

Location and movements of corps.

2. Water-supply is plentiful from wells in and about the lines, but the quality is anything but good, being very brackish, and contains, besides, an abundance of solids, organic matters in large proportion rendering it unfit for drinking purposes; in a short time the station will be provided with good potable water, as a scheme is proposed for bringing water from a neighbouring village (Danta) about five miles distant.

Water-supply.



3. Total admissions during the year, 177. Fever as usual ranks highest, being 62 ; this is also an increase of 18 in the admissions from this disease, as compared with that of last year. Contusions of upper and lower extremity gives 36 admissions, boils 20, rheumatism 11, dysentery 8, lumbago 4, neuralgia 3, &c. One death took place from perforation of the intestines. Three men were sent on medical certificate to their country, and 1 discharged by court-martial, and 8 were invalided.

Sickness, mortality, and invaliding.

Vaccination and re-vaccination.

4. Total vaccination successful 20 ; re-vaccination, none.

5. Referring to the records it is perceived that although there has been a slight increase in the admissions over the former year, the health of the squadron at this station has been, on the whole, good. No epidemic occurred during the year.

Resumé of the whole.

#### REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

Not inspected; health was less satisfactory than in previous year, owing to greater prevalence of ague; nothing unusual appears to have occurred.

#### Left Wing of H. M.'s 10th Regiment N. L. I.

AGAR.—In medical charge of Surgeon J. P. GREANY, M.D.; average strength, 243.

1. The Left Wing H. M.'s 10th Regiment N. L. I. arrived at Agar from Mehidpore by companies, relieving those of the Right Wing on the following dates:—

March 1st 1876	...	Nos. 6 and 8 Companies.
„ 4th „	...	No. 5 Company.
„ 6th „	...	„ 7 „

and remained at that station till the 24th of October, when it marched to Nusseerabad *viâ* Neemuch, relieving the 16th Regiment N. I., ordered to proceed to the Imperial Assemblage at Delhi. Nusseerabad was reached on the morning of the 19th November, being the twenty-seventh day after leaving Agar; halts were ordered every third day, thus bringing the actual marching days down to twenty-one.

2. Conservancy is well carried out: there are two permanent latrines, distant about 430 yards from the lines; they are kept clean, as the sweepers' houses are between the latrines, and they are therefore always on the spot; the filth is removed in iron receptacles and carried beyond camp limits. The only objection to the present latrines is their great distance from the lines, which, especially in the rains, is a source of great discomfort to the families.

3. Water is supplied from existing wells, of which there are six in and about the lines; it is abundant and of good quality. The wells are pucca-built, having good chunam copings, and brickwork extends for about 6 feet from the top all round the inside; there are no imperfections or sources of impurity. During the cold season the sub-soil water is about 32 feet from the surface; from this it varies to 43 feet in the hot season, and to 16 feet in the rains.

4. Food is plentiful and of good quality; the rates of the principal articles used by the sepoy as food during the year were as follows:—

Flour, wheaten...	...	...	...	10 seers per 1 rupee.
Gram ...	...	...	...	16 „
Rice ...	...	...	...	7 „
Ghee ...	...	...	...	1½ „
Dhall ...	...	...	...	9 „
Milk ...	...	...	...	16 „
Meat ...	...	...	...	6 „



Vegetables were always procurable both in the bazaar and in the wing garden, which latter was got up in 1875 by Lieutenant-Colonel Pierce, then commanding the wing. As the regiment marched without any relief, no means were left behind for its continuance nor any one left in charge; and I fear there will be very little trace of this really useful institution when the 24th Regiment arrives there from Delhi.

5. The ammunition boot as now worn without stockings is the cause of the frequent admissions into hospital of men suffering from shoe-bite. This would be in a great measure obviated if stockings were issued to the men, or if, as adopted by some of the continental armies of Europe, rags were folded smoothly over the feet.

6. The duties consist principally of the ordinary parades, musketry, and sentry duty, and has had no prejudicial effect on the men's health.

7. Amusements were got up during the rains for the men (wrestling and other athletic sports). Although some of the men take an interest in gymnastics, they will not voluntarily engage in them unless some encouragement in the shape of prizes is given.

8. A new lock-up room was built during the past year; it gives 1,300 feet of cubic capacity and 100 square feet superficial area, and is well ventilated by means of gratings.

9. The hospital is a comparatively new one, and is ample for the sick of the wing of a regiment. At no period of the year was there overcrowding. The building itself, site, &c., have been fully described in former reports, and it is, together with the out-buildings, all that can be desired.

The hospital latrines are good. Excreta is carried away and buried to the north of cantonment and outside camp limits; one sweeper is kept on the hospital establishment, and is always at hand, and twice a day removed the excreta.

Close to the hospital is a large pucca built well, the water of which is very pure and abundant at all seasons of the year; it is well protected by a chunam coping, and there is no source of impurity.

10. There were in all 360 admissions into hospital during the year; of these the greatest number was from intermittent fever, viz., 199. Chronic rheumatism gives the second highest number of admissions, 40; then follows bronchitis, 21; contusion, 19. There were 4 cases of dysentery, the same of syphilis (primary and secondary), 1 case of small-pox, and 1 case of remittent fever. No case of hepatitis occurred.

Two deaths occurred during the year. Nine men were invalided and 7 sent on medical certificate to their country. None discharged by court-martial.

11. The principal cause of the large number of admissions from intermittent fever was, as previously remarked in former reports, the fact of the men being located for the previous year in the very malarious station of Mehidpore, at which station every regiment suffers severely from malarious fever at all seasons of the year, and the men's system is so saturated with the poison that from time to time they get renewed attacks. The number of admissions under the head of contusion (or shoe-bite) was mainly occasioned by the long march from Agar to Nusseerabad, and from the practice of the sepoy walking in thick ammunition boots without socks or some protecting covering for the foot. The case of small-pox occurred in that of a man returning from furlough in the Konkan, at which place small-pox prevailed during the early portion of the year, and he doubtless contracted it there or at some village on his way to rejoin his regiment. He was at once isolated, and the usual methods adopted to prevent contagion, and fortunately the disease was confined to him alone.

12. As previously remarked, there were 2 fatal cases, 1 caused by remittent fever on the line of march; this man had previously suffered from frequent attacks of remittent fever in Mehidpore and Agar, and also was ill when the march commenced. The second fatal case was in that of an old man recommended for pension: he had suffered from time to time from ague, rheumatism, and bronchitis, and for some months before his death great wasting of the body. An attack of dysentery supervening on his already exhausted system was the actual cause of his death.



- Mortality according to race. 13. Both men were of low caste—one a Purwari and the other a Mochi.
- Epidemics. 14. None.
15. During the year there were 11 primary vaccinations and 26 re-vaccinations in the wing, and at present every one is protected by vaccination.
- Vaccination and re-vaccination.
- General health and physique of the men. 16. The general health of the men has been very good, and their physique, taken on the whole, good.
17. The hypodermic injection of quinine (neutral sulphate) was tried extensively in obstinate cases of ague, and proved successful when the ordinary mode of administering by the mouth in large doses failed to get the attacks under. Cinchonidine has also been used and proved successful in mild cases, but only when given in large doses. The hypodermic injection of morphia has proved efficacious in relieving the intense pain of acute rheumatism.
- Treatment of disease when special.
18. It will be seen from the above remarks that the wing has enjoyed good health both at Agar on the march and for the short time it has been here; the number of admissions into hospital, although comprising those of the men previously referred to, shows a decrease of 32 compared with that of last year. The march did not prove in any way injurious to the men's health, except in the one fatal case from remittent fever and the increased number of admissions from shoe-bite. It is worthy of consideration whether this cannot be prevented, in a measure, by a trifling annual expense to the State, by the issuing of socks to the men.
- Resumé of the whole.
19. The medical pupil, Buyah Sing, has been instructed, from the time I took over charge, about once in every week in elementary anatomy, materia medica, and the knowledge and compounding of drugs. Now that musketry is going on, he is generally absent from the hospital during my morning visit, as his attendance is required on the rifle range, and he is not instructed as often as heretofore. He is an intelligent and willing lad, and takes an interest in his work.
- Medical pupil how often instructed during each week.

#### REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

This charge was not seen, its small strength and temporary sojourn not appearing to warrant the loss of time involved in visiting Nusseerabad. The wing was at Agar till 24th October, a salubrious station with attendant conditions all sanitarily favourable. Health was tolerably maintained throughout, but ague was prominent, as the men were quartered at Mehidpore up to Marsh, and most of the admissions under this head were from fever contracted in that malarious locality. Mortality very moderate.

#### H. M.'s 16th Regiment N. I.

NUSSEERABAD.—In medical charge of Surgeon W. C. KIERNANDER;—strength, 623.

1. The regiment left Nusseerabad on the 22nd of November and arrived at Delhi on the 15th of December to be present at the Imperial Assemblage Camp. The left wing arrived on the 31st January from Mhow.
  2. Are according to the standard plan: the roof is single-tiled, and the plinth is low, in some of the huts being on a level with the outside ground.
  3. Latrine trenches are used, and the ground over them cultivated: all conservancy and sanitary arrangements were the same as in the previous year.
  4. Water-supply is from wells. Dilwara water is supplied to the men, but, owing to the quantity allowed each man being small, very few use it. Mahadeo well, situated in a grove of trees near the railway station, is the favourite drinking water with the men. Jungle well and the hospital well are also used by some of the men. Except Dilwara the water from the other wells is slightly brackish.
- Location and movement of corps.
- Lines.
- Conservancy and sanitary arrangements.
- Water-supply.



- Food. 5. Cheap and abundant, except in the hot season, when vegetables are scarce and very dear.
- Duties and their effect on health. 6. Duties not excessive.
7. A gymnasium taken over from the 23rd Regiment when we relieved them, affords amusement and exercise unfortunately only to a few men who go in for gymnastics. If all recruits and men up to 15 years' service were obliged to go through a few exercises daily, it would improve the physique of the men greatly.
- Exercise, amusement, and occupation.
- Lock-up rooms and cells. 8. Lock-up rooms and cells according to the standard plan.
9. We marched on Delhi in November, and were obliged to leave over a 100 men in hospital who were suffering from intermittent and remittent fever; even then we had a great many admissions on the march from the same diseases.
- Marches.
10. The hospital is placed in an open plain on high ground without a tree near it: the consequence is, that in the hot weather it is a perfect oven, and in the cold season it is exceedingly cold. I brought this to the notice of the Cantonment Committee, and they very kindly gave Rs. 50 to plant trees as I liked round the hospital. The ground, however, is hard rock, and blasting is necessary, so that it took over a month to make the holes necessary for putting in trees and filling them with earth.
- Hospital and its surroundings.
- Overcrowding, accommodation, and defects. The hospital is well built and ventilated, and the verandahs were used for patients to prevent overcrowding in the wards.
- Hospital water-supply. Water-supply from the hospital well, the water of which at certain seasons is slightly brackish.
- Sickness, mortality, and invaliding. 11. There were 1,140 admissions and 4 deaths; the percentage of treated to strength was 172·8, and the average number of daily sick was 33·24. Thirty men were invalided.
12. The principal cause of sickness was fever, generally of the intermittent type, which in about 20 per cent. of the cases, merged into a low form of remittent fever; there were 730 admissions from this cause with 1 death. I have an idea that the well water of the Mahadeo tank, which contains much vegetable matter from decomposition of the leaves, &c., which fall into it, is in some way a predisposing cause of the fever, as the greater number of cases were drinkers of this water. Steps will be taken on our return to ascertain this and any other likely cause. To the same causes probably are attributable the diarrhœa, boils, &c., &c.
- Principal causes of sickness.
13. Enteric fever caused one death and remittent fever another; one case of sudden death was from a fatty heart, and the fourth from heat apoplexy.
- Principal causes of mortality.
14. Rainfall is scanty, and during and immediately after its cessation intermittent and remittent fever are rife. In August there were 41 admissions, and the peculiarity was that nearly all the cases were admitted with all the symptoms of cholera, and yet a dose of castor-oil invariably within 24 hours changed the symptoms to those of severe remittent fever. In September there were 69 admissions from fever, generally accompanied with diarrhœa and great prostration. In October there were 144 admissions with diarrhœa and in some cases vomiting as its accompaniments. In November there were 182 admissions. We left for Delhi on the 22nd, leaving 124 men behind in hospital: we had a daily average of about 40 fever cases on the march, and in December we had 108 admissions. Four marches out of Delhi on the 10th, we were joined by about 90 convalescents from Nusseerabad, who were sent to us by train, and nearly all these suffered again from fever while in Delhi, where it was exceedingly cold.
- Influence of rainfall.
- Epidemics. 15. None.
- Vaccination and re-vaccination. 16. Was carried on by the station vaccinator. Total vaccinations 24, successful 20, unsuccessful 4; re-vaccination none.



17. The regiment is in a very weak state at present, owing to the large number of men who have suffered from fever, which leaves much prostration and liability to recurrence as its sequelæ, unfitting a man for service for from two to three months at least, and even after this time exposure to cold at night invariably brings on a second attack with a prolonged convalescence. Most of the men who have not suffered from fever are fine, well-made men, and could march anywhere.

18. In the cases of fever described in a previous para., where a man was admitted with vomiting and purging of ricewater character, with eyes sunken, Treatment of disease when special. violent cramps, and weak small pulse, the similarity to a case of cholera was almost perfect; the only diagnostic sign, however, was that his skin was warm instead of being cold and clammy. I found that an ounce and a half of castor-oil always relieved and checked the symptoms; violent fever setting in within six hours, which was amenable to ordinary treatment. The turpentine treatment of typhoid fever was tried in the only case that occurred; but in spite of it the man died exhausted after severe hæmorrhage from the bowels.

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REMARKS BY DEPUTY SURGEON-GENERAL D. WYLLIE, M.D.

I did not see this regiment, as it had left for Delhi before I could have reached Nusseerabad; the duties of the General Invaliding Committee retarded me, and thus that station remained unvisited. It will be remarked that the corps suffered excessively from fever, particularly during the latter months of the year, and that the type was far more than ordinarily severe. It will be remembered also that a large number of the men were affected with scurvy some two years ago at Mhow, the other native regiment there being then free. The circumstances may possibly have no relation, as no scorbutus appears in the returns, but they are sufficiently significant to claim a watchful attention to all that concerns sanitation and physical well-being, and in particular to the condition of the tank water-supply.

(In this report no mention of the numbers of the treated, invalided, &c., of the portion of this regiment that was at Nusseerabad for November and December last, when the headquarters had marched to Delhi, is made.)



## SIND DIVISION.

Average strength present during the year .....	2990·4
Average daily sick per cent. to the average strength ...	4·7
Ratio of mortality per cent. to the average strength.....	3·1

## H. M.'s 29th or 2nd Belooch Regiment N. I.

KURRACHEE.—In medical charge of Surgeon J. A. HOWELL; strength, 627·2.

Location and movements of corps. The regiment has been stationed at Kurrachee during the year.

2. The regiment occupies the same lines as those reported on last year; they have all been re-roofed, and are very clean and comfortable. The conservancy arrangements are well attended to; 8 sweepers being employed, one for each company, and the excreta daily removed in carts, and buried some miles from camp. The water-supply is very bad; the Commissariat wells, from which the regiment is supplied, are better than the others in camp. It would be advisable if the Municipality would hurry on their arrangements of supplying the station with water from the Malir.

Food.

3. Very good, and abundant; prices not raised during the year.

Duties and effects on health.

4. Parades and guards; these have not exercised an unfavourable influence on the health of the men.

5. There is a very good gymnasium, and once a week the whole regiment with a lot of outsiders assemble, and witness wrestling, &c. Several of the men are good sportsmen, and play cricket occasionally.

Exercise, amusement and occupation.

Lock-up rooms.

6. Four lock-up rooms; they are well ventilated and commodious.

Marches.

7. None during the year.

8. No alteration since last report; it is well situated and very commodious: there has been no overcrowding. The deficiencies of a dead-house and store-room, mentioned last year, still exist. The water-supply is from a Commissariat well close by. The latrines are kept very clean; dry-earth system in use.

Hospital.

9. There were 597 admissions during the year. On glancing at the subjoined table, it will be noticed that there has been a slight increase in the number of admissions as compared with last year:—

Sickness, mortality and invaliding.

	1875.	1876.
Average strength...	627·8	627·2
Admissions	538	597
Deaths	4	5
Proportion of deaths to strength per cent...	0·7	0·7
Do. of deaths to treated per cent ...	0·7	0·8
Do of admissions to strength per cent	85·7	95·4
Average daily sick	20·8	18·0

The principal diseases treated were fever (malarious), rheumatism, chest, and intestinal disorders.

Fever in the form of ague was the chief cause of admissions. Of the total 597,—337, or more than half, were under this heading. The disease has been more or less prevalent all the year; the largest number of admissions—58—was in December, the smallest number—8—in April; the type was mild, and there was no direct mortality from this cause; the disease yielded rapidly in the majority of cases to the usual plan of treatment. Although there have been some cases of typhoid fever among the native population of Kurrachee, I am happy to record that there has not been a single case in the regiment. Malarious fever being most prevalent in the cold months of the year, is no doubt excited by undue exposure to cold in persons predisposed to the disease. Rheumatism of a chronic form is also a common complaint; in many cases the disease can be traced to syphilis. Improving the general health.—Use of iodide of potassium with a small dose of the bichloride of mercury, if there is a suspicion of a syphilitic taint, was the plan of treatment adopted. Under the heading chest affections there were 31 admissions, mostly cases of bronchitis and occurring in the cold weather. There were



2 admissions from pneumonia : 1 case terminated fatally ; in both the disease was most extensive, and the patients weak from previous attacks of fever.

There were 18 admissions for intestinal disorder, chiefly diarrhœa. There were 2 cases of dysentery, and 1 of enteritis : one of the former, and the latter terminated fatally. Conjunctivitis, 16 cases, all of the mild form.

There were 60 cases of contusions and ulcers, in the majority of instances due to shoe-bites. There were 9 cases of dracunculus ; these occurred in men who had joined from furlough or in recruits from the Punjaub. Guineaworm is seldom seen in Sind. One case of guineaworm in a recruit just joined from the Punjaub caused most serious mischief. The man, aged about 21, in good health, was admitted into hospital on the 10th October 1876 with a guineaworm which pointed on the outer side of left knee. On admission the knee was much swollen, and there was a good deal of constitutional disturbance. I managed to extract a portion of the parasite, but the young fellow in trying extraction himself after I had left hospital broke the worm. In a few days the knee and upper part of thigh swelled a good deal, and abscesses formed, which were opened ; these did not appear to heal, and constitutional disturbance continued. After a time a sinus was noticed leading to the joint, and dead bone was detected, as a good portion of the shaft of the femur was also diseased and the patient was rapidly losing flesh, there being no chance of saving life. After a consultation and with consent of the patient I amputated the thigh at middle, by the circular method, on the 18th December 1876. After a few days he commenced improving, and at the end of the month was doing well. In the treatment of the other few cases of guineaworm I did nothing but try gradual extraction. In one or two instances the worm did break, but there was no particular disturbance.

In this case the worm must have been pretty near the joint, if not in the joint itself, and its unfortunate rupture led to the formation of abscesses in the joint and along the shaft of the femur : this causing the death of bone in a scrofulous constitution.

There were 5 deaths, one from each of the following diseases :—Pneumonia, phthisis, bronchitis, dysentery, and enteritis. None of these require special remark. Twenty-four men were invalided during the year, 23 at the annual committee, and 1 at a special board. They were invalided for the following diseases :—4 malarious fever, 1 scrofula, 3 chronic rheumatism, 1 syphilis, 2 disease of the eye, 13 debility and old age. Malarious poisoning, influence of cold on delicate constitutions, errors in diet, and, in the case of recruits, insufficient food were the principal causes of sickness. The deaths were due to chest and bowel affections, and occurred chiefly in cold weather. All deaths occurred in Mahomedans.

Epidemics.	10. None. There have been a few cases of small-pox in the station, but none in the regiment.
Vaccination.	11. Carefully attended to : there were 40 primary and 178 re-vaccinations.
General health.	12. The men are in excellent health and physique. As the regiment is allowed to recruit from the Punjaub we have a very superior class of men.
<i>Résumé of the whole.</i>	13. The health of the regiment during the year may be considered satisfactory.

#### REMARKS BY DEPUTY SURGEON-GENERAL F. G. JOYNT, M.D.

The sanitary condition of the lines is good, and the accommodation is sufficient. The water is far from pure. The hospital, visited December 4th, 1876, is in good repair, is sufficiently roomy for its requirements, and is kept clean. Ventilation is good. Vaccination has been carefully attended to.

#### H. M.'s 27th or 1st Belooch Regiment N. I.

HYDERABAD.—In medical charge of Surgeon S. B. HALIDAY ; strength, 655.

1. The regiment has been stationed in Hyderabad during the entire year.
2. This was fully described last year. The surface drainage (consisting of rainfall) of the portion of the cantonment occupied by the officers' bungalows, flows into the tank, which acts as a reservoir to

Location and movement of corps.

Water-supply.



supply the Belooch wells. It has been recommended to divert the drainage referred to above to a distance from the tank.

- |   |   |
|---|---|
| Food.                                     | 3. Good and abundant, but somewhat dearer than last year. Grain compensation made up for increase of price.   |
| Duties.                                   | 4. Consisted of the usual parades, guards, and escort duty, which had no special effect on health.  |
| Exercise, amusement, and occupation.      | 5. Wrestling, horizontal and parallel bars, &c.   |
| Lock-up rooms and cells.                  | 6. The quarter-guard is unsuitable, and the cells are much too small, especially in the hot weather; a new quarter-guard is urgently required.  |
| Hospital and its surrounding ventilation. | 7. These have been fully described last year, and no change has occurred, since the new hospital, which was reported as under consideration last year, has not been built and is much required.   |
| Overcrowding.                             | On account of the excessive number of cases of ague, tents had to be pitched near the hospital for additional accommodation.  |
| Sickness, mortality, and invaliding.      | 8. The chief diseases were the following, arranged in the order of their frequency:—malarious fever, 594; injuries, including contusions and shoe-bites, 131; digestive system, 51; cutaneous system, 32; lung affections, 27; rheumatic affections, 27; venereal affections, 22, of which 11 were primary syphilis, 9 secondary syphilis, and 2 gonorrhœa. Cellular tissue, 13; conjunctivitis, 12; small-pox, 10, of which 3 were sepoys, 3 sepoys' children in the regiment line, and 3 adults and 1 child in the regiment bazaar. Seven deaths occurred—3 from bronchitis, 1 from phthisis, 1 from phlegmonous erysipelas, 1 from dysentery, and 1 from ague. Eighteen men were invalided, 14 being pensioned and 4 discharged with gratuity. |
| Principal causes of sickness.             | 9. The river Indus rose a foot higher than last year and flooded a larger extent of the low-lying ground, which produced an excessive amount of ague cases.   |
| Epidemic.                                 | 10. Small-pox has during the last few weeks appeared.   |
| Vaccination and re-vaccination.           | 11. Fifty-four were vaccinated and 224 re-vaccinated.   |
| General health and physique of the men.   | 12. With the exception of malarious fever, it has been fair.  |
| Special observations.                     | 13. The small-pox cases were immediately isolated and every precaution taken to stop the spread of the disease. The highest temperature was 112, and the lowest 56; the average temperature of the hot weather was 107, and of the cold 59. The rainfall was 8 in ches and 20 cents; 85 recruits joined, of whom 70 were Mussulmans and 15 Hindoos. The regiment is composed of 561 Mussulmans, 139 Hindus, and 2 Jews.   |

REMARKS BY DEPUTY SURGEON-GENERAL F. G. JOYNT, M.D.

The sanitary condition of the lines is fair, and their cleanliness and ventilation are duly attended to. There is no overcrowding; water is abundant and of fair quality. Malaria has been very prevalent this year. Visited the hospital December 12, 1876; found its sanitary state fair; the accommodation is insufficient to meet an outbreak of malarious fever like the present one. It is situated rather too close to the lines in the rear. Vaccination is attended to, but the whole corps should be re-vaccinated.

H. M.'s 1st Regiment Sind Horse.

JACOBABAD.—In medical charge of Surgeon S. O'B. BANKS; strength, 3252.

Location and movement of corps. Head-quarters of the regiment not moved during the year.



2. An average of 113 sabres on out-post duty during the year.
3. The clothing has been changed in two particulars. The overalls, which were formerly made of broad cloth, are now made of double dungaree. The head-dress now worn is of the Afghan pattern, and is everything which could be desired as a protection against heat and cold, and most likely a sabre cut.
4. Cannot be said to have exercised an unfavourable influence on health.
5. With only 13 patients in hospital the available space, cubic and superficial, was only 92 and 2,276, very much under what it ought to be. Though the daily average sick for the year was only 14.3, it must be remembered that the daily average since October has been, respectively, October 21.8, November 28.5, and December 26.3. The verandahs and tents had to be used, and the hospital reserved for the more serious cases, particularly chest affections.
6. Out of an average present at head-quarters of 325.2 sabres, 687 admissions took place, being an increase of 117 over the previous year.

Malarious fevers, as usual, were the chief cause of admissions, being 432—an increase of 70 over that of the previous year for the same diseases:—

January	...	...	46	July	...	...	9
February	...	...	24	August	...	...	10
March	...	...	25	September	...	...	42
April	...	...	13	October	...	...	63
May	...	...	3	November	...	...	122
June	...	...	6	December	...	...	69

The following table shows the different diseases according to class:—

Ague	...	...	432	Gonorrhœa	...	...	11
Acute rheumatism	...	...	3	Orchitis	...	...	3
Chronic rheumatism	...	...	14	Abscess	...	...	3
Syphilis, primary	...	...	6	Urticaria	...	...	1
Soft chancre	...	...	3	Eczema	...	...	1
Suppurating bubo	...	...	1	Ulcer	...	...	38
Syphilis, secondary	...	...	2	Boil	...	...	26
Scurvy	...	...	8	Whitlow	...	...	4
Conjunctivitis	...	...	5	Stinging Insects	...	...	1
Inflammation	...	...	4	Debility	...	...	2
Bronchitis	...	...	3	Opium	...	...	1
Pneumonia	...	...	6	General burns	...	...	4
Sore Throat	...	...	3	Contusion of the eye	...	...	3
Dysentery	...	...	20	Contusion of the ear	...	...	18
Diarrhœa	...	...	8	Wound (N. E.)	...	...	1
Colic	...	...	5	Contusion (L. E.)	...	...	42
Hepatitis	...	...	2	Sprain (L. E.)	...	...	1
Jaundice	...	...	1				

Four deaths occurred from pneumonia and 1 from injury—burns.

Six men were invalided during the year—5 over fifteen and 1 under fifteen years' service from the following causes: 1 inguinal hernia right, 1 chronic rheumatism, 4 general debility. Twelve men were sent on sick certificate during the year from periods varying one to six months: 6 from malarious cachexia, 2 from pneumonia, and 1 dysentery, 2 chronic rheumatism, 1 from debility.

7. None.
8. Vaccination has been steadily carried out during the year; 407 persons, including public followers, were vaccinated; 11 primary and 396 re-vaccinations.
9. Most unsatisfactory.

10. A *resumé* of the report would only be a repetition of my remarks made under this head and that of special observations for 1874 and 1875.



## REMARKS BY DEPUTY SURGEON-GENERAL F. G. JOYNT, M.D.

The sanitary condition of the lines is fair and accommodation is ample. The water-supply is abundant, but laden with salts. Malaria has been worse than usual during the past year. Hospital visited 17th January 1877. Sanitary state fair, accommodation sufficient under ordinary circumstances, but hospital liable to overcrowding when malaria is rife; the other buildings appear to be somewhat too close to it. I noticed that the walls were damp for two feet from the floor, which, considering the nature of the soil, is not to be wondered at. The plinth is insufficient, and ought to be of burnt bricks.

## H. M.'s 2nd Sind Horse.

JACOBABAD.—In medical charge of Surgeon M. L. BARTHOLOMEUSZ, M.B.; strength, 340.

1. The head-quarters of the regiment have not moved out of Jacobabad during the year. On an average, 97 sabres have been absent on out-post duty. A troop of 82 sabres proceeded to Sukkur as a guard of honour to His Excellency the Viceroy. This troop was away from head-quarters for fourteen days.

2. The climate of Jacobabad has been so frequently described in previous reports of officers in medical charge of regiments serving in this frontier, that any further remarks would merely involve a repetition of facts. There appears to me, however, to remain one important subject, partially connected with this topic, which might, with advantage, be touched upon, and that is a want which must some day be supplied if troops continue to be permanently stationed here. I refer to the establishing of a sanitarium in connection with this district. Miagwan has before this, I believe, been recommended for this purpose; its proximity to Jacobabad and its genial hill climate are sufficient recommendations in its favour as a sanitarium for the Upper Sind District.

Miagwan is a spur of the Kirthar range, connected by a neck of land with the main range at the Hondawar peak. Miagwan slopes down to the south and west into the Khenji Valley, and has an escarped face towards Sind. It lies about 40 miles to the west of Khaira Garhi and 90 miles from Jacobabad, and commands an altitude of about 6,500 feet above the level of the sea. Judging from the altitude, the climate must be almost typical as a sanitarium; and should this be established, it would be an inestimable boon to the officers of this district, and their families broken down with ill-health, and who are at present compelled to proceed to England or in the distant hill-stations on the Himalayan range to recruit their health.

3. The regimental lines have been described, but the defective ventilation reported upon has not been remedied. The conservancy arrangements remain the same.

4. In my last report the question of water-supply in camp was fully dilated upon. The wells in camp have, during the course of the year, been cleaned out and repaired, but the supply of filters to the different out-posts, where the water is very impure, has not yet been sanctioned.

5. Food is plentiful, and of good quality throughout the year, except at certain times when fresh vegetables are scarce, and scorbutic complaints result as a consequence. Scurvy is not an unfrequent affection amongst soldiers who have been on duty at the out-posts.

6. Drills and parades supply all the regular exercise which the men get. The usual amusements of a cavalry regiment are not neglected. The absence of a gymnasium, which was noticed in my last report, has not received that attention which, in my opinion, it deserves, especially in connection with the training of recruits.

7. The head-quarters of the regiment have not marched out this year.

8. In connection with this building a dead-house has been built. I regret to have to state that the site adopted was one which was disapproved of on account of its conspicuous position in the open thoroughfare. A cook-house, in my opinion, is more urgently required than a dead-house.

9. The average daily strength present at head-quarters was 340; total number of cases treated, 421. Actual number of individuals treated, 238, showing a comparatively large proportion of re-admissions, chiefly



from ague. In analysing the principal causes of admissions into hospital it will be observed that more than half the cases were due to malarious affections. The rest were ulcers, injuries and accidents, venereal complaints, pneumonia and bronchitis, skin-diseases, and dysentery.

There were 2 deaths in hospital, both from pneumonia, and 3 out of hospital—one in the case of a suicide who shot himself with his carbine through the abdomen, causing death in a few hours from fatal injury to the liver. Percentage of mortality to strength, 0.5 per cent.

10. The amount of rainfall during the year has been registered as 6.08 inches. This fell during the months of January, February, March, June, July, August, October, November and December. The largest amount fell in July (3.65 in.)

The sanitary condition of the surroundings of the regimental lines and hospital during the rainy season is extremely defective consequent upon the accumulation of water after heavy showers of rain and the defective drainage which permits such collection to stagnate over a large surface of ground for several days, or such time until the water gradually disappears by subsidence and evaporation. All the conditions for the generation of malaria and the production of fevers which undermine the constitution of the native soldiers of this district prevailed under these circumstances in an eminent degree during the last rainy season, which was comparatively a severe one; 3.65 inches of rain fell on three consecutive days, flooding a great part of the horse lines, and submerging most of the surrounding men's lines. The water, not having any ready means of exit, only disappeared gradually, though completely, through the porous soil. The regimental hospital suffered more or less from the accumulation of rain-water, which stagnated in its neighbourhood; and owing to the high temperature of the air at this season, combined with the presence of vegetable matter used in road-making, and other organic matters present by accidental circumstances, the noxious gas evolved by putrefaction became disagreeably perceptible to the senses of the inmates and those whose duty compelled them to visit this neighbourhood. Whether diseases increased or not at this particular period of the year, it may not be easy to demonstrate; but there can be little doubt that the conditions above described cannot be conducive to health, such conditions being in total antagonism with the ordinary principles of hygiene.

With the view of discovering the true cause of this accumulation of water in this part of camp, perhaps I cannot do better than compare it with the remaining portion of camps where the drainage is of a more satisfactory nature, and where little, if any, water is found to accumulate.

Presuming that the general ground level within camp limits is pretty equal in all directions, I cannot but attribute the accumulation, confinement, and stagnation of the rain water in the neighbourhood of the regimental lines and hospital to the absence of a proper system of surface drainage.

As to the practicability of introducing the necessary drainage for carrying away the surface-water from camp limits in a country remarkable for the general levelness of its surface, there may exist a difference of opinion; but engineering skill, I have no doubt, will overcome all obstacles, if the expenditure necessary for establishing a system of drainage is sanctioned, and measures were adopted for filling up the hollows which may exist in the neighbourhood of the hospital and lines, not merely by having recourse to the silt and refuse from drains, but by the more effectual method of carting the necessary amount of earth from beyond camp limits.

Vaccination.

11. Primary vaccinations 52, re-vaccinations 470, successfully.

#### REMARKS BY DEPUTY SURGEON-GENERAL F. G. JOYNT, M. D.

The lines are well built, but the ventilation is defective; accommodation is ample; no change has yet been made in the objectionable conservancy arrangements. Hospital visited 18th January 1877; its sanitary condition is fair, accommodation sufficient for the wants of the sick.

#### Detachment H. M.'s 3rd Regiment Sind Horse.

JACOBABAD.—In medical charge of Surgeon M. L. BARTHOLOMEUSZ, M.B.; strength, 111.

1. The detachment 3rd Sind Horse has been quartered at Jacobabad since the head-quarters of the regiment marched to Khelat, in Beloochistan, in April last.

Location and movements of corps.



2. The total admitted into hospital for treatment has been 230. The strength of the detachment is 148, showing the large number of re-admissions, chiefly from ague, which caused 162 admissions into hospital. There were 5 cases of dysentery, out of which 1 proved fatal. This has been the only casualty in the detachment for the year.

The large amount of sickness may be accounted for by the fact of the sick and weakly portion of the regiment having been left behind, when the head-quarters marched to Khelat.

### Detachment of H. M.'s No. 2 Mountain Battery.

JACOBABAD.—In medical charge of Surgeon J. McCLOGHRY; strength, 524.

1. No. 2 Mountain Battery arrived in Kurrachee from Aden on the 6th of January, and remained there till the 13th of March; the men marched for Jacobabad, their families going by train and river steamer to Sukkur. The men arrived in this station on the 3rd of April, when a committee assembled and picked out the men fit for active service; these formed part of the "Political Escort" which marched into Beloochistan.

2. The lines are built on the same principle as those of the 30th Regiment, N. I., and accommodate 200 single men, giving them ample air space. They were formerly occupied by a regiment of rifles, which was disbanded some years ago. The native commissioned and non-commissioned officers each occupy a separate bungalow in rear of the lines. There are no family lines at present, married men with their wives living in the barracks.

3. There are no regular latrines attached to the lines, the men and women at present using two latrines situated in the hospital compound. The filth from the places having been mixed with dry earth is removed twice daily to a distance of  $1\frac{1}{2}$  miles from the lines.

4. The supply is the same as that of the other regiments in camp.

5. The hospital is built on the same plan as that of the 30th Regiment N. I., and is supposed to hold the same number of beds, viz., 16, which is, I consider, ample for the whole battery. There is no dead-house, nor quarters for an hospital assistant attached to the building. The building attached to the hospital as a latrine is defective, being simply an empty hut without any arrangements inside. I understand that a sum of money has been granted for the purpose of building latrines for the hospital and lines.

6. The number of cases treated during the nine months the half battery was separated from head-quarter were 181; of these no less than 135 were for ague. Chronic rheumatism comes next on the list of frequency, showing 13 admissions, to which 3 cases of lumbago may be added. Many of the cases of ague were complicated with severe rheumatic pains in the joints. There was no loss of strength either from mortality or invaliding. The principal causes of sickness were malarious fevers and rheumatism; the latter might be expected, considering the age of the men.

7. The health, like that of the other regiments stationed in Jacobabad, has been extremely bad. Most of the men are very old and of long service.

### H. M.'s 30th Regiment N. I., or Jacob's Rifles.

JACOBABAD.—In medical charge of Surgeon J. McCLOGHRY; strength, 429.

1. The head-quarters of the regiment have not been removed from Jacobabad during the year under review. The left wing in company with the 3rd Regiment Sind Horse proceeded on escort duty into Beloochis-



tan, stopping at Mustoong and Khelat for a few months; from the latter town it left for Mittree, where it is at present under canvas. There are two detachments, consisting of 14 men each, one stationed at Thul, the other at Kashmere.

2. For the accommodation of the non-married men of the regiment there are, at the east end of camp, nine parallel buildings of equal length, the one in the right and that on the left being half the width of the other seven. They are supposed to hold a thousand men, giving each man about 800 cubic feet of air space. Cross ventilation under the roofs was established last April. The barracks are all built on the ground and not raised on plinths, so that the flooring in the inundation season becomes quite damp, and crumbles away in parts. A row of trees in front of the doors of the barracks, under which the men sleep for six months of the year, is gradually decaying from want of water, and, unless verandahs are constructed as recommended in the Deputy Surgeon-General's report for last year, the men will be badly off for shade. The quarters in the family lines are not open to inspection; but from their outward appearance, and a knowledge of the habits of the occupants, no hesitation is felt in saying that they are not in a strictly hygienic condition. The bazaar, which is a little too near the hospital, is kept in very good order.

3. There is at about 1,000 yards from the lines a latrine which is simply a portion of the plain enclosed by a mud wall and divided into two compartments; it is used only by the prisoners; all the other men resorted for purposes of nature to the surrounding jungle. Attached to each of the married men's huts is a private latrine cleaned twice daily by a staff of sweepers kept up by the regiment. Proper latrines should be built on a site at a reasonable distance from the men's quarters.

4. The water is good, except in the inundation season, when some of the wells become brackish, but even then very fair water can be had at some distance from the lines.

5. Food of good quality and sufficient in quantity, is obtained at moderate prices in the Brigade and city bazaars, the regimental one being only resorted to by those who wish to purchase it on credit. From the beginning of May to the end of September vegetables are not obtainable; fruits, of which the water-melon is the most plentiful, taking their place.

6. Out-post duty is the only one which seems particularly to have an ill effect on the health of the men.

7. Besides the usual drills and parades of an infantry regiment each recruit is compelled to go through a gymnastic course. Many of the sepoys also resort to the gymnasium for exercise and amusement. Wrestling is the favourite pastime, and on one day in the week the matches got up for the occasion draw crowds of spectators. A few of the men work at trades, such as carpentry, shoe-making, &c.

8. The hospital is situated in a large compound which, owing to there being no surrounding wall, becomes a thoroughfare for the people passing between the lines and regimental bazaar. Its want of accommodation was brought forward in the annual report of the regiment for last year, and I believe a new ward has been sanctioned, but it has not been yet commenced. A cook-room and dead-house are urgently required, the former more especially, as at present those patients who are well enough to do so, leave the hospital for two hours each day for the purpose of procuring and cooking their food, while those who are confined to their beds must have men to attend them: this latter fact, of course, throws extra duty on the men out of hospital. A ward for the treatment of infectious diseases is also required. The hospital latrines are well built and are kept in very good order; they are cleaned out twice a day, McDougall's powder being used in conjunction with dry earth.

9. There were 1,023 admissions during the year, showing an increase of 194 over those for last year; this has been mainly due to the increase in the number of cases of ague, the number treated being 137 more than that for last year. Dysentery and diarrhoea account for 54 of the admissions. The



three foregoing diseases, as may be seen by the following, have increased considerably during the last four years :—

	1873.	1874.	1875.	1876.
Ague ... ..	315	247	425	572
Diarrhœa... ..	12	25	40	40
Dysentery ... ..	10	8	5	14

Boils, for which there were 58 admissions, occurred chiefly in the hot months, and were, I believe, mostly scorbutic in their origin. Pneumonia has been the principal immediate cause of deaths, 7 cases proving fatal out of 21 treated; these occurred chiefly during the first three months of the year. The other fatal cases were—2 pleuritis, 2 of lardaceous spleen, 2 of diarrhœa, and 1 each of ague, valvular disease of the heart, tonsilitis, debility, ulcerated sore throat, and remittent fever.

Principal causes of sickness and mortality.

10. Malarious fevers are the principal cause of sickness, and though not the immediate are also the primary cause of mortality.

Mortality according to race.

11. Of the 19 deaths 11 occurred in Hindus—the respective strength of Hindus and Mussulmans being 177 and 252.

Vaccination.

12. Ten children and 87 recruits were vaccinated successfully.

General health and physique of the men.

13. The general health of the men during the year has been very bad. The physique of those men whose constitutions are able to withstand the repeated attacks of malarious fever, is excellent; while, on the other hand, many of them present a cachectic appearance indicating a total unfitness for active service.

Sind sore.

14. No cases of Sind sore have been treated since I took over medical charge of the regiment on the 22nd November 1876.

#### REMARKS BY DEPUTY SURGEON-GENERAL F. G. JOYNT, M.D.

The numerous chest and throat affections are sufficiently accounted for by the dampness of the lines; space and ventilation are ample, but no plinth exists; floors are exceedingly damp. The trees intended for shelter are languishing for want of water, which the engineer fears to admit to the usual channels lest the lines should collapse from the increased moisture near the foundations. Hospital visited 17th January 1877. Is very damp on account of defective plinth. This should be of burnt brick and one foot or more high. Accommodation is insufficient; another ward is being built, but this will not meet the requirements of sickly season. Vaccination has been attended to.

#### Head-Quarter Wing H. M.'s 3rd Regiment Sind Horse.

MITTREE.—In medical charge of Surgeon C. W. MACRURY;—strength, 258·7.

The regiment was stationed at Jacobabad till 4th April, when the head-quarter wing marched into Khelat territory with the troops composing Major Sandeman's political escort. The outbreak of cholera that occurred on the march in Cutchee and the Bolan Pass I have already made the subject of a special report, which was printed by the Government of India; it is, therefore, unnecessary to refer to the subject here, except in a general way regarding its origin and propagation. I am obliged to depart from the prescribed



form of annual report on account of the regiment having been marching about for the last nine months. The long and trying marches through Cutchee and the Bolan I have described in my cholera report, and recommended a line of wells to be dug between Jacobabad and Dádur, for the use and safety of troops.

2. The first standing camp was at Mustoong, a pleasant, open, well-cultivated valley with abundance of fruit of various kinds, grain and artificial grass (lucerne), an unlimited water-supply of good quality, and an altitude of about 6,000 feet. We halted here from 27th April to 20th July, and enjoyed the change of climate from the burning plains immensely. Being under canvas, we felt the heat considerably during the day; but a cool breeze always sprang up in the evening, and the nights were invariably so cold that we found it necessary to sleep under blankets. The tableland of Mustoong is the most fertile and productive of the Beloochistan plateaux; the soil is alluvial, consisting of detritus from the surrounding hills; and the peculiar system of irrigation by means of "krazes," or pits dug at different levels till water is struck and connected by subterranean channels, admits of its being cultivated in sloping terraces, which to a certain extent fertilize each other, and preclude the possibility of the ground becoming exhausted; as when the upper slopes of the valley are flooded by rain or artificially from the water-courses, fresh soil is washed down to the lower fields. The "dewars" or tillers of the ground in these parts are industrious and skilled agriculturists; they manure their fields carefully, and seem to appreciate the advantages of the system of rotation of crops. Wine and silk could be produced here on an extensive scale if one might judge by the gigantic specimen of the vine and mulberry trees growing in the different orchards and gardens throughout the valley; the vine also flourishes luxuriantly in the open fields, which is sufficient to indicate the mildness of the climate as well as the fertility of the soil.

3. From the latitude of the Beloochistan hills their climate cannot be compared in its bracing effects with that of the Himalayas; but taking their elevation, average temperature, and dryness into consideration, I should say the valleys of Mustoong and Shawlcote are quite capable of being colonized by Europeans. Irrespective of the importance of these places in a political point of view, I am convinced they will in future be appreciated as a valuable sanitarium for troops serving on the North-West Frontier; indeed, it is difficult to understand why they have not been utilized as such since our treaty with Khelat existed; from what I have observed, the people would have been only too glad to see us amongst them. These valleys would be vastly improved by arboriculture along their numerous water-courses, which might be opened up to the hill-sides instead of running underground as at present, and road-making presents no greater difficulties than simply levelling the ground at most places.

4. The accompanying register of temperature will give an idea of the climate of Mustoong and Khelat during the hot season; the cold in winter there I believe is very severe. The nomadic portion of the population avoids it by descending into Cutchee, again migrating to the hilly plateaux with their flocks and herds when the heat becomes oppressive in the plains, to graze on the hill-sides which are covered with grass after the melting of the snow in March and April.







5. The climate, on the whole, did not agree with the majority of the men, who are natives of the plains of Hindoostan; they raised an outcry against, and blamed the water for their different complaints, and said they preferred the muddy water of the plains. Some attributed attacks of dyspepsia accompanied with tympanitis from which they suffered to it, and they were recommended to use boiled drinking water, and after a short time they improved. The Beloochees, who are a hardy race, seem to thrive on the water remarkably well, and, as far as its physical characters are concerned, it is clear, sparkling, cool and pleasant to the taste. I could not analyse it for want of instruments and re-agents, but so far as the production of soap lather would indicate, it seemed to me to be only slightly hard. What natives really mean when they state the water does not agree with them, is that the climate does not suit them. Several complained of lassitude, oppressed breathing, amounting to dyspnoea on exertion, and weakness of the limbs, owing no doubt to diminished atmospheric pressure, which at this elevation may be roughly stated to be from  $\frac{1}{2}$  to  $\frac{1}{3}$  less than on the plains; but these sensations passed off after a short residence.

6. Diarrhoea was the most prevalent disease during our residence on the Khelat hills, and was induced by the sudden and great variations of temperature, and insufficient protection from cold at night, causing congestion of internal organs and more especially inaction of the liver. It proved very intractable, and slowly but gradually undermined the constitutions of several men, who ultimately died from exhaustion on our arrival on the plains of Cutchee. It was given out when we left Jacobabad that the troops would be back in a couple of months; consequently the men did not provide themselves with sufficient warm clothing; and firewood being an expensive commodity in the hills, they suffered much from cold at night, and could only get their meals very imperfectly cooked on account of the scarcity and dearness of fuel. It is not, therefore, surprising that they suffered so much from indigestion, irritation, and looseness of the bowels.

7. The admissions during the year were 579, and 12 remained on 1st January 1876, total treated 591, being a decrease of 133 as compared with the admissions for 1875; but this only includes the sickness of the whole regiment from 1st January to 4th April 1876, and from the latter date to 31st December 1876 of the head-quarter wing only, a portion of the regiment having been left behind at the depôt at Jacobabad. The medical history of this detachment will no doubt be furnished by the officer in medical charge. Actual number of persons treated 275. Of the total treated, 237 cases were admitted for malarious fever: next in order of frequency were contusions of the lower extremity, diarrhoea, ulcers, dysentery, and cholera.

There were 20 deaths in hospital and 3 out of hospital: of the former 9 occurred from cholera, 5 from pneumonia, 3 from diarrhoea, 1 from dysentery, 1 from remittent fever, and 1 from hemiplegia consequent upon ague. Of these 18 were Mussulmans and 2 Hindus; and of those that died out of hospital 2 were Mahomedans and 1 Hindu, the latter having died of sun-stroke in Cutchee in July whilst escorting treasure to Khelat; the two former died while on leave. The sickness and death-rate has been high in proportion to the strength. The causes were cholera and the exposure, fatigue and privations to which the men were subjected in marching and living in tents for the last nine months. The average number of daily sick was 11.57, proportion of daily sick to strength 4.47 per cent., admissions to strength 223.83 per cent., deaths to strength 7.73 per cent., deaths to treated 3.38, treated to strength 228.47. Average number of days in hospital of actual number of persons treated, 7.59. Average number of days in hospital of total treated, 7.30.

8. On the 20th July we marched from Mustoong *en route* to Khelat, and proceeded by the Sirinal Valley, which runs nearly north and south and is well watered, the Mungoocher and Khelat valleys sloping towards and pouring their superfluous moisture into the open stream which runs through it, and which is thickly lined at several spots with tamarisk trees and bushes. This must have been a populous valley at one time, as it is dotted with the ruins of villages and intersected with "krazes" in all directions, some open and flowing freely, but the greater number have been allowed to silt up and fall into disuse. A case of cholera occurred at "Burrinchinao" as we marched on the morning of the 26th July, and the man, a sowar named Rahmut Khan, died at 3 A.M. next day at "Gurani Stream," where we halted till 12th August. Our bazaar butcher was seized here with cholera on the 1st August and died of the disease on the 2nd. Both these men, it was stated, had gone into outlying villages on the march in search of forage and sheep and goats respectively; but this is all I could learn as the result of my endeavours to trace the origin and source of the infection in these two cases.

9. Cholera followed in our track by the Bolan, or rather preceded us in the path of the kafilas, and spread rapidly through the different valleys from Kandahar to Khelat, travelling as usual by the highways of human intercourse. Before our arrival at Mustoong a



Jemadar of Belooch guides who escorted the kafilas as far as Quetta had died of the disease there, and from May to October cholera continued to prevail in the outlying villages between Mustoong and Khelat. Towards the end of September cholera appeared in the town of Khelat, a place redolent with excremental nuisances, and where sanitation is studiously ignored; the mortality caused by it there is unknown, but 4 or 5 deaths occurred in the "Miri," and one of His Highness the Khan's sons was carried off by the disease. The last case of cholera occurred among the troops in September, the patient being a syce, who recovered, but sank from exhaustion, consequent on the attack at Mustoong in October. On our return march I can only attribute our immunity from cholera at Mustoong and Khelat, where it raged around us for months, to our living in tents, our attention to camp sanitary arrangements, and the scrupulous care always exercised in protecting the source of our water-supply from contamination: in addition to this, the men were warned and, as far as possible, prohibited from going into the infected villages; but anything like quarantine or a *cordon sanitaire* was impossible and out of the question.

10. On the 12th August we marched from Guranee stream to Koing, two miles from Khelat, and remained at this place till October 22nd, when we began our return march to the plains by Moongoocher Mustoong and the Bolan Pass, the Battery and Rifles proceeding by the Moola Pass and rejoining us at Mittree on 29th November.

11. Mittree, where we are at present encamped, is about 20 miles east of the mouth of the Bolan Pass, on the right bank of the Nari river, which rises in the Murree hills and traverses the plains of Cutchee in a south-westerly direction. The surrounding country is bare and flat, and only cultivated in such places as the surface water from the hills can be intercepted, the ground sloping gently towards the banks of the Nari, which in some parts are thickly lined with tamarisk bushes. So far as our present knowledge of the propagation of cholera goes, I am now satisfied that it was by means of the water of this river that the troops were infected with that disease in April last.

12. Cholera was raging at Seebee, in Afghanistan territory, where the Nari debouches on the plains, before the troops left Jacobabad, as we heard that a number of people were carried off by an epidemic there. The disease travelled through the different villages on the river, and we most probably contracted it at Kunda by means of the drinking water on the 6th April—the first two seizures, both fatal, having occurred three days afterwards. On the 9th April, at Bagh, from which place the water we used at Kunda had been let loose for the use of the troops a few days before, and swept through the dry river-bed a distance of 40 miles and past the village of Kassim ke Joke, where cholera prevailed at the time. Since then I have learned that there was cholera at Mittree and Hajeeke Sher, so that all the villages on the river suffered from the disease, which must have been conveyed and communicated from the one to the other, from Seebee downwards throughout Cutchee by means of the drinking water from the river-bed, as there are no wells, as a rule, in or near the villages.

13. The river at present is very low, with a sluggish current between the pools in its bed from which our water-supply is procured; the water is muddy, but clears on standing, and after being treated with alum and passed through ghurras is not unpalatable. The supply, however, is precarious, as it not only depends on the rain-fall in the hills, but may be cut off entirely at Seebee, where it is dammed and used for cultivation purposes; it is also open to contamination from the villages above us as well as from herds of camels and cattle and flocks of sheep and goats that are daily watered in the different pools. Wells should, therefore, be sunk along the banks of the river without delay whenever the site for the permanent camp is selected.

14. The left bank of the Nari would, I think, be preferable for a station to the right, being less liable to be flooded from the hills in the direction of Dadur; and there is a suitable piece of high ground above the "Izat Sha" tombs nearly opposite, where we are at present encamped, that might answer the purpose of a site for a cantonment; there is also an eligible spot, about a mile above us on the right bank where the river takes a sharp turn to the east and forms deep pools, which might be utilized as feeders to wells dug near them—an important matter where water is scarce; but the ground would have to be protected from the hill floods by a ditch and an embankment to the west.

15. Two tents were found insufficient for hospital accommodation; one was wholly taken up by the hospital stores and hospital assistants, so that there was only one available for the use of the sick. There ought to be, at least, four tents to each regiment, and if constructed to open at both ends, they could be more easily ventilated. I have frequently had occasion during the march to borrow some of the regimental tents for hospital use, and during the cholera epidemic I had grass huts built, which answered the purpose remarkably well. I think the hospital establishment should be provided with separate tent accommodation.



16. The marching on the present occasion has proved our sick carriage to be a failure, and shown its utter inefficiency and inadequacy to the purpose for which it is kept up. The bearers are not "Kahars" but an inferior class of coolies deficient in physical stamina and untrained for their work; hence it need not be wondered at that they completely broke down. After some correspondence on the subject I was permitted to put them through a course of dooly practice at Mustoong and Khelat; but this would have been unnecessary if the bearers had been always under the exclusive control and supervision of the medical officer who is responsible for the conveyance of the sick, and would make a point of getting the men trained and keeping them efficient. A better and more economical arrangement than the present one, in my opinion, would be to have fewer but properly-trained bearers attached to each regiment of the Frontier Force, with light stretchers with hoods, instead of the present heavy cumbersome doolies, and a certain proportion of kujavas similar in construction to that used by the Russians during the Khivan Expedition.

17. I should say that for troops marching through a desert like that of Cutchee and over stony ground like the Bolan Pass, camel kujavas of some description are indispensably necessary for sick carriage, and I submit that the matter should be considered by the proper authorities.

#### REMARKS OF DEPUTY SURGEON-GENERAL F. G. JOYNT, M.D.

Visited Mittree February 19th 1877. The regiment is housed in grass huts, the sanitary condition and ventilation of which are duly attended to. The water-supply appears to be abundant and of fair quality. The sick are accommodated in tents. There were 4 fatal cases of pneumonia, which would seem to be due in a great measure to the great vicissitudes of climate which have been experienced.

#### H. M.'s No. 2 Mountain Battery.

KHELAT.—In medical charge of Surgeon C. W. MACRURY;—strength, 43.

The head-quarters of the No. 2 Mountain Battery accompanied the detached escort of the mission to Khelat, the men having been carefully inspected and selected from the battery by a special committee before leaving Jacobabad.

In marching they proved themselves to be superior to the infantry, and altogether are fine specimens of native soldiers.

2. The admissions during the last nine months were 99, of whom 26 were from ague, the next most prevalent diseases being diarrhoea and shoe-bites.

3. The casualties were 10: cholera proved fatal to 5 out of 9 admissions; 1 died from fever, 1 from pneumonia, 1 from dysentery, and 1 from diarrhoea; and the subedar of the battery, a splendid specimen of a native soldier, who had served for 46 years 10 months and 24 days, died from an attack of nephritis on the return march from Khelat.

4. The remarks on climate and disease made in my regimental report will be found also applicable to the men of this battery. I would also respectfully invite attention to my remarks on the sick carriage arrangements of the Frontier Force with a view to their being reorganized and reformed.

#### Left Wing H. M.'s 30th Regiment N. I., or Jacob's Rifles.

MITTREE.—In medical charge of Surgeon C. W. MACRURY;—strength, 148.

1. The left wing H. M.'s 30th Regiment, N. I., or Jacob's Rifles, marched from Jacobabad on 4th April 1876 and joined the other troops forming Major Sandeman's escort at Rojhan. The next march to Kunda across the desert was a long one; the distance has not been accurately measured, but it is stated to be between 35 and 38 miles, which may be considered a fair test of a soldier's endurance and marching capabilities. The number of men foot-sore on arrival at Kunda was small in proportion to the severity of the march.

2. In an exceptionally long march, like this one, it might be worth while seeing whether the men would not get over the ground, which is smooth and flat, better bare-footed than either with boots or shoes, more especially when the latter are ill-fitting and worn, as the native soldier does,



without stockings and without greasing his feet. Indeed, I cannot conceive why the native soldier should not be accustomed to do without shoes in the plains, and to use sandals only when marching in the hills or over rough ground instead of the unsatisfactory boots with which he is generally provided; if accustomed to serve without shoes, nature would furnish a hard and horny substitute on the soles of his feet.

3. For general remarks regarding the prevalence of diarrhœa and the effects of cold on the health of the men, I may refer to the annual report of my own regiment, the 3rd Sind Horse. These remarks apply equally

Effects of climate. to the men of this wing, who were subject to the same climatic influences as the rest of the force. Troops serving in these parts should always be huttet if possible, as the daily range of temperature is very great: the sickness of the men was chiefly due to vicissitudes of climate.

4. It will be observed that this wing suffered severely from cholera in comparison with the mounted portion of the force, and the cause, in my opinion, Cholera. may be attributed to the predisposing effects of fatigue from long marches on constitutions enervated and undermined by the malarious climate of Upper Sind. The infantry soldier expends more energy than the cavalry soldier in marching under similar circumstances, and is therefore more liable to be attacked and succumb from disease.

5. The admissions during the last nine months were 415: of these 102 were from ague alone. Next in order of frequency were contusions of the lower extremity or shoe-bites, diarrhœa, cholera, dysentery and boils; Sickness and mortality. the outbreak of cholera in Cutchee and the Bolan Pass was the subject of a special report in May last. The deaths were 23: of these 21 occurred from cholera out of 33 admissions, 1 died of pneumonia, and 1 from diarrhœa, of whom 17 were Hindus and 6 Mahomedans.

*Report of an outbreak of Cholera amongst the Troops forming Major Sandeman's escort en route to Quetta in April 1876.—By Surgeon MACRURY, 3rd Sind Horse, and Surgeon DUKE, in civil charge of the Khelat mission.*

On the 4th of April Major Sandeman and escort marched from Jacobabad to Rojhan, a distance of 12 miles, and halted there. Rojhan is a small hamlet lying on the border of Khelat territory. The strength of the troops and camp followers was as under:—

Corps.	Strength.	Remarks.
4th Punjab Cavalry ...	{ Fighting men ... 102 Followers ... 129	
3rd Sind Horse ...	{ Fighting men ... 241 Followers ... 249	
Mountain Train ...	{ Fighting men ... 58 Followers ... 19	
4th Sikh Infantry ...	{ Fighting men ... 282 Followers ... 95	
30th N. I. Jacob's Rifles ...	{ Fighting men ... 225 Followers ... 84	
Punjab Police ...	... 21	
Total...	1,505	

2. The health of the troops at that time was apparently good. The Punjab portion of the escort had arrived at Jacobabad on the 2nd April, and was then in perfect health, having marched from Dehra Gazi Khan in 14 days, a distance of about 220 miles. On the evening of the 5th the force marched on Kunda, a distance of 35 miles across the Cutchee desert, and, with the exception of a few shoe-bites, the health of the men did not appear to have suffered from the exertion involved in traversing such a long distance. At Kunda the drinking water was derived from a large tank, which had been filled about ten days before by a mountain torrent, and for the convenience of the troops a neighbouring field near the camp had been flooded from it. On the morning of the 7th the troops arrived at Mukkun Beyla, distant from Kunda about 16 miles. The village of Kassim ke Joke, recently plundered by the Brahoes, is one mile distant from Mukkun Beyla; the possible bearing of this fact will be afterwards noticed.

3. On the 8th the troops arrived at Bagh, a town situated on the Nari river and distant from Mukkun Beyla 22 miles; here we halted on the 9th. A considerable body of the Khan's troops, about 900 strong, were also encamped at this place. The drinking water was obtained from pools left in the more or less dried up bed of the Nari river; some of those



parts near the town were stagnant and stinking. It was here on the 9th that the first case of cholera occurred in the person of Captain Scott's bheestie. In the course of the night a sepoy of the 30th N. I. also died of the disease as the troops were marching out of camp for Hajee Kesher. On our arrival at Hajee Kesher, on the 10th, it was found that several of the men were sick with cholera, and Surgeon MacRury, in conjunction with Captain Humfrey, took the necessary steps for their isolation. A tent was pitched well in rear of the camp, and this was rapidly filled with patients. We decided as to the plan of treatment to be adopted, and this we endeavoured to carry out as effectively as circumstances admitted of throughout the outbreak.

4. By the evening of the 10th a large number of admissions had taken place, and the question had to be decided whether the troops should march or not; the only objection to marching being the difficulty of transport of the sick, whilst for marching there were the following weighty considerations:—cholera had been in Hajee Kesher some time previously, the water-supply was limited and derived from pools as at Bagh, the heat was very great, rising to 103° in a good hill tent; by two forced marches the troops could reach the Kirta plain, more than 1,000 feet above sea level, where there is a plentiful supply of running water; further, the political object of the mission required that Major Sandeman should reach Kirta as soon as possible. We, therefore, decided that the course most likely, on the whole, to benefit the troops was to march, and this view we communicated to Major Sandeman and Captain Humfrey. Major Sandeman did every thing possible to provide carriage for the sick; as many charpoys and coolies as could be obtained from the village were sent by the Khan's officials, but before the troops started, so many more cases had occurred that it was found impossible to bring on the sick. Every arrangement was made for their comfort by Major Sandeman, and they were left behind in a tent and under trees in charge of 3rd Class Hospital Assistant Yenkut Ram, 3rd Sind Horse. It was fortunate that the regimental carriage was free to pick up the numerous cases that fell out on the march. On arrival at Pir, after a long and difficult march of 22 miles, a cholera hospital was established, and before the troops could march for Kirta at 10 P.M., 40 cases had occurred, and it was impossible to move them. Surgeon Duke was, therefore, left in charge of them, whilst Surgeon MacRury proceeded with the escort up the Pass to Kirta.

5. It should be mentioned that a violent dust storm commenced just before the arrival of the troops at Pir, and continued without intermission for two days and two nights. The march to Kirta was a very trying one, as it lay along the stony bed of the Bolan river, the distance being 22 miles. The strong wind depressed the men very much, and in consequence of it they had been unable to cook their food on the previous day, and it is not, therefore, surprising that they were much fatigued on arrival at Kirta. The benefit of the change from the hot Cutchee plain to the higher level of the Pass was immediately apparent, as there were only 15 admissions on the 12th. On the 13th there were but 10, and from this date till the 19th, when there were none, the admissions gradually decreased in number, and the type of the disease seemed to become less virulent. The usual precautions for the isolation of the sick were also adopted here and arrangements were made for bringing up the sick from Hajee Kesher and Pir. On the 19th the greater portion of these arrived, and on the 20th the force marched to Abgoom, 21 miles higher up the Pass and about 3,600 feet above the level of the sea. The admissions and deaths from 9th to 19th April were as follows:—

Corps.	Total Number of admissions.	Total Number of deaths.	Strength.
4th Punjab Cavalry ...	{ Fighting men ... 11	6	102
	{ Followers ... 3	3	129
3rd Sind Horse ...	{ Fighting men ... 25	8	241
	{ Followers ... 22	11	249
Mountain Train ...	{ Fighting men ... 9	5	58
	{ Followers ... ..	.....	19
4th Sick Infantry ...	{ Fighting men ... 18	6	282
	{ Followers ... 4	3	95
30th N. I. or Jacob's Rifles ...	{ Fighting men ... 33	21	225
	{ Followers ... 9	4	84
Punjab Police ... ..	3	1	21
Total.....	137	68	1,505

6. There is no doubt that cholera has been prevalent in Cutch for some months past, if not for years, and a disease resembling it prevailed in the frontier districts in the cold season, the nature of which Surgeon Banks, 1st Sind Horse, was deputed to investigate, and, no doubt, the fullest information regarding it will be found in this report. Subsequently we obtained



information that cholera had existed some time previously at Kassim ke Joke near Mukkun Beyla, and Major Sandeman was informed that one of the syces belonging to the Khan's troops had died of the disease the day we arrived at Bagh. It was also stated that at Seebee, Hajee Kesher, and other places the disease had been very fatal some weeks before. Inquiry is made with great difficulty in this part of the world, and this is all the information bearing on the subject we have been able to obtain.

7. With regard to the water-supply, the troops were compelled to drink whatever was available, and it is more than probable, when the prevalence of the disease in the district is re-collected, that the water was contaminated with cholera discharges. The water at Rojhan was obtained from wells; at Kunda it was abundant, but at the same time it had traversed a large tract of country in its passage to that place, and this tract is known to have been infected. The water at Mukkun Beyla and Bagh was limited in quantity and stationary, and were the fact established of the virus being imbibed by means of drinking water, and if the period of incubation were known, it would not be difficult to settle definitely the place at which the troops became infected, as water could be obtained at the halting places only. If troops are to march through Cutch we should strongly recommend that a line of wells should be dug between Rojhan and Dadur, as the water-supply is scanty, uncertain, and unsatisfactory.

8. The earlier cases proved rapidly fatal, and were of a severe character, the patients being much distressed by spasms and cramps; the latter cases suffered but little from these complications, but, on the other hand, they afforded several instances of suppression of urine followed by uræmic poisoning.

9. There is no doubt that many cases of diarrhœa were prevented from developing into cholera by the timely administration of the old-fashioned cholera pills, consisting of opium, assafœtida, camphor, and acetate of lead; as far as possible the cramps were relieved by shampooing, and as much sodawater and effervescing medicine as was available was given to relieve the intense thirst; mustard poultices were applied to check vomiting, and extract of beef was freely administered; stimulants were given as required; corn-flour and rice were taken as soon as they could be retained; blisters were applied to the loins and nape of the neck in cases of suppression of urine, with marked benefit in at least two cases; and no efforts were spared to promote the comfort of the sick in the difficult circumstances in which we are placed.

10. The kafilas we escorted suffered severely from the disease; it is not certain where it first showed itself among them. There were found to be several cases among them at Hajee Kesher, and these rapidly increased in number, and it is believed on good authority that at least 50 of them died in the Pass. The stench arising from the imperfectly buried bodies has rendered it impossible for us to encamp at the regular halting places in the Bolan. From noticing the small number of cases among the kafilas at Hajee kesher and the rapid development of the disease amongst the caravans, as the distance from Hajee Kesher increased, we infer that they caught the infection at the same place as the troops, either at Kunda, Mukkun Beyla, or Bagh.

11. In conclusion, we have to express our regret at the small amount of information we are able to afford, and that the urgent practical duties connected with the outbreak did not admit of our being able to fill in the cholera register. We have the greatest gratification in reporting that every possible assistance was given us in the most cordial manner by Major Sandeman, Captains Humfrey and Scott, and by Lieutentant Harrison, who were constant in their visits to the hospital. Our thanks are also due to Captains Reynolds and Shepherd for their co-operation. We have pleasure in recording the excellent conduct of the medical subordinates. Third Class Hospital Assistant Yenkut Ram, who was left in charge of the sick at Hajee Kesher, deserves our thanks. We have further great pleasure in bringing to notice the excellent conduct of medical pupil Taijee Aheer, who was constantly on duty in the cholera tents during the outbreak; Hospital Assistants Teg Ali, Ramdyal, and Babajee, Rawoot also behaved well.

12. I must add that Surgeon Duke has assisted me in the compilation of this paper; throughout the outbreak he was associated with me in the management of the sick; we both of us treated any case that came before us, whether the patient belonged to the civil or military department; he has, therefore, countersigned this report.

*Remarks on the site near the village of Mittree, on which the Political Escort, Khelat Territory, is encamped.*

By DEPUTY SURGEON-GENERAL F. G. JOYNT, M.D.

The site occupied is portion of an alluvial plain stretching southward, but bounded on east, west and north by a mountain range, over which the Bolan Pass winds from a point some 18 or 20 miles west and by north of Mittree.



The physical geography of the district would indicate the occasional, if not the frequent, occurrence of thunderstorms, and the site suggests malarious fever of a severe type on the subsidence of inundations. On these points, as also on the thermal range, rain-fall, and prevailing winds, sufficient information is not available—any records there are, not extending over a period of twelve months.

The soil is sandy, impregnated with salts, so as to present, after rain, extensive patches of saline efflorescence. It exhibits also the baked glazed appearance of a level tract periodically inundated. There is little or no vegetation. Its water-supply, of fair quality, is plentiful, derived from the river Nara, which runs near, and is said to be perennial. It appears to overflow its banks annually. Forage and general supplies from the adjacent country are said to be ample. The village of Mittree, a mud structure, is within a short distance of the encampment, but on somewhat higher ground. The tract does not appear capable of drainage during the period of inundation, and suffers, it is said, so intense a heat during the hot season as to induce the very natives to emigrate to the adjacent hills for shelter.

On sanitary and climatic grounds it is, in my opinion, unsuitable as a site for a permanent camp.



FOR THE YEAR ENDING DECEMBER 31, 1912

ASSETS

Item	1912	1911
Real Estate	100,000.00	100,000.00
Investments	50,000.00	50,000.00
Accounts Receivable	10,000.00	10,000.00
Prepaid Expenses	5,000.00	5,000.00
Other Assets	5,000.00	5,000.00
<b>Total</b>	<b>170,000.00</b>	<b>170,000.00</b>

LIABILITIES

Item	1912	1911
Accounts Payable	10,000.00	10,000.00
Accrued Expenses	5,000.00	5,000.00
Other Liabilities	5,000.00	5,000.00
<b>Total</b>	<b>20,000.00</b>	<b>20,000.00</b>

NET ASSETS

Item	1912	1911
Surplus	150,000.00	150,000.00
<b>Total</b>	<b>150,000.00</b>	<b>150,000.00</b>

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**STATEMENT.**

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REVENUE

Item	1912	1911
Government	100,000.00	100,000.00
Private	50,000.00	50,000.00
<b>Total</b>	<b>150,000.00</b>	<b>150,000.00</b>

EXPENSES

Item	1912	1911
Salaries	100,000.00	100,000.00
Travel	5,000.00	5,000.00
Printing	5,000.00	5,000.00
Other	5,000.00	5,000.00
<b>Total</b>	<b>115,000.00</b>	<b>115,000.00</b>

RESERVE

Item	1912	1911
Surplus	150,000.00	150,000.00
<b>Total</b>	<b>150,000.00</b>	<b>150,000.00</b>

NET ASSETS

Item	1912	1911
Surplus	150,000.00	150,000.00
<b>Total</b>	<b>150,000.00</b>	<b>150,000.00</b>



STATEMENT showing the SICKNESS and MORTALITY among the NATIVE

N.B.—The regiments are placed as

Regiment.	Station.	Movement during the year.	Average daily sick.	Average daily strength present during the year.	Remained on 1st January 1876.	Admitted during the year.	Total treated.	Discharged cured.	Discharged otherwise.	Died in hospital.	Died out of hospital.	Remaining.	Average daily sick per cent. to average strength.	Ratio per cent. of admissions to average strength.	RATIO PER CENT. OF DEATH.				Invalided.		
															In Hospital.		Out of Hospital.			For discharge the service.	For change of climate.
															To treated.	To average strength.	To treated.	To average strength.			
<b>PRESIDENCY DIVISION, ADEN</b>																					
Detachment, 4th Regiment N. I.	Bombay	None.	5.6	136.0	6	100	106	87	13	2	1	4	4.1	73.5	1.9	1.5	0.9	0.8	11	1	
29th Regiment N. I.	Do.	None.	42.7	594.5	27	722	749	625	83	13	2	25	7.1	121.2	1.7	2.2	0.1	0.2	48	31	
21st do.	Do.	None.	12.5	568.5	16	283	299	257	29	3	3	10	2.1	49.7	1.0	0.5	2.7	1.2	21	22	
Wing 7th do.	Tanna	None.	4.2	276.0	12	171	183	159	16	1	1	6	1.5	61.9	1.1	0.7	0.6	0.4	5	2	
17th Regiment N. I.	Sarat	None.	35.0	631.6	18	1,194	1,212	1,139	24	15	5	14	5.6	189.0	1.2	2.4	0.6	0.8	30	24	
Detachment, 29th Regiment N. I.	Janjira	None.	0.1	17.0	...	6	6	6	...	...	...	...	5.8	35.2	...	...	...	...	...	...	
Do 21st do.	Bushire	None.	0.7	16.0	...	18	18	17	...	...	...	1	4.3	112.5	...	...	...	...	...	...	
Do.	Bassadore	None.	2.7	12.0	...	198	198	196	1	...	...	1	22.5	1600.0	...	...	...	...	...	...	
Do.	On board the steam ship "Dah-houie"	None.	0.2	8.0	1	10	11	10	1	...	...	...	2.5	12.5	...	...	...	...	...	...	
Do.	Do. "Magdala."	None.	...	8.0	...	2	2	1	...	...	...	...	...	...	...	...	...	...	...	...	
Do.	Do. "Abyssinia."	None.	...	8.0	...	2	2	1	1	...	...	...	...	25.0	...	...	...	...	...	...	
Do.	Do. "Hugh Rose"	None.	0.2	9.1	...	3	3	3	...	...	...	...	2.2	32.9	...	...	...	...	...	...	
Do.	Do. "Quangtung."	None.	...	8.0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Details 21st Regiment N. I.	Bombay	None.	1.9	28.0	7	16	23	11	4	5	...	3	6.8	5.7	21.7	17.8	...	...	2	...	
Total...			105.8	2,329.7	87	2,723	2,810	2,531	172	49	15	67	4.5	117.3	1.4	1.8	0.5	0.6	117	80	
<b>ADEN</b>																					
6th Regiment N. I.	Aden	None.	14.3	642.6	4	425	429	406	12	4	...	7	2.2	66.1	0.9	0.6	...	...	20	10	
4th and 5th Company Sappers and Miners	Aden	None.	2.2	104.2	2	48	50	46	2	...	...	2	2.0	46.0	...	...	...	...	8	1	
Aden Troop	Aden	None.	0.1	89.5	2	158	160	156	...	1	...	3	6.8	176.3	0.6	0.1	...	...	2	2	
Detachment, 6th Regiment N. I.	Perim	None.	0.3	50.0	1	2	10	7	3	...	...	...	6.0	18.0	...	...	...	...	...	...	
Total...			22.9	886.3	9	640	643	613	17	5	...	12	2.5	72.2	0.7	0.3	...	...	30	13	
Total Presidency, Aden and Bombay Marine...			128.7	3,207.9	96	3,363	3,459	3,146	189	45	15	79	3.9	104.8	1.3	1.4	0.6	0.6	147	93	
<b>POONA</b>																					
1st Regiment N. I. C.	Poona	None.	10.4	281.0	7	252	289	276	6	3	1	4	3.5	95.9	1.0	1.0	0.5	...	13	5	
5th Regiment N. I.	Do.	None.	22.1	589.0	13	1,106	1,119	1,089	17	...	...	13	3.7	187.7	...	...	...	...	54	11	
8th do.	Do.	None.	28.1	684.0	26	1,311	1,337	1,297	18	...	...	19	4.1	191.6	0.2	0.2	...	...	58	17	
26th do.	Do.	None.	30.2	598.0	34	793	827	735	61	5	...	26	5.1	132.5	0.6	0.8	...	...	10	21	
Sappers and Miners	Kirkee	None.	7.3	360.3	11	169	180	152	11	8	...	14	2.0	46.9	1.6	0.8	...	...	8	2	
Detachment, Poona Horse	Dhulia	None.	3.4	102.0	...	41	41	37	1	1	...	2	3.0	49.1	2.4	0.9	...	...	...	1	
4th Regiment N. I.	Satara	None.	6.7	322.6	5	263	268	248	21	3	...	6	1.7	51.6	0.9	0.3	...	...	4	10	
19th do.	Sholapur	None.	10.7	631.5	12	326	338	308	17	4	...	12	2.3	67.8	0.9	0.7	...	...	6	9	
15th do.	Ahmednagar	None.	13.6	584.0	23	396	419	386	17	5	...	19	2.7	63.8	1.2	0.8	...	...	31	8	
2nd Grenadier Regiment N. I.	Belgaum	None.	16.7	639.0	8	402	410	390	26	5	...	14	3.8	81.8	1.0	0.9	0.8	0.7	30	18	
14th do.	Do.	None.	17.4	569.1	23	456	489	436	34	6	...	4	14	3.8	81.8	1.2	0.8	...	...	30	18
Head Quarter, 13th Regiment N. I.	Malegaon	None.	7.7	348.3	4	290	313	304	2	2	...	5	2.1	85.5	0.6	0.6	...	...	14	2	
Poona Horse	Sirur	None.	10.1	314.5	13	247	260	215	32	1	...	12	3.2	78.5	0.4	0.3	...	...	18	20	
3rd Regiment N. I.	Kolhapur	None.	16.0	517.0	23	544	567	535	17	2	...	13	2.9	59.4	0.4	0.4	...	...	10	11	
Arrived in February from Ahmedabad.																					
Detachment 3rd Regiment N. I.	Kaladgi	None.	1.2	89.8	...	63	63	56	6	...	...	1	1.3	79.5	...	...	...	...	...	6	
12th do.	Dharwar	None.	13.6	642.8	15	303	318	301	3	4	...	10	2.1	47.1	1.2	0.6	...	...	15	...	
Detachment 4th Regiment N. I.	Asingarh	None.	5.5	144.7	1	128	129	122	4	...	...	3	3.8	88.4	...	...	...	...	9	...	
Total...			220.4	7,418.6	218	7,249	7,467	6,967	291	42	5	167	2.9	97.3	0.5	0.5	0.1	0.1	287	156	







STATEMENT showing the SICKNESS and MORTALITY among the NATIVE

Regiment.	Station.	Movement during the year.	Average daily sick.	Average daily strength present during the year.	Remained on 1st January 1876.	Admitted during the year.	Total treated.	Discharged cured.	Discharged otherwise.	Died in hospital.	Died out of hospital.	Remaining.	Average daily sick per cent. to average strength.	Ratio per cent. of admission to average strength.	RATIO PER CENT. OF DEATH.				Invalid ed.		
															In Hospital		Out of Hospital.			For discharge the service.	For change of climate.
															To treated.	To average strength.	To total.	To average strength.			
<b>NORTHERN</b>																					
1st Grenadier Regiment N. I.	Ahmedabad	None.	28.8	660	18	828	846	743	73	11	1	15	4.3	125.4	1.5	1.4	0.2	0.6	62	1	
Wing 13th do.	Do.	None.	12.5	291.2	4	434	438	4.7	52	3	1	6	4.3	148.0	0.9	0.4	1.1	1.1	35	1	
Squadron 2nd Regiment N. L. C.	Rajkot	None.	3.9	145.0	3	98	101	91	6	3	1	8	2.6	67.5	0.3	1.1	1.1	1.1	3	1	
1st Company Native Artillery.	Do.	None.	3.0	120	...	84	84	78	2	1	1	2	2.5	70.0	1.0	0.3	0.3	0.3	2	1	
7th Regiment N. I.	Do.	None.	12.5	280	9	375	384	390	65	1	1	18	4.4	133.9	0.2	0.3	0.3	0.3	24	1	
28th do.	Do.	None.	20.0	438.7	20	543	533	482	75	23	1	1	3.7	108.4	0.3	0.4	0.4	0.4	35	2	
11th do.	Banaj	None.	19.2	678.2	14	480	499	452	18	1	1	4	2.8	71.3	0.3	0.3	0.4	0.3	14	1	
2nd Regiment N. L. C.	Do.	None.	7.4	315.4	7	246	253	239	9	1	1	6	2.3	77.9	0.3	0.3	0.3	0.3	13	1	
18th do. N. I.	Do.	None.	16.2	627.0	23	508	531	515	3	1	1	6	6.0	83.1	0.3	0.4	0.6	0.4	46	1	
2nd do.	Mhow	None.	31.8	524.2	33	739	772	699	61	4	1	8	6.0	140.8	0.3	0.7	0.3	0.3	46	1	
25th do.	Do.	None.	31.9	522.6	10	774	784	747	19	1	1	17	5.9	148.1	0.1	0.1	0.3	0.0	33	1	
An average strength of 128 men were at Mahidpur from October to December.																					
3rd Regiment N. L. C.	Noemuch	March to Delhi in November on account of Imperial Assemblage	10.2	332.8	9	412	421	410	2	1	1	3	3.0	125.4	0.2	0.2	0.2	0.2	12	1	
24th do.	Do.	Do.	18.6	651.6	25	787	812	762	20	2	1	20	2.8	130.7	0.3	1.0	0.2	0.2	24	1	
Squadron 2nd Regiment N. L. C.	Nussersabad	Squadron left for Delhi in November on account of Imperial Assemblage.	5.2	105.4	4	177	181	171	4	1	1	4	4.8	106.3	0.2	0.9	0.2	0.2	8	1	
16th Regiment N. I.	Do.	None.	39.1	651.1	15	1,359	1,521	1,661	123	4	1	83	6.0	200.4	0.3	0.6	0.2	0.4	35	1	
Squadron 1st Regiment N. L. C.	Baroda	None.	0.6	144.8	9	203	214	207	7	1	1	1	4.5	141.3	0.1	0.1	0.4	0.5	4	1	
9th Regiment N. I.	Do.	None.	11.9	662.0	11	452	463	430	20	2	1	8	1.8	68.2	0.4	0.3	0.6	0.4	36	1	
22nd do.	Do.	None.	22.1	647.0	22	634	630	595	33	1	1	20	3.4	97.9	0.3	0.9	0.2	0.2	30	1	
Detachment 1st Regiment N. I.	Saira	None.	0.5	30.6	...	33	33	32	1	1	1	1	1.4	98.4	0.1	0.1	0.1	0.1	1	1	
Detachment 13th do.	Do.	None.	0.3	16.0	...	16	16	15	1	1	1	1	1.9	109.0	0.1	0.1	0.1	0.1	1	1	
16th Regiment N. I.	Mahidpur	Marched to Noemuch in October.	33.2	378.0	22	1,074	1,096	1,012	51	3	1	30	8.1	281.5	0.2	0.7	0.2	0.2	21	1	
Wing, 16th do.	Angar	Left on 24th October to join its Head Quarters at Noemuch.	14.9	243.0	14	360	374	348	18	2	1	36	6.1	145.1	0.5	0.6	0.2	0.2	9	1	
Detachment 28th Regiment N. I.	Dwarka	None.	3.3	82.9	...	114	114	100	6	1	1	2	3.9	135.8	0.1	0.1	0.1	0.1	1	1	
Detachment 7th do.	Bards Chowky	Joined its Head Quarters at Rajkot in October.	7.4	67.2	1	261	262	231	8	1	1	1	11.0	388.3	0.4	1.4	0.1	0.1	1	1	
Detachments 3rd and 25th Regiments N. I.	Indore	None.	6.0	224.6	3	209	214	199	8	1	1	5	2.6	93.0	0.1	0.1	0.1	0.1	4	1	
<b>Total</b>			<b>365.5</b>	<b>8,907.3</b>	<b>273</b>	<b>11,177</b>	<b>11,450</b>	<b>10,065</b>	<b>694</b>	<b>68</b>	<b>10</b>	<b>333</b>	<b>4.1</b>	<b>125.1</b>	<b>0.5</b>	<b>0.7</b>	<b>0.1</b>	<b>0.2</b>	<b>482</b>	<b>20</b>	
<b>SINDH</b>																					
26th Regiment N. I.	Kurrachee	None.	18.0	627.2	19	397	616	580	6	2	1	25	2.8	95.1	0.3	0.7	0.4	0.4	24	1	
27th do.	Hyderabad	None.	38.9	633.0	32	900	932	848	16	7	1	61	5.8	137.9	0.7	1.0	0.1	0.1	15	1	
36th do.	Jacobabad	209 men were detached on escort duty to Kheilat from April to December.	34.8	677.9	30	1,438	1,408	1,347	24	62	1	55	6.0	248.8	1.8	2.2	0.1	0.1	22	1	
1st Sind Horse	Do.	None.	14.3	223.2	14	647	701	664	12	5	1	20	4.3	311.2	0.7	1.3	0.1	0.3	6	1	
2nd do.	Do.	None.	11.8	349.7	22	399	421	382	18	4	1	14	3.4	117.3	0.4	0.5	0.7	0.3	29	1	
3rd do.	Do.	Head Quarters marched to Kheilat in April on account of escort duty.	17.7	369.7	12	809	821	772	8	21	1	20	4.3	218.8	2.5	3.0	0.2	0.3	4	1	
A party of about 60 men were detached on escort duty to Kheilat from April to December.																					
2nd Company Native Artillery.	Do.	None.	7.6	95.4	...	299	299	271	1	10	1	16	7.9	313.4	0.3	1.0	0.1	0.1	1	1	
<b>Total</b>			<b>142.2</b>	<b>2,990.4</b>	<b>129</b>	<b>5,129</b>	<b>5,238</b>	<b>4,870</b>	<b>83</b>	<b>91</b>	<b>10</b>	<b>211</b>	<b>4.7</b>	<b>171.3</b>	<b>1.7</b>	<b>3.1</b>	<b>0.1</b>	<b>0.3</b>	<b>97</b>	<b>6</b>	
<b>Grand Total</b>			<b>856.8</b>	<b>22,583.3</b>	<b>716</b>	<b>26,918</b>	<b>27,634</b>	<b>25,336</b>	<b>1,259</b>	<b>167</b>	<b>68</b>	<b>790</b>	<b>3.7</b>	<b>119.2</b>	<b>0.8</b>	<b>1.0</b>	<b>0.2</b>	<b>0.2</b>	<b>1,011</b>	<b>51</b>	



TROOPS serving in the BOMBAY PRESIDENCY during the Year 1876—continued.

Hindus.				Mahomedans.				Regiment.	Average number of consecutive nights in bed.	Number of Recruits joined during the year.	CASTES.												Remarks.	
Strength.		Died per cent. to strength in and out of hospital and on leave.		Strength.		Died per cent. to strength in and out of hospital and on leave.					Christians.			Hindus.			Mahomedans.			Others.				
Strength.		Died per cent. to strength in and out of hospital and on leave.		Strength.		Died per cent. to strength in and out of hospital and on leave.					Europeans.			Eurasians.			Natives.							
Average daily strength.	Died in hospital.	Died out of hospital.	Average daily strength.	Died in hospital.	Died out of hospital.	Average daily strength.	Died in hospital.				Died out of hospital.	Average daily strength.	Died in hospital.	Died out of hospital.	Average daily strength.	Died in hospital.	Died out of hospital.	Average daily strength.	Died in hospital.	Died out of hospital.	Average daily strength.	Died in hospital.		Died out of hospital.
<b>DIVISION.</b>																								
710	1.0	66	1.5	802	1st Grenadier Regiment N. I.	3.8	33	65	..	..	..	17.9	..	..	57.1	10	2	66.0	1	..	2.0	..		
280	0.9	24	4.1	156	Wing 13th Regiment N. I.	4.0	..	2.0	..	..	..	3.4	..	..	248.0	2	..	31.8	1	..	8.0	..		
64	1.5	66	..	154	Squadron 2nd Regiment N. L. C.	8.8	..	1.0	..	..	..	2.0	..	..	73.0	1	..	66.0	..	..	4.0	..		
92	..	17	..	118	1st Company Native Artillery.	6.7	11	2.0	..	..	..	1.0	..	..	92.0	..	..	18.0	1	..	9.0	..		
251	0.4	51	..	219	7th Regiment N. I.	..	..	31	4.0	..	..	12.0	..	..	220.0	1	..	45.0	..	..	3.0	..		
439	2.3	74	..	335	28th Regiment N. I.	..	..	52	4.5	..	..	10.0	..	..	442.7	11	..	63.3	..	..	12.5	..		
642	2.5	74	..	729	11th Regiment N. I.	..	..	34	6.0	..	..	..	..	..	598.4	2	1	55.2	..	..	4.0	..		
132	..	129	..	315	2nd Regiment N. L. C.	..	..	11.2	26	5.1	..	3.0	..	..	180.1	..	..	132.1	..	..	..	..		
533	0.7	83	..	628	18th do. N. I.	..	..	45	4.6	..	..	9.8	..	..	532.0	..	..	82.2	..	..	..	..		
299	1.3	71	..	394	23rd do. do.	..	..	6.0	47	5.6	..	4.0	..	..	494.8	3	1	88.5	..	..	8.3	..		
379	0.5	92	..	677	15th do. do.	..	..	6.5	68	4.7	..	..	..	..	431.9	1	2	79.7	..	..	7.0	..		
293	..	170	0.0	464	3rd do. N. L. C.	..	..	4.1	17	5.0	..	..	..	..	203.0	..	..	120.9	1	..	..	..		
564	1.2	81	..	684	21th do. do.	..	..	6.1	30	6.4	..	..	..	..	539	5	2	78.6	2	..	10.6	..		
18	..	8	12.5	27	Squadron, 3rd Regiment N. L. C.	4.0	..	0.9	..	..	..	0.4	..	..	73	..	..	33.0	1	..	..	..		
126	1.1	76	..	624	16th Regiment N. I.	..	..	11.1	31	6.2	..	..	..	..	538.0	3	3	92.0	1	..	13.2	..		
102	0.9	45	..	147	Squadron, 1st Regt. N. L. C.	..	..	8.1	..	1.0	..	..	..	..	96.0	..	1	48.8	..	..	..	..		
578	0.6	74	..	668	9th Regiment N. I.	..	..	31	6.8	..	2.0	..	..	..	571.5	2	2	76.7	..	..	2.0	..		
359	0.5	92	..	476	22nd do. do.	..	..	42	5.3	..	..	16.0	..	..	550.0	6	..	75.0	..	..	6.0	..		
35	..	7	..	42	Detachment, 1st Gr. Regiment N. I.	..	..	..	..	..	..	0.4	..	..	29.1	..	..	4.1	..	..	..	..		
31	..	10	..	42	Detachment, 13th Regiment N. I.	..	..	..	..	..	..	0.1	..	..	14.3	..	..	1.6	..	..	..	..		
263	0.7	52	1.2	394	10th Regiment N. I.	..	..	4.1	62	5.0	..	..	..	..	277.0	2	..	71.0	1	..	23.0	..		
225	..	41	..	331	Wing 10th Regiment N. I.	..	..	6	..	2.2	..	..	..	..	186.3	..	..	38.7	..	..	17.0	2		
79	..	7	..	86	Detachment 28th do.	..	..	7.5	..	0.9	..	..	..	..	77.2	..	..	6.7	..	..	..	..		
..	..	..	..	..	Detachment 7th do.	..	..	5.6	..	0.1	..	..	..	..	56.9	1	..	9.5	..	..	0.2	..		
237	..	39	..	780	Detachment 23rd do.	..	..	9.7	..	2.0	..	..	..	..	191.8	..	..	29.8	..	..	2.6	..		
7,512	0.6	1,451	1.0	9,160		..	..	616	88.2	..	..	11.2	..	..	147.7	..	..	7,200.2	53	19	1,440.8	13.2	137.4	2
<b>DIVISION.</b>																								
90	1.1	570	1.3	663	29th Regiment N. I.	..	..	51	5.1	6.5	..	..	..	..	84.8	..	1	519.3	5	2	2.1	..		
189	0.7	561	1.0	702	27th do. do.	..	..	4.0	85	4.0	..	..	..	..	131.9	1	..	522.0	6	..	2.0	..		
263	0.5	900	0.7	652	30th do. do.	..	..	9.5	117	6.2	..	..	..	..	335.8	25	..	542.1	17	..	..	..		
37	..	367	1.3	414	1st Sind Horse	..	..	4.0	27	5.6	..	..	..	..	26.4	..	..	298.6	5	1	..	..		
67	2.9	301	..	373	2nd do.	..	..	4.0	26	4.0	..	..	..	..	63.0	..	..	270.0	2	1	..	..		
65	0.0	372	0.1	513	3rd do.	..	..	7.0	82	7.0	..	..	..	..	58.9	3	1	369.2	18	2	..	..		
35	0.1	43	0.5	141	2nd Company Native Artillery.	5.7	12	1	..	..	..	..	..	..	72.6	6	..	..	..	..	4	1.2		
770	0.0	2,503	0.3	3,288		..	..	410	34.1	..	..	..	..	..	8.5	..	..	672.5	35	4	2,304.1	37	6	5.3
10,644	1.1	1,929	1.0	13,588		..	..	1,689	234.4	..	..	15.8	..	..	374.8	..	..	10,009.7	164	33	5,517.1	95.13	665.9	4



Summary of the Statistics for the Year 1876 and 6 previous years.

Years.	Average Daily Strength.	Admissions into Hospitals.	Ratio per Cent. of Admissions to Average Strength. Mean of all.	Average Daily Sick per Cent. to Average Strength. Mean of all.	Deaths in Hospital.	Ratio of Deaths in Hospital per cent. to Average Strength.	Ratio of Deaths in Hospital per cent. to Admissions.	Deaths out of Hospital and on Leave.	Total Deaths out of the Average Strength in the year.	Ratio per Cent. of Deaths to the Average Strength.	Ratio per Cent. to Strength of Hindus who died in and out of Hospital and on Leave.	Ratio per Cent. to Strength of Mahomedans who died in and out of Hospital and on Leave.	Ratio per Cent. to Strength in-validated for discharge of the Service.	Ratio per Cent. to Strength in-validated for change of Climate.
1876 ...	22,583.3	26,918	119.2	3.79	247	1.09	0.90	49	296	1.31	1.14	1.57	4.27	2.17
1875 ...	22,819	25,475	111.63	3.38	213	0.93	0.83	66	279	1.22	1.30	1.18	4.27	1.83
1874 ...	22,750	26,601	116.92	3.67	176	0.77	0.66	72	248	1.09	0.99	1.12	4.60	1.73
1873 ...	22,967	29,035	126.86	3.82	165	0.71	0.56	81	246	1.07	...	...	4.35	2.11
1872 ...	22,903	36,209	158.09	4.54	226	0.98	0.62	95	321	1.40	...	...	3.98	2.13
1871 ...	22,959	29,733	129.50	4.31	236	1.03	0.79	97	333	1.45	...	...	3.12	2.10
1870 ...	22,715	28,380	139.08	4.33	191	0.84	0.68	95	286	1.26	...	...	3.71	2.33











APPENDIX II.

RETURN showing the Admissions and Deaths, &c., amongst the Native Troops of the Bombay Presidency at the several Stations for the Year 1876 compared with 1875.

1876.		1875.									
Regiment.	Station.	Average Strength.	Average Daily Sick.	Admissions.	Deaths in Hospital.	Regiment.	Station.	Average Strength.	Average Daily Sick.	Admissions.	Deaths in Hospital.
Detachment 4th Regt. N. I.	Bombay	136.0	5.6	100	2	Detachment 4th Regt. N. I.	Bombay	141.5	6.3	133	2
20th Regiment N. I.	Do.	594.5	42.7	722	13	20th Regiment N. I.	Do.	621.7	29.3	624	9
21st do.	Do.	568.5	12.5	283	3	do.	Do.	586.0	17.4	371	5
Right Wing 7th Regt. N. I.	Tanna	276.0	4.2	171	2	Right Wing 7th Regt. N. I.	Tanna	301.0	8.2	267	5
17th Regiment N. I.	Surat	631.6	35.0	1,194	15	26th Regiment N. I.	Surat	614.0	34.4	1,240	11
Detachment 20th Regt. N. I.	Janjira	17.0	0.1	6	...	Detachment 20th Regt. N. I.	Janjira	17.0	1.4	8	...
Do. 21st do.	Bushire	16.0	0.7	18	...	Do. 21st do.	Bushire	16.0	0.4	37	1
Do. do.	Bassadore	12.0	2.7	198	...	Do. do.	Bassadore	12.0	2.0	155	...
Do. do.	On board the Steamer "Dal-housie"	8.0	0.2	10	...	Do. do.	On board the Steamer "Dal-housie"	8.0	0.3	14	...
Do. do.	On board the "Magdala"	8.0	...	...	...	Do. do.	On board the "Magdala"	8.0	...	...	...
Do. do.	On board the "Abyssinia"	8.0	...	2	...	Do. do.	On board the "Abyssinia"	8.0	...	...	...
Do. do.	On board the "Hugh Rose"	9.1	0.2	3	...	Do. do.	On board the "Hugh Rose"	10.0	0.2	14	...
Do. do.	On board the "Quangtung"	8.0	...	...	...	Do. do.	On board the "Quangtung"	8.0	0.3	9	...
Details attached to 21st Regiment N. I.	Bombay	28.0	1.9	16	5	Details attached to 21st Regiment N. I.	Bombay	35.0	2.5	32	1
6th Regiment N. I.	Aden	642.6	14.3	425	4	2nd Gr. Regiment N. I.	Aden	592.0	13.5	363	1
4th and 5th Co. Sappers and Miners	Do.	104.2	2.2	48	...	5th Co. Sappers and Miners.	Do.	97.0	1.5	46	...
Aden Troop	Khor Mucksa...	89.5	6.1	158	1	Aden Troop	Khor Mucksa,	90.7	5.5	188	...
Detachment 6th Regt. N. I.	Perim	50.0	0.3	9	...	Detachment 2nd Gr. Regiment N. I.	Aden	45.8	1.1	21	...
						2nd Co. Native Artillery	Perim	66.8	1.1	29	1
						Detachment 21st Regt. N. I.	Aden	10.0	...	...	...
						Detachment 21st Regt. N. I.	Bagdad	10.0	...	...	...
Total...	Total...	3,207.0	128.7	3,363	45	Total...	Total...	3,288.5	125.4	3,551	36

Presidency Division, Aden and Bombay Marine.



1875.		1876.									
Regiment.	Station.	Average Strength.	Average Daily Sick.	Admissions.	Deaths in Hospital.	Regiment.	Station.	Average Strength.	Average Daily Sick.	Admissions.	Deaths in Hospital.
1st Regiment N. L. C.	Poona	291.0	10.4	282	3	1st Regiment N. L. C.	Poona	301.6	8.9	310	1
5th do. N. I.	Do.	589.0	22.1	1,106	...	8th do. N. I.	Do.	690.0	28.1	1,381	2
8th do.	Do.	684.0	28.1	1,311	5	17th do.	Do.	658.5	22.8	791	3
26th do.	Do.	598.0	30.2	793	2	1st Gr. Regiment N. I.	Do.	629.5	24.6	779	3
Sappers and Miners	Kirkee	360.3	7.3	169	3	Sappers and Miners	Kirkee	488.5	9.2	281	4
Detachment Poona Horse	Dhulia	102.0	3.1	41	1	Detachment Poona Horse	Dhulia	91.5	1.9	31	1
4th Regiment N. I.	Satara	322.6	6.7	363	2	4th Regiment N. I.	Satara	352.5	5.6	308	1
19th do.	Sholápur	631.5	10.7	326	3	19th do.	Sholápur	668.0	14.0	625	2
15th do.	Ahmednagar	584.0	13.6	396	4	13th do.	Ahmednagar	674.0	14.7	543	2
2nd Gr. Regiment N. I.	Belgaum	630.0	16.7	402	4	5th do.	Belgaum	634.0	14.4	407	4
14th do.	Do.	569.1	17.4	466	5	6th do.	Do.	610.5	11.1	356	4
Hd.-qrs. 13th Regt. N. I.	Málegaon	348.3	7.7	309	2	15th do.	Málegaon	608.0	14.4	517	2
Poona Horse	Sirur	314.5	10.1	247	1	Poona Horse	Sirur	308.3	10.6	292	3
3rd Regiment N. I.	Kolhápur	547.0	16.0	544	2	14th Regiment N. I.	Kolhápur	524.0	20.2	419	4
Detachment 3rd Regt. N. I.	Kaládgi	89.8	1.2	63	...	Detachment 14th Regt. N. I.	Kaládgi	85.0	1.4	53	1
12th Regiment N. I.	Dharwar	642.8	13.6	303	4	12th Regiment N. I.	Dharwar	685.0	18.3	363	4
Detachment 4th Regt. N. I.	Asirgarh	144.7	5.5	128	...	Detachment 4th Regt. N. I.	Asirgarh	137.0	4.0	151	...
Total...		7,448.6	220.4	7,249	42	Total...		8,145.9	224.2	7,607	40
1st Gr. Regiment N. I.	Ahmedabad	660.0	28.8	828	11	3rd Regiment N. L. I.	Ahmedabad	700.5	32.4	1,226	15
Wing 13th Regt. N. I.	Do.	291.2	12.5	434	3	Squadron 2nd Regt. N. L. C.	Rájkot	146.0	3.9	119	1
Squadron 2nd Regt. N. L. C.	Rájkot	145.0	3.9	98	1	1st Co. Native Artillery	Do.	124.0	2.6	105	1
1st Co. Native Artillery	Do.	120.0	3.0	84	1	7th Regiment N. I.	Do.	247.0	6.8	284	4
7th Regiment N. I.	Do.	280.0	12.5	375	1	28th do.	Do.	551.2	15.9	550	9
28th do.	Do.	528.7	20.0	563	13	11th do.	Bhuj	671.0	16.1	314	4
11th do.	Bhuj	678.2	19.2	485	2	2nd do. N. L. C.	Deesa	288.9	9.4	243	1
2nd do. N. L. C.	Deesa	315.4	7.4	246	1	18th do. N. I.	Do.	583.0	21.2	732	...
18th do. N. I.	Do.	627.0	16.2	508	3	16th do.	Mhow	547.7	24.7	749	5
23rd do.	Do.	524.2	31.6	739	4	25th do.	Do.	517.0	22.5	744	1
25th do.	Do.	522.6	31.0	774	4	3rd Regiment N. L. C.	Neemuch	316.0	12.3	361	1
3rd Regiment N. L. C.	Neemuch	333.8	10.2	412	1	24th Regiment N. I.	Do.	622.0	23.2	1,015	11
24th Regiment N. I.	Do.	651.6	18.6	787	7	Squadron 3rd Regt. N. L. C.	Nusseerabad	122.6	3.7	152	...
Squadron 3rd Regt. N. L. C.	Nusseerabad	106.4	5.2	177	1	23rd Regiment N. I.	Do.	629.0	17.9	665	...
16th Regiment N. I.	Do.	653.1	39.2	1,309	4						

Poona Division.

Division.







## APPENDIX III.

COMPARATIVE STATEMENT showing the Health of the Native Troops in the Four Divisions of the Bombay Presidency.

	1876.										1875.									
	Average Strength.	Admissions.	Deaths.	Average Daily Sick.	Ratio per Cent. of Admissions to Average Strength.	Ratio of Deaths per Cent.		Average Daily Sick per Cent. to Average Strength.	Average Strength.	Admissions.	Deaths.	Average Daily Sick.	Ratio per Cent. of Admissions to Average Strength.	Ratio of Deaths per Cent.		Average Daily Sick per Cent. to Average Strength.				
						In Hospital.	To Admissions.							In Hospital.	To Admissions.					
Presidency Division. { Bombay Circle. Aden ..	2,320.7	2,723	40	105.8	117.3	1.4	1.6	4.5	2,396.2	2,904	34	102.7	125.4	1.2	1.4	4.3				
Poona Division ...	7,448.6	7,249	42	220.4	97.3	0.5	0.5	2.9	8,145.9	7,607	40	224.2	90.3	0.5	0.4	2.7				
Northern Division ...	8,937.3	11,177	68	365.5	125.1	0.6	0.7	4.1	8,547.1	10,714	105	318.2	125.3	0.9	1.2	3.7				
Sind Division ...	2,990.4	5,129	92	142.2	171.5	1.7	3.1	4.7	2,837.5	3,603	32	104.9	126.9	0.8	1.1	3.6				
Total ...	22,583.3	26,918	247	856.8	119.2	0.9	1.0	3.7	22,819.0	25,475	213	772.7	111.6	0.8	0.9	3.3				



