

MADRAS RECORD OFFICE

Government of Madras.

Revenue DEPARTMENT.

G.O. No. 108

Press
Mis.

209. 210

Dated

15-1-1866.

Not to be folded or roughly handled

Proceedings of the Madras Government, Revenue Department.
15th January 1866.

No. 209. Read the following Proceedings of the Madras Government in the
Military Department :—

Forwarding three copies of the Minutes of Pro-
ceedings of the Bengal Sanitary Commission } (Here enter : 2nd December 1865, No. 4,736.)
for May, June, and July 1865.

No. 210. ORDER THEREON, 15th January 1866, No. 108.

Miscellaneous.

Ordered to be recorded.

(True Extract.)

(Signed) J. GROSE,
Acting Under Secretary to Government.

Exd. S. T. Augustin.

PROCEEDINGS OF A MEETING OF THE SANITARY COMMISSION
FOR BENGAL, HELD ON THE 6TH MAY 1865, AT SIMLA.

PRESENT:

JOHN STRACHEY, ESQ., C. S. ... *President.*
SURGEON MAJOR J. P. WALKER, M. D. ... *Member and Secretary.*

60.

Scurvy at Mooltan.

Read again Minutes Nos. 35 and 54 of the Proceedings of the Commission during 1865.

Read letter No. 486, dated 12th April 1865, from the Secretary to the Government of India, in the Military Department, acquainting the Commission—with reference to the President's letter No. 153, dated 30th ultimo (Minute 54)—that the Right Hon'ble the Governor General in Council has no objection to a trial of the use of quinine as a prophylactic at Mooltan, should the Medical Officers on the spot think it desirable. His Excellency in Council entirely concurs with the President of the Commission in thinking that no good cause has yet been shown for restricting the period of duty at Mooltan to one year; whilst the apparent marked success of the measures sanctioned by Government two years ago, in order to ensure as far as possible the health of the troops there, is very satisfactory.

61.

Delhi Sores.

Read again Minute No. 192 of the Proceedings of the Commission on the 25th August 1864.

Read Military Department docket No. 647, dated 15th April 1865, forwarding for information a copy of letter No. 644 of same date, from the Secretary to the Government of India, in the Military Department, to the Officiating Principal Inspector General, Medical Department, intimating, with reference to the Report of a Special Committee on the Delhi Sore, recently submitted, that Government sanctions a consolidated allowance of Rs. 1,000 a month to Assistant Surgeon Lackersteen while employed in analysing the water at Delhi, Lahore, and Mooltan. The Government considers it desirable that further information be obtained as to the duration of the different classes of sores, and the proportion that yield to treatment whilst the patients remain at Delhi, or in its vicinity, as, from the Table attached to the report, it appears that nearly three-fourths of those attacked recovered; also whether those of the soldiers who abstained altogether from spirits or malt-liquor appeared more or less liable to the disease.

It is intimated that instructions will be at once issued for all the wells in the Fort to be carefully and thoroughly cleansed, and the water constantly drawn from them; and that His Excellency the Commander-in-Chief will be requested to cause every precaution in regard to the drinking-water, to prevent the men as much as possible from taking any but that provided them for that purpose.

62.

Sonah Springs.

Read again Military Department docket No. 613, dated 2nd August

Letter No. 3638, dated 30th September 1863, and No. 2069 G, dated 11th June 1864, with two enclosures.

1864, forwarding for remark the papers noted in the margin, regarding the thermal sulphuretted hydrogen springs at

Sonah, in the Goorgaon District, said to have proved beneficial in the treatment of Delhi Sores.

Read again the President's letter No. 564, dated 4th idem, reporting that the question was rather a medical than a sanitary one, for the use of the water had been recommended solely as a curative agent, and therefore, should the Medical Authorities consider the further trial of it a matter of importance, it would not be right that the Sanitary Commission should raise objections, but that as in the correspondence there was really nothing at all to show that any benefit had been derived from the use of the water, or the grounds upon which it was anticipated that benefit may hereafter be derived, the Commission hesitated to recommend to the Government to incur the very considerable expense of building a temporary barrack, stationing a Medical Officer at the spring, and making all the necessary arrangements for carrying out such an experiment as had been suggested.

Read Military Department docket No. 1383, forwarding for information—with reference to the President's letter No. 564, dated 4th August 1864—copy of a letter No 1379, dated 29th April 1865, from the Secretary to the Government of India, in the Military Department, to the Deputy Quarter Master General of the Army, intimating that the report received on the result of a further trial of the Sonah Springs confirms the opinion which Government had formed after consideration of the previous report, and of the report on the analysis of the water, which showed that there was no fair ground for expecting that its use would be beneficial. The Special Committee on the Delhi Sores in its report expressed a similar opinion, and the Right Hon'ble the Governor General in Council concurs with His Excellency the Commander-in-Chief in considering that the experiment of sending British Soldiers to Sonah need not be continued.

63.

Frontier Sore.

Read Military Department docket No. 1281, dated 27th April 1865,

Letter No. 1192, dated 19th April 1865, from the Officiating Principal Inspector General, Medical Department, to the Secretary to the Government of India, Military Department, with three enclosures.

Letter No. 1210, dated 27th April 1865, in reply.

forwarding for information the correspondence noted in the margin, regarding the use of vinegar as a prophylactic against the occurrence of Frontier Sores at Dera Ismael Khan.

The Officer in Medical charge of a detachment of Her Majesty's 35th Regiment stationed there recommended that a ration of vinegar should be issued to counteract the tendency to "Frontier Sores"—analogous in character and effect to the Delhi Sores—prevalent among the European soldiers stationed there, the issue of pickles for three months to the detachment of Her Majesty's 89th Regiment having apparently been productive of benefit. The recommendation was also based on the belief that the condition of the system in those suffering from "Frontier Sore" is more or less allied to that observed in scurvy. The Deputy Inspector General of Hospitals, Lahore Circle, recommended the suggestion as worthy of a trial, and the Officiating Principal Inspector General, Medical

Department, in soliciting the sanction of Government for the experiment, observed that the issue of vinegar and pickles to the European troops at Mooltan had a beneficial effect generally on the health of the men; but it is at present doubtful whether the use of the former as an antidote to the condition which results in the Frontier Boil will be equally beneficial.

The Government sanctioned the issue of 6 ounces of vinegar weekly per man, with a proportionate quantity of sugar daily, to the detachment of European troops stationed at Dera Ismael Khan, as an experiment during the remainder of the hot and rainy months, with the view of preventing, if possible, attacks of the "Frontier Sore," and directed that the results of these measures should be carefully watched and reported in due course.

64. Construction of Hospitals for Native Troops.

Read again Minute No. 33 of the Proceedings of the Commission on the 6th February 1865.

Read Military Department docket No. 899, forwarding for information, with reference to the President's letter No. 88, dated 20th February last, a copy of the following communication addressed to the Secretary to the Government of India, in the Public Works Department:—

No. 898.—OFFICE MEMORANDUM—MILITARY DEPARTMENT, 19TH APRIL 1865.

With reference to the communications marginally noted, the undersigned is directed to acquaint the Secretary to the Government of India in the Public Works Department, that the Right Hon'ble the Governor General in Council concurs in the proposals submitted by Colonel Crommelin for the construction of hospitals for Native Troops as modified by the Sanitary Commission, excepting in the following points:—

- I. The provision of punkahs in the two small wards. This the Governor General in Council does not consider necessary.
- II. The ward Orderly's room. This will not, it is believed, be required.
- III. A separate compartment in the Guard-room for the Native Officers Commanding the Guard. This is quite unnecessary. Moreover, the Guard is merely a Non-Commissioned Officer's party.
- IV. Separate wards for Native Officers have not been hitherto given, nor it is believed would they often be desired. Should a Native Officer desire it, however, he might generally be accommodated in one of the small wards; and some consideration might be, and it is believed is now generally, shown to the Native Commissioned grades in regard to their remaining in hospital when they prefer residing in their own quarters, with their families and comforts about them, unless the nature of the complaint is such as to render their remaining in Hospital expedient.

V. Provided a sufficient amount of ventilation is ensured, which should not be difficult, the division of each of the main wards as proposed by Dr. Bruce appears expedient. The heat would not, the Governor General in Council thinks, be materially, if at all, increased in the hot season, whilst the comfort

of the sick in the cold season, in Northern India at any rate, would be greatly increased by the arrangement.

2. The Governor General in Council observes that, in the provision of cook-rooms, lavatories, and privies, and in requiring them to be used, great care will be necessary not to offend the prejudices of the men, and His Excellency the Commander-in-Chief will be requested to cause this to be carefully pointed out to Commanding and Medical Officers.

(Signed) H. W. NORMAN, *Colonel,*
Secy. to the Govt. of India.

65. Construction of Hospitals for European Troops.

Enter Memorandum upon some of the principles which should be attended to in designing Hospitals for European Troops in India, by Lieutenant Colonel W. A. Crommelin, Royal Engineers.

* Read again letter No. 823 M—5191, dated 3rd November 1864, from the Under Secretary to the Government of India, Public Works Department, requesting the opinion of the Commission on Lieutenant Colonel Crommelin's Memorandum upon European Hospitals.

* Read again Minute No. 27 of the Proceedings of the Commission on the 30th January 1865.

Read Military Department's docket, dated 4th March 1865, forwarding for the information of the Commission, with reference to the Officiating President's letter No. 58, dated 30th January 1865, a copy of Office Memorandum No. 219 of same date, addressed to the Secretary to the Government of India, in the Public Works Department, intimating that the Right Hon'ble the Governor General, in the Military Department, approves of Colonel Crommelin's recommendation as detailed in his Memorandum on the principles to be attended to in designing Hospitals for European Troops in India, dated 25th August 1865.

No. 65 A. Epidemics in Jails.

Read letter No. 1969, dated 28th February 1865, from the Under Secretary to the Government of India, Home Department, transmitting the correspondence noted in the margin, for the opinion of the Commission on the general principles which should be observed in framing rules for guidance in cases in which, owing to the prevalence of epidemic disease in a Jail, it may seem necessary or proper to remove for a time the whole or a portion of the prisoners confined therein.

The Commission was engaged in considering the subject.

66. Disinfection of Tents used for Cholera Hospitals, and of the Furniture in Small-pox and Cholera Wards.

Read again Minute No. 51 of the Proceedings of the Commission on the 30th March 1865.

Read letter No. 489, dated 12th April 1865, from the Secretary to the Government of India, intimating "that the Right Hon'ble the Governor General in Council concurs with the Commission in thinking that it will be quite sufficient to cause the cots and punkah fringes, which have been used by cholera or small-pox patients, or in wards set apart for them, to be subjected to the action of boiling water when they are no longer required for such cases; and that in ordinary cases, whenever the bedding used by such patients can at once be subjected to the same process, that course should be adopted, and the unnecessary destruction of Government property be thus avoided.

"His Excellency the Commander-in-Chief will be requested to cause instructions to be issued for the process being sufficiently superintended by trustworthy persons, to ensure the thorough subjection of the articles to the proper temperature, and the thorough washing and fumigation of tents used for Cholera Hospitals, as recommended * * before they are again brought into use."

67. President and Secretary of the Commission proceed to Simla on duty.

Read letter No. 1465, dated 28th March 1865, from the Secretary to the Government of India, Military Department, intimating that the Right Hon'ble the Governor General in Council considers that as the presence of the President of the Sanitary Commission at Simla may be useful in connection with questions concerning Sanitary Depôts,—which will probably come under discussion during the ensuing hot season and rains—sanction is accorded to his proceeding to Simla on duty, accompanied by the Secretary, on the understanding that no extra expense is incurred by the arrangement. Also intimating that the services of the Engineer Member of the Commission will be available, as he is about to proceed to Simla in his capacity of Under Secretary to the Government of India, in the Public Works Department; and that as regards the other two Members their services may be employed by the President in any way that may seem practicable to him in aiding the work of the Commission.

Sanitary State of Chinsurah.

68. Read again Commission's Minute No. 311 of 1864.

Read Military Department docket No. 174, dated 5th April 1865, forwarding the correspondence—as per margin—showing the action taken by the Government of India on Minute No. 311 of the Proceedings of the Sanitary Commission on the 19th December 1865, on the sanitary state of Chinsurah.

Military Department Proceedings Nos. 668 and 669, dated 14th January 1865.
Letter No. 1085 C, dated 22nd March, from the Quarter Master General.
Letter No. 659, dated 14th February 1865, to the Quarter Master General, and copy thereof under docket No. 660, to the Secretary to the Government of Bengal.
Letter No. 172, dated 5th April 1865, to the Quarter Master General.

From the correspondence it appears that the Hon'ble the Lieutenant-Governor of Bengal was moved to inform the Government of India what remedies could be applied to the evils noticed in the report, especially those referred to in Clauses II and III, and His Excellency the Commander-in-Chief was moved to cause Government to be furnished with a statement of the strength and sanitary condition of the occupants of the Depôt during the preceding three months, with His Excellency's opinion both as to the necessity for leaving the Depôt unoccupied, and also as to the arrangements which can be made to accommodate the recruits and others elsewhere, or to ensure their staying as short a time as possible at the Depôt, should His Excellency consider it inexpedient to vacate it for a time, as suggested by the Sanitary Commission.

The Right Hon'ble the Governor General having honored the Military Depôt with a visit, and minute inspection, the result was communicated by the Secretary to the Government of India, Military Department, to the Quarter Master General, in the following letter No. 659, dated 14th February 1865:—

"In communicating as follows the substance of the remarks on the state of the Depôt at Chinsurah, recorded by the Right Hon'ble the Governor General after His Excellency's recent visit to that place, I am directed to request that His Excellency the Commander-in-Chief may be moved to cause all the measures therein noticed as necessary, which can be carried out by the Military Authorities, to be adopted without delay; and that Government may be informed whether there are any, and if so which of them, that must be ordered by the Government of Bengal, to which a copy of this letter will be sent.

"2. His Excellency observed that the river bank was generally uncared for, and a portion of it in a filthy state, owing to the absence of any provision for the necessities of the native servants and others; the cyclone in October last having destroyed the latrine which formerly existed. This should be remedied.

"3. The front towards the river is partially obstructed by bamboo huts belonging to camp-followers and others. These huts, His Excellency thinks, shut out a portion of the cool fresh air from the river; they are, moreover, irregularly built, so that cleanliness could with difficulty be secured, and the ground about them was strewn with rags and other unseemly rubbish. These huts should be moved to one side, and re-constructed there in regular lines; and with a little management, His Excellency thinks, this could be done without much inconvenience to the people or the troops, and at a small cost.

"4. The baths in the upper story of the barracks are scarcely wide enough to admit the body of an ordinary sized man. This should be remedied at once, and arrangements made for filling the plunge-bath near the barracks, which is a very good one though the machinery is represented to be insufficient to keep it properly filled.

"5. The upper stories, moreover, seem to be in part occupied by married families. This, His Excellency thinks, should not be. The men are at Chinsurah for but a short time together, and the whole of the upper floors should be used by the men to sleep in. Sufficient space might be found for the women and children, it is believed, on the upper story of the old Dutch Barrack, and all stores or Offices should be removed to the lower story.

"6. Similarly, in the hospital no men should sleep in the lower story if accommodation can be given them in the upper one.

"7. More carefulness and energy in attending to cleanliness in the neighbourhood of the barracks would, His Excellency in Council considers, tend to diminish the number of cases of cholera and the virulence of the attacks of that disease, which His Excellency was sorry to hear was a frequent visitant at the Depôt."

The Quarter Master General having submitted the documents marginally noted, with an intimation of His Excellency the Commander-in-Chief's support of the remedial measures therein recommended, the Secretary to the Government of

India in reply communicated the orders of the Government of India in the following letter No. 172, dated 5th April 1865:—

"In reply to your letter No. 1085, dated 22nd ultimo, I am directed to acquaint you, for the information of His Excellency the Commander-in-Chief, that the Bengal Government will be requested to take effectual steps to secure the proper sanitary condition of the slaughter-house at Chinsurah.

2. "The necessity of maintaining the Chinsurah Depôt, so long as Calcutna is the port of embarkation and disembarkation for so large a portion of the British Force in the Presidency, seems scarcely open to question; and it does not appear to be really an unhealthy one. At the same time the importance of detaining the men at the Depôt for as short a time as possible is admitted; and His Excellency, it is believed, has caused this to be repeatedly impressed on the Divisional Authorities.

3. "The necessity of exercising the utmost care to ensure cleanliness in the neighbourhood of the barracks, and of making the best use of the upper stories of the latter, was pointed out in my letter No. 659, dated the 14th February last, in which the condition of the plunge-bath, and of the baths in the upper story of the barracks, was adverted to as requiring attention.

4. "The Bengal Government appears to have given orders respecting the plunge-bath, and the Right Hon'ble the Governor General in Council considers that the best position for the new lavatories might be decided on the spot by the Commandant and Medical Officers, and the Executive Engineer.

5. "For the reasons urged by Dr. Rennie, His Excellency in Council considers that the verandah of the principal barrack, which was partially unroofed by the cyclone in October last, should be restored; and as before suggested in para. 5 of my letter of the 14th February, the upper story of the Dutch Barrack should be converted into proper married quarters, in which sanitary rules should be strictly enforced."

Read Military Department docket No. 996, dated 21st April 1865, in continuation of docket No. 174, dated 5th idem, the following letter No. 2088, dated 1st April 1865, from the Secretary to the Government of Bengal, to the Secretary to the Government of India, Military Department:—

"I am directed to acknowledge the receipt of Assistant Secretary Lieutenant-Colonel Bacon's endorsement No. 668, dated the 14th January last, forwarding a copy of a Resolution recorded by the Sanitary Commission for Bengal on the sanitary state of the Military Depôt

at Chinsurah, and enquiring what remedies can be applied to the evils noticed by the Commission in paragraphs 2 and 3 of the Resolution.

2. "The points to which the Commission draw the attention of Government in those two paragraphs are—

"(1) The adoption of prophylactic measures to prevent the civil inhabitants of Chinsurah becoming affected with the fever prevailing in the surrounding district.

"(2) The adoption of measures to prevent the accumulation of filth, decayed and decaying vegetable matter, and other noxious substances in and about the enclosures of Native houses.

"(3) The improvement of tanks.

"(4) The improvement of the drainage of the Bazar.

"(5) The removal of the present slaughter-shed.

"(6) The prevention of the sale of unwholesome food and drink.

3. "With respect to prophylactic measures against the epidemic fever, I am desired to observe that, in the obscurity which still covers the immediate exciting cause of the disease, increased attention to cleanliness and proper conservancy must be mainly relied on to ward off its attacks. The chief prophylactics known are, therefore, those suggested by the Sanitary Commission itself.

4. "The Lieutenant-Governor purposes immediately to extend the operation of the District Municipal Act No. III (B. C.) of 1864 to the Stations of Hooghly and Chinsurah. The Municipality to be constituted under the Act will have full and express powers to deal with points 2, 3, and 4, and the attention of the Municipal Commissioners will be especially drawn to the importance of those measures.

5. "In regard to the 5th point, I am to state that Act III (B. C.) of 1864 is in course of amendment with a view to vest the Municipal Commissioners appointed under the Act with power to frame the necessary rules for regulating the establishment and maintenance of slaughter-houses, and upon this amendment being made, the Municipality of Hooghly will be able to deal with the slaughter-shed noticed by the Commission.

6. "As to the 6th point, I am to state that the Towns and Bazars of Chinsurah and Hooghly have been included within the limits of the tract within which, under the provisions of Section 29, Act XXII of 1864, (an Act for the regulation of Military Cantonments), it is penal to sell any spirituous liquor to Soldiers except under a license granted by the Commanding Officer. This, it is hoped, will put a stop to the sale of unwholesome drink to the troops at Chinsurah. The only method of preventing the sale of unwholesome food is by rigorous enforcement of the provisions of the Indian Penal Code, and the Magistrate's attention will be drawn to the subject."

69. Barrack Construction and Barrack Accommodation for European Troops in India.

Read again Minute No. 115 of the Proceedings of the Commission on the 6th June 1864.

Read Circular No. 22 of 1865, of the Public Works Department, communicating for the information of the Sanitary Commission the following Resolution of the Right Hon'ble the Governor General in Council, dated 17th March 1865, on the details of Barrack Accommodation to be provided for European Troops.

"RESOLUTION.—In the Circular of the Public Works Department No. 89, dated 16th December 1864, the numbers of buildings and of sleeping rooms for unmarried men to be provided, as a rule, for the units of the several arms of the service, have been fixed as follows:—

	Number of Barracks.	Number of rooms per Barrack.	TOTAL NUMBER OF ROOMS.
For a Light Field Battery	3	2	6
Garrison Company of Artillery	1 or 2	3 or 2	3 or 4
Troop of Cavalry	1	3	3
Company of Infantry	2	2	4

"2. It will be necessary to provide separate quarters for the whole of the Non-Commissioned Officers as will be presently detailed (partly in detached ranges, and partly in the barracks of single and married men), and also for the full authorised complement of married men calculated at 5 per cent. of the strength of each arm. It is also considered advisable that the band of each Cavalry and Infantry Regiment should have its own distinct barrack arranged for 44 men in each case.

"3. It remains, therefore, to determine for how many unmarried men of each arm accommodation shall be provided, having due regard to the necessity of making sufficient allowance to meet the probable contingency of there being frequently a deficiency in the authorised proportion of married men.

"4. This question is in a very considerable degree affected by the number of rooms which it has been considered desirable, for particular reasons, to assign to each unit; for it will be apparent that each room must have the same number of beds on each side, and that the addition of one bed space to the length of a room is tantamount to the addition of accommodation for two men. This addition of one bed to the length of each room will multiply the accommodation for each arm as follows:—

	No. of rooms.	Men.
Light Field Battery of Artillery	6 × 2 = 12	
Garrison Company of Artillery	3 or 4 × 2 = 6 or 8	
Regiment of Cavalry	21 × 2 = 42	
Ditto of Infantry	40 × 2 = 80	

and when considered with reference to the total amount of accommodation to be provided throughout the three Presidencies, will be attended with very important financial consequences.

"5. After much consideration of the subject, the Governor General in Council considers that the following scale of accommodation for unmarried men

"*Regiment of Cavalry.*—The Sergeant Major will have a detached bungalow. The School Master and School Mistress will have quarters at the school, probably in a detached block.

"The Band Master Sergeant and Trumpet Major will be in the Barrack with the Band.

"The Hospital Sergeant will have quarters in the hospital. The 7 Troop Sergeants and 21 Sergeants, Class C, will have quarters in the barracks of the single men.

single men.

"For the remainder, viz., Quarter Master Sergeant, Sergeant, Instructor of Musketry, Pay Master Sergeant, Armourer Sergeant, Saddler Sergeant, Farrier Major, Orderly Room Clerk, there will be a range containing two quarters, Class A, and five quarters, Class B.

"*Regiment of Infantry.*—The Sergeant Major, School Master, School Mistress, Band Master Sergeant, Drum Major, and Hospital Sergeant will be accommodated as directed for the Cavalry Regiment.

"8. The 10 Color Sergeants and 30 Company Sergeants will be quartered in the barracks of the unmarried men, and there will be a detached range containing two quarters, Class A, and three quarters, Class B, for the Quarter Master Sergeant, Sergeant Instructor of Musketry, Pay Master Sergeant, Armourer Sergeant, and Orderly Room Clerk.

"9. The following Table shows the Regulation strength of all arms; and the total extent of accommodation to be provided with reference to the foregoing details:—

"7. They will be thus disposed of—

"Head Quarters of a Brigade of Artillery.—The Hospital Sergeant will be quartered at the hospital, and the remainder in a range containing two quarters, Class A^o, and two quarters, Class B.

"Batteru Royal Horse or Field Artillery.—There will be a separate range of three quarters for the two Sergeants, Class B, and for the Farrier Sergeant, Class C. The remaining six Sergeants will have quarters in the barracks for the single men. Two additional quarters Class C, will be allowed in the married men's range to meet the requirements of a senior Collar-maker and Wheeler of a Brigade who rank as Sergeants.

" *Garrison Company of Artillery*.—The Sergeant, Class B, will be accommodated in a quarter attached to the married men's range, and the remainder in the barracks of the unmarried men.

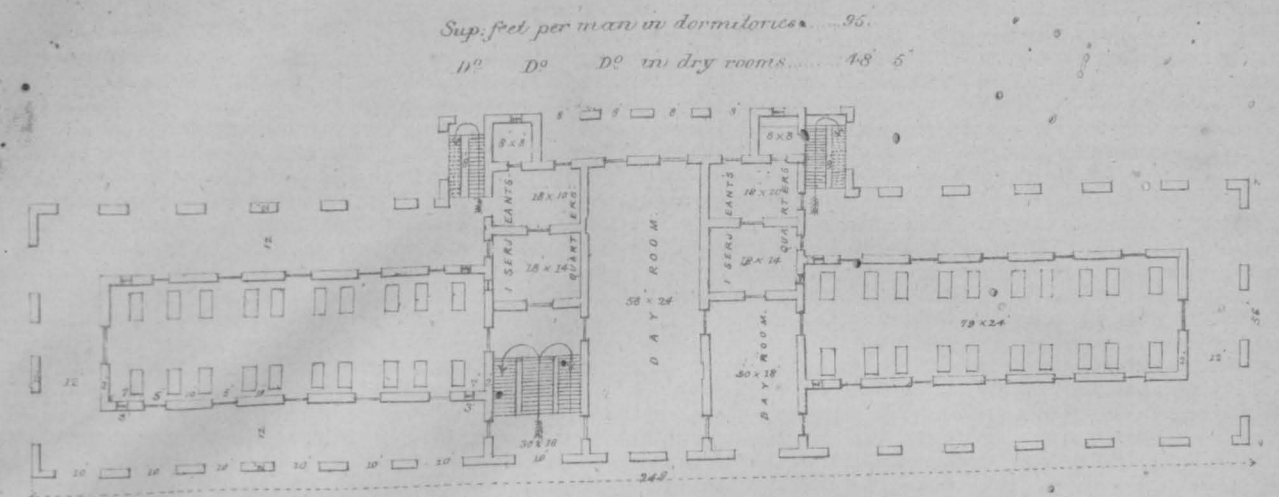
	Class A.	Class B.	Class C.	PRIVATES.				GRAND TOTAL.
				Band.	Married.	Unmarried.	Total Privates.	
<i>Garrison Company of Artillery.</i>								
Regulation strength ...	0	1	4	...	...	...	70	75
Accommodation to be provided ...	0	1	4	0	9	66 or 64	75 or 73	79 or 77
Excess accommodation ...	...	...	...	...	...	...	...	4 or 2
<i>Regiment of Cavalry.</i>								
Regulation strength ...	5	15	21	...	...	...	476	517
Accommodation to be provided ...	5	15	21	44	56	420	520	561
Excess accommodation ...	...	...	...	...	...	...	...	44
<i>Regiment of Infantry.</i>								
Regulation strength ...	5	16	30	...	...	...	870	921
Accommodation to be provided ...	5	16	30	44	105	800	949	1,000
Excess accommodation ...	...	...	...	...	...	...	...	79

It will thus be seen that in every instance an excess of accommodation is provided for in the barracks which it is considered will be sufficient to meet all contingencies,—and it is moreover to be borne in mind that the hospital accommodation has not been taken into account in the above calculation.

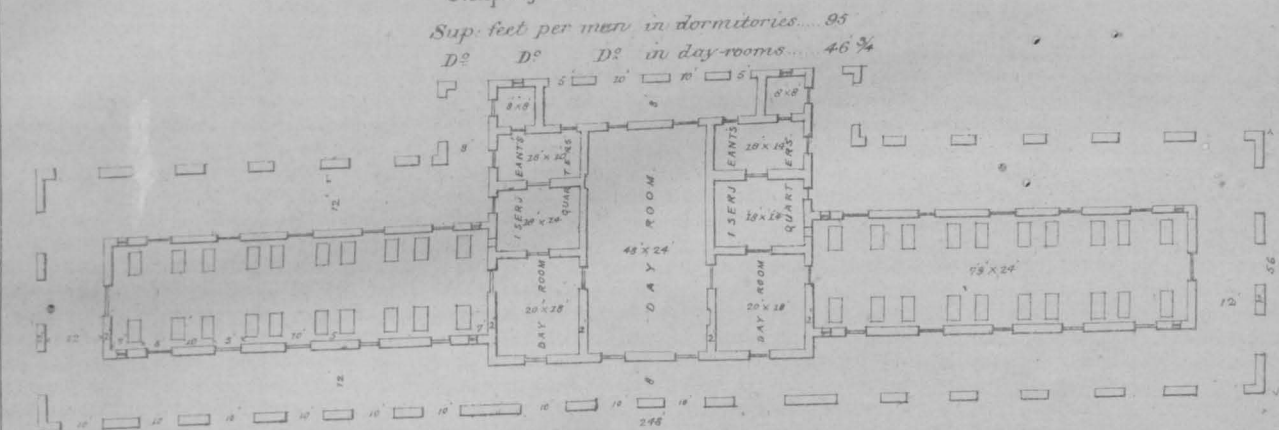
ORDER.—Ordered, that the above Resolution be reported for the consideration and approval of Her Majesty's Secretary of State, and that meanwhile it be communicated, together with the specimen plans referred to in Circular No. 89 of 1864, for the information and guidance of the Local Governments and Administrations noted in the margin."

Governments of Madras, Bombay, Bengal, N. W. P., and the Punjab.
Governor, Straits Settlements.
Chief Commissioners of Oudh, Central Provinces, and British Burmah.
Resident at Hyderabad.
Governor General's Agents, Central India and Rajpootana.
Military Department.
Quarter Master General.
Adjutant General.
Sanitary Commission for Bengal.

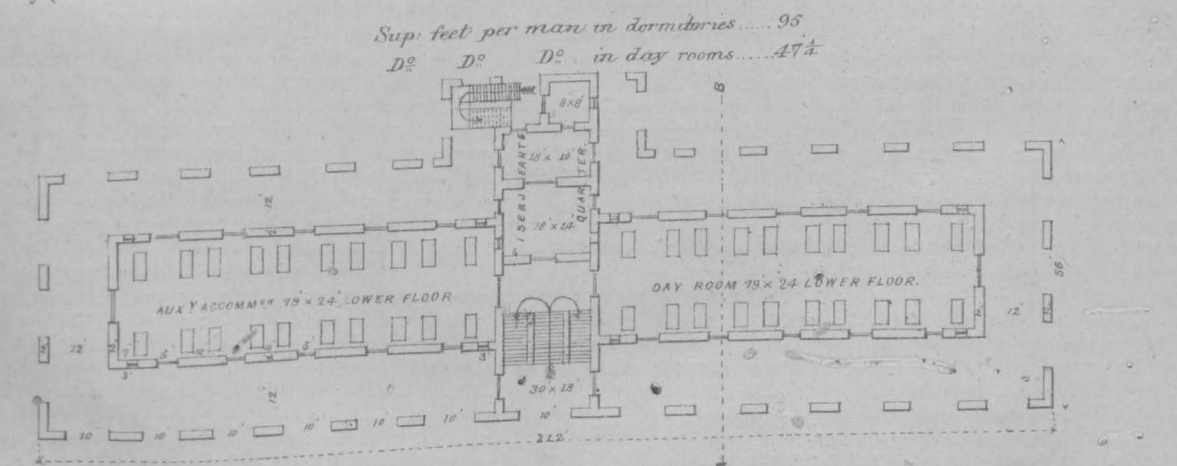
SPECIMEN PLANS REFERRED TO IN CIRCULARS N° 89 OF 1864 & N° 22 OF 1865.
N°1 Plan of a double Storied Barrack suited for the unmarried men of a whole Company of British Infantry, both Stories being occupied as dormitories:



N°2. Plan of Single Storied Barrack suited for the unmarried men of a half Company of British Infantry.



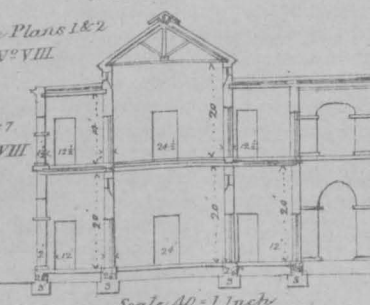
N°3. Plan of upper floor of Double Storied Barrack for Half a Company of British Infantry (unmarried men) the lower floor being set apart as day rooms and for auxiliary purposes.



SECTION ON A.B.

N.B. Plans N°1 & 2 are in modification of the Plans 1 & 2 referred to in Conclusion on proposal N° VIII of above circular.

Plan N°3 is in modification of Plans 6 & 7 referred to in Conclusion on proposal N° VIII of above circular.
Fire places may be provided for the day rooms, but in the lower floor only.



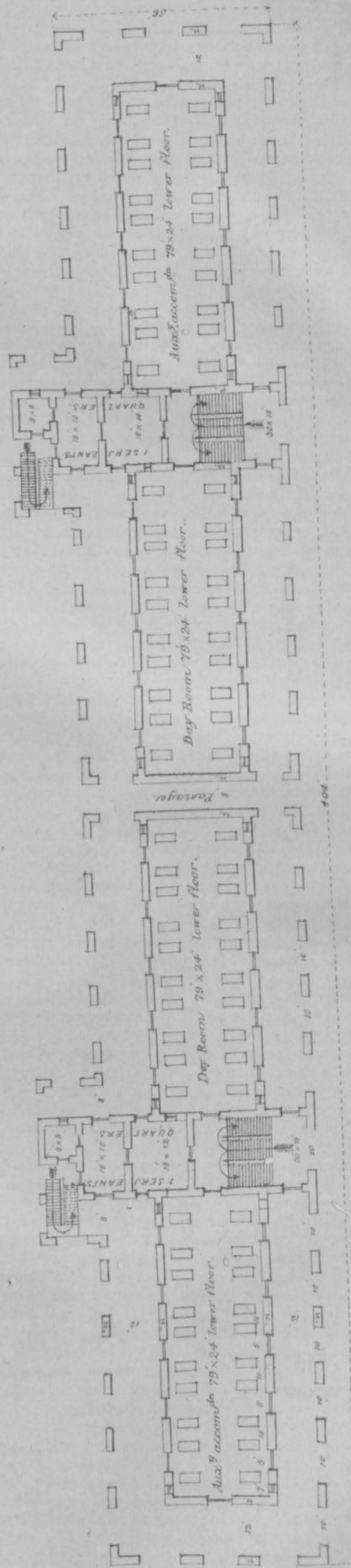
For Hill Stations the dimensions may be altered according to Conclusion on proposals N° V & VIII.

The Roof of the stair cases and Sergeants Quarters should be flat and on a level with that of the Verandah to admit of end Ventilation of wards by means of Clerestory windows.

Scale 40' = 1 inch

[128]

N^o 4.
PLAN OF UPPER FLOOR OF DOUBLE STORIED BARRACK
for a
whole Company of European Infantry.
The lower floor being set apart as day rooms,
and for auxiliary purposes.



Scale of 40' = 1 inch.

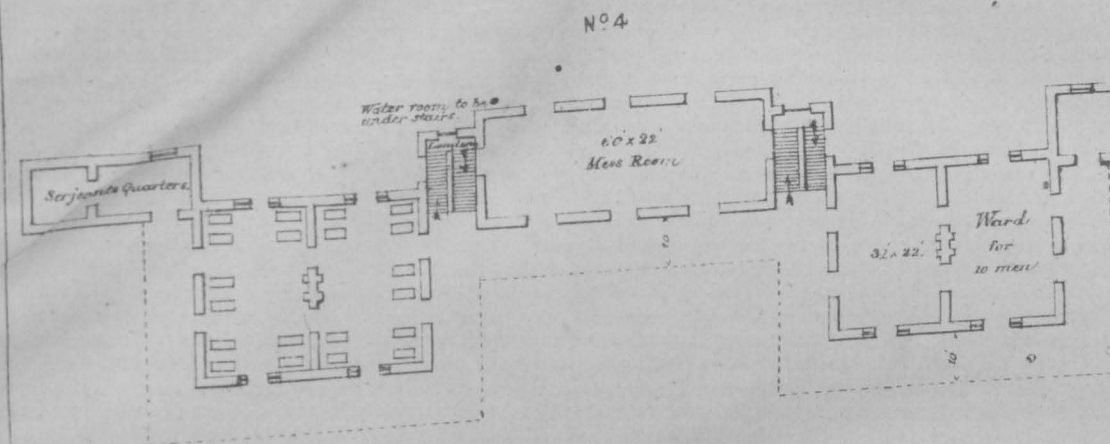
N.B. Fire places may be provided for the
day rooms in the lower floor only.
The roof of the stair cases and Serjeants
Quarters should be flat and on a level
with that of the verandah to admit of
easy ventilation of wards by means of
closet windows.

MILITARY ORPHAN PRESS CALCUTTA.

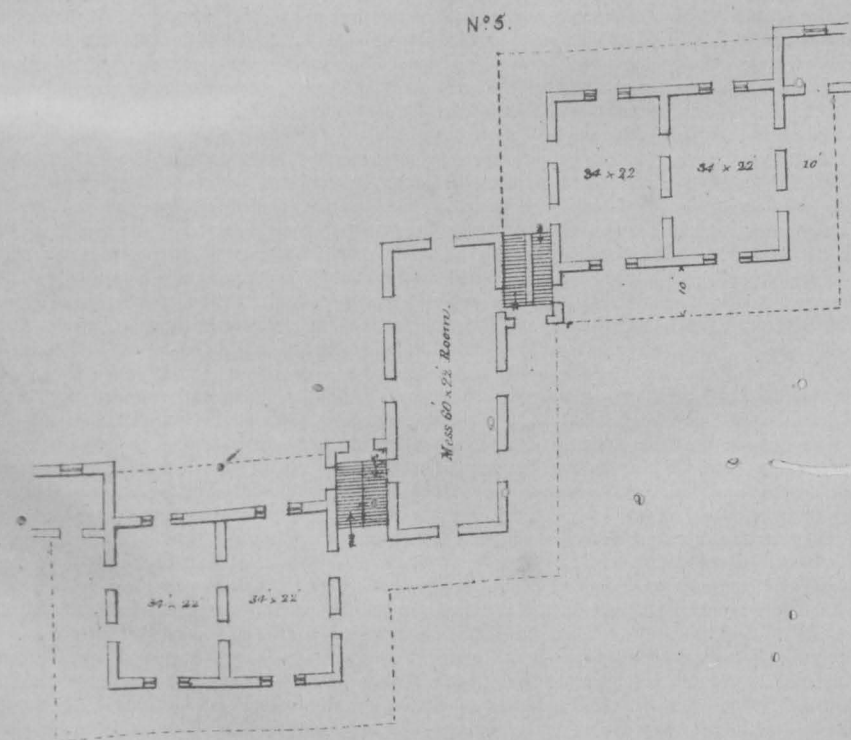
[129]

SPECIMEN PLANS REFERRED TO IN CIRCULARS N^o 89 OF 1864 & N^o 22 OF 1865.

Plans 4 & 5 of Barracks for a full Company of British Infantry
referred to in Conclusion on proposal N^o 8 of
Circular N^o 89.



N.B. Mess Room a Single storied Building.
Wings double storied, both stories to be
occupied as dormitories.



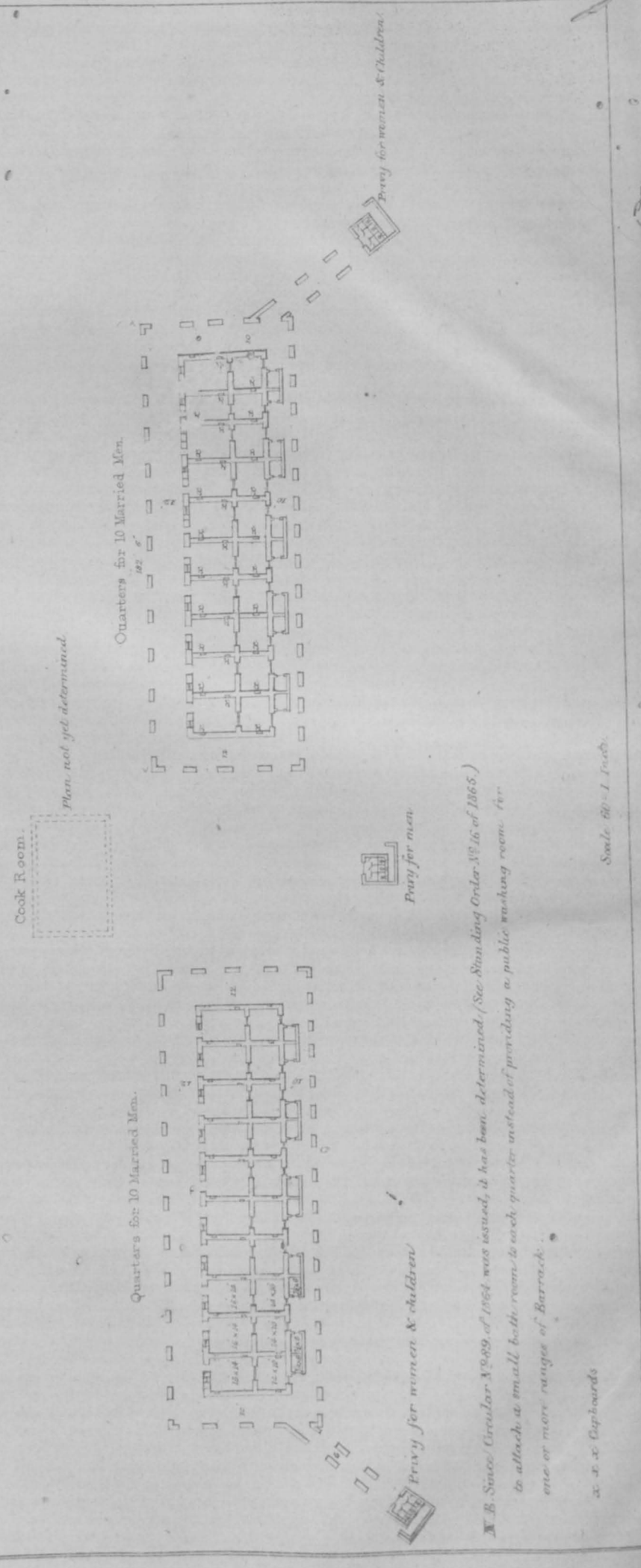
Scale 40' = 1 inch.

SPECIMEN PLAN REFERRED TO IN CIRCULARS N° 89 OF 1864 & N° 22 OF 1865.

PLAN OF FAMILY QUARTERS FOR 2 COMPANIES

of a

Regiment of British Infantry.



70.

Slaughter-Houses for European Troops.

Read again Minute No. 13 of the Proceedings of the Commission on the 12th January 1865.

Read Circular No. 26 of 1865 of the Public Works Department, communicating for information the following Resolution of the Right Hon'ble the Governor General in Council, dated 22nd March 1865, on slaughter-houses for European Troops, containing general instructions to be followed in the construction of new, and modification of existing buildings :—

“RESOLUTION.—The Governor General in Council has for some time had under consideration the subject of slaughter-houses for European Troops, and observes that although it may not be possible to lay down one, or even several standard plans, which can be strictly followed in detail in all parts of India, yet that there are certain real and essential requirements which are common to all slaughter-houses, and for which provision should in all cases be made.

“2. His Excellency in Council is therefore pleased to lay down for information and guidance the following general instructions which should be followed in the construction of new, or the modification of existing slaughter-houses.

“The component parts of a slaughter-house are—

“1st.—The slaughter-stand, on which the animals are killed.

“2nd.—The gallows, on which the carcasses are hung for the purpose of being dressed.

“3rd.—The hanging-house, into which the carcasses are removed after they are dressed, and where they remain hung up, until they are issued to the Troops.

“4th.—Yards and sheds for the cattle.

“5th.—A yard in which the fodder for the cattle may be stacked.

“6th.—A well.

“7th.—The general enclosure.

“3. The slaughter-stand need be merely an unenclosed floor on the open ground, covered with sand to a depth of one foot, and raised a few inches above the ground level, and having a rather broad but shallow and saucer shaped drain, (say, 2 feet wide and 1 foot deep), which should run along the front of it and (say, 2 feet wide and 1 foot deep), which should run along the front of it and communicate with a small pucca tank or reservoir, also shallow. It will prove convenient to place this reservoir immediately outside the enclosure of the slaughter-yard, so that the villagers or others may be able to carry away the contents without entering the yard. The drain should be broad and rather deep, so that the heads and horns of the animals, which are slaughtered over it, may not come in contact with its bottom and sides during their death throes. The floor should be about 15 feet wide, and will vary in length with the size of the slaughter-house, or in other words with the number of cattle to be slaughtered at one time. It has been suggested that this floor should be paved, so as to admit of its being thoroughly washed and cleansed, and because it is feared that the earthen floor will absorb blood, &c., and become offensive. But a paved floor would be expensive, and is otherwise objectionable, inasmuch as the cattle when thrown upon it, previously to being slaughtered, would be liable to be

bruised and injured. Moreover as the greater portion of the blood and offensive matter would fall into the drain, it is probable that not more than the surface of the earthen floor would be tainted, and this might be constantly renewed. On the whole it seems advisable that the sand floor should be adopted in the first instance, at any rate, and should experience show that it proves offensive, a paved floor can subsequently be substituted. The sand should be renewed frequently.

"4. *The Gallows* consist merely of strong posts let into the ground close to the slaughter-stand, at intervals of about 6 feet, and connected at top by stout wooden bars from which the carcasses are suspended, and which should be about 8 feet from the ground.

"5. A broad shallow drain, communicating with the drain of the slaughter-stand, should be constructed along the whole length of the gallows, to catch the blood and offal that may fall from the carcasses while they are being dressed. The slaughter-stand and gallows should be in the open air, that is to say, they should not be covered in by any roof, in order that the air may pass freely over, and purify the ground on which the processes of slaughtering the animals and cleansing the carcasses are performed. The Sanitary Commission have recommended, that the gallows should be covered in by a permanent roof, but the Governor General in Council doubts whether there is any necessity for such covering, and considers that it might prove objectionable inasmuch as it would obstruct free ventilation. The gallows should, therefore, in the first instance, be constructed without the covering of a permanent roof; if in practice it is found that such cover would be advantageous, it can be added. During the rains protection from the weather might be afforded by canvas awnings which would be easily erected and removed according to the season.

"6. *The Hanging House or Meat Shed* should be built close to the slaughter-stand, so that the carcasses may not have to be dragged to any distance. It will be most conveniently situated, if placed at one corner of the general enclosure, with a door in the outer wall from which the meat can be issued. It should be about 16 feet high and 16 feet wide, but its length will depend upon the number of carcasses to be stored in it at one time: this can easily be calculated by reckoning that a length of 3 feet should be allowed for each bullock, and one foot for each sheep; and that 8 bullocks or 40 sheep are sufficient on the average for 1,000 men per diem. This shed should be well ventilated. It should have openings in the roof and windows in the outer wall, in addition to the door above-mentioned, and the front should be open and protected by jhamps or jaffree work. The floor should be pucca (paved if possible) and sloped to a small drain which should run along the centre and communicate with the same tank as the slaughter-stand drain. This drain will catch the drippings from the carcasses, and also carry off the water which should be freely used for washing out the shed. Dressers need not be provided as the carcasses are not cut up until they reach the ration ground of the troops. Gallows for hanging the carcasses must be erected over the drain. The details, here specified, provide for the cleansing of the hanging sheds by means of water; it is possible however that dry earth may prove a more satisfactory purifying agent, and the necessary experiments with it as a substitute for water should be tried.

"7. *Yard and shed for cattle*.—The cattle will generally feed in the yards, and will sleep in them during the hot weather and rains when fine; in cold and rainy weather they will sleep in sheds. The yards need only be enclosed by mud walls 5 feet high, and the sheds may be of temporary construction. Cattle for 30 days' supply of meat have by recent orders to be kept at the slaughter-yard. The average numbers for 1,600 men, for this period, are 400 sheep and 160 bullocks. The space to be allowed in the sheds should be at the rate of 6 or 8 square feet per sheep, and 30 square feet per bullock. The Sanitary Commission think 36 square feet should be allotted to each bullock, but this is a point which in practice will soon be discovered and can easily be provided for.

"8. *Yards for fodder*.—No buildings seem necessary for the storage of fodder, this can be stacked in an open yard in which there should also be space sufficient for a small row of huts which the Contractors will require to construct for their establishments. A yard 250 feet square should suffice for a Regiment.

"9. *The Well*.—A well, 6 feet in diameter, in which there is a good supply of water, should suffice.

"10. *The Enclosure*.—For the whole of the above parts should be on a liberal scale. Slaughter-houses are generally at the out-skirts of stations where plenty of ground is available, and as the only expense of the general enclosure is the mud wall of 5 feet in height, and as cattle require room to move about in, there can be no object in cramping the space. An area of from 70 to 80 yards square will probably be found sufficient for a Regiment.

"11. *Cess Pools and Offal Pits*.—It is essential that the whole of the offal shall be carried away daily, and that the blood and liquid refuse should not on any account be deposited in cess-pools within the premises, where it would be liable to become offensive, thereby subjecting the freshly killed meat to effluvia. The greater portion of the refuse can be disposed of to the villagers, and the remainder must be carted away daily by the establishments.

"12. The shallow tank or reservoir alluded to in para. 3 is only intended as an immediate and temporary receptacle of the fluid refuse."

"ORDER.—Ordered, that copies of the foregoing Resolution, with a sketch showing the various component parts of a slaughter-house, be forwarded to the Local Governments and Administrations, and to the Heads of Departments noted in the margin."

Governments of Madras, Bombay, Bengal, N. W. Provinces, and Punjab.
Governor, Straits Settlements.
Chief Commissioners, Central Provinces, Oudh, and British Burmah.
Resident at Hyderabad.
Agents, Governor General, Rajpootana, and Central India.
Quarter Master General of the Army.
Commissary General.
President, Sanitary Commission.

71.	Cholera Camps—Extra-Expenditure for.
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From the correspondence it appears that while at Cawnpoor cholera appeared in the Regiment, a man and a woman of a Detachment in the entrenchment, living in adjoining quarters, were attacked on the 19th August 1864, and both died in hospital. The Detachment quartered in the entrenchment was that day moved into camp on the Oudh side of the Ganges. On the 22nd idem a child living in the Depôt Barracks occupied by soldiers' families died from the disease. On the 25th two fatal cases occurred, one among the men in the Eche-lon Barracks, and the other a child in the female hospital.

On the march of the Right Wing a patient in hospital was seized with cholera and died on the third day. On the 31st idem a child with the Left Wing having been attacked the camp was moved on the 3rd September to Murdarpoor, two or three miles off the road. In the Right Wing a fatal case having occurred, on the 2nd September among the men the camp was moved on the 3rd idem from Buntiah to Mungurwarra, on the west of the Lucknow road, where, however, on the 14th idem two cases (one fatal) having occurred among the children, the women and children were immediately moved to a spot three-quarters of a mile further off the road. No other cases occurred in camp, but the orderly-room clerk having been sent on duty into Cawnpoor on the 17th September was attacked by cholera on the 18th, and died that night.

492. When Troops are sent into camp all the buildings occupied by them in Cantonments should be thoroughly purified without the least delay.

No mention is made as to whether any camp-followers were attacked with cholera.

Exclusive of the depreciation in the value of the camp-equipage, and of the cost of its carriage to and fro the camps, and irrespective of any increased expense connected with rationing the troops out of cantonments, the extra expenditure consisted of Rs. 489-1-0 for repairs to the Camp equipage executed by the Quarter Master of the Regiment, and Rs. 2,140-7-0 paid by the Commissariat Department for maintaining the extra Quarter Master's establishment—tent-pitchers, water-carriers, and trench-diggers—requisite in camp.

OPINION.

I.—The Commission is of opinion that the removal of the troops into camp was attended with most satisfactory results, while it does not appear that the move, by which the disease was evaded, led to the prevalence of any other diseases.

II.—The only point on which it seems necessary to remark is that the Regiment remained in camp forty-two days after the occurrence of the last case of cholera in the Right Wing, and fifty-six days after the last case in the Left Wing, the result of which was that extra expense was incurred for establishments and contingencies. Although the Commission does not doubt that in this particular case the Medical Officers may have had good reason for delaying for a longer time than usual the return of the troops to cantonments, it is desirable to notice that if the rules laid down by the Cholera Commission and approved by Government be acted upon, cases of this kind will be quite exceptional, there being no reason for supposing that under ordinary circumstances any considerable extra expense—such as that incurred in the present instance—need be caused by the removal of troops into camp on account of cholera.

72. Cholera Camps—Selection of Sites.

Read Military Department docket No. 289, dated 7th April 1865, forwarding for information copy of a letter No. 2473, dated 31st March 1865, from the Junior Secretary to the Government of Bengal, reporting for the information of His Excellency the Governor General in Council that the three sites noted in the margin have been selected by the Collector

1. At Moneir, 400×200 yards.
2. At Anundpore, 400×400 yards.
3. Near the Soane River, 400×200 yards.

of Patna, in communication with the Military Authorities at Dinapore, for the formation

of Cholera Camps in the neighbourhood of that Station, and that instructions have been issued to the Board of Revenue for taking possession of the lands under the provision of Section II. of Act VI. of 1857. A charge of Rs. 19 was incurred for the measurement of the lands alluded to.

73. New pattern Tents for Indian Army.

Read again Minute No. 185 of the Proceedings of the Commission on the 15th August 1864.

Read again Minute No. 207 of the Proceedings of the Commission on the 5th September 1864.

Read Military Department docket No. 1518, dated 29th March 1865, forwarding for the information of the Commission, with reference to the President's letters No. 558, dated 22nd August, and No. 618, dated 5th September 1864, a

copy of the subjoined letter No. 1514, dated 29th March 1865, from the Secretary to the Government of India, in the Military Department, to the Quarter Master General.

“Having laid before the Government of India your letter No. 1593, dated the 9th May 1864, and other correspondence connected with the question of the description and scale of camp equipage to be maintained for European troops in India, I am directed to communicate to you, for the information of His Excellency the Commander-in-Chief, the decision of the Right Hon'ble the Governor General in Council on the various questions involved.

“2. First as to the Staff Sergeant's tents. The Governor General in Council approves of the proportion of tents proposed by His Excellency for the Staff Sergeants, with the single exception of the scale recommended for the Schoolmaster, who should not, in the opinion of Government, require better accommodation than a Sergeant Major, *i. e.*, a Staff Sergeant's tent.

“3. Secondly as to the Private's tents. The Governor General in Council approves of the gradual introduction in all the three Presidencies, as new tents are made up, of the European Private's tent of the new Bengal pattern as recently improved; and the Inspector General of Ordnance will be instructed to have two tents carefully made of that pattern, and sent as muster tents for the guidance of the Ordnance Departments in Madras and Bombay.

“4. These improved tents will be supplied,—exclusive of the 2 tents per 100 Rank and File for the men's families, and 1 tent for every 6 families of married Sergeants, allowed by Government General Order No. 385 of 1852,—in the proportion of 1 tent to every 16 men, to which number the allotment of men to each of the existing tents in Madras and Bombay should, the Governor General in Council considers, be reduced at once.

“5. In order somewhat to diminish the expense which will be incurred by the above arrangements, His Excellency in Council approves of the Commander-in-Chief's suggestion that camp equipage shall not be maintained for the permanent European Garrisons of stations where there are large Arsenals, from the reserve stock contained in which they could at any time be supplied with tents on an emergency; as, on occasions of relief, it could generally be easily arranged that they should take over the tents of the relieving Corps.

“6. The Governor General in Council also concurs with the Commander-in-Chief in thinking it most desirable that Regiments marching in relief should leave behind them all of the more bulky articles of their equipment that they can well do without during the march; and he will be glad to be favored with the detailed scheme for carrying out the suggestion, which in para. 5 of your letter, His Excellency offers to submit.

“7. With respect to His Excellency's proposal to equip the Native Army with bell tents, in order that there may be at any time a supply of tents suitable for service in colder climates beyond sea, or in mountainous regions in India, the Governor General in Council observes that the Pal is believed to have been deliberately substituted for the bell tent in the last century in consequence of its being thought much better suited for general service in India, an opinion confirmed by our experience in most of the expeditions on our North-West Frontier.

"8. The Governor General in Council is also prepared, should the Commander-in-Chief deem it desirable, to consider the expediency of having the present Sepoy's tent,—which consists of two Pals, each open at one end and closed by purdahs at the other,—converted into two by the addition to each Pal of one standing pole, and purdahs to the open end: each Pal would then be a tent in itself. It might also be possible to have the three standing and two ridge poles of each Pal, which are about $8\frac{1}{2}$ feet long, jointed; though it is believed that this could scarcely be done without using a heavier wood than the bamboo for the poles, and otherwise considerably increasing the expense.

"9. Experiments are being made as to the feasibility of strengthening the ferules and cap pieces of the poles and ridge poles of the European Private's tent, and also as to the possibility of effectually ventilating the upper part of the tent through the flies: and the Sanitary Commission have further suggested that it would greatly improve these if the Staff Sergeant's tents were the lining buff instead of blue. Government is quite prepared to order this latter change prospectively, should His Excellency think it desirable. The ground for adopting it is that it would render the tents more cheerful; the objection to it is that, as the dark-blue cloth tends greatly to keep out the sun's rays, its withdrawal from the walls (it might still form one of the folds of the outer flies) would materially increase the heat of the tents.

"10. The value of this objection might be tested by actual trial, a tent with the buff instead of the blue lining being pitched alongside another with the latter lining, and the temperature in each carefully observed; and I am to request the early opinion of His Excellency the Commander-in-Chief on this proposal and on the suggestions made in para. 8 above. I am also to request that His Excellency may be moved to cause tables, showing in detail the camp equipage to be allowed to each Cavalry and Infantry Regiment, and each Field and Garrison Battery of Artillery, respectively, in accordance with the above decisions, to be prepared and submitted for the approval of Government and communication to the other Presidencies."

74. Wash-houses and Laundries for European Troops.

Read again Minute No. 40 of the Proceedings of the Commission on the 13th February 1865.

Read letter No. 61, dated 2nd March 1865, from the Secretary to the Government of India, Military Department, requesting (with reference to Officiating President's letter No. 84, dated 13th February 1865, recommending the provision of laundries for the Hospitals, and drying-rooms for the Barracks of British Troops with the means of drying the air of these rooms during the rainy season,) that the Commission will prepare and submit to Government a complete scheme, showing in detail the size, fittings, &c., of the laundries and drying-rooms it would recommend for, say, a British Infantry Regiment, the mode in which it would dispose of the water used, and the arrangements for drying and heating the air as proposed. It is also intimated that if the Commission can ascertain approximately the probable cost, the information would be useful.

The Commission was engaged in considering the subject.

75. Comparative Sickness and Mortality among the Married and Unmarried British Troops in Bengal during 1863.

Read Military Department docket No. 8, dated 1st March 1865, forwarding for the information of the Commission a copy of the subjoined letter No. 7 of that date, from the Secretary to the Government of India, Military Department, to the Adjutant General:—

"In acknowledging the receipt of your Office Memo. No. 29, dated 26th January last, forwarding Returns of sickness and mortality among the married and unmarried Soldiers of Her Majesty's British Forces in Bengal for the year 1863, I am directed to state, for the information of His Excellency the Commander-in-Chief, that these Returns, though of considerable value, would be of more practical importance, if the general causes of sickness and death were indicated. This would enable a more definite comparison to be made of the true sanitary state of the two classes of married and unmarried men, who, while exposed to the same climatic influences, live under such dissimilar circumstances.

"2. The Right Hon'ble the Governor General in Council observes that the Returns show first, that the sickness among married Soldiers is not one-half so great as among the unmarried, and secondly, that the mortality among married Soldiers is one-third greater than among unmarried. There are, His Excellency in Council believes, several well marked causes for this comparative exemption of married men from sickness. For instance;—

1st.—There is the absence from among them of venereal disease, which this last year, constitutes one-sixth it is believed of all the admissions into Hospital.

2nd.—The married Soldiers from living in separate small rooms, are less exposed to the variations of temperature, as they have complete command over the doors and windows—the tatties and punkahs. It is otherwise with the unmarried Soldiers, who live in large barrack rooms, each containing from 20 to 50 men, and having a number of doors and windows, the opening and shutting of which it is, in practice, so difficult to regulate. Under these circumstances, the excessive heat, and cold, at different seasons of the year, are often bitterly complained of in these large rooms; and, with the great changes in the temperature during every 24 hours, are certainly prejudicial to the health of the Soldier.

3rd.—Unmarried men are more subject to attacks of contagious diseases, from numbers being herded together in one apartment, and thus from their external circumstances more thrown in the way of contagion.

4th.—Married men (as is the case with married Officers) from not sleeping in the open air, but being protected by closed doors or purdahs from the malarious night air and cold draughts, are freer from fever than unmarried men.

5th.—Married men are less in the habit of wandering about the bazars, in the pursuit of drink and vicious excesses, and hence escape attacks of fever and other diseases.

6th.—Many of the married men are Non-Commissioned Officers, or have some "orderly" work, through which they escape sentry duty. This last is often very trying, especially at night, to the health of the private Soldier.

7th.—Some married men may, it is believed, get treated at home for slight sickness, for which the unmarried Soldier goes to Hospital, hence their names do not appear in the register of sick.

"3. The first four are, His Excellency in Council believes, the principal causes of the comparative exemption of the married Soldier from sickness in India. If, by the eradication or material elimination of Syphilis from our Military Stations, and a reduction of the numbers massed together in one room, the amount of sickness in the Army could be decreased to the married men's standard, or one-half its present rate, the boon would be invaluable.

"4. Two principal causes are assigned for the greater mortality among married men, as compared with unmarried men.

1st.—That many married men drink, steadily, much larger quantities of liquor, and are able to afford to do so from often being Serjeants, or from their wives earning a little money in excess of what they spend. During the past year, of the seventeen deaths in the Indian Army from delirium tremens, fourteen occurred among Serjeants, and only three among the Privates.

2nd.—The other cause is that the married men are usually old Soldiers, among whom the mortality is highest.

"5. On this very important subject of the difference between the health and death rate of married and unmarried Soldiers, full statistics, with explanatory remarks on exceptional cases, might, the Governor General in Council thinks, be advantageously collected, for some years back; as the sanitary laws of barracks in India would thereby be greatly elucidated.

"6. I am to request that His Excellency the Commander-in-Chief may be moved to cause Government to be informed whether the means exist of compiling such statistics."

ORDER.

That the Secretary to the Government of India, Military Department, be requested to favour the Commission with the perusal of the detailed Returns submitted to him by the Adjutant General with his Office Memorandum No. 29, dated 26th January 1865.

76. Experimental use of Thermantidotes for Ventilating Barracks at Agra during the rainy season.

Read Military Department docket No. 1170 A, dated 5th April 1865, forwarding for the information of the Commission a copy of the following letter No. 1170 of that date, addressed to the Quarter Master General, by the Secretary to the Government of India, in the Military Department:—

"In reply to your No. 256C, dated 5th instant, I am directed to acquaint you that Government sanctions the continuance of the Thermantidote Establishment in the five barracks at Agra during the ensuing rainy season, at a monthly expense not exceeding Rs. 195; but before passing any orders on the proposal to supply the other barracks with them, I am to request further information on the following points.

1st.—The percentage to strength of admissions into hospitals from the five barracks in question, and the percentage from the other barracks during the period when the thermantidotes were used.

2nd.—The percentages of daily sick respectively during the same period.

3rd.—The number of men accommodated in each of the five barracks, and the area and cubic space afforded in them to each man; and the space afforded per man in the other barracks.

4th.—The number of barracks which it is proposed to supply with thermantidotes, and the number of the latter which will be required.

5th.—The probable percentage on the original cost for repairing and renewals.

"2. It appears from the enclosures of your letter that the original cost of the thermantidotes and under ground channels for each barrack was Rs. 954, and that the Coolie Establishment at Rs. 39 a month each, with the repairs, would amount to about Rs. 200 for each barrack for the season. It seems desirable therefore, before the question of any extension of the system is considered, that both the extent of the benefit likely to be derived and the expense to be anticipated should be carefully considered."

77. Disinfectants during the prevalence of Epidemic Cholera.

Read the following extract from the Report of the Cholera Commission:—

"Para. 515. We think that while carrying out, during the prevalence of Cholera, measures for the preservation of cleanliness, in the necessity of which every one will agree, it will be prudent to admit the possibility that the discharges from Cholera patients may have specially poisonous properties, and that efforts should be made to destroy those properties by means of chemical disinfectants immediately on the issue of the discharges from the body.† * * * Independently of these reasons, the use of chemical disinfectants during the prevalence of epidemic and contagious diseases is a precaution which should never be neglected.

† The best disinfectants that can be used are probably Chloride of Lime and Condry's Fluid (Permanganate of Potash). The latter possesses the great advantage of having none of the disagreeable smell or objectionable properties which sometimes seriously interfere with the usefulness of the former. For the purposes that are especially required during an epidemic of Cholera, Condry's Fluid possesses great advantages. As a mere deodorizer, it is in some respects less efficacious than other compounds, because it has no power of preventing decomposition. For the latter purpose Chloride of Zinc (Burnett's Fluid), and Carbonic Acid, (McDougall's Powder), are very efficient. The alkaline manganates and permanganates, on the other hand, are oxidizing agents, which actually destroy the offensive organic substances, and are therefore especially valuable when the object is not to prevent decay, but to get rid altogether of the products of existing decomposition.

There is doubtless much truth in the objections which have been made to the employment of disinfectants, and deodorizing preparations during ordinary circumstances. They serve to conceal impurities which ought not to be allowed to arise, and which can be prevented by proper care and cleanliness. During the presence of epidemic disease there is less danger that they will be suffered to become a substitute for other precautions, instead of being, as they should be, an addition to them.

"During seasons when Cholera prevails, chemical disinfectants should be freely used in all the latrines provided for the Troops, in Cantonments and in Camp, and on all occasions on which their employment is indicated."

Read letter No. 150, dated 29th March 1865, from the Secretary to the Commission, to the Secretary to the Principal Inspector General of the Medical Department, requesting that the Commission may be informed whether, in the opinion of the Principal Inspector General, sufficient provision has been made for the supply of chemical disinfectants to the hospitals for European troops, so that there may be no difficulty in properly carrying out the rules contained in Sections 515 to 517 of the Report of the Cholera Commission, which have been ordered by the Government to be strictly observed.

Read letter No. 1171, dated 10th April 1865, from the Secretary to the Principal Inspector General, Medical Department, in reply, forwarding for the information of the Commission the subjoined Statement showing the quantity of disinfectants at present at the Presidency, and in the Up-country Medical Depôts, and intimating that the Principal Inspector General considers the quantities sufficient for all probable wants, and that they can at any time be supplemented by local purchases, if necessary; also that McDougall's Disinfecting Powder will be procured from England, and in the interim it can be procured from the manufacturer's agent in Calcutta should circumstances call for such a step:—

	Crew's Disinfecting Fluid.	Turner's Disinfecting Fluid.	Condy's Disinfecting Fluid.	Calx Chlorinata.	Liquor Sodæ Chlorinata.	Zinci Chlorid Sol.
	lb. oz. dr.	lb. oz. dr.	lb. oz. dr.	lb. oz. dr.	lb. oz. dr.	lb. oz. dr.
Presidency Medical Stores' } Department }	34 0 0	71 0 0	21 Powder *			4,165 0 0
Allahabad Medical Depôt ..	...		9 6 0	220 10 0	50 7 0	713 15 8
Saugor " ..	...		13 12 13	60 4 0	14 7 0	186 10 14
Umballa " ..	...		41 12 0	132 1 0	78 0 0	350 7 0
Sealkote " ..	...		121 3 0	226 13 12	56 4 0	396 4 10

* lb. j Powder will make 10 lbs. of the Fluid by measure.

ORDER.

The Commission has been informed that Medical Officers with British Regiments are sometimes under the impression that disinfectants are not procurable in sufficient quantities, and that these may consequently not always have been applied for when required. Although this may possibly be a mistake, and no impression of the kind may really exist, the Commission thinks it desirable to communicate to the Inspector General of Hospitals of Her Majesty's British Forces in India the information received from the Medical Department, and embodied in this Minute.

78. Sanitary Administration of Military Cantonments in which there is not a Cantonment Magistrate.

Read Military Department docket No. 6, dated 1st April 1865, forwarding the correspondence marginally noted for the opinion of the Commission, as to the best course to be followed for the Sanitary Administration of Cantonments in which there is not a Cantonment Magistrate.

Letter No. 1776, dated 21st March 1865, with enclosures, from the Secretary to the Government of Bengal, to the Secretary to the Government of India, Military Department.

OPINION.

I. There is no Cantonment Magistrate at Cuttack. The Government of Bengal considers that this being the case, the general control of the Police must, of necessity, under Section 11 of Act XXII of 1864, be in the hands of the District Magistrate; and that the Police being under the control of the Magistrate, it is expedient that the conservancy arrangements of the Cantonment should also be in the hands of that Officer as well as all the funds available for conservancy pur-

poses. These funds will consist of the taxes levied under Act XX of 1856, rent from fishery and grazing farms, fines levied by the Military Authorities, under Section 84 of Act XXIX of 1861, and a subsidy from the Military Authorities of Madras. It is presumed that these include the whole of the local funds of the Cantonment.

According to this view the responsibility for the administration of the Police and Conservancy would be transferred from the Commanding Officer to the Magistrate of the District.

II. There are obviously questions of much general importance involved in the present reference. The principle it is proposed to apply to Cuttack will apply equally to all Cantonments in which no Cantonment Magistrate is appointed, and the whole system of sanitary administration in such Cantonments will depend upon the manner in which these questions are decided.

III. The main points now at issue depend upon the interpretation which ought to be put upon certain Sections of Act XXII of 1860. The first question is, whether in a Cantonment in which no Cantonment Magistrate is appointed, Section 11 of the Act deprives the Officer Commanding the Cantonment of Police powers.

The Act says—"The Administration of the Police within the limits of any Cantonment in which there shall be a Cantonment Magistrate shall be vested in the District Superintendent, subject to the general control and direction of the Commanding Officer of such Cantonment." The Act does not say that when there is no Cantonment Magistrate the Commanding Officer shall have no such power of control and direction. It appears to the Commission that the intention of the law was merely to declare that when there is a Cantonment Magistrate he is not charged with administration of the Police, and that in Military Cantonments the District Superintendent is to administer the Police as in other parts of the District, with this exception only, that he is to be subject to the general control of the Commanding Officer instead of to that of the Magistrate of the District. Under the old law—before Act XXII of 1864 was passed—the Commanding Officer had authority over the Police of the Cantonment, and there seems no reason for supposing that it was intended to take this power away when there is no Cantonment Magistrate. It seems, indeed, more necessary that these powers should be held by the Commanding Officer when there is no Cantonment Magistrate, than when there is such an Officer.

IV. It has been proposed that the management of the Conservancy of the Cantonment shall be made over to the Magistrate of the District. But it appears to the Commission that the Conservancy cannot be efficiently arranged unless Rules are laid down under Section 19 of Act XXII of 1864—for there is no

* Breaches of any Rule or Regulation made under Section 17, shall be triable by the Cantonment Magistrate when there is such an Officer; but the Local Government may invest any Assistant Cantonment Magistrate, or any other person, with powers to try such breaches, and may authorize such person to exercise such powers independently of the Cantonment Magistrate. The Magistrate of the District shall have no control over the Cantonment Magistrate, or over any Assistant Cantonment Magistrate, or any other person invested with such powers as herein aforesaid."

other law which will provide for what is required—and according to Section 20,* breaches of such Rules cannot—as the Commission reads the law—be tried by the Magistrate of the District.

The intention of this Section seems to be that breaches of the Cantonment Rules must be tried by an Officer independent of the Magistrate of the

District, specially appointed for the purpose. This Officer may be the Cantonment Magistrate, or Assistant Cantonment Magistrate, or "any other person," but these last words cannot be intended to include the Magistrate of the District, because the concluding sentence of Section 20 says—"The Magistrate of the District shall have no control over the Cantonment Magistrate, or over any Assistant Cantonment Magistrate, or any other person invested with such powers as herein aforesaid."

V. Rules and Regulations for Cantonments will be made under Sections 17 and 18 of Act XXII of 1864, whether a Cantonment Magistrate has been appointed or not. Nothing is said in these Sections regarding the power or responsibility of the Commanding Officer, not—as it appears to the Commission—because it was intended that such power and responsibility should cease, but because any mention thereof was needless. It was assumed that the Government when it made and confirmed the Rules for a Cantonment under Sections 17 and 18 would preserve the proper authority of the Commanding Officer in any way that was necessary.

VI. In the Draft of Rules and Regulations for the Sanitary Administration of Military Cantonments submitted to the Government of India on the 28th July last, the Commission proposed—as the very first and most fundamental Rule—that "the Officer Commanding the Cantonment is responsible, within the limits of Cantonments, for the enforcement of all Rules and Regulations laid down by lawful authority regarding matters affecting the Public Health." It appears to the Commission that this Rule ought, under all circumstances, to be enforced, and that it cannot be affected by the fact that a Cantonment Magistrate has or has not been appointed.

VII. If there be no Cantonment Magistrate, or Assistant Cantonment Magistrate, the Commission thinks that some other person should be appointed, under Section 20 of Act XXII of 1864, for the enforcement of the Rules and Regulations of the Cantonment. If the services of neither the Station Staff Officer nor of the Sanitary Officer nor of any other Officer in the Cantonment can be made available for the purpose, the Officer Commanding the Cantonment may himself be vested with the necessary powers. These powers can in any case be limited, under Sections 17 to 19 of the Act, in any way which the Government may think fit.

VIII. In Clause 37 of Section 4 of the Draft Rules and Regulations for the Sanitary Administration of Military Cantonments, which have been submitted by the Commission to the Government of India, Military Department, provision was made for the contingency of there being no Cantonment Magistrate.

IX. The foregoing opinions will be embodied in a letter addressed to the Military Department.

Routine.

The Commission adjourned.

(Signed) JOHN STRACHEY, *President,*

Sanitary Commission for Bengal.

PROCEEDINGS OF A MEETING OF THE SANITARY COMMISSION
FOR BENGAL, HELD ON THE 12TH OF MAY 1865, AT SIMLA.

PRESENT:

JOHN STRACHEY, ESQ., C. S.

SURGEON MAJOR J. P. WALKER, M. D.

President.

Member and Secretary.

79. President to Officiate as Secretary to the Government of India,
Financial Department.

Read G. O., Financial Department, No. 163, dated 9th May 1865, appointing Mr. John Strachey, in addition to his own duties as President of the Sanitary Commission, to officiate as Secretary to the Government of India, Financial Department; and notifying that Mr. Strachey took charge on the forenoon of the 9th idem.

80. Cholera in the Saugor Jail.

Read letter No. 1853-140, dated 21st April 1865, from the Secretary to the Chief Commissioner of the Central Provinces, transmitting for the information of the Sanitary Commission a Report by Dr. W. D. Rice, the Civil Surgeon of Saugor, on an epidemic visitation of Cholera in the Saugor Jail during 1864.

From the Report it appears that cholera having prevailed during April to the eastward, the first case occurred, in the City of Saugor on the 29th of May. For the next five days a few scattered cases occurred, after which the epidemic became more virulent and 15 to 20 cases a day were reported by the Police, but as many more passed unnoticed. On the 11th of September the last of 553 reported cases occurred in the City. Three hundred and seventy-five deaths were reported.

On learning that the disease prevailed at Dumoh—45 miles off—the Civil Surgeon selected a site for encamping the prisoners in the event of their becoming affected in the jail. The site selected was on the narrow ridge of a crescentic shaped hill two hundred feet higher than the jail, and two and a half miles to the south of it. There was room on this plateau for a single row of tents only, beyond which the ground sloped gently at first for 30 feet on both sides into a very precipitous descent; the soil being light and gravelly. Extraordinary measures of conservancy for the neighbouring City were recommended and carried into effect, and in the jail filtered water was used for drinking, the wheaten flour was carefully sifted, good cooking was enforced, the latrine vessels were renewed, the duration and severity of out-door labour was much relaxed, and anything the Civil Surgeon thought might help to prevent cholera was executed.

On the 11th of July the first case of cholera occurred in the Saugor Jail, and within twelve hours seven cases (four fatal) occurred in as many different wards.

Next morning all the prisoners were moved into camp. Dr. Rice states:—

"The next day, the 12th, no cases occurred; during the night, between the 12th and 13th, seven cases more occurred, four in the camp, and three amongst the attendants on the cases first attacked. Of these seven, three died, none of whom had been attendants. On the 16th another man attending the sick was attacked, but recovered, and the same occurred to another on the 18th, another attendant was attacked on the 22nd and recovered.

"Cholera having ceased amongst the *main* body of the prisoners on the 13th of July, I considered I was safe in bringing the prisoners back to the Jail on the 28th, especially as it had disappeared from the City for a few days; I took the precaution, however, of bringing them in, in batches of 20 a day, and distributing them throughout the entire Jail. At the end of eight days some 150 men had thus returned, when a case occurred in the Jail (on the 5th August) which proved fatal next day. A second occurred on the 6th, which recovered, but on the 8th, three cases occurring in rapid succession warned me that I had better take to the tents again; 1, 2, 3, and 4 cases occurred on the 9th, 10th, 11th, and 12th, and then finally ceased in the camp. Between this and the 23rd October, the date of the last case, 14 more cases occurred, one every 3rd or 4th day, chiefly amongst the attendants on the sick.

"Forty-six cases occurred altogether, of these 16 died; of the 46 cases, 38 were males and 8 females. Of the deaths, 14 were males, and 2 females.

"Fifteen cases occurred amongst those waiting on the sick, of which 2 died, one male and one female.

"During all this time, the Native Lines of Madras Cavalry and Infantry Corps, said to be very crowded and very dirty, escaped without a single case; a few sporadic attacks were reported in the Cantonment Bazar, and it was very bad, I heard, in the lines of the Magazine clashes, situated about a mile to the North-East of the City, between it and Cantonments.

"The European Troops escaped the disease till October, when both the Artillery and Infantry being infected, they were moved into camp."

The measures taken by Dr. Rice consequent on the appearance of cholera in the jail on the 11th July are thus narrated:—

"The Deputy Commissioner procured the loan of some Sepoy's tents from the Brigadier General, and also lent some Government tents in his own possession; with the aid of these, I was enabled to form a camp; and on the morning of the 12th July, the day after cholera appeared in the Jail, every prisoner was out of it on his way to the camp.

"On the ground which I had selected, I placed the tents 'en echelon,' so that no one was to windward of the other; on a lower plateau, three quarter of a mile distant, I placed my cholera tents in three batches. One for *suspected* cases, a second for *convalescents*, and the third for those in which the disease was unmistakably developed. Communication between the camp and infected localities was prohibited.

"In the main camp I abolished a general hospital, distributing the patients throughout the camp; an 'extra blanket' was issued to the prisoners; food was cooked and served out twice a day; when the weather was dry the prisoners were employed in light labour, at first in clearing the camp of stones, brushwood, and roots. I then cleared the top of the hill of all jungle, a number of trenches were dug three feet wide and as deep and long as the nature of the soil would admit of. Into two portions of these, the night soil and urine were thrown separately, and immediately covered in. As soon as the camp was made trim, and all necessary work done, the prisoners were employed in road making, there were inspection parades morning and evening; and every prisoner with the least symptom of diarrhoea was placed under observation or treatment. At the same time a cholera-pill was given to every prisoner every second night for a few days when it was at its worst.

"The result of these arrangements was that cholera was not only prevented from spreading, but the 'opening out and airing,' so to speak of the prisoners on the hill seemed to free them from the taint which they had received in the Jail, for during the first night they were in camp seven cases occurred, being the men I should say who were infected in the Jail. After this, no more cases occurred amongst the main body, until I brought some of the prisoners into the Jail in the manner before described, when they became again infected, though each prisoner had then about 700 cubic feet of space allowed him; clearly showing that some noxious choleraic effluvia must have clung to the Jail for three weeks. Where was it? There is no timber, matting-twine, or tiles on the roof; for most of the time a very high wind blew through the Jail. I had the barracks fumigated by burning damp wood in them every other

day, with all the doorways blocked up: and yet the prisoners, after being for a fortnight in camp without a case, no sooner settle in the Jail, with a cubic space per man of 700 feet, than the disease re-appears proportionately as bad as the first out-break. Fortunately I did not altogether abandon the camp, the tents were left standing and on the morning of the 8th August every man was again out; the same success, as before, attended this measure. These two attacks corresponded, in point of time, with those of the City before described. In the Jail, the out-break of each was attended with much rain, a high S. W. wind being superadded in the latter attack.

"The females' ward is separated from those of the males by a high wall; during the first attack they escaped, though I don't know why, for their barrack was neither the cleanest nor the least crowded one of the Jail; indeed, it was ever the one managed with the most difficulty. But on the occasion of the second attack they suffered in equal proportion with the males. I was obliged to move them out of the Jail into tent-shaped 'choppers,' [Straw-thatched frames] as I had no tents for them, nor were any procurable.

"For one portion of the time, I was obliged to place 22 men in each pāl, the regular number of which being 12, no cholera appeared amongst them. I placed 8 women in a grass chopper of the same size in a perfectly similar, though detached, locality; in three days they had cholera, though over three hundred men, two and a half times more crowded, escaped, being in tents making the *only* difference in favor of the men. I concluded, from this circumstance, that grass choppers are worse than useless as substitutes for tents.

"When the prisoners were moved into camp, I had all the 'leeping' scraped off the walls, and the chubootas dug up and removed; every thing was re-applied fresh; and damp wood burned in the wards every second day. As stated before, this mode of purification seemed to have been inefficacious, for when the prisoners come back the disease re-appeared. Subsequently, at a cost of Rs. 2-8 for chloride of lime and sulphuric acid, I was enabled to purify the whole of the Jail with free chlorine gas.

"These substances cost less than a fourth of the expense of moist wood, they are very cheap and the results, in my opinion, much more reliable.

ORDER.

The Secretary was requested to communicate the thanks of the Commission to the Chief Commissioner of the Central Provinces, for Dr. Rice's interesting Report, and to intimate that the measures adopted by that Officer appear to have been very judicious.

81. Planting Trees in the immediate vicinity of Barracks.

Read letter No. 817, dated 17th February 1865, from the Assistant Secretary to the Government of India, Military Department, requesting the opinion of the Commission on the subject of planting trees in the immediate vicinity of barracks.

Read Minute No. 12 of the Proceedings of the Commission on the 12th January 1865, regarding planting trees in the European Infantry Lines at Agra.

OPINION.

I. Although the opinion expressed in Minute No. 12 of 1865 had especial reference to Agra, it was intended to be equally applicable to the general question that has been raised.

II. The Commission strongly recommends that in all Cantonments in which there is a deficiency of shade, measures should at once be taken for planting trees in the manner suggested in Minute No. 12 of 1865.

III. The Commission considers that the provision of shade is desirable at Stations in the Hills as well as at those in the plains of India. The fact ought not to be forgotten that the heat of the direct rays of the sun is greater in the Hills than in the plains, and that during a considerable part of the year, shade is as necessary to comfort in the one case as in the other.

The Hill Station of Dugshai is an excellent example of a place which would be improved, to an extent that can hardly be overstated, by judicious planting. It is hardly too much to state that it is almost as bare and hideous as Meean Meer. The advantage of its excellent climate and fine situation would be far better appreciated by the Soldiers if there were trees and vegetation, to afford shade and to mitigate the intolerable glare.

82. Sanitary State of Pundhurpoor—a place of pilgrimage.

Read Military Department docket No. 119, dated 10th April 1865, forwarding a printed Report on the Sanitary condition of Pundhurpoor by Dr. A. H. Leith, the President of the Sanitary Commission for Bombay.

Pundhurpoor is a place of pilgrimage in the Sholapoor Sub-Collectorate of the Poona Zilla. The idol Vitoba—the chief object of worship among the Murathās—attracts crowds of pilgrims on two days in every month, the eleventh from new and full moon; and twice a year, July and October, the religious observances last for a fortnight, and are attended by a great number of devotees from distant parts.

According to the census of 1851, there were 2,100 houses and 14,000 resident inhabitants, or 6 $\frac{2}{3}$ to a house, and when visited in January 1865 by Dr. Leith, there was no sign of there having been any considerable increase in the number of houses in the interim. "The town of Pundhurpoor has importance in a sanitary point of view far beyond what the amount of its resident population could give it. It calls for attention on account of the vast numbers that flock to it at all times under circumstances that favor the generation of disease, and who, in returning to their homes, scatter that disease in an epidemic form throughout the country." * * * The pilgrim population fluctuates according to the time of the month and year. The influx at the ordinary eleventh of the moon is estimated to be from eight to ten thousand, and at the Jutra in the months of Ashar and Kartick it is variously guessed to be 50,000 to 100,000."

"It has for many years been noticed that cholera frequently appears with virulence at the Pundhurpoor pilgrimage, and that it spreads over the country. Whether it be that the germs of the disease have until the outbreak been lying latent in the town, or whether they have been gathered to this focus by the many pilgrims converging to it from all quarters, is not known; but it is manifest that the seeds of the disease could scarcely find more favorable circumstances for their rapid development than they meet with at this place. The poison here concentrated acquires great intensity, and destroys many on the spot, while it is disseminated to towns and villages, near and far off, by the returning survivors of the pilgrims. The city of Poona and its neighbouring Cantonments are particularly exposed to the danger of the disease being imported, by the custom observed of following up the pilgrimage to Vitoba by one to Dnyanoba at Alundee, about twelve miles from Poona."

The chief sanitary defects of the place are noticed in the Report, and remedies are suggested for their removal.

83. Typhus Fever in the Jubbulpore Jail.

Read again Minute No. 53 of the Proceedings of the Commission on, the 30th March 1865.

Read letter No. 3162, dated 31st March 1865, from the Under Secretary to the Government of India, Home Department, intimating that the views of the Commission regarding the prevention of the spread of typhus fever in the Jubbulpore Jail will be communicated to the local Governments.

Read letter No. 1595-120, dated 10th April, from the Secretary to the Chief Commissioner of the Central Provinces, in reply to this Office letter No. 129, dated 17th March last, regarding the appearance of typhus fever in the Jubbulpore Jail, intimating that the Chief Commissioner learned of the sanitary deficiencies pointed out with surprise and regret, and had directed a strict enquiry to be made as to how the falling off arose.

84. Rest-Houses.

Read again Minute No. 312 of the Proceedings of the Commission on the 19th December 1864.

Read again Minute No. 37 of the Proceedings of the Commission on the 6th February 1865.

Read Military Department docket No. 209, dated 5th May 1865, forwarding for information a copy of Minute of Council, No. 22 of the 28th April 1865, wherein it is ordered that, "as it appears from the correspondence submitted by the Deputy Quarter Master General that the objections urged by the Sanitary Commission against the retention of the Jhoosie Rest-House, do not practically exist, the Public Works Department be informed that the Government in the Military Department consider it advisable to retain the Rest-House at Jhoosie, as well as those at Allyghur and Kutka Gurowlee for the occasional use of the Troops."

85. Annual Report on the Sanitary Condition of the Army.

Read letter No. 681, dated 17th ultimo, from the Deputy Secretary to the Government of India in the Military Department, transmitting copy of a Military letter from the Right Hon'ble the Secretary of State for India, No. 70, dated 9th March last, in which His Excellency the Right Hon'ble the Governor General of India in Council is requested to arrange for the Sanitary Commissions of Bengal, Madras, and Bombay submitting, at the close of each calendar year, a report upon the sanitary condition of the Army in their respective Presidencies during the preceding twelve months. "The Report should treat separately of the European and Native portion of the Army, and should be as short and concise as possible, consistently with the object in view, which is to obtain a complete statement of the sanitary condition of the troops during that period, and the various measures that have been either determined upon or carried out, with a view to the improvement of that condition, with the remarks upon the results of those measures."

"With a view to the preparation of the reports, arrangements should be made by the Sanitary Commissions at the several Presidency towns for obtaining Annual Reports of the above nature from every military station in the country."

These latter reports should be forwarded at the close of the year, so as to admit of the early preparation of the general report from each Presidency above-mentioned, and which should be forwarded to me by the several Governments not later than the 1st March."

The Commission was engaged in designing Statistical Returns of Sickness and Mortality in the Bengal Presidency, with a view to giving effect to the orders of the Right Hon'ble the Secretary of State for India, regarding the submission of an Annual Report on the sanitary condition of the Army.

86. Conservancy Establishment at small Stations occupied by Native Troops only.

Read Military Department docket No. 457, dated 12th April 1865, forwarding the correspondence noted in the

Letter No. 210 C (B D), dated 21st March 1865.
" " 1956, dated 13th September 1864.
" " 373, dated 19th September 1864.
all from the Quarter Master General.

margin, and desiring the opinion of the Commission on the following points:—(1) as to

the necessity of allowing any Conservancy Establishment at small stations occupied by Native Troops only, in addition to that now sanctioned; and (2), as to the means of meeting the expense if such additional establishments are required.

OPINION.

I. It appears to the Commission clear that Conservancy Establishments are usually, if not always, required at small Military Stations occupied by Native Troops only, in addition to the sweeper per Company allowed by Government. These sweepers are ordinarily not more than sufficient for the performance of necessary work within the Regimental lines, and there can hardly be a Cantonment in which other duties connected with the conservancy and general sanitary arrangements have not to be carried out. The only questions about which there can be any doubt appear to be—first, the scale upon which Conservancy Establishments should be allowed; and, second, the manner in which such establishments ought to be paid for.

II. With regard to the scale upon which Conservancy Establishments should be allowed. There can, the Commission thinks, be no doubt of the justice of the opinion expressed by His Excellency the Commander-in-Chief, to the effect that no scale of Conservancy Establishment which shall be generally applicable can be laid down for such stations. Each case must be considered on its own merits. Every Cantonment ought to be maintained in a proper sanitary condition, and the means ought to be provided of enforcing within it sanitary regulations,—such as those recommended by the Commission to the Government of India, Military Department, in the President's letter No. 620, dated 5th September last, for introduction into all Military Cantonments.

III. With regard to the manner in which the expense of maintaining the necessary establishments should be met. The Commission believes that the cases will be extremely rare—if indeed they ever occur at all—in which the local funds cannot be made sufficient to bear the charge. If this be clearly shown to be impossible, the Government should contribute,—but not otherwise. In the Statement furnished to the Government of India by the Quarter Master General, a list of fifteen stations is given at which only Native Troops are stationed. Among these there are only four at which there are at present no means of meeting the expense of Conservancy Establishments,—at least to some extent. These are Segowlee, Almorah, Gowhatty, and Debroogurh. But in all cases it has been assumed

that the only manner in which money can be raised is by means of a grazing fund. This is a mistake. If Rules founded upon Act XXII of 1864 be introduced into every Cantonment—as the Commission has recommended—there will be many other ways of obtaining money. In Clause 13 of Section II of the Commission's Draft Rules for Military Cantonments, the various sources are detailed from which a Cantonment Fund for sanitary purposes may be formed.

IV. It appears that in the case of these small Cantonments, it will often be right to act upon the principle—which the Commission has on former occasions maintained—that if the cantonment funds are insufficient to carry out the local measures required for protecting the health of the inhabitants, they ought in many cases to receive help from the local funds raised by the Civil Authorities from places in the vicinity.

V. A good illustration of the points noticed in the Clauses III and IV of this Minute is found in the correspondence referred to the Commission for opinion on the present question. It is said that it is quite impossible to raise ten Rupees per mensem at Almorah, because there is no grazing fund, or the means of forming one, and it is therefore proposed that the expense shall be borne by Government. Now the Almorah Cantonment not only contains the houses of the Military Officers attached to the Regiments, but all the best houses of the Station and Sanitarium, as well as having one of the largest and most flourishing towns in the hills quite close to it. If instead of ten Rupees a month, a hundred Rupees were wanted, there ought to be no difficulty in providing them.

87. Prevention of Venereal Disease among European Troops.

Read the following letter No. 133, dated 20th March 1865, from the President to the Secretary to the Government of India, Military Department:—

"In your Office letter No. 511, dated 25th July last, it was intimated to me that copies of my letters Nos. 19, 245, and 245A, dated the 21st March and 2nd May 1864, on the prevention of venereal disease among European soldiers, had been sent for the consideration of the Local Governments and Administrations named in the margin, and for the consideration and opinion of His Excellency the Commander-in-Chief. Some papers have been received by the Commission from the Government of the North-Western Provinces and the Administrations of Oudh and the Central Provinces, but there is nothing to show whether any action has been taken in the matter.

"2. I have, therefore, the honor to solicit that the Commission may be favoured with any information submitted to the Government of India, showing what effect has been given to the recommendations contained in the 13th paragraph of my letter No. 245, dated 2nd May 1864.

"3. The subject is one of very great importance to the health of the European troops, and the Commission would respectfully suggest that the Local Governments and Administrations be urged to act in the matter, if they have not already done so, and that the result be communicated to us, as, until the information asked for in paragraph 13 of my letter No. 245, before referred to, be furnished, we are not in a position to make further recommendations regarding the measures to be adopted."

Read Military Department docket No. 110, dated 4th April, in reply, forwarding for information a copy of a Circular letter of same date, addressed to the Local Governments and Administrations, enquiring what measures have been taken on a communication made on the 12th July 1864, regarding the prevention of venereal disease among the European troops, and with what result.

Routine.

The Commission adjourned.

(Signed) JOHN STRACHEY, *President,*
Sanitary Commission for Bengal.

**PROCEEDINGS OF A MEETING OF THE SANITARY COMMISSION
FOR BENGAL, HELD ON THE 23RD MAY 1865, AT SIMLA.**

PRESENT :

JOHN STRACHEY, ESQ., C. S.	...	...	<i>President.</i>
SURGEON MAJOR J. P. WALKER, M. D.	...	...	<i>Member and Secretary.</i>
CAPTAIN E. C. S. WILLIAMS, R. E.	...	...	<i>Member.</i>

88. Calcutta General Hospital.—Sanitary State of neighbourhood.

Read again the following Clause of Minute No. 95 of the Proceedings of the Commission on the 23rd May 1864.

"XXII In the immediate neighbourhood of the Hospital on the south-east side, and in contact with its walls, there is a large native bazar or village. The Commission looks upon this as a serious evil, and recommends that enquiry be made into the possibility of removing or at least of diminishing it.

"If the removal of the bazar be impossible, strict sanitary regulations ought at all times to be most carefully enforced in it."

Read Military Department docket No. 132, dated 4th April 1865, forwarding for information a copy of a Memorandum No. 130 of same date, addressed to the Secretary to the Government of India, in the Public Works Department, intimating "that it does not appear necessary to the Right Hon'ble the Governor General in Council, in the Military Department, to take any final steps for removing the huts or bazar on the east of the General Hospital, or for acquiring the land, until it has been ascertained what the cost of the measure will be, and whether, after reserving so much of the land as Government may require, the remainder might probably be sold at no great loss. Proper precautions will be taken to prevent any use of the land which might be objectionable on sanitary grounds. In the mean time, and until the Hon'ble the Lieutenant Governor can decide as to the best course to recommend, His Honor will be requested to cause the recommendation of the Sanitary Commission for Bengal to be carried out, viz., that "strict sanitary regulations should at all times be most carefully enforced in it," and the Medical Authorities of the Hospital will be instructed to watch the locality closely, and bring promptly to the notice of the Bengal Government any disregard of those regulations."

89. Filter for Calcutta General Hospital Tank.

Read again the following Clause of Minute No. 95 of the Proceedings of the Commission on the 23rd May 1864.

"VI. That the water from the drinking-water tank should be filtered before withdrawal from the tank."

"There exists a large square-shaped well in connection with the western end of the tank, part of which could probably be converted into a downward and upward filter of charcoal, gravel, and sand (as described in the Report of the Barrack and Hospital Improvement Commission on the Mediterranean Stations), and the remainder would serve as a reservoir for the filtered water. It is not intended that the filtration at the tank should be in supercession of the existing arrangements for filtering water in the wards, but as a material aid towards obtaining a purer water."

Read again Minute No. 225 of the Proceedings of the Commission on the 12th September 1864.

Read Office Memorandum No. 6457, dated 29th April 1865, from the Superintending Engineer, Presidency Circle, forwarding for information a copy of letter No. 442, dated 4th idem, from the Garrison Engineer, Fort William, reporting that (as recommended in Clause III of the Commission's Minute No. 225), the filtering medium of the Filter in the General Hospital had been reduced in the plan from 8 feet in thickness to 4 feet, and that the work was about to be commenced as the water had fallen nearly to its lowest level.

In Clause IV of Minute 225 the Commission expressed a wish to learn the result of a similar filter which Captain S. Trevor, the Garrison Engineer, was constructing in the Ditch of Fort William, and in his letter referred to, the following information is furnished on the subject.

"With regard to the filter in the Fort, which I am requested to report on, I have to state that I found it necessary to remove the charcoal and sand altogether, as I found that for the purpose of a plunge bath requiring to be filled at each flood-tide, the filter did not act quick enough. I also found that owing to the low level of the Cunette, the filter was quickly submerged all through the rains, and that the inferior vegetable charcoal obtained from the market became in consequence worse than useless. I therefore adopted burned clay or broken brick as a filtering medium, seeing it highly spoken of in the extract* from Mr. Conybeare's Report given at page 8 of Appendix 4 of the Report of the Committee on the Drainage of Calcutta, and of which I annex a copy for easy reference. I have made arrangements for holding the water in a state of stillness in a portion of the Cunette in front of the filter, in order that it may there deposit the silt, &c., in suspension. It then passes into the bath through the filter, which is now filled

EXTRACT FROM MR. CONYBEARE'S REPORT.

"It will be remarked in these experiments that sand is by no means the most powerful filtering medium in proportion to its bulk, and that in many of the foregoing experiments, results were obtained with clay and animal charcoal filters far more perfect than could be produced by an equal thickness of sand; but it must be remembered that these experiments were tried with a thickness of only 9 inches of sand, and that in filters of the most recent construction for purifying the water supplied to towns, an aggregate thickness of 12 feet of filtering media is provided.

"Clay, though experimentally equal to animal charcoal, is found inconvenient to use, as it is liable to muddy the water that passes through it. Burnt clay is, however, free from the objection, and stated to be otherwise equally efficacious. It is probable the amygdaloid owes its efficiency to its similarity to burned clay."

entirely with broken brick of different degrees of fineness. As it is necessary that the water should pass through the filter quickly, and the filtering surface is not large, the water is not made much clearer or lighter by the process than it is in the settling chamber, but I suppose the burnt clay exercises some influence in rendering the organic matters held in suspension innocuous."

90. Disinfectants during the prevalence of Epidemic Cholera.

Read letter No. 199, dated 8th instant, from the Secretary to the Commission, to the Secretary to the Principal Inspector General of Hospitals, Her Majesty's British Forces, communicating the information embodied in Minute No. 77 of the Proceedings of the Commission on the 6th idem.

Read letter No. 503 M O, dated 13th instant, in reply, intimating that the information therein received has been communicated to the Officers of Her Majesty's British Forces by means of Circular Memoranda, and communicating that the Inspector General of Hospitals was not previously aware of the existence of an impression among Medical Officers that disinfectants are not procurable in the requisite quantities.

91. Uniform system of Statistics of sickness and mortality in Jails.

The Commission was engaged in considering the subject.

92. Sanitary State of Chinsurah.

Read Military Department docket No. 462, dated 13th May 1865, forwarding for the information of the Commission a copy of letter No. 2861, dated 4th idem, from the Under Secretary to the Government of Bengal, to the Commissioner of the Burdwan Division, communicating the request of the Government of India, Military Department, that steps may be taken to secure the proper sanitary condition of the slaughter-house at Chinsurah, and intimating that the Hon'ble the Lieutenant Governor has been pleased to extend the operation of Act VII (Bengal Council) of 1865, (*an Act to make provision for the better regulation and supervision of public slaughter-houses*), to the Towns of Hooghly and Chinsurah, to enable the Municipal Commissioners of Hooghly to deal with the nuisance complained of, and it was requested that their immediate attention should be drawn to the subject.

93. General Sanitary Condition of the Bombay Army.

Read letter No. 172, dated 20th instant, from the Secretary to the Government of India, Military Department, transmitting five copies of the observations of the War Office Sanitary Commission on the Report by Dr. Leith, President of the Sanitary Commission for Bombay, on the general sanitary condition of the Army of that Presidency, and requesting that the Government may receive an expression of opinion on the suggestions therein contained.

Also with reference to Military Despatch No. 70, from the Right Hon'ble the Secretary of State for India, requesting that the Commission will prepare and submit at the close of each calendar year a Report on the sanitary condition of the Bengal Army during the preceding twelve months in the form and manner prescribed in the Despatch.

The Commission was engaged in considering the subjects.

94. Calcutta Water-Supply.

Read again Minute No. 236 of the Proceedings of the Commission, on the 13th September 1864, on the Calcutta Water-supply.

Read Mr. William Clark's Report to the Justices of the Peace on a supply of water for Calcutta, dated 20th January 1865.

The subject of the water-supply for Calcutta has frequently come under the consideration of the Commission. It has lately taken a definite shape in consequence of the submission to the Government of Bengal by the Calcutta Municipality of an elaborate scheme prepared by its Engineer Mr. William Clark, under which it is proposed to bring from Pulta, about 15 miles above Calcutta, a supply of water sufficient for all the requirements of the city.

In its Minute No. 236, dated 19th September 1864, the Commission reviewed the subject of the water-supply for the Town of Calcutta, after having had an interview with the Chairman of the Justices of the Peace on the subject, with the object of assisting in expediting the adoption of a proper scheme for supplying the town with good water, which might, if carried out without delay, be brought

to a completion simultaneously with the drainage works, to the success of which it is essential. Believing that so long as the question of source of supply remained undecided, no definite scheme could be submitted, likely to meet with prompt sanction, however unexceptionable on other grounds, it was therefore to this point it directed its attention, and the result was that it recorded its opinion that the water of the natural reservoir of the Hooghly basin is the only financially practical source of supply, and that the water should not be taken off at a point lower down the river than Pulta. It came to this conclusion very unwillingly, for the quality of the water at Pulta is by no means satisfactory at all seasons. Much better water might be obtained by storing in artificial reservoirs, but the calculations made by the Commission showed that this mode of supply was impracticable on account of the expense.

The Commission does not here propose to discuss the scientific merits of Mr. Clark's project, but there is one point common to it and all similar plans which it seems necessary should be singled out for notice. If the River Hooghly be accepted as the only practically available source of supply, we must necessarily be contented with the water that is furnished, and it is a matter of the greatest importance that the best possible means of filtration should be adopted.

Mr. Clark's Report assumes that there will be no insuperable difficulty in filtering at Pulta the whole quantity of water required for the supply of the Town. This quantity is at present estimated at six millions of gallons daily, but it is considered that double this amount must ultimately be supplied. It is proposed to purify the water from the large amount of organic matter which it contains by filtering through *magnetic carbide of iron* by the process known as Mr. Spencer's. This process is undoubtedly very successful when performed on a small scale, and it is asserted that it answers equally well for the removal of organic impurity when applied to large bodies of water.

The question of the filtration on a large scale of water for the supply, not only of Calcutta, but generally of Indian towns and cantonments, is one of great importance, but it is one regarding which there exists in this country absolutely no practical experience. This Commission is desirous of obtaining the opinion of the highest scientific authority at home upon the point whether water — such as that of the Hooghly at Pulta — can, practically, by any known process deserving of confidence for the permanency of its action, and applicable to the supply of a large town, be rendered sufficiently pure for ordinary domestic use, according to the standard ordinarily accepted in Europe. If this problem has been solved, as Mr. Clark and the Calcutta Municipality appear confidently to believe, the result will be one of great importance, for there can be no doubt that, until a short time ago, the highest authorities considered that there were no known means practically applicable on a large scale of removing organic impurities in solution from water by filtration.

The Commissioners appointed to consider the question of the supply of water to London reported as their opinion that, "whatever substances may be employed for filtering, water cannot be deprived of matter held in solution by

* Quoted from Mr. Spencer.

any practical modification of filtration."* The same conclusion is stated in a report upon the whole question of drinking-water presented to the French Academy of Medicine by Monsieur Poggiale in 1863:— "No known process," writes M. Poggiale, "is suitable for the filtration of the water required for the supply of a large town.

'Before having recourse,' says Monsieur Guérard, 'for the supply of a large town to water which it is necessary to filter, it ought to be conclusively proved that it is impossible to obtain any other.' 'I am certainly not one,' remarks Monsieur Dumas, 'who would limit the powers of human industry and science. I have no doubt that the time will come when it will be possible satisfactorily to filter large masses of water economically and rapidly; but up to the present time, whenever attempts have been made to furnish 100,000 cubic metres of filtered water daily, whether by means of natural filtering beds, or by artificial filters, the water furnished has in no case been really filtered; it has been merely strained in a manner which does not remove the necessity in private establishments of making use of portable filters.'—*L'Année Scientifique. L. Figuier, 1864. Hygiène Publique, p. 344.*

It is possible that these difficulties may have been got over as completely as Mr. Clark supposes, but if they still exist, they will form a strong reason for considering the expediency of adopting the suggestions previously made by this Commission, to the effect that a quantity of water sufficient for purely personal uses should alone be brought from Pulta, and that the remaining requirements of the town should be met by a supply of water pumped up from the river at Calcutta, for it is possible that the greater the quantity of the water to be dealt with, the greater will be the difficulty of proper filtration.

The Commission proposes to collect all the published papers regarding the quality of the water of the Hooghly as indicated by chemical analysis, with a view to their being forwarded through the Government of India, Military Department, together with a letter embodying the contents of this Minute, to the Right Hon'ble the Secretary of State for India, with the recommendation that the opinion of the War Office Sanitary Commission be asked upon the points connected with filtration referred to.

95. Prevention of Venereal Disease in the Madras Presidency.

Read letter No. 30, dated 8th instant, from the Secretary to the Sanitary Commission for Madras, forwarding, in compliance with this Office request, a copy of the rules prepared by Messrs. Ellis and Robinson, for the prevention of the spread of venereal disease among European Troops in the Madras Presidency, and other papers on the same subject.

96. Sanitary Administration of Military Cantonments.—Rules under Act XXII of 1864.

Read Military Department docket No. 145, dated 18th May 1865, forwarding for information a copy of letter No. 144 of same date, from the Secretary to the Government of India, Military Department, to the Deputy Quarter Master General, acquainting His Excellency the Commander-in-Chief that it has been determined by Government to appoint the President and Members of the Sanitary Commission now at Simla * to be members of the Special Committee now sitting at Simla, to consider the rules to be laid down for Military Cantonments under the provisions of Act XXII of 1864.

* Mr. Strachey.
Dr. J. P. Walker.
Captain E. C. S. Williams, R. E.

87. Meteorological Observations with special reference to Cyclones.

Read letter No. 2481, dated 31st March 1865, from the Junior Secretary to the Government of Bengal, forwarding, at the request of the Commission, a copy of correspondence relative to the establishment of a system of Meteorological observations with special reference to Cyclones.

Read the following enclosure in the above, being letter No. 1059, dated 20th February 1865, from the Junior Secretary to the Government of Bengal, to the Secretary to the Government of India, Home Department:—

"The Lieutenant Governor desires to draw the attention of the Government of India to the necessity, which the experience of the Cyclone of 5th October has made abundantly manifest, for establishing at the Port of Calcutta and along the Coast of the Bay of Bengal, within the region of Typhoons, (that is to say, from Rangoon to Madras,) a system of Meteorological Observation similar to that which is now in operation in the United Kingdom under the direction of Admiral Fitzroy, and to that which His Honor believes already exists at Bombay, whereby not only may timely notice be given to the Masters of Vessels in Port, and within sight of the Coast, of the probable approach of bad weather, but the conditions of the atmosphere at various points may be carefully recorded and communicated to the Meteorological Department in England, to the Bombay Observatory, and elsewhere, with a view to the general promotion of Meteorological Science, especially in its practical bearing on navigation and on the safety of life and property within the influence of such storms as that with which Bengal has been lately visited with such destructive consequences.

"2. The Lieutenant Governor has hitherto abstained from entering on this subject, because the Observatory in Calcutta, where alone Meteorological Observations are made and recorded, is superintended by the Surveyor General of India, under the orders of the Government of India, and His Honor was also aware that the Government of India has lately been in communication with the Asiatic Society, in consequence of a proposal made by the Meteorological Committee of the Society, to place the Observatory on a more efficient footing with a view, however, rather to the bearing of Meteorology on the measures to be taken for the preservation and improvement of the public health, than to its important influence on the safety of the shipping resorting to Calcutta and other ports in the Bay of Bengal, of other property liable to be damaged by violent storms, and of the lives of those who are exposed to their fury either at sea or within the reach of the storm-wave on land.

"3. With a view, therefore, of establishing a system of Meteorological Observation on the more extended basis indicated in the first paragraph of this letter, the Lieutenant Governor has determined to appoint a Committee composed of the gentlemen whose names are entered in the margin, for the purpose of considering the whole question of drawing up a practical scheme for giving effect to the object in view."

98. Prevention of Venereal Disease by Ablution.

Read again Minute No. 77 of the Proceedings of the Commission on the 9th May 1864, on the prevention of venereal disease among European troops by additional facilities for ablution in private.

Read Military Department Office Memorandum No. 437, dated 29th June 1864, forwarding Commission's Minute No. 77 to the Secretary to the Government of India, Public Works Department, for consideration as to the best mode of providing ablution where means are now wanting or imperfect.

Read letter No. 438, dated 29th June 1864, from the Secretary to the Government of India, Military Department, to the Quarter Master General, forwarding the Commission's Minute No. 77, with a view to His Excellency the Commander-in-Chief being moved to favor Government with his opinion on the subject.

Read Military Department docket No. 1513, dated 29th March 1865, forwarding for report letter No. 1069 C, dated 23rd idem, from the Quarter Master General, submitting the under-mentioned documents regarding existing and proposed means of ablution as a preventive of venereal disease among European troops serving in Bengal.

No. 1449, dated 24th September 1864, and enclosures, from the Officer Commanding the Presidency Division.

No. 227, dated 19th September 1864, and enclosures, from the Officer Commanding the Benares Division.

No. 249, dated 3rd September 1864, with enclosures, from the Officer Commanding the Gwalior Division.

No. 268, dated 3rd October 1864, and enclosures, from the Officer Commanding the Oudh Division.

No. 1021, dated 12th August 1864, and enclosures, from the Officer Commanding the Rohilkund District.

No. 674 A, dated 9th September 1864, and enclosures, from the Meerut Division.

Proceedings dated 10th August 1864, from the Officer Commanding the Sirhind Division.

No. 478, dated 25th August 1864, and enclosures, from the Officer Commanding the Lahore Division.

No. 21, dated 28th August 1864, and enclosures, from the Officer Commanding the Peshawur Division.

Memorandum of Regulations suitable for Lock Hospitals, dated Ferozepore, 22nd September 1864.

Memorandum dated 23rd January 1865, by the Inspector General of Her Majesty's Hospitals.

ORDER.

As the subject is one which will receive the attention of the Special Committee now sitting at Simla to consider the rules to be laid down for Military Cantonments under the provisions of Act XXII of 1864, with which the President and two Members of the Sanitary Commission have been associated, the above-mentioned documents will be laid before it for consideration.

99. Prevention of Venereal Disease among European Troops in Lucknow.

Read letter No. 1005, dated 29th March 1865, from the Secretary to the Chief Commissioner of Oudh, forwarding a copy of letter No. 2760, dated 1st November 1865, addressed to the Secretary to the Government of India, Military Department, on the subject of the prevention of venereal disease among European troops in Lucknow.

ORDER.

As the subject is one which will receive the attention of the Special Committee now sitting at Simla to consider the rules to be laid down for Military Cantonments under the provisions of Act XXII of 1864, with which the President and two Members of the Sanitary Commission have been associated, the above-mentioned correspondence will be laid before it for consideration when drawing up rules for the prevention of venereal disease.

100. Meteorological Observations throughout India.

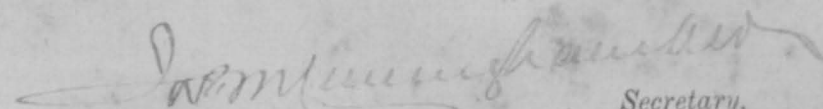
The Commission was engaged in considering how a practical scheme for systematically conducting Meteorological Observations throughout India could be organized.

Routine.

The Commission adjourned.

(Signed) JOHN STRACHEY, *President,*
Sanitary Commission for Bengal.

(True Copy)


Secretary,
Sanitary Commission for Bengal.

PROCEEDINGS OF A MEETING OF THE SANITARY COMMISSION
FOR BENGAL, ON THE 12TH JUNE 1865, AT SIMLA.

PRESENT:

JOHN STRACHEY, ESQ., C. S. ... *President.*
SURGEON MAJOR J. P. WALKER, M. D. ... *Member and Secretary.*

101. Prevention of Venereal Disease among European Troops—Lock-hospitals.

The Commission was engaged with the Special Committee appointed for framing rules to be passed under Section 19 of Act XXII of 1864, with which the President and Members of the Sanitary Commission at Simla were associated, as indicated in Minute No. 96 of the Proceedings on the 23rd ultimo. The subject under consideration was the prevention of venereal disease among European Troops.

102. Statistical Returns of Sickness and Mortality in the Bengal Presidency.

Read the following extract from letter No. 255, dated 10th instant, from the President of the Commission, to the Secretary to the Government of India, Military Department:—

"5. In the last para. of the Secretary of State's letter it is said that with a view to the preparation of these Annual Reports, arrangements are to be made by the Sanitary Commission for obtaining reports from every Military Station in the country. This is a subject on which we have already addressed the Government, and it is one upon which orders appear to be urgently required.

"6. In Office Memorandum of the Military Department, No. 396, dated 18th August 1864, the Principal Inspector General of the Medical Department was ordered to prepare, in concert with the President of this Commission, a scheme for the establishment of a statistical branch in his office, the want of which has long been much felt. It was understood to be the intention of the Government that the proposed establishment should provide for all the requirements of a statistical nature both of the Medical Department and of the Sanitary Commission. The whole subject was thoroughly discussed by the Commission with Dr. Bruce, and in his letter to your address, No. 722, dated 6th December last, he proposed to appoint under Dr. Bryden, who has been for some time past in charge of the Statistical Branch, an establishment costing Rs. 480 per mensem. Under the arrangements that were proposed, the Sanitary Commission would have obtained from Dr. Bryden regularly every month, full Returns of mortality and disease, as well as Sanitary Reports, from every Military Station. Details would have been given for European and Native troops and for prisoners in Jails, and also for the Civil Dispensaries throughout the whole Presidency. Annual Returns and Reports would also have been supplied. Thus it was hoped, as was stated in the letter from the Principal Inspector General of the Medical Department, that in course of time the means would be collected 'for the study, upon a wide and accurate basis, of the laws which regulate the origin of special diseases, and the limitation of epidemic influences.' According to the plans that were proposed, no additional Returns or Reports, beyond those already

PROCEEDINGS OF MEETINGS

OF THE

SANITARY COMMISSION

FOR BENGAL,

HELD DURING THE MONTH OF

MAY 1865.

furnished to the Medical Department, would have been called for by the Sanitary Commission from any Officers in medical charge of Troops or Civil Establishments. This appeared to us very important, for Medical Officers have already to submit quite as many Reports and Returns as they can properly prepare without neglecting their other work. Nor would it be possible to obtain additional voluminous Returns from all Military Stations without incurring fresh expenditure.

"7. These propositions, however, were not sanctioned by the Government, in consequence, it is believed, of the unsettled question regarding the future position of the Indian Medical Service with reference to the European Army. Although, therefore, Dr. Bryden's appointment still continues, he has no establishment to help him in the preparation of statistics. The Sanitary Commission has, consequently, no means of procuring the Returns and Reports which are required, and unless this be remedied, the present orders of the Secretary of State cannot be carried out.

"8. It appears to us that, whatever may be determined hereafter regarding the connection between the European Army and the Indian Medical Service, it will be essential that there should be a separate Statistical Office, attached either to the Indian Medical Department or to the Sanitary Commission, under the authority of the Government of India. The Returns of sickness and mortality among the European Troops will lose a great part of their value unless they are systematically reviewed in connection with the similar Returns for Native Troops, for prisoners in Jails, and for the Civil Population received from the same stations at which the European Troops are quartered. But whatever be the final determination of the Government regarding the permanent establishment of an Office for the collection of Medical and Sanitary Statistics, some temporary arrangement appears to be unavoidable, if the Sanitary Commission is expected to carry out the orders of the Secretary of State. The cost of the Establishment formerly proposed by the Principal Inspector General of the Medical Department, in communication with the Sanitary Commission, was, as stated above, Rs. 480 per mensem. This, however, was intended to provide for a permanent and complete establishment, and it was admitted that the whole would not be required immediately. As a temporary arrangement we beg to recommend that a sum not exceeding Rs. 200 per mensem be allowed for Dr. Bryden's Office, it being left to the Principal Inspector General of the Medical Department to distribute the amount as he may think best. After careful consideration, we believe this to be the very lowest amount for which it will be possible to furnish the Returns and Reports that are required. It appears better at present to ask for a lump sum which can be distributed as may be found to be most convenient, than to propose the entertainment of an establishment. When some experience of the working of the Office has been gained, it will be easier, than it is now, to say exactly what permanent establishment will be required."

103. Annual Report of the Commission for the past year.

The Commission was engaged with matters connected with the Annual Report of the Commission for the past year, about to be submitted to the Government of India, Military Department.

104

Sanitary Survey of Military Stations.

The Commission was engaged in considering the subject.

105.

Calcutta Small-pox Hospital.

Read docket No. 3806, dated 2nd June 1865, from the Secretary to the Government of Bengal, forwarding printed copies of correspondence on the Small-pox Hospital at Chitpore.

From Dr. Chuckerbutty's Report it appears that the Small-pox Hospital was established at Chitpore in the neighbourhood of Calcutta, on the 19th December last, during the prevalence of an epidemic visitation of the disease, and continued open until the 13th April when preparations for closing it on the decline of the epidemic commenced.

The following Table exhibits the medical transactions during the interval:—

		Admissions.	Deaths.	Recoveries.	Remaining.	Mortality to admissions per 100.
EUROPEANS ...	Male ...	188	51	127	10	27.12
	Female...	23	5	16	2	21.73
NATIVES ...	Male ...	317	134	149	34	42.27
	Female...	99	59	31	9	59.56
Total ...		627	249	323	55	39.71

The Deputy Inspector General of Hospitals, Presidency Circle, considers that the institution exerted a most important influence in preventing the more extensive diffusion of the disease in Calcutta and its vicinity.

Expenditure.—Exclusive of any charges for the railway steamer, the estimated total expenditure on account of the hospital up to 31st March 1865 was Rs. 16,062-2-10 as indicated below:—

	Rs.	A.	P.
Accommodation, including purchase of old buildings, erection of new, repairs, purchase of tents, &c. ...	9,999	0	0
Furniture, including beds ...	848	7	0
Clothing and bedding ...	149	6	11
Establishment ...	2,215	8	9
Diet, including cooking utensils ...	877	14	8
Medicines, including wines and liquors ...	880	0	0
Contingencies, including burial and cremation expenses for 56 Europeans, at Rs. 5, 64 Mahomedans at Rs. 3, and 89 Hindoos at Re. 1-9-6 ...	613	13	6
Conservancy Expenses ...	18	0	0
Lighting Expenses ...	100	0	0
Sundries ...	360	0	0
	1,091	13	6

Total Rs. ... 16,062 2 10

PROCEEDINGS OF A MEETING OF THE SANITARY COMMISSION
FOR BENGAL, HELD AT SIMLA, ON THE 26TH JUNE 1865.

PRESENT:

JOHN STRACHEY, ESQ., C. S. *President.*
SURGEON MAJOR J. P. WALKER, M. D. *Member and Secretary.*
CAPTAIN E. C. S. WILLIAMS, R. E. *Member.*

106.

Troops travelling by Rail.

Read again Minute No. 11 of the Proceedings of the Commission on the 12th January 1865, wherein it is recorded that the Secretary to the Government of India, Military Department, requested the opinion of the Commission on the question of the distances which may be travelled by bodies of men in health, invalids, women, and children by Railway, and regarding the arrangements which should be made for their convenience in transit.

OPINION.

I. As regards the distance which may be travelled daily by bodies of men in health, the Commission considers that, under ordinary circumstances, the distance should not, on an average, exceed what can be accomplished in twelve hours, or thereabouts. In this case the question of distance resolves itself into one of time, for the fatigue and exposure are not in proportion to the distance travelled, but to the time the travellers are confined in the carriages. Single journeys of much greater duration may be travelled by healthy troops without prejudice to their health; indeed women and children frequently travel continuously for 30 hours from Calcutta to Allahabad, a distance of 630 miles. Such lengthened journeys, however, occasion considerable inconvenience which it is desirable to avoid, when, as under ordinary circumstances, it is unnecessary for the attainment of any important end.

The present rate of travelling on Indian Railways, including stoppages, appears to be about 20 miles an hour, so that the distance which would be travelled per diem of 12 hours would average 240 miles, and admit of a body of troops leaving Calcutta by ordinary train on Monday morning reaching Delhi, distant 1,019 miles, on Thursday night, having halted en route each day 12 hours, more or less, say at Colgong, Mogulserai, and Cawnpoor.

Assuming that two ordinary through trains will run each way daily—one starting in the morning, the other in the evening—troops arriving at any Military Rest-house along the line in the evening would have two hours for disembarking and a meal on arrival, eight hours for sleep, and two hours for a meal and preparatory arrangements before proceeding on the next day's journey.

II. Should the speed of ordinary trains be increased to 25 miles per hour, including stoppages, Military Rest-houses which under the present rate of travelling would be 12½ hours distant, would then be reached in 10 hours. In fixing the sites for Military Rest-houses along the line, this contingency should be borne in mind, and stations otherwise desirable need not be rejected because, according to the present rate of speed, the time occupied in reaching them would be two hours in excess of the average time recommended, on sanitary grounds, for a day's journey.

The Commission would therefore suggest that Military Rest-houses be established along lines of railway at intervals, corresponding with journeys by ordinary trains of 12 hours' duration. It may, however, be often undesirable that the day's journey should extend to 12 hours. For instance, troops may reach the railway fatigued, or the train may pass a station so late at night as not to admit of more than a six hours' journey without undesirable exposure to the sun, or an epidemic may be prevailing in the neighbourhood of a station, at the end of a 12 hours' journey, or delay in the first half of the journey may occur so as to make it desirable to obtain shelter from further exposure intermediately. By having intermediate Rest-houses at stations corresponding with six hours' travelling, journeys could, on the one hand, be divided to the utmost extent that is likely to be required to meet all ordinary contingencies, and on the other hand the daily run could be extended in multiples of six hours, and admit of the troops receiving their meals every sixth hour. In a sanitary point of view this last consideration is one of much importance.

These intermediate rest-houses will, the Commission thinks, be required under any circumstances for bodies of invalids, women, and children.

III. The distance which can be travelled by invalids, women, and children without prejudice to health, and without serious inconvenience, depends upon their state of health, the season of the year, the time of day, the entire length of the journey, and the conveniences available in the carriages for their comfort.

Under favourable circumstances a journey of twelve hours' duration—say from 6 P. M. to 6 A. M.—would be as well borne by invalids as one of half that duration; indeed, if provided with the means of sleeping comfortably, most would prefer to continue the journey till morning to being disturbed at midnight and required to leave the railway-carriage. While every advantage should be taken of favourable circumstances for lengthening the duration of the journey, their occurrence cannot be calculated upon, and therefore it is desirable that arrangements should be made for invalids, women, and children being accommodated in Rest-houses after travelling six hours, corresponding with 120 miles of distance.

IV. According, therefore, to the plans which have now been recommended, there would be Rest-houses at intervals of six hours, for the accommodation, sometimes of invalids, women, and children, and sometimes for bodies of healthy troops, and at these places regular meals should be served on the arrival of trains.

V. As regards the distances at which arrangements should be made for necessary purposes, and the length of time which trains carrying troops should stop at such places, the Commission is of opinion that in addition to adequate urinal and latrine accommodation at every station for Native, Eurasian, and European passengers, there should be maintained, at intervals corresponding with distances equal to three hours' travelling, latrine accommodation suitable for European habits.

Adequate arrangements for the convenience of troops should be made at terminal stations as well as at the intermediate ones mentioned.

At stations where there are separate rest-houses on the main-line or on sidings, the additional latrine accommodation for European troops should, the Commission thinks, be within the Rest-house enclosure.

VI. The length of time which trains carrying detachments of troops should stop at stations for necessary purposes will depend entirely on the amount of accommodation available.

VII. At the Rest-houses there should be every facility afforded to the troops for washing and bathing. The arrangements may be as simple as possible, but they should be abundant and instantly available.

VIII. The extent to which accommodation in these Rest-houses should be afforded must depend on the maximum strength of the detachments which it is considered may properly be sent off at one time. This must be determined mainly on military and financial grounds, and the sanitary bearings of the question are not very important.

IX. The Commission does not desire to assert that the construction of new buildings to fulfil the objects of Rest-houses will always be required. It is quite possible that at many of the larger railway stations little is really wanted in the way of fresh accommodation for troops. Unless under exceptional circumstances, for which provision cannot be made, the movements of troops take place almost entirely during the cold season. Shelter from sun and rain, the provision of necessary conveniences, and the means of obtaining a tolerable amount of rest and refreshment, are all that is necessary. To provide elaborate and expensive buildings for such purposes as those which are required in this case would be foolish extravagance.

X. There is, however, one other point which the Commission thinks it important to notice. Great benefit to the health of the European troops might result from these Rest-houses at seasons when they are not required for their primary use, viz., by using them as refuges in times of severe endemic and epidemic sickness, and this may sometimes be a valid reason for constructing them on a larger scale, and in a more substantial manner than would otherwise be necessary.

The improved condition in every respect of the European soldier in India has resulted in a great diminution of sickness and mortality, and a still further diminution may be anticipated. But, however much may be done to counteract the unfavorable climatic conditions to which the European constitution is exposed in India in ordinary times, there are years of epidemic constitution, recurring at frequent but undefined intervals, when the best sanitary arrangements within Cantonments are almost powerless. Unfavorable local conditions at such seasons will probably ever remain in a great measure beyond the power of man to control. Fortunately, however, even in years of epidemic constitution, the prevalence of disease is often confined within limited areas at a time, and it is on the recognition of this fact that bodies of troops may be preserved from pestilence and death by promptly moving away from localities which are suddenly attacked, or which it is believed are about to become so. The utility of this method of evading epidemic sickness in the case of cholera has been acknowledged by the Government, but the Commission believes that it is capable of a wider application, and that it may be so extended as to include all the more serious diseases prevailing epidemically and endemically. It is probable that this may be found to be the only simple and practicable means of obviating the recurrence at short intervals of years of high death-rate from extraordinary causes, after good sanitary arrangements have counteracted successfully the

ordinary causes of disease. No arrangement could be more favorable for facilitating the adoption of the system of evasion of disease in the case of troops on or near lines of railway than the provision of ready furnished Military Rest-houses in the manner that has been proposed.

XI. It would not be in time of epidemic sickness alone that these Rest-houses would be useful. There are always men to whom change of air would be of the utmost service; comparatively slight changes, such as can be obtained by moving from one place to another in the plains, even to no great distance, are often very beneficial, and with these Rest-houses it may become possible to some extent to afford to the soldiers advantages of a similar nature to those which are already available for other classes of the community.

XII. Although it would be extravagant to construct all other Rest-houses in the country on a scale sufficient to meet such objects as these, the Commission thinks that these considerations ought not to be overlooked. The Government has to some extent already admitted the truth of the principle which the Commission has been advocating, by ordering the preservation of some of the old Rest-houses on the Grand Trunk Road, in the vicinity of Military Stations, which are conveniently situated as refuges for the troops in case of outbreaks of cholera.

107. Uniform system of Statistics of Sickness and Mortality in Jails.

The Commission was engaged in considering the subject.

108. Municipality of Simla.

Read letter No. 259, dated 13th instant, from the Secretary to the Sanitary Commission, addressed to the Chairman of the Municipal Commissioners for Simla, bringing to notice by order of the President, the extremely offensive condition of the ground in the immediate vicinity of the public roads, it being hardly possible to go in any direction for a hundred yards without becoming sensible of this objectionable and unwholesome state, which is evidently caused by the almost total absence of necessary conveniences for the servants and others residing on the ground attached to private houses, and from the apparent neglect of any attempt to prevent nuisances being committed close to the roads and places of public resort; and intimating that if the new rules prepared by the Municipal Commissioners receive the sanction of the Government of the Punjab, the means

will be provided of removing this and many other defects at Simla, although it may be doubted whether they will be found sufficient for all the sanitary requirements of the place. Also recommending that if there is likely to be any delay in the passing of these Rules, a special application be made to the Government to allow Rule 30,* which obliges all house-proprietors to construct proper necessities on their estates,

* "RULE 30. The proprietor of every house, unless specially exempted by the Commissioners, shall cause to be erected for the use of the native servants and others residing on the grounds attaching thereto, a 'necessary' and 'cesspool,' according to the plan that may be laid down by the Commissioners for general adoption; if any proprietor refuse or neglect to comply with this requirement after a notice from the Commissioners, and after a reasonable time given on such notice, the Commissioners may cause such 'necessary' or 'cesspool' to be constructed at the expense of the proprietor, who shall be further liable to a fine not exceeding Rs. 50."

to be immediately enforced, as not a day should be lost on this essential reform; the many difficulties which will doubtless have to be contended with before the present evils can be got rid of appearing to be only another reason

for avoiding further delay. It was, however, suggested that it would be an improvement if in the proposed Rule 30 referred to, the words "permanent [fixed], or temporary [moveable] receptacles of filth, refuse, and rubbish" were substituted for the word 'cesspool'; the construction of cesspools—according to the ordinary acceptance of the term—being undesirable, the use of the word is liable to misapprehension.

109. **Substitution of Ambulances for Doolies.—Fracture Dandee.**

Read again Minute No. 28 of the Proceedings of the Commission, on the 30th January 1865, on the substitution of Ambulances for Doolies.

Read letter No. 1461, dated 28th March 1865, from the Assistant Secretary to the Government of India, Military Department, forwarding letter No. 1005 C, dated 20th idem, from the Quarter Master General, with reports by Military and Medical Officers on the question of the substitution of Ambulances for Doolies; also a model of a fracture *dandee*, and enquiring whether the Commission desired to add any thing to, or in substitution of, the recommendation contained in the Officiating President's letter No. 59 of the 30th January last.

OPINION.

I. The Commission does not desire to add any thing to the recommendations contained in Minute No. 28 of the Proceedings on the 30th January last, on the substitution of Ambulances for Doolies.

II. With regard to the fracture *Dandee*, the Commission considers that there can be no doubt that dandeers of the kind might with great advantage be supplied for field service, and especially for service on the hills, in addition to the usual complement of Doolies. The *Dandee* might easily be strapped on the top of the Doolie, and carried with it without any additional establishment.

III. The model of the *Dandee* appears to the Commission to be generally good. Whether the substitution of a jointed frame-work of wood and cane for the leather netting, in the way that has been suggested, would be desirable, seems doubtful, as such an alteration would add to the weight of the *dandee*, and as no mattress will be used, the leather bottom with adjusting straps will probably be more comfortable.

110. **Annual Report of the Commission for the past year.**

The Commission was engaged with matters connected with the Annual Report of the Commission for the past year, about to be submitted to the Government of India, Military Department.

Routine.

The Commission adjourned.

(Signed) JOHN STRACHEY, *President*,

Sanitary Commission for Bengal.

PROCEEDINGS OF THE SANITARY COMMISSION FOR BENGAL.
ON THE 30TH OF JUNE 1865, AT SIMLA.

PRESIDENT.

JOHN STRACHEY, ESQ., C. S., ... *President.*

SURGEON-MAJOR J. P. WALKER, M. D., ... *Secretary and Member.*

CAPTAIN E. C. S. WILLIAMS, R. E., ... *Member.*

111. **Annual Report of the Commission for the past year.**

Read the following letter No. 268, of this date, addressed by the President to the Secretary to the Government of India, Military Department; being the Annual Report of the Sanitary Commission for Bengal for the past year:—

"I have the honor to submit the Report of the Sanitary Commission for Bengal for the year 1864-65. In the orders under which the Commission was originally constituted, it was directed that "an Annual Report upon Public Health should be submitted to the Government by the Commission as soon after the 1st May as possible, treating of all the subjects that properly fall within its cognizance, and showing what has been done and proposed during the year." The Report will be, in future, prepared for the calendar year, in accordance with the orders that have lately been given by the Secretary of State and by the Government of India.

2. This being our first Report, it is desirable that we should state briefly the circumstances under which the Commission was appointed, and the nature of the duties that have devolved upon it.

The appointment of a Sanitary Commission at each of the Presidencies in India was one of the recommendations made in the Report, submitted in May 1863, by the Royal Commission appointed to inquire into the sanitary state of the Army in India. It was recommended that these Commissions should be "so constituted as to represent the various elements, civil, military, engineering, sanitary, and medical; to give advice and assistance in all matters relating to the Public Health, such as selection of new stations and the sanitary improvement of existing stations and bazaars; to examine new plans for barracks and hospitals; to advise on the laying out of stations and bazaars, the sanitary improvement of native towns, prevention and mitigation of epidemic diseases, and generally to exercise a constant oversight on the sanitary condition of the population, European and Native; to report on the prevalence, causes, and means of preventing sickness and disease."

In accordance with this recommendation, and with the instructions of the Secretary of State, the formation of Sanitary Commissions was ordered by the Government of India, and in February 1864 the Commission for this Presidency was appointed. It was determined that the President of the Commission should be a Civil Officer, and the Secretary a Medical Officer; and that one other Medical Officer, and two Military Officers, one of them an

Officer of Engineers, should be Members. The President and Secretary were to devote their whole time to the work of the Commission; the duties of the other Members were to be performed in addition to those of their regular offices. The orders of the Government of India, No. 1044, dated 29th February 1864, describe the nature of the work which the Commission was expected to perform, and indicate generally the intentions and wishes of the Government. It was stated that the primary object was the diminution of mortality in the Army, and the improvement of its sanitary condition, but that it was impossible that these objects should be attained unless measures were also taken for the improvement of the Public Health generally, and for the prevention of the more obvious causes of disease among the community at large. The Commission is a purely consultative body and has no executive functions.

3. The questions that have come before the Commission since it was appointed, have been very numerous, and separate Reports regarding many of them have been submitted to the Government. In those Reports we have fully described the principal sanitary evils which have come to our notice, and have made suggestions for their removal. In the present Report we shall, for the most part, deal with another side of the question. It will be less our object to point out the remedies for defects than to show the existing state of things; to describe the principal measures of sanitary importance which have been carried out or proposed during the past year by the Government; to give a true representation of the present sanitary state of the Army, and, so far as the imperfect means at our disposal will allow, of other classes of the population.

4. The Report of the Royal Commission gave a very unfavorable account of the sanitary condition of the Army in India. The statement, frequently reported in that Report, that 69 per thousand has been the average annual rate of mortality among the British Troops in India, has been considered in a Despatch from the Government of India to the Secretary of State, which has been published and laid before Parliament, and the question has been so fully discussed that it is unnecessary that we should again enter into it at length. It will be sufficient if we make a few remarks upon the subject.

That the average annual rate of mortality in the Army in India, between the years 1800 and 1856, was 69 per thousand, must be accepted as a fact, and when the Royal Commission declared that these figures represented the expense at which we had held dominion in India during the past century, the conclusion was undoubtedly correct. If nothing more than this had been asserted, there would have been no room for calling in question the justice of the statement, but it was assumed by the Commission, that this rate of 69 per thousand represented the actual mortality in the Army in India at the time when the Report was issued; and this assumption is certainly not correct.

In 1857 the Royal Commissioners appointed to inquire into the Regulations affecting the sanitary condition of the Army, stated in their Report that the average annual rate of mortality in the Infantry at home was 187

per thousand, and in the Foot Guards 20.4 per thousand. Since that time the rate of mortality in the Army at home has been reduced to half the former amount, and it does not now exceed 9 or 10 per thousand. There is no more reason for saying that the average rate of mortality in the Army in India is now 69 per thousand, than for saying that the rate in the Army at home is 18 or 20 per thousand. The figures are as obsolete in the one case as in the other. The improvement in the health of the Army has been immense in both countries; it has been effected in both cases during the same period, and it has been mainly due to the same cause, the great efforts that have been made to improve the condition of the Soldier, and to protect him against the more serious causes of disease. It may be confidently stated that those efforts have been even greater in India than at home, and the result has been that the rate of mortality in India is probably not higher at the present time than that which prevailed ten years ago in England.

We have stated that the death-rate of 69 per thousand for the period between 1800 and 1856, is to be accepted as a fact. For at least ten years, however, before 1856, the average mortality was not nearly so high as this, unless in exceptional cases, when it was raised by war or by a violent epidemic of Cholera. To make up the death-rate of 69 per thousand, all the deaths were included which occurred in the Army during the first half of this century, a period of frequent war and commotion. This period includes the Campaigns of Lord Lake and Sir Arthur Wellesley, against the Marhattas; the Pindaree war; the two Companies against Nepal; the two Burmese wars, one of them prolonged and fatal; the disastrous war in Afghanistan; the wars in Scinde and Gwalior, and the two wars in the Punjab with all their bloody battles. It was assumed by the Royal Commission, on the authority of Sir A. Tulloch, that 10 deaths per thousand out of the whole number, were due to the various wars between 1817 and 1855, but there is nothing to show what confidence this estimate deserves. It is, we think, unlikely that it should be worth much, for it is hardly possible, in a country like this, to estimate the amount of sickness and mortality caused by war. It may easily happen that Troops far away from the scene of action may suffer more severely than those which are actually engaged with the enemy. Serious war in India almost invariably disturbs all Military arrangements throughout the whole country; it often involves the necessity of marches in hot and unhealthy seasons; it throws additional labor upon the Soldiers, wherever they may be stationed, and causes additional exposure to the climate.

To whatever extent the rate of mortality in the Army in India may have been actually raised by the mode of calculation adopted by the Royal Commission, the principle involved appears to us to be faulty. It has been truly remarked that if we were to reckon up all the deaths that have taken place in the French Army since the beginning of the century, including those which occurred in the great battles of the first Napoleon, and those of the three or four hundred thousand men who perished in the retreat from Moscow, if we were to quote the enormous death-rate which we should thus obtain as the normal rate of mortality in the French Army at the present time, and were to draw from this death-rate the conclusion that the present sanitary condition of the

French Army was unsatisfactory, and discreditable to the existing Government of France, we should be taking a similar course to that which has been followed by the Royal Commission. We by no means, however, intend to assert that the exaggeration of the rate of mortality in the case of the Army in India has been actually as great as it would be in the case which has been supposed.

In further illustration of our meaning, and by way of caution against placing a wrong value upon the figures which we have ourselves given in this Report, we borrow from the Report of the Cholera Commission the following remarks upon arithmetical averages: "People are too much in the habit of considering that average or mean results have necessarily a real signification and represent facts. Very often, although the assertion may seem paradoxical, this is far from being the case. An average or mean is strictly an abstract arithmetical idea, and in that sense every such means, properly calculated, is correct; but when we come to apply this abstract idea to facts, and to inquire its signification, we shall see that it may, in some cases, have no tangible or useful meaning whatever. Thus, if we had before us 100 objects, one of which was 1,001 feet high, while the remaining 99 were each 1 foot high, we should say quite correctly in one sense that the average height of the whole was 11 feet. But, in fact, the height of none of the objects could be at all near to 11 feet, and the arithmetical idea could not have any useful signification. It would, in truth, confuse us, and lead us wrong instead of assisting our apprehension of the facts. In the example first given, a little consideration will show that the series of facts are not properly comparable; that we have one series of facts of one sort, and another of another sort; and that although we may arbitrarily and in an abstract way talk of them as a whole, yet in matter of fact they are distinct, and cannot properly be viewed together in respect of their height,—the sense in which we have been considering them. The only legitimate way of dealing with such an assemblage of facts is to consider them in groups that are properly comparable. In very many cases the difference between false and true induction lies in our success in making such distinctions properly."*

We observe that this principle has been carefully acted upon in the preparation of the Medical Statistics of the French Army. Whenever a body of troops has been placed under circumstances which are evidently peculiar, it is considered that its statistics of mortality and disease must form the subject of special investigation, and must be kept entirely separate from those of the rest of the Army which has been living under ordinary conditions.†

5. Before speaking in detail of statistical results, we desire to notice that Dr. Bryden's Statistical Returns of sickness and mortality nearly the whole of the figures given in the body of this Report are derived from Dr. Bryden's Tables; and it has been thought desirable to reprint the whole of these in an Appendix. We cannot acknowledge too fully

* Report of Cholera Commission, page 214.

† Vide "Statistique Médicale de l'Armée," 1862.

the valuable assistance of every kind which Dr. Bryden has at all times given to us. For some time past he has been specially employed, under the orders of the Government of India, in the Statistical Branch of the Medical Department in Calcutta, in the preparation of these Returns. We believe them to be far more complete and trustworthy than any Returns of the kind that have ever been published, and Dr. Bryden deserves the greatest credit for the manner in which, under circumstances of peculiar difficulty, this work has been performed. We had hoped to have been able to include with the present Report Dr. Bryden's remarks upon his own tables, but it has been found more convenient to submit these to the Government separately. It will be highly interesting to learn the conclusions to which Dr. Bryden has been led by his minute study of these statistics of mortality and disease.*

6. According to Dr. Bryden's Tables, the sickness, mortality, and invaliding among the European Troops in the Bengal Presidency, including Burmah and Pegu, during the five years ending with 31st March 1857, were as follows:—

TABLE I.

YEAR.	Average Strength.	RATIO PER THOUSAND OF AVERAGE STRENGTH.				
		Daily Sick.	Admitted.	Died in Hospital.	Died out of Hospital.	Invalided.
1852-53	20,865	92.9	2,393	59.9	2.9	27.3
1853-54	21,505	77.8	1,887	46.6	2.0	25.5
1854-55	20,046	86.6	2,221	50.0	1.9	23.9
1855-56	19,885	81.7	2,247	33.1	1.4	27.7
1856-57	21,304	88.0	2,787	70.0	1.5	32.7

The excessive mortality in 1856-57 was due to a violent epidemic of cholera, which caused the death of 33 per thousand of the whole force. Although the average rates of mortality for the five years shown in the above Table is considerably less than the estimate of the Royal Commission, it will be seen that it was nevertheless extremely high. In other respects these figures are quite as unfavorable as those given by the Royal Commission. Their Report states that "1,000 British Soldiers at home experience about 1,000 attacks of sickness in the year, but in India the Soldier's sickness is doubled. A battalion of 1,000 men [in Bengal] sent yearly on an average 2,045 cases to the hospitals; each Soldier in India was exposed, therefore, to two attacks

* It is desirable to notice that the term "European Troops" used in this Report, and in Dr. Bryden's Tables, is the term which was commonly adopted in India before the amalgamation of the two Armies, to include both Her Majesty's British Troops and those in the Service of the Indian Government. These Returns for "European Troops" will therefore necessarily differ from those from Her Majesty's British Forces, for all the years before the amalgamation was completed. In future, it will, we think, be desirable to discard the term "European Troops" altogether.

of illness in the year instead of one."* It is stated in another place that "on an average, in the stations in Bengal, 84 men in a battalion of 1,000 were constantly in hospital." These statements are quite borne out by the foregoing table.

For the last nine months of 1857, the first year of the Indian mutiny, we have no Returns in which we have confidence, but the circumstances under which the troops were placed were so entirely exceptional, that this is of little importance so far as our present objects are concerned. In 1858 the troops were exposed to almost as great an extent as in the previous year. The rate of mortality rose to 100.6 per thousand, of which all except 4.3 was due to disease, and not to loss in action. During the same year the number daily sick was 122.6 per thousand, and the number admitted into hospital was 3,111 per thousand.†

7. With the return of peace in 1859, there was a great improvement in the health of the Army, although for a considerable part of the year the accommodation provided was necessarily insufficient, and the troops were still suffering from the effects of the mutinies. The following Table shows the general results from 1859 up to the end of 1864:—

TABLE II.

YEAR.	Average Strength.	RATIO PER THOUSAND OF AVERAGE STRENGTH.				
		Daily Sick.	Admitted.	Died in Hospital.	Died out of Hospital.	Invalided.
1859	55,104	90.3	2,229	44.0	1.4	34.4†
1860	48,901	83.9	2,052	35.6	1.1	34.4†
1861	44,879	82.0	2,046	44.8	1.2	28.1
1862	42,980	76.8	1,971	26.8	1.3	31.5
1863	41,351	69.6	1,839	22.5	2.6	35.0
1864	40,385	62.1	1,641	19.5	1.4	36.8

8. In 1861 the most fatal epidemic of cholera occurred that has ever been known in India. During the year there were 1,663 admissions and 1,065 deaths in the Bengal Presidency from this disease. Of this number no less than 725 admissions and 450 deaths occurred at the single station of Meean Meer. Including men, women, and children, the whole force at Meean Meer

* Report, Svo. edit., p. 29.

† Vide Appendix.

‡ In consequence of the change made from 1st January 1860 in the period for furnishing the Annual Returns of the Army in India, the invaliding of 1859 and 1860 has been mixed up. The mean for the two seasons has therefore been taken.

was 2,452, and out of this number 880 were attacked by cholera, and 535 died in the space of little more than a month. At Morar, during an almost equally short space of time, 152 Soldiers died, out of 210 that were attacked. The Special Commission that was appointed by the Government of India to inquire into this epidemic was strongly of opinion that in both these cases the mortality was aggravated to an enormous extent by extreme mismanagement. If it had not been for this, the year 1861 would have formed no exception to the steady improvement that has been going on in the health of the Army since 1859.

9. In a Report submitted by our Commission last year, it was stated with reference to the Returns for 1863—"there are 46 principal Military stations. In 28 of these, containing about three-fourths of the whole force, the death-rate in 1863 was less than 20 per thousand; in 18 stations it was under 13 per thousand, and in 8 stations it was under 10 per thousand. We have no access at present to the Returns for Madras and Bombay, but we believe that it may be safely stated that the mortality in the Army in India during the last two years has been little, if at all, more than 20 per thousand, the rate which prevailed among the Guards at home only six years ago, and which the Royal Commissioners in their Report considered might become the death-rate in India under improved sanitary conditions." It will be seen from the detailed Returns given in the Appendix to this Report that the results in 1864 were still more satisfactory. The average rate of mortality for the Army in this Presidency was lower than it had ever been in any previous year. Except in Bengal Proper, and in the Districts including Dinapore, Benares, Oudh, and Cawnpore, the average mortality was less than 18 per thousand, and in the Punjab, which contains a larger proportion of the Army than any other Province in India, the rate was only 14.5 per thousand, or, excluding deaths out of hospital, only 13.2 per thousand.

10. The following Table shows the amount of sickness and mortality among the European Troops in the several Provinces of the Bengal Presidency for the year 1864.

TABLE III.

PROVINCE.	Average Strength.	RATIO PER THOUSAND OF AVERAGE STRENGTH.					
		Daily Sick.	Admitted.	Died in Hospital.	Died out of Hospital.	Died from all causes.	Died from Cholera.
Bengal Proper	2,002	61.9	1,510	20.5	4.5	25.0	2.5
Dinapore, Benares, Oudh, and Cawnpore.	10,333	59.9	1,420	25.4	1.1	26.5	6.8
Meerut and Rohilkhand	5,950	72.4	1,688	16.8	.8	17.6	.2
Agra and Central India	4,854	64.5	1,871	16.5	.8	17.3	.6
Punjab	15,886	56.1	1,698	13.2	1.3	14.5	.06
Troops on the March, Invalids, Recruits, &c.		...					
Total Bengal Presidency	40,385	62.1	1,641	19.5	1.4	20.9	2.4

11. The Returns in the Appendix show that the Army in this Presidency during 1864 was distributed at 54 Stations. Great improvement in the health of the Army. At 41 of these Stations, occupied by nearly three-fourths of the whole force, the rate of mortality was less than 20 per thousand; there were only 7 Stations in which it exceeded 25 per thousand; and in 12 Stations it was under 10 per thousand*.

The facts that have been stated fully justify the conclusion which has been expressed above, that the death-rate of 69 per thousand which the Royal Commission considered applicable to the Army in India, when its Report was written, has become entirely a thing of the past. The present rate of mortality in India hardly exceeds the rates which prevailed among the Infantry and Guards at home for the fifteen years ending with 1853, when they were 18 and 20 per thousand. It falls far short of the rate—38 per thousand—which the Royal Commission considered to be applicable to the Officers of the Army in India; and it hardly exceeds the rate—20 per thousand—which, according to the Commission, prevailed among the Civil Servants of the Government in India at the Soldiers' ages, and among the Native Troops.

The foregoing Tables show also that it is not only in the rate of mortality that there has been this great and progressive improvement. The number of men constantly sick, which before the mutinies, according to the very moderate estimate of the Royal Commission, was 84 per thousand, has gradually fallen, until in 1864 it was 62 per thousand. It was 54.5 per thousand in the United Kingdom in 1861. In a similar manner, the number of annual admissions into Hospital, which before the mutinies exceeded 2,000 per thousand men, has gradually fallen to 1,641 in 1864. It was 1,025 per thousand men in the United Kingdom in 1861.

12. We have no detailed Returns showing the mortality of the Army in Madras and Bombay during the last few years, but Rates of mortality among European Troops in Madras and Bombay. these Presidencies have almost always been more healthy than Bengal, and that there can be no doubt that the death-rate of 69 per thousand given by the Royal Commission for India generally is still less applicable to them than it is to us.

According to a Return dated 30th May last, prepared at the Horse Guards, and presented to the House of Commons, the rates of mortality per thousand of average strength in Her Majesty's Forces in the Madras and Bombay Presidencies during the last five years have been as follows:—

Year.	Madras.	Bombay.
1860 ...	20.4	29.1
1861 ...	15.7	21.3
1862 ...	19.6	25.5
1863 ...	19.2	13.2
1864 ...	20.1	15.8

* This does not include the men at convalescent depôts, the rates of mortality at which are always, and necessarily exceptionally high.

13. No proper arrangements having been organized for furnishing to our Commission regular Returns and Reports, the remarks will be very imperfect which we are able to make regarding the sickness and mortality at particular Stations during 1864. It is hoped that in future we shall have access to more complete sources of information, under the arrangements which are now under the consideration of the Government, and which contemplate the establishment of an efficient system for recording and reporting all available facts of statistical and sanitary interest. Details for every Station showing the amount of sickness and mortality from all the principal diseases will be found in the Appendix to this Report.

The following Table shows all the Stations in which the mortality in hospital during the year exceeded 20 per thousand:—

TABLE IV.

STATION.	Average Strength.	RATIO PER THOUSAND OF AVERAGE STRENGTH.					
		Daily Sick.	Admitted.	Died from Cholera.	Died in Hospital, not including Cholera.	Died out of Hospital.	Died from all causes.
Barrackpore ...	455	52.3	1,536	4.4	33.0	2.2	39.6
Berhampore ...	202	48.9	1,253	...	24.8	...	24.8
Dinapore ...	968	75.4	1,693	5.2	17.6	1.0	23.8
Benares ...	1,081	75.7	1,692	5.6	20.4	1.9	27.8
Lucknow ...	2,470	60.4	1,706	15.8	27.9	.8	44.5
Cawnpore ...	1,131	57.9	1,292	5.3	19.5	.9	25.6
Allahabad ...	950	59.9	1,236	12.6	11.6	1.1	25.3
Delhi ...	964	89.4	2,378	...	21.8	1.0	22.8
Saugor ...	817	79.8	2,397	2.5	18.4	1.2	22.0
Umritsur and Govindgurh...	501	68.0	2,293	...	24.0	...	24.0
Meean Meer ...	910	62.8	1,713	1.1	22.0	2.2	25.3

14. The rate of mortality at Lucknow during 1864 was higher than in any Station in this Presidency, being 44.5 per thousand, out of which amount 15.8 was due to Mortality at Lucknow and other Stations. Cholera alone. The troops at Lucknow consisted of the 107th and 36th Regiments, the 5th Lancers, and four batteries of Artillery. The 107th is an old and seasoned Regiment. It lost 22 men out of an average strength of 894, or 24.6 per thousand, and one-half of the deaths occurred in one week from Cholera. The Artillery lost only five men. The 36th Regiment arrived from England at the end of 1863, and reached Lucknow in a tolerably healthy condition in January. "It continued," writes the Surgeon of the Regiment, Dr. Bell, "in a good sanitary state till April, when the increasing heat of the weather began to tell on the young unseasoned Soldiers, and fevers

"became prevalent. They presented no great variety; a few have been returned 'as 'common continued;' there were only 24 cases of 'Intermittent;' the rest 'were returned as 'Remittent,' but of these at least 10 cases might with equal 'correctness be called Typhoid.* * The result is one for which I was wholly 'unprepared from my six years' experience in Madras, viz., that a Typhoid Fever 'almost identical with that of Europe, with ulceration of Peyer's glands, pre-'vails in this country, and is as fatal as at home. It seems the same disease 'in every respect, but that there are no petechiae and there is greater tendency 'to remissions. From the inquiries I have made, I believe it to be a new disease 'in this country, and it is certainly a very fatal one.* * This disease pre-'vailed all through the hot season from July to October, and proved fatal in 'seven cases."

There were six cases of Heat Apoplexy, and all were fatal except one. They all occurred during the hottest weather of the year, and in the opinion of the Medical Officers were caused entirely by the intense heat. On the 15th September, Cholera attacked the Regiment and proved fatal in 27 cases, all of which, with one exception, occurred within a week after the first outbreak of the disease.

There were six fatal cases of Phthisis, and 39 men were invalided from the same cause. In 19 cases this disease was a sequela of fever. It has been thought that many of these cases which were recorded as Phthisis may have been closely related to the fatal fever which has been noticed above, and there has been a suspicion that the great mortality from these diseases in this Regiment may have been really due to an attack of the same fever which, as we have stated elsewhere, has proved so fatal in some of the Jails. This, however, is a point which cannot at present be cleared up. Altogether, the 36th Regiment lost 60 men during the year. We have made a special reference to the Medical Department on the subject of the fevers which proved so fatal at Lucknow, and upon other points connected with the health of the troops at the Station, and we hope that further information may be obtained. The 5th Lancers also suffered severely, losing 20 men during the year. A fever which was apparently similar to that which prevailed in the 36th Regiment, proved fatal in five cases. There were three fatal cases of Heat Apoplexy and one of Cholera.

The causes, independently of Cholera, which led to the large mortality in the 36th Regiment and in the 5th Lancers, while the Artillery and the 107th Regiment escaped with comparatively little sickness, have not been explained, except by the fact that the two former were new to the country, and unacclimatized. It may be doubted whether this explanation is sufficient. We have not been able to discover that the local sanitary conditions under which the Regiments were placed differed to any important extent, or that there were any special differences in the management of the men. In all cases the amount of space allowed in barracks and hospitals appears to have been ample. The attack of Cholera, which was so fatal, happily lasted for only a few days. Immediately on its appearance, the men were removed into camp, and there can be no doubt that this measure had the almost immediate effect of stopping the disease. Lucknow has, on several former occasions, suffered severely from Cholera, but with the exception of 1863, when the rate of mortality

was 28.5 per thousand, the Station has been, for some years past, healthier than the average. In 1861 the mortality was only 14 per thousand, and in 1862 it was 15.3 per thousand.

With the exception of Barrackpore, regarding which Station further information has been called for, it will be observed from the foregoing Table that in almost every case in which the rate of mortality exceeded 20 per thousand, Cholera was the cause. The removal of the troops from the Station was carried out in all instances, and in all with decided benefit.

The rate of mortality at Meean Meer was unduly raised by the death of eight men, who belonged to regiments at other Stations."

The preceding Table gives a good illustration of the manner in which the average rate of mortality for the whole Army is often raised by an unusual number of deaths from some special causes, at a very few Stations. The omission of the single Station of Lucknow would reduce the death-rate for 1864 to 19.4 per thousand, and the omission of the eleven Stations named in the Table would reduce it to 17.8 per thousand.

15. "The great endemic diseases of India," (we quote from the Report of the Royal Commission,) "those which injure the health or destroy the life of the British Soldier, are fevers, dysenteries, diseases of the liver, and epidemic Cholera, which has for many years engrafted itself on the endemics of the country. Compared with these, all other diseases are of minor extent and importance." The truth of these remarks is illustrated by the following Table, which shows that these diseases, and Heat Apoplexy, have caused nearly four-fifths of the total mortality in the Army in this Presidency for the last five years.

TABLE V.

YEAR.	Total Deaths from all causes.	DIED FROM					
		Fevers.	Dysentery.	Diarrhoea.	Heat Apoplexy.	Hepatitis.	Cholera.
1860 ...	1,743	237	229	130	125	172	589
1861 ...	2,009	178	165	76	60	130	1,065
1862 ...	1,153	144	114	39	51	130	413
1863 ...	930	117	121	33	45	150	169
1864 ...	846	127	67	27	59	119	97
Total Deaths } 1860—1864 }	6,681	803	696	305	340	701	2,333

16. All these diseases invariably reach their maximum in the hotter months of the year, and throughout the greater part of India the troops are probably as healthy in the cold season as in any country in the world.

Greater prevalence of disease in the hot season.

The extent to which the heat of the climate predisposes European constitutions to disease, and aggravates the influence of causes hostile to health, is illustrated by the following Table. The number of deaths from each disease being assumed to be 100, the Table shows the proportion of the whole number occurring in the three coldest months, and in three months of the hot and rainy season. The figures represent the average results of the five years ending with 1863.

The great difference in the mortality during the two seasons will be seen at a glance. It is only in the case of diseases of the respiratory organ that the rates are higher in the cold than in the hot months:—

TABLE VI.

CAUSE OF DEATH.	DIED PER CENT. OF TOTAL DEATHS FROM EACH CAUSE.					
	December.	January.	February.	July.	August.	September.
Fevers	3.9	3.3	1.8	10.0	11.7	13.5
Dysentery	5.7	5.4	3.2	8.0	13.8	15.0
Diarrhoea	7.7	5.8	3.1	8.3	14.1	14.4
Heat Apoplexy	1.2	.4	1.4	23.3	8.3	6.5
Hepatitis	9.1	6.2	5.9	8.2	10.0	11.2
Cholera	.4	.2	1.1	15.6	47.1	10.2
Respiratory Diseases	13.0	14.2	9.6	5.0	5.0	6.7
Phthisis Pulmonalis	8.1	7.2	5.3	10.6	10.6	9.2
Delirium Tremens	5.9	3.0	1.5	8.9	8.2	14.8

The same facts are illustrated by the following Table, showing the number daily sick, and the number of admissions into hospital, per thousand of strength, from all causes, during the cold and hot months respectively:—*

TABLE VII.

	RATES PER THOUSAND OF AVERAGE STRENGTH.					
	December.	January.	February.	July.	August.	September.
Daily sick, 1859-63	66.6	70.1	70.5	87.9	92.3	92.5
" 1864	48.7	49.9	56.3	69.3	66.9	71.8
Admitted, 1859-63	1,412	1,365	1,162	2,075	1,995	1,945
" 1864	1,039	1,001	998	1,384	1,703	1,481

* See para. 29 and Table XVI, showing the comparative amount of disease among the European and Native Troops in the hot and cold seasons.

17. The nature of the relation between meteorological phenomena in India and the prevalence of disease is a subject which has been little studied, but which possesses great interest and importance. The regularity with which certain diseases invariably recur in an epidemic form at certain seasons is very remarkable. This has been shown very clearly with respect to Calcutta by Dr. Hugh Macpherson.* A summary of the facts has been given in the Report of the Cholera Commission, and we take from it the following account.† It is shown that Cholera is always present in Calcutta; that it invariably reaches its lowest point every year about August; that it then gradually rises through the autumn and winter; reaches its climax in April, when it causes more than half the total number of deaths; and then again falls regularly until August. The annual rise and fall of small-pox in Calcutta nearly corresponds with that of Cholera. On the other hand, when Cholera is at its minimum, the number of deaths from Dysentery and Diarrhoea reaches its maximum. The apparent relation is obvious between the meteorological conditions which characterize the ordinary climate of the year in Calcutta, and the variations in the mortality from Cholera. When the air is almost at its driest, and the temperature almost at its maximum of heat, before the commencement of the periodical rains, Cholera reaches its climax. When the rainy season is at its height, Cholera is at its lowest point, and with the diminution and cessation of the rains, Cholera again increases.

If we compare these facts with those which hold good in the North-Western Provinces, we find a most remarkable contrast, although the relation between meteorological phenomena and the disease is marked in an equally striking and interesting manner. In the North-Western Provinces, when Cholera becomes epidemic, it almost invariably commences with the hot season, it reaches its climax with the maximum of rain in July and August, and then falls gradually until it almost ceases in the winter. The apparent relation between the progress of Cholera and the season of the year is as well marked in the North-Western Provinces as it is in Calcutta. In the Diagrams given in the Report of the Cholera Commission, it is curious to observe how exactly the curves of Cholera correspond with those of rain-fall, of tension of vapour, of temperature, and of barometric pressure, and how remarkable a contrast they offer to the curves for Calcutta, the disease reaching its maximum in the one case at the very time when it reaches its minimum in the other. "So far as our information extends, this is a branch of inquiry in which literally nothing has been accomplished, nor indeed can we find that any serious attempt has hitherto been made in India even to point out its importance. It would be difficult to find a better example of the vast practical interest of those statistics of science, the collection of which has hardly, up to the present time, been commenced. Although we can draw no conclusion regarding the actual nature of the relations that exist between meteorological conditions and Cholera, it is evident that those relations are real. When we consider the regularity with which the same phenomena constantly recur, and the excellence of the opportunities which exist for their observation, we cannot doubt that it is within the power of science to solve many problems regarding them, which nothing but our deliberate neglect and ignorance have suffered to remain in mystery.‡

* On the mortality of Calcutta during the 20 years ending 1860.—*Indian Annals of Medical Science*, 1862.

† Report, p. 181.

‡ Report of Cholera Commission, page 183.

The meteorological observations that have hitherto been recorded in this Presidency are most imperfect, and our knowledge of the climate is consequently very incomplete. Our Commission is about to submit to the Government propositions for carrying out systematically the observation and record of meteorological phenomena in India.

Although the importance of the influence exercised by local sanitary conditions, other than those due to mere climate, can hardly be estimated too highly—a fact of which there can be no better proof than the actual diminution that has occurred in the sickness and mortality in the Army—there has perhaps been a tendency among sanitary reformers to under-value the importance of the influence produced by climate alone in India on European constitutions. However complete may be our sanitary improvements, and however great may be our success in getting rid of obviously removeable causes of disease, we cannot hope that the mortality among our countrymen in India will ever fall to the rate which prevails in healthy districts in Europe. The Royal Commission stated its belief “that two per cent. (double the rate at home Stations since the introduction of sanitary improvements,) may be taken as the possible mortality, under improved sanitary conditions,” of the troops in India. This expectation has already been fulfilled, and we may reasonably hope for still further improvement. But when the Royal Commission goes on to say that the time may possibly come when “we may cherish the hope of realizing what statistical inquiries appear to point to, namely, that the natural death-rate in times of peace of men of the Soldiers’ ages in India will be no more than 10 per thousand per annum,” we fear that the hope is too sanguine.

18. The following Table, taken from Dr. Bryden’s Report, gives the means of comparing the rate of mortality from the principal diseases in the European and Native Army in the Bengal Presidency, with that which prevails in the Army in the United Kingdom. These figures illustrate in a forcible manner the importance of purely climatic influences. It will be seen how different is the character of the most fatal diseases of the two countries :—

TABLE IX.

DISEASE.	DIED IN HOSPITAL PER THOUSAND OF AVERAGE STRENGTH.		
	European Army, Bengal Presidency, 1862-64.	Army, United Kingdom, 1859-61.	Native Army, Bengal Presidency, 1862-64.
Cholera	5.5	...	1.9
Small Pox	2	1	2
Heat Apoplexy	1.2	...	...
Apoplexy and Brain Affections	3.1	5	3
Fever	3.2	6	4.1
Dysentery and Diarrhoea	3.2	1	2.6
Hepatitis	3.2	2	2
Phthisis Pulmonalis	1.9	3.7	4
Chest Affections	1.0	1.5	1.6
Heart Diseases	6	8	1
Delirium Tremens	4	1	...
Injuries	3	9	3
All other Causes	2.4	1.3	1.8
All Causes	23.1	9.6	13.5

Mortality among European Troops in the several Provinces of the Bengal Presidency.

19. The following Table shows the mortality among the European Troops from the principal diseases during the last three years in the several Provinces of the Bengal Presidency :—

TABLE X.

RATIO PER THOUSAND OF AVERAGE STRENGTH.															
YEAR.	Province and average strength.	ALL CAUSES.		CHOLERA.		FEVER.		HEAT APOPLEXY.		DYSENTERY.		DIARRHOEA.		HEPATITIS.	
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
1862	Bengal Proper, 2,457	1494	265	7	61	463	57	2	20	48	24	137	4	49	23
"	Dinapore, Benares, and Oudh, 5,951	1516	140	1	1	441	54	2		46	21	86	1	47	30
"	Cawnpore, Meerut, and Rohilkhand, 5,810	1842	223	6	37	581	57	2	11	51	30	121	11	75	49
"	Agra and Central India, 5,429	2676	475	39	269	1,067	55	3	20	54	30	133	9	69	23
"	Punjab, 15,839	2165	278	23	127	972	30	2	14	42	24	125	10	60	25
1863	Bengal Presidency, 42,969	1971	268	16	96	806	33	2	12	40	27	120	9	62	30
1863	Bengal Proper, 1,893	1761	206	5	32	592	32	2	11	100	47	123	5	62	11
"	Dinapore, Benares, and Oudh, 5,647	1576	217	11	76	476	14	1	6	45	15	96	2	60	4
"	Cawnpore, Meerut, and Rohilkhand, 5,509	1635	238	9	76	462	26	3	13	46	28	105	13	57	45
"	Agra and Central India, 5,493	1902	219	6	38	738	36	2	11	60	31	109	6	53	36
"	Punjab, 15,660	2676	181	1	1	1,076	35	3	13	39	32	81	9	71	23
1863	Bengal Presidency, 41,551	1838	225	6	41	739	28	2	11	40	29	96	8	64	36
1864	Bengal Proper, 2,002	1511	259	6	25	423	5	2	5	40	35	140	5	38	25
"	Dinapore, Benares, and Oudh, and Cawnpore, 16,333	1426	265	9	68	432	4	3	24	41	17	123	9	47	24
"	Meerut and Rohilkhand, 5,959	1688	177	2	2	450	25	2	13	34	14	82	7	67	4
"	Agra and Central India, 4,854	1871	173	8	6	670	28	2	10	34	25	103	8	62	25
"	Punjab, 15,886	1688	145	1	1	730	19	2	10	31	13	75	5	62	62
1864	Bengal Presidency, 40,355	1641	210	3	24	542	31	2	15	36	16	98	7	56	30

Gradual diminution of disease among European Troops.

20. The gradual diminution of serious disease in the Army during the last six years, is further illustrated by the following Table :—

TABLE XI.

DISEASE.	DIED PER THOUSAND OF AVERAGE STRENGTH.					
	1859.	1860.	1861.	1862.	1863.	1864.
Cholera ...	8.7	12.0	23.7	9.6	4.1	2.4
Fevers ...	6.6	4.9	4.0	3.3	2.8	3.1
Heat Apoplexy ...	4.1	2.6	1.3	1.2	1.1	1.5
Delirium Tremens ...	.7	.8	.5	.4	.5	.4
Dysentery ...	10.2	4.7	3.7	2.7	2.9	1.6
Diarrhoea ...	2.4	1.0	1.7	.9	.8	.7
Hepatitis ...	4.9	3.5	2.9	3.0	3.6	3.0
Phthisis Pulmonalis ...	1.3	1.7	1.9	1.9	2.2	1.6
All Causes ...	44.0	35.6	44.8	26.9	22.5	21.0

21. The Returns that are at present available for showing the mortality among Officers of the Army in India and among Officers of the Army. Women and Children are very imperfect. We hope that this deficiency will be supplied in future Returns.

According to the Report of the Royal Commission, the average annual rate of mortality among Officers of the Indian Army from 1814 to 1833, was 38 per thousand, and it appears to have been considered that this rate represented, at least approximately, the mortality at the time when the Report was published. There can be no doubt, however, that the actual rate has been for many years much lower than 38 per thousand; probably it is not at the present time one-half of this amount. In 1861, according to the Report of the Royal Commission, the rate was 16 per thousand. During the eight years ending with 1853-54, it was 21 per thousand. During the same period the average annual ratio of admissions to strength was 1,323 per thousand. These figures are taken from Dr. Hugh Macpherson's valuable Tables. * The same diseases cause the greatest amount of sickness among both Officers and men.

22. The average annual rate of mortality among the wives of Soldiers in India was estimated by the Royal Commission at 35 per thousand. We fear that for the Bengal Presidency this estimate is too favourable. During the four years ending 1853-54, the average annual rate of mortality among the women of this class was 44.5 per thousand, and the ratio of admissions to strength was 1,268 per thousand.† It

* Analysis of the later Medical Returns of European Troops serving in the Bengal Presidency.

† Dr. H. Macpherson's Tables.

is shown by Dr. Bryden's Tables in the Appendix, that for the four years ending with 1863, the average rate of mortality among the women was 49.6 per thousand.

23. The mortality among the children of European Soldiers has been still more lamentable. For the four years ending with 1853-54, the average annual rate of mortality was 84.1 per thousand.* For the four years ending 1863, it was 90.4 per thousand.† Further reference to this excessive mortality has been made in para. 37 of this Report.

24. The following Table shows the comparative mortality among the men, women, and children of the European Army from the principal diseases for the four years ending with 1863 :—

TABLE XII.

DISEASE.	DIED IN HOSPITAL PER THOUSAND OF AVERAGE STRENGTH.		
	Men.	Women.	Children.
Cholera ...	11.5	17.4	16.4
Small Pox ...	.4	.8	.7
Fevers ...	3.9	5.3	10.7
Dysentery and Diarrhoea ...	4.3	9.6	21.7
Diseases of the Liver ...	2.8	1.9	.3
Respiratory Diseases ...	.9	1.8	3.4
Phthisis Pulmonalis ...	1.7	3.8	.3
All Causes ...	30.3	49.6	90.4

25. The Returns of mortality and sickness among the Native Troops may be carefully compared with those for the Europeans.

According to the Report of the Royal Commission, the average annual rate of mortality among the Native Troops has been under 20 per thousand.

The rates of admissions and mortality from all causes among the Native Troops during the last four years have been as follows :—

TABLE XIII.

YEAR.	Average Strength.	RATIO PER THOUSAND OF AVERAGE STRENGTH.				
		Daily Sick.	Admitted.	Died in Hospital.	Died out of Hospital and on leave.	Died from all Causes.
1861	39,797	40.1	1,169	16.8	3.5	20.3
1862	35,922	44.8	1,385	14.0	3.2	17.2
1863	37,469	46.2	1,477	14.6	5.1	19.7
1864	37,225	43.0	1,389	12.7	.4	13.1

* Dr. H. Macpherson's Tables.

† See Table in Appendix.

26. The following Table shows the amount of sickness and mortality among Native Troops in the several Provinces of the Bengal Presidency for the year 1864. It may be compared with the preceding Tables, which give similar details for the European Troops:—

TABLE XIV.

Province.	Average Strength.	RATIO PER THOUSAND OF AVERAGE STRENGTH.					
		Daily Sick.	Admitted.	Died in Hospital.	Died out of Hospital.	Died from all causes.	Died from Cholera.
Bengal Proper	7,929	47.0	1,513	20.3	.5	20.8	6.4
Dinapore, Benares, Oudh, and Cawnpore	6,945	32.7	975	8.9	.3	9.2	1.2
Meerut and Rohilkhand	4,388	40.8	1,227	10.5	.7	11.2	...
Agra and Central India	4,984	43.5	1,230	6.4	.4	6.8	...
Punjab	10,504	46.5	1,679	11.1	.3	11.4	.09
Troops on the march, &c.	...	...	...	...	...	...	...
Total Bengal Presidency	37,325	43.0	1,389	12.7	.4	13.1	1.7

27. It is impossible to look at these Tables, or, still more, at the detail-
Great difference in amount of disease in different Provinces.
ed Returns from which they have been compiled, and which are given in the Appendix to this Report, without observing the great differences in the rates of sickness and mortality in different Provinces of India. The remarks that have been made above (para. 4) regarding the caution with which conclusions must be based on arithmetical averages, are peculiarly applicable here. Under the name India are included many different countries of great extent, varying among themselves in climate and in all physical conditions as much as the different countries of Europe vary from one another. It is further from Calcutta to Lahore than from London to Naples, and the difference between the two climates is as great in the former case as in the latter. If we strike an average between the rates of mortality in the French Army in Paris and in Rome, or between the rates in the English Army in London and Malta, the arithmetical result will be of little use as an illustration of the sanitary condition of the troops, and general averages for India have a hardly greater value.

28. It will be seen that the same diseases, with a few exceptions, caused the chief mortality, among both Europeans and Natives, nor, with these exceptions, were the differences in the rates of mortality very great, but Heat Apoplexy, Delirium Tremens, Hepatitis, and Phthisis Pulmonalis were almost confined to the Europeans. Among them, 6.5 per thousand died from these four diseases, while among the Natives only 0.7 per thousand died from the same causes. These diseases account for the greater part of the difference between the rates of mortality of the two classes of men.

The admissions into hospital on account of Fevers and Dysentery were more numerous among the Natives than among the Europeans. The most striking difference of all is seen in venereal diseases, for which 255 per thousand of Europeans were admitted, and only 49 per thousand of Natives.

29. These results are generally in accordance with those observed in former years. The following Table shows the average rates of mortality from the principal diseases among the European Soldiers in this Presidency for four years, and among the Native Soldiers for three years, both periods ending with 1863. The figures in respect of Cholera are not properly comparable, because the period included the great epidemic of 1861, which was so extraordinarily fatal to the European Troops at a few Stations:—

TABLE XV.

DISEASE.	DIED IN HOSPITAL PER THOUSAND OF AVERAGE STRENGTH.	
	Europeans.	Natives.
Cholera	11.5	2.8
Small Pox	.4	.3
Fevers	3.9	4.1
Dysentery and Diarrhoea	4.3	2.9
Diseases of the Liver	2.8	.2
Respiratory Diseases	.9	1.5
Phthisis Pulmonalis	1.7	.5
All Causes	30.3	15.2

During the same periods the admissions for venereal diseases were 312 per thousand among Europeans, and 58 per thousand among Natives.

30. We have not the means of making a proper comparison between the amount of sickness and mortality at different seasons of the year among the European and Native Troops respectively. There is, however, reason to believe that the cold season which is so healthy for Europeans is the most fatal to Natives.* This appears to be shown also by the Returns of sickness and mortality in Jails. The result is in accordance with what has been observed in other countries, and is especially interesting as illustrating the importance of purely climatic influences upon

* See paras. 15 and 16, and Tables VI and VII, showing comparative amount of disease among the European Troops in the hot and cold seasons.

different constitutions independently of local sanitary conditions. The following Table gives the means of comparison for the year 1864 only:—

TABLE XVI.

	RATIO PER THOUSAND OF AVERAGE STRENGTH.					
	December.	January.	February.	July.	August.	September.
Daily sick, Europeans ...	48.7	49.9	56.3	69.3	66.9	71.8
„ Natives... ..	46.2	43.2	41.2	35.3	39.5	50.1
Admitted, Europeans ...	104	100	100	138	179	148
„ Natives... ..	113	93	84	93	132	140
Died, Europeans ...	2.4	.9	1.0	2.0	2.0	3.1
„ Natives	1.5	1.0	1.2	.7	.9	.6

31. The following Table shows the admissions and deaths from the principal diseases during the year 1864 for both Sickness and mortality among European and Native Troops in 1864. European and Native Troops:—

TABLE XVII.

DISEASE.	RATIO PER THOUSAND OF AVERAGE STRENGTH.			
	EUROPEANS. AVERAGE STRENGTH, 40,383.		NATIVES. AVERAGE STRENGTH, 37,225.	
	Admitted.	Died.	Admitted.	Died.
Cholera	3	2.4	4	1.7
Small Pox	2	.4	1	.3
Fevers	542	3.1	693	3.8
Heat Apoplexy ...	2	1.5	3	.1
Delirium Tremens ...	4	.4	.1	...
Dysentery	36	1.6	74	1.1
Diarrhoea	98	.7	64	1.1
Hepatitis	56	3.0	2	.1
Respiratory Diseases ...	80	1.0	37	1.8
Phthisis Pulmonalis ...	8	1.6	.9	.5
Rheumatism	84	...	57	...
Veneral Diseases ...	255	...	49	...
Eye Diseases	43	...	26	...
All Causes	1,641	21.0	1,389	12.1

32. It is an important question how far this great diminution of sickness and mortality in the Army in India is likely to be permanent. Believing as we do that this has undoubtedly been brought about by the improvement in the condition of the Soldiers, we look forward with confidence to still further progress as the consequence of the Probable permanency of diminution of mortality in the Army in India. Evasion of epidemic disease.

constant efforts that are being made. But however much may be done to counteract the unfavorable climatic and other conditions to which Europeans are exposed in India in ordinary times, there are years of epidemic constitution recurring at frequent but undefined intervals, when the best sanitary arrangements within our Cantonments are almost powerless. The unfavorable conditions which exist at such seasons will probably ever remain, in a great measure, beyond the power of man to control.

Fortunately, however, even in years of epidemic constitution, the prevalence of disease is often confined within limited areas at a time, and it is on the recognition of this fact that bodies of troops may be preserved from pestilence and death, by promptly moving them away from places which have become affected with the prevalent disease. The utility of this method of evading epidemic sickness has been proved, to the most complete demonstration, in the case of Cholera, and it was fully acknowledged by the Government in giving sanction to the recommendations of the Cholera Commission. We believe that the principle is capable of a wider application, and that it may be so extended as to include all the more serious diseases prevailing epidemically and endemically. It is probable that this may be found to be the only simple and practicable means of obviating the recurrence, at short intervals, of years of comparatively high death-rate from extraordinary causes, after good sanitary arrangements have counteracted successfully the ordinary causes of disease. We have noticed in a separate Report that this system of evading disease will be greatly facilitated by the extension of Railways, and by the provision of Military rest-houses at convenient Stations along the lines.

33. Among all the causes which may render us apprehensive regarding the permanency of the improvement that has taken place in the rate of mortality in the Army in India, the most important is Cholera. If we can guard against the terrible epidemics of this disease which have so often attacked our troops, we need perhaps hardly fear that there will be, in time of peace, any serious or continued increase to the rate of mortality which now prevails. But it is visionary to suppose that any amount of ordinary sanitary improvements, such as we are likely to see carried out, will have the effect of preventing the liability to Cholera, in a country like this, where the disease is always present, and in some part of which it is almost always virulent. The system of evading disease of which we have just been speaking has been fully applied in the case of Cholera.

One of the most important measures taken during the past year was the promulgation by the Government of the rules proposed by the Commission appointed to inquire into the Cholera Epidemic of 1861, with the object of preventing the spread of Cholera among the European Troops. These Rules prescribe, in great detail, the measures of precaution and prevention which are invariably to be adopted when Epidemic Cholera is prevalent, or when its attack is apprehended. With a few slight modifications, recommended by the Sanitary Commission for Bengal, the Rules have been sanctioned by the Government, and their strict observance has been ordered.

There is no subject connected with the health of the Army in India which is of more essential importance than this, and it is desirable that we should briefly state here the general character of the measures that have been taken. The average mortality in the Army in India from Cholera alone, during the last fifty years, has been higher than that which now prevails in the Army in England from all causes put together, and not less than a sixth part of the whole number of deaths during that period has been due to this disease. Very frequently, the prevalence of Cholera has been most excessive and most alarming. We have already noticed its terrible virulence in 1861, especially at Meean Meer and Morar. It would be difficult, as the Report of the Cholera Commission truly states, to find a parallel to the mortality at Meean Meer, at least in modern times and among civilized men.

The Cholera Commission arrived at the conclusion that "whenever an excessive mortality from Cholera had occurred among the Soldiers, it was obviously due to causes which might have been avoided,—either to positive mismanagement, or to the neglect of precautions which it was easy to adopt." "There is a common impression," says the Commission, "that there is something essentially strange and mysterious in all that concerns this disease, and that it is almost hopeless to attempt to lay down any principles of any kind regarding it. There can be no greater mistake. There is perhaps no disease which has more strongly marked and invariable characteristics, which regularly present themselves during every epidemic attack, and it is this fact which gives room for hope that means may be found for its prevention. It is only when we come to the purely medical part of the question that we must admit that we at present know almost nothing." The recommendations of the Cholera Commission are founded upon the principle that the observation of facts is the sole basis of physical knowledge, that the facts which characterize an epidemic of Cholera are remarkably uniform and obvious, and that in this uniformity of character we have a sound basis for measures for the prevention of the disease.

The Rules laid down by the Cholera Commission start with the assumption that no general measures of sanitary improvement, although these too are essentially necessary, will alone enable us to contend successfully with Cholera, but that special measures are also required, based upon the belief that the cause of Cholera is a specific poison, propagated according to certain special laws.

Of all the characteristics of the disease, the most constant and important, so far as our present objects are concerned, is this, that Cholera is evidently a disease which attaches itself to particular localities. "Although an epidemic may be diffused over a vast extent of country, the local distribution of the disease is always most partial and unequal. Among a number of places near one another and apparently placed under altogether similar circumstances, some escape and others are attacked. One part of a town is ravaged by the disease, while other parts are untouched by it. 'In a few houses in a street,' writes Dr. Baly, half the inhabitants are carried off by the disease; in the remainder not a single death occurs.' * * We have here a rational basis for practical measures

for mitigating the violence of an epidemic of Cholera. If we find that in some particular place there is evidently present a special cause which is fatal to the persons exposed to it, the obviously reasonable plan is, if possible, to avoid the place altogether. Nor is this only a matter of theory. It has constantly been found in practice that the result of removal, even to a very short distance from the infected locality, is sufficient to cause the total cessation of the disease."*

The rules of the Cholera Commission provide, accordingly, for the instant removal of the troops from the place in which Cholera has appeared, and for stopping all communication with the infected locality until it may safely be believed that all danger has ceased. It is assumed that Cholera is communicable by human intercourse; the Commission, while it avoids the discussion of any theory, evidently leans to the belief that the disease is disseminated by the discharges from Cholera patients, and many of the Rules are framed to meet this presumed danger. The necessity of carrying out a most vigilant inspection of the men during the prevalence of Cholera is strongly insisted upon, with the object of ensuring the discovery and treatment of the disease in its earliest stage. The main object during an epidemic of Cholera is the prevention of fresh cases of the disease in its virulent form. Prevention is often possible, but medical treatment has little value after the disease has become fully developed. On all these points, and on many others more or less connected with them, rules have been laid down in great detail. We cannot as yet judge fully of their practical effect, but we have every right to hope that they will gain the end at which they aim. They are, in all essential respects, only a further development of the rules which were laid down in the General Order issued by His Excellency the Commander-in-Chief on the 7th April 1862, and which have undoubtedly proved most successful in checking the progress of the disease among the troops. To watch the operation of these rules, and to learn by experience the points in which they are defective, is now one of the most important duties of Medical and Sanitary Officers in India. The Cholera Commission declared its belief that if proper measures of prevention were adopted, mortality such as that which occurred in 1861 at Meean Meer would be hardly possible in future. We see no reason why this opinion should be considered too sanguine.

34. Although we hope that the total mortality from Cholera may in future be reduced, we fear that there is little room at present for anticipating any greater measure of success in the treatment of the disease. The Report of the Cholera Commission shows that there is, unhappily, great reason for believing that the proportion of deaths from Cholera to cases treated has gone on for many years steadily increasing among the European Troops in all parts of India. The percentage rose in Bengal between 1818 and 1854, from 26.7 to 42.0; in Bombay, during the same period, from 18.5 to 43.2; and in Madras, between 1829 and 1851, from 27.1 to 62.3.†

* Report of Cholera Commission, Section II, para. 431.

† Report of Cholera Commission, p. 249.

In the Bengal Presidency, since 1854, the percentage of deaths to case treated among the European Troops has been as follows :—

1854-55	...	...	50.5
1855-56	...	...	50.0
1856-57	...	...	53.6
1858	...	...	54.3
1859	...	...	50.2
1860	...	...	53.3
1861	...	...	64.1
1862	...	...	61.3
1863	...	...	75.1
1864	...	...	72.6

The percentage of deaths to cases of Cholera treated has been far greater among the European Soldiers than among the Native Troops, or Native prisoners in Jails. According to the Report of the Cholera Commission, the rate among the Native Troops between 1826 and 1861 was generally from about 30 to 40 per cent. In the epidemic of 1861, among all classes of Europeans, the percentage of deaths to cases was 63.8, while among the Native Troops it was 38.2, and among the prisoners in Jails it was 47.9.* Since 1861 the rates have been as follows :—

YEAR.	Native Troops.	Prisoners.
1862	50.3	36.4
1863	57.0	36.5
1864	44.0	36.6

We can say nothing which would throw any additional light on these lamentable facts. They serve to illustrate strongly the truth of the principle constantly insisted upon by the Cholera Commission, and noticed above, that during an epidemic of Cholera among European Soldiers, the main object ought always to be the prevention of fresh cases, rather than the medical treatment of those who have been attacked; that medical treatment is ordinarily almost useless after virulent symptoms have appeared; and that the difficulty of affording medical treatment to patients suffering from Cholera ought never to be admitted as a reason for omitting to carry out precautionary measures. This last point is one of much practical importance. The disinclination to sub-divide Hospital Establishments during the prevalence of Cholera has frequently prevented the proper separation of the troops into different detachments, and has led to the exposure of the men to a positive danger for the sake of giving them an advantage which is for the

* Report of Cholera Commission, p. 250.

most part imaginary. So long as it remains true of our Regimental Hospitals that nearly three-fourths of those attacked by Cholera die, medical treatment must be looked upon as a matter of quite secondary importance. There is no reason whatever for supposing that the rate of mortality is higher than this when European medical treatment is altogether wanting.

35. Measures for the prevention of Cholera are hardly more necessary than measures for the prevention of venereal diseases. It has been noticed in another part of this Report that Act XXII of 1864 has given power to the Government to make Rules and Regulations for inspecting and controlling houses of ill fame in Military Cantonments and for preventing the spread of venereal diseases. The Act also provides* that the Governor General in Council, whenever it shall appear necessary for the protection of the health of the troops, may extend to any place outside the limits of any Cantonment, and in its vicinity, all or any of the Rules and Regulations made within the Cantonment for the purposes just stated, or may make any additional Rules and Regulations that are required.

We have shown, in a separate Report, that at least one-third of the whole Army has ordinarily passed through the hospitals in the course of the year on account of these diseases alone. At many stations the proportion has been much higher, amounting to fifty, sixty, and even seventy per cent. of the force. It may be assumed on any day in the year that a number of men equal to the ordinary effective strength of a Regiment are disabled from this cause. Statements such as this give, however, no sufficient representation of the real evil. The highest authorities agree in declaring that these diseases are the origin of a very large proportion of the invaliding which occurs every year, and that the mortality from other diseases is seriously aggravated by them. Dr. Duncan Macpherson, Inspector General of Hospitals, who has made the subject a matter of special study, declares his conviction that "fully two-thirds of those who imbibe the disease are invalided within five years, and are sent out of the service with a loathsome poison circulating in their veins which passes down to their posterity." It is, as this Commission has already declared, little better than folly to talk of measures for improving the health of the Army, and to ignore the existence of causes of disease which every body knows and admits to be more important than almost any others which exist. That preventive measures may be adopted which will have the effect of diminishing to a very great extent these frightful evils, is a fact completely proved by experience both in Europe and in India, and the Government has now the power of dealing effectually with the whole subject. We had hoped that before this time greater progress than we are able actually to report would have been made towards the introduction of an efficient system of prevention. Unforeseen delays have interfered in carrying out the plans which have been recommended, but we confidently hope that during the present year measures will be taken which will produce most important and beneficial results.

* Section XXV.

The plans that it is proposed to adopt will be in accordance with the recommendations of the Royal Commission, and with the orders of the Secretary of State. It is satisfactory to know that similar measures for the protection of the Army and Navy at home were authorized by Parliament in the last Session, by the Contagious Diseases Prevention Act (27 and 26 Vict. c. 85).

36. There has already been some diminution in these diseases, although they are still lamentably common. The following Table shows that they were less prevalent among the European Troops during 1864 than in any previous year since the mutinies:—

TABLE XVIII.

YEARS.	Average Strength.	No. of Admissions from Venereal Diseases.	Admitted for Venereal Diseases per thousand of average strength.
1858	43,771	11,446	261.1
1859	55,104	19,777	359.0
1860	48,901	16,478	338.0
1861	44,879	16,567	369.1
1862	42,980	13,671	318.1
1863	41,351	11,650	281.7
1864	40,385	10,295	254.9

37. As one means of diminishing the liability to this class of diseases, the Measures recommended by Royal Commission recommended in its Report that Mr. Acton. additional measures of cleanliness, such as have been proposed by Mr. Acton, should be provided in barrack lavatories. This recommendation has been carried into effect during the past year. Private bathing-rooms with a supply of water have been already provided in addition to the ordinary means for bathing and washing to the extent of about four per Company, and in new buildings this provision will be further increased.

38. It has often been said that one great cause of the extreme prevalence of these diseases is the restriction placed upon marriage. This, however, can hardly be the case in India, for the number of married men is, at the present time, less than half of the number authorized under the existing regulations, viz., 12 per cent. On the 1st May 1863, out of 66,748 Rank and File in the three Presidencies, only 3,776 were married. This is certainly not the result of any adverse pressure put upon the men. Although the wives and children of Soldiers in India have to suffer many hardships, the quarters provided for them are usually much better in India than in England or in the Colonies, and greater efforts have been made by the Government to improve their condition. There can be no doubt that in the Army generally, there is no strong inclination

to marriage. It may, we think, be doubted whether this is to be regretted. Putting aside other considerations, which might lead us to the same conclusion, the rate of mortality among Soldiers' children in India is so excessively high, that we may well hesitate in coming to the conclusion that marriage in the Army is a thing to be generally desired. For the four years ending with 1863, the average annual death-rate among the children of the European Soldiers in this Presidency was no less than 90 per thousand.* We have no exact statistics to show the age of these children, but we may safely consider that the mortality was, on a very moderate calculation, four or five times greater than among children of similar ages in England. Although this lamentably high rate may doubtless be diminished, we fear that there is little probability that it will fall to anything like a European standard. It is only by the extremest care, and with the help of all the advantages of superior intelligence and wealth, that the children of European parents belonging to the higher classes of society can be reared in the plans of India, and even of these, it is probable that few would reach a healthy maturity if they were not sent at an early age to Europe or to the Hills. "One of the chief impediments," writes Dr. Chevers, one of the highest living authorities upon the subject, "to the colonization of India by Europeans is the almost absolute impossibility of raising healthy children in the plains. * * So long ago as the year 1835, Dr. Twining, of Calcutta, published the question—'Does the third generation of the European race exist in India all the individuals being of pure European descent, and having been born and reared in this country?' This plain question has been known, probably, to every Medical man throughout India for nine and twenty years. Many Medical Officers, long engaged with European Troops and attached to invalid depôts, have, to our knowledge, been greatly interested in its investigation, but in no single instance has it ever been answered in the affirmative."† Until the Government undertakes (and we must confess that such a supposition seems to us altogether visionary) to send all the children of European Soldiers to England or to the Hills, when they reach the age of five or six years, and then to make arrangements for their education and support, it appears, to say the least, very questionable whether marriage in the Army ought to be encouraged. It may even be doubted, as Dr. Chevers has shown, notwithstanding the success of those truly admirable and most useful institutions, the Lawrence Asylums in the Hills, whether the children of English Soldiers can be brought up in full mental and bodily vigour in the climate of any of our Indian Sanitaria; and even if this question be decided in the affirmative, it must be remembered that this can only be done at a cost for which, as Dr. Chevers says, gentlemen's children could be brought up and educated for professions in Europe.‡

39. The question of the manner in which the advantages of Hill climates can best be extended to the European Troops, has been the subject of much discussion during the past year, and the Sanitary Commission has submitted to the Government a Report containing a full statement of its views upon this im-

* See para. 22.

† Can India be colonized by Europeans? Re-printed from the "Calcutta Review" for April 1864.

‡ The cost of the Lawrence Military Asylum at Sunawur, in the Himalaya, containing about 400 boys and girls, was, in the year 1864, nearly £16,000, or £40 for each child.

portant subject. The principal conclusion of the Commission with regard to Himalayan Sanitaria, may properly be stated here; whether hereafter they be in all cases admitted to be correct or not, they will show the points that have to be decided, and the present state of the question. We consider—

1st.—That no climates in India have been more completely tested by actual experience than those of the Himalayan Sanitaria; and that their great value to the European Troops, if judicious use be made of them, is certain.

2nd.—That the most suitable elevation above the sea for Himalayan Sanitaria for European Troops is ordinarily about 6,000 feet above the sea; that no Sanitaria should ordinarily be below 5,000 feet, or higher than 7,500 feet above the sea.

3rd.—That all make-shift arrangements for housing troops in the Hills are objectionable, and that good barracks and good sanitary arrangements are as necessary in the Hills as in the plains.

4th.—That in the practically accessible parts of the Himalaya in Northern India, elevation above the sea is the only important cause of variation of climate, and that the outer ranges are as suitable for Sanitaria as the ranges more distant from the plains.

5th.—That it is essential that Hill Sanitaria should be as near to the plains and as easily accessible as possible; that those parts of the mountains are objectionable which are separated from the inhabited portion of the plains by unusually wide and unhealthy tracts of forest and Terai, or by the Siwalik Hills and Doons; and that the most suitable situations for Sanitaria for the Troops are those where the higher ranges rise immediately out of the plains.

6th.—That in choosing the actual site for Sanitaria, no general or necessary connection can be assumed to exist between geological structure and liability to disease; that all Sanitaria should possess an ample supply of good water, level ground, sufficiency of wood, and southern aspect; and that the requisite for a good Sanitarium can seldom be obtained except in the vicinity of ranges of greater elevation than that which is required for the Sanitarium itself.

7th.—That it has been proved by experience that the influence of Hill climates upon European constitutions is preservative against disease rather than curative; that to obtain the greatest amount of advantage, the men who are sent to the Hills should in all cases be selected, in preference to sending whole Regiments, and that no general removal of sick men to the Hills is proper.

8th.—That it must be assumed on military and political grounds that no very large proportion of the Army can be placed in the Hills; and that the only portion of the Army that can be stationed in the Hills is that which may be looked upon as a reserve to be drawn upon in emergencies, over and above the force which is ordinarily necessary for the military occupation of the country; that after reducing, as far as possible, the number of unhealthy stations in the plains, a sufficient number of Hill Stations should be provided to which such portion of the troops as can be spared from duty in the plains should be sent

in rotation, and that all stations in the plains within practicable distance from the Hills should have their Hill Sanitarium, to which a portion of each Regiment should be sent.

9th.—That for the present it might be assumed that 20 per cent. of the European Soldiers may with advantage be stationed in the Hills, and that Hill Sanitaria might be at once formed on this assumption, similar arrangements being also made for the women and children.

10th.—That there is no advantage in multiplying the number of Sanitaria, but that, as far as possible, they should be concentrated in a few healthy and convenient situations in the vicinity of existing stations.

40. The following figures show the number of men per thousand of average strength invalided during the last seven years. Amount of Invaliding. Details showing the causes of invaliding will be found in the Appendix:—

Year.	Invalided per thousand.
1858	43.6
1859 } *	33.9
1860 }	
1861	28.1
1862	31.5
1863	35.0
1864	36.8

It will be seen that there has been an apparent increase in the rate of invaliding. We are not now able to draw any positive conclusions from these figures. Although the number invalided has increased, it does not follow that the amount of disease has increased also. With the increase of consideration for the Soldier, and of anxiety to preserve him against all avoidable causes of disease, there is an increased disinclination to keep him in a climate which is unfavorable to him. The greater facilities for conveying men from the interior to the port of embarkation and thence home have probably had a similar effect.

41. The seventh recommendation made in the Report of the Royal Commission is, "that provision be made for passing Invalids at the port of embarkation without delay, and for their immediate shipment home."

* Average of two years.

Great changes and improvements having been made in respect of this matter since the inquiries of the Royal Commission, we think it desirable to show clearly the practice which now prevails. This is explained in the following Memorandum by Dr. C. A. Gordon, one of the members of our Commission, who from his position as Deputy Inspector General of Hospitals in Calcutta has had the best opportunities of becoming acquainted with the present system:—

In the evidence given before the Royal Commission to inquire into the sanitary state of the Army in India, it is stated that great laxity of discipline and drinking prevails among troops coming down the river from the Provinces to Calcutta; that the landing of the old Soldier at Calcutta, like that of the young Recruit, has often been most destructive; that Invalids used to land at Fort William, and would come in great numbers into the General Hospital there, with no additional illness than that which was caused by drunkenness; that as a rule, the decision of the Up-country Boards should be final, and that the use of the final Board was not apparent.

At the time to which the witness examined before the Royal Commission referred, the Invalids from the Provinces had few of the advantages they have enjoyed of late years. Formerly they were brought down-country in the native-made boats—these being nightly moored near some village from which it was easy to obtain deleterious liquors, such as the Indian Soldier of those days was prone to indulge in; and on their arrival at Fort William they were accommodated in low ill-ventilated casemates, the counterpart of which are now used as Store-rooms, the very rooms themselves being occupied by the men of a Native Regiment. With other improvements recently extended to the Army in India, however, has come within the last few years a very important one in the arrangements regarding the conveyance of Invalids to Calcutta, and in their accommodation while there.

The native kind of boat has since 1857 been abandoned for the Steamer and comfortable Troop boat attached to it, the last body of Invalids brought down by country boats having arrived at Chinsurah from Gurmucktesur Ghât on 27th February 1857. Still more recently, full advantage has been taken of the Railway: arrangements being made at suitable distances along the line for the accommodation and due rest of the men en route from the more distant Stations. The casemate barracks formerly used have, since August, 1861, been abandoned for the purpose, and the men are now accommodated in an airy and well raised double-storied barrack in Fort William, freely exposed to the prevailing winds.

In 1857 a dépôt was established at Allahabad for the purpose of accommodating sick

* No. 1250, to Assistant Adjutant General, H. M.'s Forces, from Deputy Secretary to Government of India, in the Military Department, dated 30th October 1857, establishing Convalescent and Depot Hospital at Allahabad.

and wounded, and whence they could from time to time be despatched by Steamers and Troop boats to Calcutta.* Still more recently, however, rail communication having taken the place of river conveyance, men arriving at Allahabad have been despatched in that way, arriving at Calcutta in smaller numbers at a time than they formerly did. Accordingly the dépôt was broken up in 1864, in accordance with Military Department letter dated Simla, 28th April 1864, to the Adjutant General, No. 278 E.

In 1863, orders were issued abolishing the final invaliding Committees that had up till then met annually at Calcutta and Mooltan, and in their stead establishing Divisional Boards to be presided over by a Deputy Inspector General—the decision of these being final.

Since these orders were brought into effect, the Invalids at Fort William and the Stations immediately around Calcutta, namely, Chinsurah, Dum-Dum, Barrackpore, and Berham-pore, are brought to Calcutta for this purpose. Those at other Stations are brought before Local

Boards, and are sent to Calcutta with their documents as nearly ready as possible to await embarkation.

The results of the new system, as compared with that which it superseded, are apparent from the following comparison. In the Invaliding season of 1862 there were in all 1,388 men brought before the Invaliding Board, of which the writer of this Memorandum was President, and of these, no fewer than 200 had to be remanded from time to time for further observation before the Committee was in a position to dispose finally of their cases. In 1863, on the abolition of the final Invaliding Committee, the number of men brought before the Board at Calcutta was 111, of whom 8 were remanded. It deserves to be mentioned that even this number, comparatively small as it was, was increased by the fact that the 43rd Regiment having been ordered to New Zealand, it became necessary to select from it all men who did not appear fit for active service. In 1864 the number brought forward was 71, of whom only 2 were remanded.

Invaliding Boards at the different Stations are now held as early as possible after September, so that men who are recommended by them to be sent home may, in accordance with General Orders, reach Calcutta on or before the 1st of January, and, with a view to prevent troops being sent to Calcutta during the more unhealthy months, strict orders have been issued

G. O., H. M. B. F., 12th March 1860, and 2nd October 1860.
Adjutant General's Circular, 116, E,
9th September 1864.

by the Military authorities to the effect that Soldiers, whether as transfers or for embarkation to England or the Colonies, are not to be sent to ports of embarkation between the 1st of April and 30th of September, except in special cases.

A Circular Memorandum from the Quarter Master General, a copy of which is attached to this Memorandum, directed such arrangements to be made in 1864 as much facilitated the despatch of troops from and to the Upper Provinces, and rendered the journey as little harrassing to themselves as was practicable.

Synthea, the nearest point to Calcutta, at which a Camp, such as is ordered in that Circular, was formed, is situated at a distance of only 119 miles from Calcutta, so that Invalids were readily despatched from it to Fort William, as detachments vacated the barracks there, and proceeded on their voyage to England. By means of the telegraph, information was readily obtained from Allahabad as well as Synthea, regarding the numbers of men actually at these places respectively, and thus, preliminary arrangements could be made in respect to shipping, the precise numbers to be accommodated being decided on their arrival at Calcutta.

That the detention of Invalids at the port of embarkation is an evil, there can be no question, and that it is especially so at Calcutta is self-evident. Men so detained are there accommodated in a Fort the very nature of which demands that its occupants be healthy and effective men: incentives to crime and opportunities of committing irregularities are abundant; and in the bazars of the neighbouring city disease of a communicable nature, to which men newly arrived are particularly liable, is ever rife.

There are some circumstances, however, which, so long as they continue as at present, must operate more or less powerfully against the complete removal of the present necessity for detaining men at Calcutta for a short time previous to embarking.

A few of the more important of these are enumerated:—Thus, the system has hitherto been that the Committee for the purpose of Invaliding Soldiers for England assemble once a year, namely, as soon as practicable after September. In this way the entire wreck, so to speak, of the previous twelve months, comes to be disposed of within the short period embraced by the cold season. It is true that Supplementary Committees were assembled in the Presidency and Benares Divisions at the end of the cold season of 1864-65, and several men thus sent home, who would otherwise have increased the numbers of those to be brought forward

in the succeeding year. Doubtless similar Committees will in future be permitted to assemble at the more distant Stations, between which and Calcutta, communication by rail is now easy; but up to the present time the plan here alluded to has not been generally adopted.

It is necessary that the accounts of Invalids as well as other men be adjusted and settled prior to their being despatched to England, and that claims raised by them be investigated. Reference to their Regiments is thus often necessary, requiring the temporary detention of individuals unless they are willing to leave the adjustment entirely to the Officers concerned. Military documents are, it is stated, sometimes received in an incomplete condition; and in all cases the Officer in charge of the dépôt has to see that the kit of each man is complete prior to embarkation.

Shipping is finally taken up for the precise number of men, their wives and children borne upon the Allotment Return sent to the Deputy Quarter Master General by the Commandant of Invalids; it is necessary that the latter allow himself a considerable margin for probable casualties. Thus, it often happens that a man may almost at the last moment prefer a claim that necessitates reference to his Regiment; and of course he must be detained in the mean time, unless he be willing to leave its settlement to the Officers concerned. A man may die or become too ill to embark, or, as is sometimes the case, he may be placed in confinement for some crime committed, and not be available or in a fit state to embark. In either case the man may have a wife and children of particular ages, so that the precise equivalent of these must be held available for substitution, if necessary, up to the time of embarkation, as payment is made to the owners for the numbers borne upon the Return on which the Ship has been originally chartered.

When practicable, those men who are most seriously ill are despatched with least delay, when their condition is not so extreme as to render their embarkation inadvisable. As a rule, however, men are put on board ship nearly in the order of their arrival at Calcutta.

In accordance with the system still in use of taking up Shipping for the troops, the routine adopted in regard to this matter is as nearly as possible the following:—The Quarter Master General's Department having obtained information that a certain number of men are in waiting for transport, the Marine authorities invite 'Offers to be made by the agents or owners of vessels,' and the terms being so far arranged for conveyance and feeding, the vessel is surveyed as to her sea-worthiness.

The preliminary survey next takes place, during which special arrangements in regard to the convenience of the troops are seen to; namely, ventilation, fittings, means for cooking, and arrangements generally; the Officers upon whom this duty falls being one of the Quarter Master General's Department, the Principal Medical Officer at the Port, and an Officer of the Marine Department who acts as Agent for Transports. Meantime the Adjutant General's Department publishes the names of Officers, Military and Medical, appointed to take charge of the Troops proceeding by the Ship.

The owners obtain from a Contractor provisions and water, and arrangements are made for the precise numbers and designations of persons borne upon the Allotment Return. At the same time the Commissariat and Medical Store Departments, respectively, prepare Medical comforts, medicines and instruments, in accordance with a scale laid down for their guidance.

The next proceeding is that the Ship's stores are surveyed as to their quality and quantity. The Committee appointed for this purpose consists of the Officers already mentioned; but in addition to these, the Officers appointed to the Military and Medical charges respectively are included, a few of the Non-Commissioned Officers and Soldiers about to proceed by the vessel being also on board to see the various articles provided for the voyage.

The embarkation usually takes place in two or three days after this final survey. The morning is selected for it. Cooks either proceed on board at a very early hour, or what is still better, are embarked the previous evening, so that the men's breakfast may be served up with the least possible delay; and whenever the state of tide permits, the vessel drops down the river and proceeds on her voyage.

Not only does the departure from Calcutta of Invalids and Time-expired men depend upon the convenience and interest of private Ship-owners, but with Railway communication; as it at present exists, troops are only brought down in small parties at a time, so that several days are sometimes required to enable a number such as is usually put on board one Ship to accumulate.

In suggesting means for still further facilitating the transport of troops from Inland Stations to Calcutta, or *vice versa*, and of the speedy embarkation of Invalids for England, it is necessary to assume—

1st.—That the line of Transports now in progress be established upon the footing of the ordinary Admiralty Transports provisioned by the Victualling Department, and in fact worked precisely as are those in operation between the United Kingdom and the Colonies.

2nd.—That the Railway communication with the Provinces be so far improved that large bodies of troops may, without interfering with ordinary traffic, be conveyed as necessary by train.

These improvements having been effected, the condition of India as regards facilities of transport will have become in a measure similar to that of the United Kingdom, save in the great distances to be travelled in the one country as compared to the other.

It is necessary that we bear in mind the fact that a very large proportion of men who are included as 'Invalids' are not really in such an infirm condition as to be unable to attend to their own wants, or to undergo considerable fatigue. Many are men whose period of service for pension is complete or nearly so; they are passed by Invaliding Boards as worn out. Others are suffering from the effects of injuries which render them unfit for Military duty, but are in no way in infirm health. And others although debilitated by climate and by endemic disease are nevertheless capable of undergoing a considerable degree of such fatigue as is likely to attend a Railway journey. The conclusion arrived at from experience gained at Calcutta during three consecutive seasons is that the proportion of Invalids who arrive at the Port in a bed-ridden or helpless condition is about five per cent. With the exception, therefore, of this proportion, it does not appear that any special arrangements are in reality required for the conveyance to Calcutta of Invalids beyond those that already exist for troops in health.

Men so ill, however, as to be unable to undergo the fatigue of such a journey, ought, I think, to be conveyed in Railway carriages specially fitted up for them, and in the arrangement of these some useful hints might doubtless be taken from what has recently been found to answer so well in America, where carriages of this nature were during the war freely used; being fitted up for long journeys, with all the appliances of a perfect Hospital. In this country, however, a carriage of this nature fitted for the accommodation of eight or ten bed-ridden patients at a time would alone be required.

At a Port such as Calcutta, where large bodies of troops embark and disembark every year, and where men are often found to be in an unfit condition to continue their journey, the existence of a General Hospital becomes a matter of necessity. It is contemplated, therefore, that men arriving from the Provinces in a low state of health would be accommodated and attended to here until fit to embark; but with the provisions already made that men in

very advanced stages of disease shall not be sent from their Regiments or depôts, the number of sick who would require to be retained would be comparatively small.

The letter by the Quarter Master General already quoted, details the places at which it has been convenient to establish temporary Camps for troops travelling from the Upper Provinces and proceeding to them. These are respectively placed at distances of about six hours' journey from each other, so that, when necessary, detachments may rest at each.

Were a regular transport to arrive at Calcutta with reinforcements, these would doubtless be despatched to the Upper Provinces in detachments, being conveyed direct from the Ship to the Railway. Under ordinary circumstances, there would be no necessity for any being detained at Calcutta, except those found on medical examination to be in infirm health. These would, as a matter of course, be taken to Hospital.

So with troops coming down from Inland Stations; were their accounts finally settled prior to their departure for Calcutta, and the completeness of their kit seen to, the necessity which at present exists for their temporary delay at the Port of embarkation would altogether cease. They might proceed direct on board the transport as they arrive from the Railway Terminus; the Military and Medical Staff on board taking charge respectively of them there in the same manner as if they were joining a Garrison or Invalid Battalion on shore, for it seems a matter of necessity that on board the Transports there be a Military Officer permanently appointed to command the troops, and a Medical Officer to take charge.

It is evident that a depôt, however, must exist somewhere, so that arrangements be made with regard to troops about to leave India, as well as to provide for the requirements of those arriving in the country; and an important point to be considered is, where such a depôt may most conveniently be formed, having in view the requirements of these two classes.

Allahabad is no less than 630 miles from Calcutta, or about thirty-six hours' journey by Rail. This circumstance is doubtless a material objection against its being made the starting place for troops about to sail from Calcutta, and a rendezvous for those arriving in the country. Yet, when the central position of this Station is considered, and the facilities, which are daily increasing, of rapid communication between it and Central as well as North-Western India taken into account, when, too, it is borne in mind that between it and Calcutta there is really no point that seems to be at all adapted for the purpose, and that retention of troops at the latter is with good cause condemned, there seems to be in reality no alternative left.

A few words, therefore in, regard to what appears to be the best means of conducting the journey between that Station and the Transport must conclude this Section.

The halting places along the line of Railway, detailed in the Quarter Master General's letter given in the Appendix, are, for all purposes, the most convenient that could be devised. The average period required to pass from one to the other is six, or at the utmost eight hours.

The only accommodation that has been provided at these, however, has hitherto been in tents. The Commissariat Department has had an establishment at each for the purpose of supplying provisions to detachments arriving, notice being sent on beforehand of the particular numbers to arrive by specific trains. One of the tents was fitted up as a camp hospital, and a small medical establishment was kept in readiness on the spot, with a view that men taken so ill as not to be able to continue their journey received all attention and requirements. The tents for the troops were provided with bed-steads, but not with bedding, the troops themselves having their own.

It is considered, that, to meet all requirements for the rapid transport of troops now contemplated, little more would be necessary in regard to these halting places than to have one or more buildings erected at each with the usual accessories. Thus, with ordinary organization, every thing necessary for the comfort of the troops would be in readiness for them. Arrangements would be made for the removal of the men from the train to these buildings and for

re-commencing their journey at the appointed time, while the presence of a suitable medical and hospital establishment at each would in reality add efficiency to economy by rendering it unnecessary to send Officers of various grades with small detachments, and by affording all necessary succour and accommodation to the more seriously ill among the troops en route.

The Sanitary Commission for Bengal has already recommended an alteration in the system of supplying the troops with bedding, by which the necessity will cease for the conveyance from place to place of the large bundles that now are the property of individuals. Instead of these, each man will have his couple of blankets, which can be rolled up in little bulk, and readily available for men during their temporary halts, should the state of the season render this necessary. The bed-steads will be provided with suitable mattresses, and a reserve stock will be with propriety kept on hand to meet possible emergencies.

Were these arrangements carried into effect, there is every reason to believe that bodies of troops could under ordinary circumstances be moved to or from the port of embarkation not only with facility but with absolute comfort to themselves; while, at the same time, the journey for very sick persons would be reduced to its minimum of inconvenience.

It would be necessary that a Steamer with troop boat attached be held available for conveying from the Railway Station to the Transport, or *vice versa*, such bodies, together with their baggage, as may arrive, and it seems to be above all things desirable that there should be at Calcutta an Officer specially appointed to superintend and direct disembarkation and embarkation, with reference to the transit from or to the vessel, and the arrangements connected with arrival at or departure from the Railway Station.

It is true that there exist sanitary objections against the detention in the river of troops on board freight Ships, and that heretofore every exertion has been used to have vessels of this description towed rapidly away to sea. It is not contemplated, however, that similar objections would extend to regularly fitted up Transports, as these would not, it is apprehended, be crowded as are the former, while their ventilation and general arrangements would be far superior.

The recommendations contained in the latter part of the foregoing Memorandum have been lately laid before the Government by our Commission with a separate Report, in which the whole question of the transport of troops by Railway, and the provision of rest-houses at convenient intervals, has been discussed.

The determination which has lately been taken to establish a line of Transports for troops between England and India, and to adopt the overland route instead of that by the Cape of Good Hope, will, it may be anticipated, produce hereafter most important and beneficial results.

These will be felt in many respects, and not the least of the advantages gained will be the means which will be afforded of removing rapidly to England Invalids and men who have suffered from the climate of India.

42. It is desirable that we should state generally the nature of the Barrack accommodation now provided in this Presidency, and the measures that are in progress for its improvement.

The Report of the Royal Commission gives a very unfavorable idea of Indian Barracks. It is stated, "the greater proportion of the Force is lodged in Barracks in such large numbers per room as to be very injurious to health; many of these rooms being several hundreds of feet in length, and some of them con-

taining from a quarter to half of a regiment each!" *** "The ventilation is generally imperfect; and from the arrangement of doors and windows, men are exposed to hurtful draughts. Many of the rooms are too high, and as a consequence there is much surface overcrowding, both in Barracks and Hospitals, although with large cubic space. In a number of instances both the space and area per bed are much too small. Barracks and Hospitals have frequently no glazed windows, and only wooden shutters. Both barrack and sick-wards often are, as a rule, dark. There are four or even six rows of beds between the opposite doors or windows, increasing greatly the already existing difficulty of ventilation and exposing the inmates to foul air."

The evidence upon which these and many other unfavorable conclusions were based, was given either by Officers who had only seen this country at a time when sanitary improvements had been little thought of either in India or at home, or who spoke of the state of things existing immediately after the mutinies of 1857-58, when the country had just passed through one of the greatest convulsions recorded in history. A great European Army was suddenly thrown into India with no previous warning, and under circumstances which often made it impossible to give proper consideration to the question of how the necessary accommodation could best be furnished. Barracks and Hospitals and other military buildings had suddenly to be provided in the least possible time, with most imperfect means either of obtaining good designs, or of supervising the execution of the works that were undertaken.

The determination of the numerous questions connected with the permanent distribution of the Army was a work of time and of difficulty. It is only during the past year that a decision has been arrived at regarding the manner in which the troops are to be distributed at the various Stations in this Presidency. So far as was practicable, the number of men at unhealthy places has been diminished. Some Stations must necessarily, for military reasons, be retained, at which, in spite of all precautions, we must expect a considerable amount of sickness; but such places are not numerous, and the bulk of the Army will be situated at Stations which there is every cause for hoping will prove healthy. So long as these questions remained pending, it was difficult to make final arrangements for supplying the permanent Barracks and other military buildings that are required, and the troops have necessarily, up to the present time, been, to a considerable extent, lodged in the Barracks that were built in the years immediately following the mutinies.

Imperfect as these often are, there has been constant improvement going on. For several years past there can be no doubt that matters have been far more satisfactory in this respect than the Royal Commission supposed, and their conclusions are little applicable to the present state of things. The existing buildings are, for the most part, altogether inferior to those which, under the arrangements which we are about to notice, will take their place, but in spite of all their faults, we believe that it is true, even at the present time, that there is no country in which the troops are, upon the whole, housed so well as they already are on this side of India.

We think it desirable to quote *in extenso* the following Despatch from the Government of India to the Secretary of State, written in July 1859. It

gives a clear account of the measures taken, under circumstances of great difficulty, to provide proper accommodation for the troops, and shows the great interest which for many years past has been taken by the Government of India in improving the condition of the Soldier. It must be observed that this Despatch was written two months after the Royal Commission was first appointed, and before it commenced its inquiries, and that its Report was not issued until four years later:—

Despatch from the Government of India, Public Works Dept., to THE RIGHT HON'BLE LORD STANLEY, Secretary of State for India,—No. 17 (Military), dated 28th July 1859.

We propose in this Despatch to lay before your Lordship some authentic details as to the quality of accommodation which has of late years been provided for the European Troops serving in India, especially in the Territories under our more immediate supervision, that is, in Bengal, the North-Western Provinces, Oudh, and the Punjab.

2. We are the more desirous to do this, because we believe there is no correct apprehension in England of what has been accomplished in this respect. In the evidence of Mr. J. Ranald Martin before the Royal Commission on the re-organization of the Army, that gentleman states "that he never saw a good Barrack in India, though one in Sindh, erected by Sir Charles Napier, is said to be very fine." Though both the force of the general statement and that of the exception are afterwards somewhat qualified, the weight of Mr. Martin's reputation, and this general statement of his experience, are likely to convey a wrong impression where it is not known how much has been done since that gentleman's Indian experience terminated.*

* In a well known professional Periodical, "The Builder," of March 27th, 1858, also appears the following paragraph:—
"The greatest ignorance of sanitary requirements appears to prevail in India, and the condition of the Barracks is frightful. This the Government have known for years, but frightful it still remains."
In an after Number Mr. Martin's evidence is quoted in support of this statement.

3. Some of the older Barracks, such as those at Berhampore and Dinapore, erected in the last century, are handsome buildings and must have cost considerable sums,† but they are built in squares, which is a bad arrangement where so much of health and comfort depends on free access of wind, and they are in other respects defective. They were also, we have reason to believe, often over-crowded. The late Colonel Otter, of Her Majesty's 61st Regiment, told our Secretary in this Department that, when he was quartered at Berhampore, thirty years ago, two Battalions mustering some 1,400 men were lodged in these double-storied blocks, to which we have assigned, after the addition of verandahs and other material improvements, in the arrangements now in progress, only 600 men.

4. The era from which we may date a decided advance in Barrack arrangements was the foundation of the Umballa Cantonment by Lord Ellenborough in 1843-45, on the abandonment of Kurnal.

The Infantry Barracks at Umballa were intended only to be temporary. As is (naturally) often the case, they were made to serve their purpose too long, and it became necessary to condemn them. They have lately been almost re-constructed, and will now afford excellent quarters.

5. But the Cavalry Barracks, built for Her Majesty's 3rd Dragoons by Captain (now Sir Robert) Napier, were in substantial little inferior to anything since built. In them ridge ventilation was introduced, perhaps for the first time. These Barracks have always held a high place as healthy and commodious buildings.

6. The erection of the Meerut Barracks for two Regiments of Infantry, in 1845-46, was another step in the right direction. There are four of these to a Company, and they

have always been healthy. We believe the sub-division of troops in Barracks to be a point hitherto too little regarded, and that, with smaller bodies under one roof, we should have nearer approach to the standard of health in private houses.

7. Improvement of a decided character had therefore begun some time before Sir Charles Napier took up the subject. But his strong representations were doubtless most effective in fixing the high standard which was aimed at in the Barracks, commenced or projected during his command, at Meean Meer, Sealkote, Rawul Pindee, and Peshawur. This scale again became practically the standard wherever new Barracks had to be built or old Barracks to be remodelled. The two-storied Barracks at Cawnpore, the progress of which was interrupted by the revolt, but which are now going on again, are designed on this scale; the new Barracks at Agra (truly splendid buildings as regards their purpose) have been built on it, as have also the Artillery Barracks at Umballa, and the Sapper Barracks at Roorkee; the Dragoon Barracks at Meerut have been remodelled on the same scale; the new Barracks at Trimulghery, in the Deccan, are rather an exaggeration of it; and in 1857, when it was considered desirable to prepare standard plans of all military buildings, the Punjab scale was taken as the basis of the plan issued.

8. In the Punjab Cantonments, the hospitals and other subsidiary buildings have also been designed on a scale equally ample with that of the Barracks.

9. The plan of the two Barracks at Kussowlee for 250 men each, built in 1855-56, was a modification of the same ample scale of accommodation to suit the Hill climate. Unhappily they have lately been burned.

10. The two great blocks of three-storied Barracks lately completed in Fort William are necessarily peculiar in shape and disposition. But they are on no inferior scale of space, and are highly appreciated by Officers and men.

11. The Chinsurah Barracks are now undergoing alterations to bring them nearer the same standard.

12. All the older Barracks in Fort William have also been materially improved of late years, with one exception, viz., the Royal Barrack (for Officers). The chief defects of this may be remedied without much difficulty, and orders have lately been issued for the necessary changes.

13. In November 1857, to meet the demand for new permanent Barracks, which was lately to arise, the Government of India ordered from England complete sets of wrought-iron girders, joists, and roof-trusses for five complete sets of double-storied Barracks on the standard scale. The pressure for buildings of more ready construction has prevented our yet making use of these.

14. For, when troops poured into India in 1857, it was manifest that there was no time for such elaborate structures. It was necessary to provide for immediate wants as quickly as possible. It could not even be determined where garrisons would be most required when the tide of insurrection should have receded, and many places in which they would certainly be wanted (the whole Province of Oudh, for instance) were still unrecovered. All that could be done was to occupy such points, untouched by insurrection or recovered from it, as military considerations, sanitary reputé, facilities for construction, or aid from existing buildings, recommended to the selection of Government.

15. In Bengal the points selected were Dum-Dum, Barrackpore, Hazareebagh, Raneegunge, Dinapore, Darjeeling, (as the temporary post of a Detachment, perhaps to become permanent,) Dacca, and, more lately, Dehree on the Soane Ferry, and Dorunda in the Chota Nagpore Territory.

16. The plan generally adopted in Bengal for these new structures will be found in Figure 37.

17. The difficulty of rapid construction in India generally arises, not merely from the time required to collect large bodies of artisans, but from the impossibility of suddenly establishing an extensive brick manufacture.* In building against time our Officers had therefore to dispense as much as possible with the use of burnt brick. The foundations used were of this material, with a superstructure of brick pillars only, the intervals being filled up with walls of kutchra or sun-dried brick; additional security was given by frequent cross walls.

18. The Court of Directors, in connection with the despatch of reinforcements, announced their having ordered skeleton frames of iron to facilitate the preparation of cover calculated to provide for 10,000 men; three-fifths of these were sent to Calcutta and the remainder to Kurrachee for use in the Punjab. These frames began to arrive in March 1858, and have been of the greatest service in completing accommodation at Dum-Dum, Barrackpore, and Raneegunge. They are also now being used in construction at Dorunda and Dehree.

19. In the Punjab they have already been not less serviceable at Mooltan. And they are about to be used in the completion of Barracks of a more permanent kind at Ferozepore and Meean Meer. The scarcity of timber has rendered this advisable.

20. The drawings (Figures 17 to 21) show the various ways in which these frames have been, or are being applied.

21. Their great defect is the want of height in the side stanchions. This is less felt where a veranda is cut off from the interior space, as at Barrackpore. But where, as in the plan sent out from England, the whole interior is converted into a Barrack ward, and the veranda is consequently an extraneous addition, the lowness of the latter is complained of by the medical men.

22. The plan (Figure 37) already referred to was not at first ready for issue in the Upper Provinces, but general instructions quoted in the margin were given to the then Government of the Central Provinces.

Extract of letter from D. P. W. to Secretary to Government, Central Provinces, No. 5372 of 20th November 1857.

"It is suggested that a safe and suitable construction for the temporary Barracks might consist in the erection of substantial piers of brick laid in lime mortar for the support of the roof trusses or principal rafters, the intermediate spaces being afterwards filled with walling of sun-burnt brick; safe provision, however, for the use of wet tatties being made on the western side of the buildings. But the Government would desire to leave to the Superintending Engineer a large discretion as to the style of building which he may judge may be most rapidly completed at each locality, provided the construction be secure and the cover sufficient. The accommodation afforded should not, however, be beneath the scale indicated by a ward of 18 feet in clear breadth, with a veranda of 10 or 12 feet wide on each side, that on one side being closed, and that on the other open, the whole raised at least 3 feet from the ground. And the superficial area per man, exclusive of the verandas, should not be less than 60 feet."

23. The Sketches, Figures 22, 24, 25, 26, show the temporary Barracks erected in the early part of 1858 at Benares and Allahabad.

24. The new Barracks at Benares are excellent, and have given general satisfaction. It was, however, impossible to provide at once all that was required *de novo*. The buildings of a Central Lunatic Asylum at Benares, which had been in progress before the mutinies, were also taken possession of, and altered to suit them as far as possible for Barracks. They are defective in some points.

25. At Allahabad a great task was thrown on the Engineer. He had to provide for upwards of 4,000 men, besides providing largely for Officers, who, in India, have hitherto found their own accommodation. Captain Impey showed extraordinary energy, and accomplished a great feat in providing the required cover in little more than six months. But this pressure almost inevitably led to defects. No exertions could provide all the material that was required. The orders were not strictly observed, and in many of the Barracks the floor is barely raised above the general level of the ground.

26. At Roorkee and at Futtighur, Barracks were erected of the pattern shown in Figure 27. They are airy and comfortable.

27. At Muttra, somewhat similar Barracks were built. Part of the accommodation required there was, however, given by the adaptation of existing Cavalry stables. These are now being replaced by proper Barracks.

28. In Rohilkund, generally, the accommodation has hitherto been more or less of a make-shift character. So far as large buildings, cutcheries, and the like could be turned to account, it is unexceptionable. But a large addition had to be made of temporary ranges. These are all well ventilated and sufficient in superficial area, but the walls are generally of insufficient substance, either wattle and dab, or thin brick work.

29. In judging of these and similar structures, the circumstances must be considered. They were the best that could be given at the time, and were immeasurably preferable to the only alternative, that of continuance under canvas.

30. We may here observe that on the Grand Trunk Road, Barrack ranges were erected at proper intervals as Rest-Houses for the accommodation of Detachments proceeding by Bullock Train. These are shown in Figure 30. They have sometimes been the subject of unfavourable criticism by the passers-by, who were not aware of the limited purpose which they were intended to serve; but we have not heard of their being complained of by the troops. They appear to us (and the Governor General has seen nearly all of them) to be in the main good and fit for their purpose, viz., that of giving shelter during the heat of the day. Some huts of an inferior character that were run up hastily at Raneegunge and elsewhere have been gradually improved or replaced by better structures. In the North-West Provinces and Punjab, where the mid-day heat is more severe, Barracks of a superior kind, with glazed doors, are now being erected as Rest-Houses.

31. At Gwalior, after its recapture in June 1858, the lateness of the season and the almost total deficiency in timber necessitated the use of hut Barracks of small pretensions. These have this year been almost entirely remodelled, and some considerable progress has also been made with Barracks on the scale shown in Figure 35, or of similar calibre.

32. At Jhansi, Barracks on that scale are in progress, but the progress has been slow, owing to the more than usually scanty supply of labour in that part of the country. In the mean time all that could be done has been done to adapt existing buildings to the comfortable accommodation of the troops.

33. At Ooraie, where it has lately been necessary to establish a Wing of Infantry since Calpee proved unhealthy, Barracks for a detachment of that strength are well advanced.

34. At Banda means were sadly deficient. Existing buildings were adapted as well as the circumstances admitted, but Lord Clyde has pronounced against the retention of this as a European Station. At Saugor, the accommodation was largely derived from the adaptation of existing buildings supplemented by the erection of several Barracks. At Jubbulpore, Barracks for a Regiment were built, which are well spoken of, but of these no drawings are at present available.

35. At Kamptee, good temporary Barracks of a substantial kind have been erected for four squadrons of Dragoons, and orders have been given for the improvement of the old Infantry Barracks.

36. In the Punjab, at Rawul Pindee, Barracks for Artillery and for an additional Regiment of Infantry, on the plan formerly used at that Station, are in rapid progress.

37. At Cambelpore, on this side Attock, good and substantial temporary Barracks for half a Regiment, highly spoken of by Major General Sir Sydney Cotton, have been erected.

38. Our present object, however, is not to summarise the progress made in Barrack building all over the country, but to show the calibre of accommodation that has been or is being provided.

39. At Delhi all the accommodation was derived from the adaptation of existing buildings. The halls of the palace were converted into comfortable quarters for half a Regiment. But though the occupation of the palace was inevitable, the mass of buildings existing within was a serious drawback.

40. At Lucknow, necessarily, the mass of troops was placed in existing buildings as late as the beginning of June 1858; a considerable force was ordered to be huddled at Muriaow (the old Lucknow Cantonment), and at Nawabgunge on the road to Fyzabad. At such a time nothing but the most hasty construction was possible, and the huts could only be looked on as a few degrees better than canvas.

41. Before the working season of 1858-59, it became necessary to consider what calibre of accommodation of a more permanent kind should be provided in the recovered Provinces, especially Oudh and Rohilkund. To follow the standard plan would have been to say that the troops were to remain for years with cover of a make-shift character. And the expense of building simultaneously a great number of Cantonments on the scale of Meeran Meer or Trimulgherry would have been enormous even if time had been of little moment. Indeed, the difficulty found in carrying out rapidly even the more moderate scale of building adopted shows that the achievement would have been impossible.

42. Beyond a certain limit, it is not the indefinite increase of height or space in Barracks that is required to improve the health of the Soldier. It is not even in the first degree the improvement of drainage and Barrack Offices, essential as these are, but the right internal economy of the Regiment, the reformation of the habits of the men, and the provision of healthy employments as well as of amusement.

43. The plan adopted for Barracks in Oudh and Rohilkund, and which is being followed also at Jhansi and several other Stations, was approved by Lord Clyde and by Sir William Mansfield, and is shown in figure 35. It dispenses with the inner verandah of the Punjab plan, a construction regarding the advantages of which opinions differ greatly. But it affords, what that plan scarcely does, a separate apartment for meals and occupation in the day time. Good open verandahs all round, cler-story windows, and wide eaves, are additional points worthy of notice. The Barracks are for half-Companies; the wards, separated by the dining hall, for quarter-Companies. And thus the sub-division to which we have before alluded is obtained.

44. Barracks on this plan are now in progress at Lucknow (Dilkoosha) and at five other Stations in Oudh. As yet they have not made much progress except at Lucknow. Bricklayers were very scarce in the districts; the times have been very unfavorable to the voluntary migration of artisans; and the demand all over the country simultaneously, not only for Barracks, but for Railway works, has as yet rendered all attempts to increase their numbers materially very unsuccessful. In the mean time available labour of this kind has been chiefly concentrated on buildings to serve as Hospitals, whilst huts of a superior character have been erected for all the troops. A Sketch of these is given in figure 36.

45. Including these statements, we may be permitted to observe that of late years it is seldom indeed that a proposition made to our Government for the addition of any improvement or comfort to the accommodation of the British Soldier has met with a negative. The scale on which every description of Barrack building was planned, and was being executed in Lord Dalhousie's time,* and up to the outbreak,

* The differences which arose between Lord Dalhousie and Sir Charles Napier had apparently led some to believe that because the latter was an ardent supporter of all that tended to the Soldier's comfort, the former must have been cold in the matter. Nothing could be more untrue.

was one which, if it erred, erred on the side of over-liberality. And this liberality was not confined to Barracks, but extended to Hospitals, quarters for married men, and all out-offices, when the mutiny broke out. (See accompanying lithographed standard plans.)

46. As regards the later efforts of our Government and of our servants in the Department during the last two years, we do not pretend to deny that there have been mistakes, and that some disappointment has too often followed sanguine expectations. But if just consideration be given to the state of the country under which these works have been commenced and carried on, to the circumstance that the great sources of timber supply were for a long time absolutely shut up, to the inadequacy of the Department even in its full previous strength to meet so sudden and vast a tax, to the fact that many of our best and ablest Departmental Officers were engaged in the field, and not a few lost to us altogether, to the consequent necessity for transferring Officers from Province to Province, according to the degree of pressure, a measure attended with disadvantage to the works, with injury to the organization of the Department, and with an excess of strain on many of those concerned, which ere long will further tell on our available strength, and to the great competition for the limited supplies of material and skilled labour which still continues, we trust that what has been done may meet with a fair judgment. A great deal, it must be acknowledged, still remains to be done, notwithstanding that since the outbreak of the mutinies in May 1857, Barrack accommodation (not counting huts or other inferior temporary Barrack adaptations, restorations, or Barracks for married men) has been completed, or is in active progress, for not less than 40,000 English Soldiers, within the Provinces we have spoken of.

42. There are now very few Barracks in the Bengal Presidency which answer **Improvement of Barrack accommodation.** to the description contained in the extract which has been given above, (para. 41,) from the Report of the Royal Commission. At three or four old Stations in Bengal Proper, occupied by small bodies of men, there are Barracks of great size. The Dalhousie Barrack in Fort William, which was built only a few years ago, is intended to hold an entire Regiment, and has six rows of beds between opposite windows, but we believe that in no other case for many years past has any Barrack been built to hold more than a single Company. Since 1857 few Barracks have been built for more than half this number, and they have been generally constructed on thoroughly good principles. The half-Company Barracks divided by a dining hall in the centre, (referred to in para. 43 of the foregoing despatch,) which were built by Colonel Crommelin in Oudh and elsewhere before any attention was called to the subject in England, and five or six years before the publication of the Report of the Royal Commission, are, in all essential respects, identical in design with the best single-storied Barracks that have since been erected or recommended either in England or in India. In a memorandum written by Colonel Yule in February 1862, when he made over charge of the Department of Public Works to his successor, he wrote as follows:—"An earnest endeavour has been made in most of the new Barracks erected under the Government, of late years, to introduce a greater sub-division of accommodation than had formerly been usual for Barracks. Formerly barracks were almost always made for one Company, or 100 men. I have long thought this system of accommodating a hundred men in one great apartment, even when the amount of cubic air per man was more than ample, an objectionable and injurious one, and one of the causes which keeps the average health of British Soldiers in India low. The experience of Europe is, I believe, the same, whilst our own experience of the results of hutting men in small parties is very favorable. The Barracks built in Oudh, Rohilkund, Gwalior, Behree, and lately at Hyderabad, have been for half-Companies, divided in two by a spacious dining-hall, so that practically they may be considered almost as quarter-Company Barracks. Double verandahs have been dispensed with."

The existing Barracks for a whole Company are mostly divided into three or more rooms, but the separation of the rooms is usually imperfect, and when, as is very often the case, there are double verandahs to the Barrack, it is hardly possible to keep the air in a proper state of purity at all seasons. All that can be done until these Barracks are superseded by others of better construction is to take care that abundant space is given to the men, and that ample ridge and other ventilation is afforded. This, we believe, has been already done in every case.

43. The statement made in the Report of the Royal Commission that "Barracks and Hospitals have frequently no glazed windows, and only wooden shutters," certainly does not apply to this Presidency. So far as we have been able to discover, there is not a single Barrack or Hospital of which this is true, or of which it has been true for many years past. The statement that "both Barrack and sick wards are, as a rule, dark," is perhaps true of the buildings with double verandahs, but of no others. Whether, however, this is a disadvantage, is doubtful, although, upon other grounds, we strongly object to buildings of this construction. Almost every body who has lived in the Upper Provinces of this Presidency during the hot weather knows that excess of light and excess of heat almost necessarily go together, and that, however theoretically objectionable, exclusion of light is essential to comfort. Unfortunately, it is not always easy to exclude light without interfering with ventilation.

44. After full consideration of the subject, and after consulting the most competent authorities, the general rules and principles have been laid down by the Government, according to which all Barracks for European Soldiers are in future to be invariably constructed. From these fundamental rules, there can in no case be any departure, and specimen plans, suitable for different localities, in the plains and in the hills, have been prepared. The following are the principal rules that have been laid down regarding the construction of Barracks for unmarried Soldiers.

Under ordinary circumstances, no Barrack for Infantry will be built to hold more than half a Company. Barracks for whole Companies will only be considered admissible in special cases, as, for example, in a fort. For Cavalry, each Barrack will hold a Troop. For a Light Field Battery of Artillery there will be three Barracks, one for each Division. The number of men provided for under one roof will be, in the case of the Infantry, 40, in that of the Artillery 44, and in that of the Cavalry 60. The Barracks will contain sleeping rooms capable of holding from 16 to 22 men in each. The latter number will in no instance be exceeded. The rooms will in all cases be entirely separate, having no direct communication with each other. Double-storied Barracks will, as a rule, be adopted in all parts of India, the upper floor being alone used as dormitories, and the lower floor being occupied for day-rooms and other purposes. About one-half of the space in the lower floor will usually consist of day-rooms for the men, one-fourth will be an open arcade for exercise and amusement, and the remainder will be used for auxiliary purposes, such as Store-room, Sergeant's Mess, Regimental Library,

Recreation-room, &c. All out-offices, such as cook-rooms, lavatories, latrines, &c., will be provided in separate buildings. The minimum space allowed in the sleeping-rooms in the plains will be as follows:— $7\frac{1}{2}$ running feet of wall space per man; 90 superficial feet per man; width of ward, 24 feet; height of wards in both floors to wall plate, 20 feet; this will give 1,800 cubic feet per man. In stations in the hills, the space allowed will be somewhat less, but the allowance will never be less than 77 superficial feet and 1,232 cubic feet per man. There will be only two rows of beds in a room, between opposite windows; not more than two beds will be allowed in the wall space between two contiguous doors; and no bed will be placed within nine inches of a door. There will be a single verandah, 12 feet wide, all round the Barrack. Quarters for two Sergeants will be provided in each half-company Barrack. Each Sergeant's quarters will be on the scale authorized for married men. Separate married quarters will be provided for the rest of the Non-Commissioned Regimental Staff. The principles have also been laid down according to which Barracks for married Soldiers are to be constructed. Each family will be allowed two rooms, one measuring 16 feet by 14, and one 14 feet by 10. The quarters will, as a general rule, be grouped in blocks to suit the wants of Troops and Companies; each block for a Troop of Cavalry or Battery of Artillery will ordinarily contain eight quarters, and each block for a Company of Infantry will contain ten quarters. There will be an open verandah on both sides of each block. The quarters of each family will be entirely separated from each other by division walls running up to the roof. As a general rule, single-storied buildings, well raised above the ground, will be adopted, but double-storied buildings will be constructed when they are shown to be more suitable in any particular case. Covered passages will be built to connect the Barracks and out-offices, and latrines and bathing rooms will be provided for men and women in entirely distinct buildings.

The Resolution of the Government of India* in which the foregoing rules have been embodied, has been sent to the Home Government for approval. In all respects of importance they coincide with the views expressed by the Royal Commission and by the Barrack and Hospital Improvement Commission, and there can be no doubt that if any modifications be hereafter ordered, they will not affect the general principles that have been laid down.

45. It has been noticed above that the lower stories of the new Barracks will contain the day-rooms and other auxiliary accommodation. It is desirable that we should state in some detail the nature of the arrangements which the Government proposes to carry out.

In each half-company Barrack, the portion of the lower floor devoted to day-rooms will be divided into three compartments. There will be a general mess-room for the Barrack, and two other rooms, one for each sub-division of the half-company. It is considered desirable to separate the recreation-rooms from the mess-rooms, so that the occupants of the former may not be inconvenienced by flies, by preparation for meals, &c.; and the sub-division of the recreation-rooms has been thought desirable, with the object of affording to the men places more quiet and private than they could otherwise

* Public Works Department Circular No. 89, dated 16th December 1864.

obtain. These rooms will be furnished with tables and short benches, and in the Upper Provinces with fire-places. In addition to these rooms, there will be for each Regiment large general recreation and refreshment-rooms, with separate reading-room and library; and for at least eight out of the ten Companies there will be open arcades in the lower story of the Barracks, which will furnish places for drill, exercise, and amusement, and will remove much of the temptation to the men to wander out in the sun when weary of the barrack-rooms. The reading-rooms will be furnished with presses for the books supplied by the Government, and for the Regimental library. The question of the supply of books by the Government is to be considered separately. Some of the Regimental workshops will also be provided for in the lower stories of the Barracks; but for carpenters' shops and other noisy trades, separate building will be provided. The canteen will also be in a separate building.*

In addition to the means of employment and recreation that have been above noticed, it is proposed to provide for each British Regiment the following: (1), a double Fives Court for each Wing of the Regiment, on an improved plan, one Court for each Wing to have a back wall to admit of its being used for racket-playing; (2), a double skittle alley for each Wing, one of each to be of sufficient length to allow of the American bowl game; (3), a gymnasium, according to the English standard plan as far as practicable; (4), a swimming bath for each Wing for the men, and another, if this should be proved to be desirable, for their families, to be raised above the level of the ground to admit of complete natural drainage; (5), a cricket ground, to be railed in and turfed by Government; (6), a Sergeant's mess, with reading and recreation-rooms in a central position, convenient to the Staff Sergeant's Quarters, or, in the case of Batteries of Artillery, or other small bodies of men, under the same room as the Staff Sergeant's Quarters; (7), a women's day-room for each Wing of the Regiment. The expediency of ultimately providing a theatre, for theatrical performances and for lectures, has also been recognized, but it was considered that this should only be done when provision had been made for the other more pressing requirements of the troops.†

46. It has been noticed elsewhere (para. 37) that the number of married men is at present much below that which is allowed by the regulations of the Army. Considering that the number will probably increase, and that it is desirable that accommodation should be ready whenever it is required for the wives and children of the Soldiers, it has been determined by the Government that married quarters should at once be furnished for 12 per cent. of the Rank and File and Drummers.‡ The nature of the accommodation provided for married Soldiers has already been described (para. 44).

47. The principles upon which Hospitals for the European Troops in India should be constructed have been considered during the past year, and standard plans have been

* Resolution, Government of India, Public Works Department, No. 1 M, dated 3rd January 1865.

† Secretary to Government of India, Military Department, No. 824, dated 25th November 1864, to Quarter Master General of the Army.

‡ Resolution, Government of India, Military Department, No. 388, dated 20th September 1864, and Resolution, Public Works Department, No. 902 M, dated 25th November 1864.

prepared. The same course will probably be adopted that has been taken in respect of Barracks. Certain fixed rules will be laid down, which will be obligatory on all occasions in which new hospitals are required. The chief of the proposed rules are as follows:—

All Regimental and Detachment hospitals will be double-storied buildings. The whole of the wards for the sick, together with a certain amount of necessary subsidiary accommodation, will be arranged in the upper floors, and the day-rooms, quarters for the medical subordinates, administrative offices, store-rooms, &c., will be provided in the lower floors. Unless under exceptional circumstances, when there may be a want of sufficient building space, no hospital will be built with more than two stories of sick wards.

The maximum number of sick in one building will be sixty, but these will not be under one continuous roof, each building being divided into two sections, and each having, as nearly as possible, an independent ventilation. The hospital for a Regiment of Infantry will consist of two such buildings for the men, and one building for the women and children. For a Regiment of Cavalry, there will be one building for the men, and one for the women and children, and one building will serve for two Batteries of Artillery. In each hospital there will be separate wards for the sick and for convalescents. Ward Offices, day-rooms for sick and convalescents, quarters for medical subordinates, for Hospital Sergeants and orderlies, and the necessary store-rooms, surgery, kitchens, bath-rooms, privies, &c.; many of these requirements will be provided for in detached buildings.

The maximum number of beds in any ward will be thirty-two. The beds will be arranged on the opposite sides of the room between the doors; there will not be more than two beds between the opposite doors of the ward, and not more than one or two beds between two doors, or between a window and door on the same side of the ward. The ordinary width of a ward will be 26 feet, and the height 21 feet; each bed will have ten feet of wall space, 130 square feet, and 2,730 cubic feet. These plans are, in all essential respects, exactly similar to those that have been recommended by the Royal Commission, by the Barrack and Hospital Improvement Commission, and by Miss Nightingale, and although they may be in some points modified, we believe that they will, in all essential respects, be approved by the Government. The principles of hospital construction and management have been so completely studied, and have been so completely verified by long experience in England and in France, that no doubt remains regarding them. There is no subject of which it can be asserted with greater confidence that it is thoroughly understood, and no subject on which all authorities are more unanimous.

48. It may here be mentioned that the principles on which hospitals are to be constructed for Native Troops, have also been laid down during the past year, in the same manner which has been followed in respect of hospitals for Europeans. Although the buildings for Natives will necessarily be less elaborate and expensive, the principles of construction will be in both cases the same. Various other measures are proposed for improving the hospitals of the Native Troops,

for affording more hospital accommodation, and for improving the administration.

49. No sufficient arrangements had hitherto been made for affording Hospitals for Native servants of British Regiments. It has now been determined by the Government that a small hospital for the reception of severe cases of sickness or accident occurring among Native followers shall be provided near the Regimental hospital; this will also be used as a dispensary where out-patients can attend to receive medicine.

50. The provision of new barracks to the full extent that is required must necessarily take a considerable time, whatever efforts be made to hasten the work. The Government has therefore ordered that in all cases in which the European Soldiers have not the full amount of space in their barracks which has been determined upon as the standard, viz., 90 superficial feet of floor space per man, temporary accommodation shall at once be provided to the full extent required, whatever be the cost. These instructions are now being carried out. The Returns that have lately been received show that there are few barracks in this Presidency at the present time in which the full amount of 90 square feet per man is not afforded, and it is believed that, in a very short time, there will be none at all. So far as our information extends, there is even now no barrack which can be said to be crowded to an objectionable extent. We have not referred to the cubic space that is allowed, because this is always ample. It is seldom less than 1,200, and often more than 2,000 cubic feet per man.

The Commission has lately represented to the Government that it would be desirable to issue similar orders with the object of preventing the possible overcrowding of the hospitals of the European troops. It has been recommended that whenever at any Station the existing hospital accommodation is insufficient to provide for 12 per cent. of the average strength of the troops, at the rate of 130 superficial feet per patient—the standard rate which has been proposed for future adoption—temporary additional accommodation should be provided to the full extent required.*

Even when hospital accommodation is provided at this rate, it may sometimes happen, during especially unhealthy seasons, that it is insufficient. Such cases can only be provided for when they occur, and we believe that there can seldom be any great difficulty in meeting them. The principle should, we think, be acted upon, which has already been laid down by the Government on the recommendation of the Cholera Commission, for the prevention of crowding in hospitals during the prevalence of Cholera. If temporary hospital accommodation cannot be given, all unimportant cases, the treatment of which in hospital is not essential, should be discharged. The following extract from the Report of the Cholera Commission is applicable to all exceptional occasions in which the number of sick is so large that the whole cannot be accommodated in the hospital. "Trifling cases of ordinary disease ought at such times to be

* Since this was written, these recommendations have been carried out, with this exception, that it has been considered necessary to substitute 100 for 130 square feet as the minimum space to be afforded.

considered of very little importance. They should receive a palliative treatment in Barracks or in camp. It is far better that they should receive no treatment at all, than that they should be admitted into hospital."*

51. It has been determined by the Government that the work required for the permanent accommodation of the Army ought to be carried out in the shortest practicable time. It is believed that the whole may be finished in four or five years. The work comprises, first, the provision, whenever necessary, of entirely new Barracks and other buildings for the European Troops at the regular stations of the Army; second, the improvement, whenever necessary, of all existing buildings, so that they may be made to afford accommodation approximately equal to the new scale which has been laid down; third, the formation of new Hill Sanitaria for the European Troops; fourth, the construction of fortified forts and places of refuge; fifth, general works in Military Cantonments, such as roads, churches, water supply, lighting Barracks with gas, drainage, conservancy, &c. &c.; sixth, provision, when necessary, of new accommodation for Native Troops; seventh, provision of temporary accommodation for European Troops, pending the completion of permanent buildings; eighth, provision, when necessary, of Officer's quarters; ninth, works required for the Ordnance and Commissariat Departments, Bakeries, Slaughter-houses, &c.

The probable total outlay upon these works is estimated at not less than ten millions sterling.

We believe that it may safely be asserted that in no other country has the construction of works of such magnitude, and involving so great an expenditure, ever at one time been undertaken by a Government for the benefit of its Soldiers. It is not less certain that, if these works be completed in the manner and upon the scale proposed, there will be no country in the world which can be compared to India in respect of the accommodation provided for the troops, and in the general arrangements made for their health and comfort.

52. The whole of the plans according to which the new Barracks and Hospitals and other buildings required for the accommodation of the European Troops are to be constructed have been prepared by Colonel Crommelin, R. E. Our Commission has frequently had occasion to express its opinion of the excellent manner in which this important work has been performed. The Government has been fortunate in obtaining for this purpose the services of an Officer who possesses so complete a knowledge of the sanitary principles upon which military buildings should be constructed. It may be confidently stated that there are no Barracks or Hospitals in any country more thoroughly satisfactory than those which have been designed by Colonel Crommelin.

53. The important subject of the ventilation and cooling of Barracks and Hospitals, and of the application of tatties, thermantidotes, and punkahs, has been under consideration. Many experiments have been tried, some of which have apparently been successful, but which, generally speaking, have

* Report of Cholera Commission, Part III, Sec. 500.

led to no good result. At Agra five of the barracks have been fitted with thermantidotes with underground channels to convey fresh air to all parts of the buildings, and the local authorities consider that the measure has been very beneficial. Similar plans had previously been carried out with great success in the Agra Central Prison, under the direction of Dr. Stewart Clark, Inspector General of Prisons, North-Western Provinces. It has now been determined by the Government that the whole subject ought to be taken up in a systematic manner, and that this can only be accomplished efficaciously by requiring a select body of Officers, really qualified by special mechanical training, to experimentalize and report on the subject. A Committee of experienced Officers has consequently been appointed with this object at Roorkee, where the workshops afford special facilities for carrying on the necessary experiments.* We believe this to be a subject of great importance, and we hope that the investigations of the Committee may lead to very valuable results.

54. One of the recommendations of the Royal Commission was to the effect that Saddlery Rooms should be provided in all Cavalry Barracks, and saddles removed out of the Barrack rooms. The Returns which we have received being incomplete, we are unable to assert that separate Saddlery Rooms everywhere exist; but the provision of such rooms has long been recognized by the Government as a matter of course, and if there are still cases in which saddles or harness are kept in Cavalry or Artillery Barrack rooms, they are exceptional.

55. One of the recommendations of the Royal Commission appointed to inquire into the sanitary state of the Army in India referred to the necessity of improving the means of lighting the Barracks and Reading Rooms in the evening. There can be no doubt that this is a matter of much importance. No small amount of intemperance and disease has its origin in the difficulty of employing themselves in a rational manner in the evening, which the men often experience in consequence of the imperfect lighting of the Barracks. The provision of sufficient means of lighting is, however, not an easy matter. The question has been under the consideration of the Government of India during the past year, and the following extracts from the orders that have been given will show what has been done and what is proposed:—†

"The Government of India is satisfied that something must be done towards greatly improving the present system of lighting Barrack buildings; and, although the data are very imperfect, they appear to afford sufficient grounds for leading to the inference that gas, which has been adopted almost universally elsewhere, should also be introduced into all Indian Military Cantonments. Wherever coal can be produced at moderate cost, it seems obvious that coal gas will be more economical than oil gas, and this will be the case in many Stations.

* Secretary to Government of India, P. W. Department, No. 657 M. 4217, dated 2nd September 1864, to Secretary to Government, North-Western Provinces.

† Resolution, Government of India, Public Works Department, No. 554—6M 3703, dated 8th August 1864.

To arrive at a practical conclusion as to the probable cost of lighting with coal gas, it will be desirable to make an experiment at some convenient Station where coal will certainly be the cheapest source of supply, and His Excellency in Council considers that Dinapoer is a suitable one at which to test the coal gas. * *

The design being completed, as well as the information of the local officers will admit, it should be sent to the Secretary of State, with a request that it may be submitted to an experienced Gas Engineer in England, and that the needful steps may be taken for obtaining the plant, to be sent out with an intelligent person to superintend the execution of the works. * * *

But as coal gas will not be procurable everywhere, the provision of oil gas will probably be necessary at many Stations, if gas is to be used at all. From Lieutenant Colonel Robertson's estimate it seems likely that oil gas may be supplied at moderate prices; but this question is one that can only be fully tested by a trial, which should be made, if on further enquiry the cost does not seem excessive and the results are otherwise encouraging. His Excellency in Council, therefore, considers that a project should be prepared for some Station where coal will almost certainly never be available, and where oil may be expected to be procured at reasonable cost, and that Rawul Pindee seems a good place to select for the purpose, unless the Local Government would desire the trial to be made at some other Station."

It is hoped that the result of these measures will be the general introduction of gas for lighting Barracks, but as some time must necessarily elapse before this can be carried out, experiments are being made with the object of ascertaining whether, as a temporary arrangement, some of the improved cheap oil or other lamps of the present day might not at once be adopted, in supercession of the existing very imperfect oil lights. Calcutta is the only place in this Presidency which is now lighted with gas, and gas has been already introduced into the Barracks in Fort William.

The grant of additional lights to Reading Rooms, and to Non-Commissioned and Married Men's quarters, has been sanctioned by the Government.

56. The Royal Commission has stated in its Report that "means of recreation are few, of exercise none, of instruction limited"; that "the men's amusements, such as they are, are always connected, more or less, with drink, and they are everywhere most deficient in amount"; that "at most of the Stations there are no workshops at present; while it is admitted that everywhere they would be most useful." This subject is referred to in the fifth recommendation of the Commission.

We think that the Commission would certainly not have written in the terms quoted above, had it known how much had been accomplished in respect of these important matters before its Report was issued. We are far from saying that there was not, and is not still, much room for improvement, but there can be no question that in regard both to the useful employment and to the means of recreation of the Soldiers more has been done in India than at Home, or in any other part of the Empire. Nearly two years before the issue of the Report of

the Royal Commission, the Commander-in-Chief in India, Sir Hugh Rose, had instituted the admirable system of Regimental workshops, which has since been developed with such excellent success. The system was established by General Order of the Commander-in-Chief on the 10th September 1861, and in General Orders of the 6th April 1864 Sir Hugh Rose stated that it had been introduced into five Regiments of Cavalry and thirty-two Battalions of Infantry in the Bengal Presidency. The following list is given of the trades that are practised:—Tailors, Carpenters, Weavers, Brush-makers, Book-binders, Blacksmiths, Tin-smiths, Masons, Labourers, Watch-makers, Painters and Glaziers, Sawyers, Bakers, Saddlers, Wheelwrights, Shoe-makers, Armourers, Shoeing-smiths, Gardeners, Printers, Turners, and Engravers. According to the last Report, published in General Orders of the 6th June 1865, the number of men regularly employed in the workshops during the past year was 791; the amount of money actually realized for work done during the year, was £15,787, and there was stock in hand to the value of £6,123. "In publishing," says the General Order just referred to, "for general information, the Reports of workshops in British Regiments serving in the Bengal Presidency for the year ending 31st December 1864, His Excellency the Commander-in-Chief congratulates the Army on the rapid and successful development of a system instituted by Sir Hugh Rose in September 1861. The system was in full working order in this Presidency in no less than three Regiments of Cavalry and thirty-three Battalions of Infantry. Conspicuous among these His Excellency observes the 7th Dragoon Guards, the 7th, 19th, 42nd, 79th, and 91st Regiments of Foot, and the 2nd Battalion of the Rifle Brigade. From recent Returns received from the Madras and Bombay Presidencies, His Excellency is glad to find that workshops have been established in six Battalions of Infantry in the former; and in fourteen Batteries of Royal Artillery, two Regiments of Cavalry, and ten Battalions of Infantry in the latter; whilst the most distinguished Regiments in these Presidencies are the 1st Royals, and 3rd Battalion 60th Rifles; the 1st Battalion 4th, 33rd, 44th, and 72nd Regiments of Foot. So satisfactory a result could not have been attained without the zealous endeavours of Commanding Officers, and the able and hearty co-operation of the individual Officers more particularly connected with the workshops, and Sir William Mansfield desires to thank all those whose efforts have resulted in so marked a success."

The following Extract from the General Orders of His Excellency the Commander-in-Chief, dated 6th April 1864, refers to other means of occupation and recreation that have been provided for the Soldiers:—"His Excellency has seen at his inspections that the industrial system for children has been carried out with very good effect in several Regiments; and that the Soldiers' children, the girls, have not only learned to make their own clothes and to sew neatly, but have also acquired a useful and practical education, under the superintendence, in many cases, of excellent School-mistresses. Generally speaking, throughout the Army in Bengal, the system of manly exercises and out-of-door recreation combined with gymnastics has kept pace with the useful industrial occupation of the men. In many Regiments, such as the 1st Battalion 20th, 38th, 51st, and 101st Regiments, and the 3rd Battalion Rifle Brigade, each Company has its cricket club, who play matches with other Regiments in their Stations, or among themselves; also, quoits, bowls, &c., &c. There is not a Regiment that has not its

Reading and Recreation Room, well furnished and fitted up, and supplied with the means of lighting, &c. These are in the evenings crowded with men, who can there obtain wholesome refreshments, tea, coffee, cold meat, &c. Spirits are not allowed. His Excellency has observed, too, with much gratification, the increasing popularity and success of Regimental Libraries, as shown by the number of Subscribers; in the 3rd Battalion Rifle Brigade, 671; 2nd Battalion Rifle Brigade, 675; 81st Regiment, 640; 1st Battalion 7th Fusiliers, 607; 1st Battalion 23rd Regiment, 580; 34th Regiment, 523; 35th Regiment, 506; 80th Regiment, 504; 104th Regiment, 495; 1st Battalion 20th Regiment, 475; 71st Regiment, 440; 88th Regiment, 424; 90th Regiment, 412. Nor has this favorable state of things been confined to the Presidency of Bengal. His Excellency has received Reports from the Commanders-in-Chief of both the Madras and Bombay Armies, showing that great progress has been made by the Regiments quartered in both these Presidencies, towards the establishment of workshops, Reading Rooms, Gymnasias, and other means of occupation and amusement.

* * * To this system of useful employment and recreation may, in a great measure, be attributed a considerable decrease in the consumption of ardent spirits in this Army, than which nothing can be more gratifying." In acknowledging the receipt of this Report, the Adjutant General was desired to "convey to His Excellency the Commander-in-Chief the cordial expression of the gratification with which the Government of India have received this satisfactory Report, showing, as it does, the hopeful growth and progress of a system so eminently calculated to improve, both morally and physically, the status of Her Majesty's British Troops in this country. The Government of India has satisfaction in being able to congratulate Sir Hugh Rose upon the early success of this beneficial project, for the establishment of which His Excellency has evinced so much anxiety. The continued growth and extension of the system will always remain an object of great interest to the Government."

57. In the construction of the extensive works which have to be pro-

vided for the accommodation of the Army, the
Employment of Soldiers on Public Works.

Government of India has expressed the hope* that it may be found possible to give employment on a large scale to the European Soldiers, with much advantage to themselves and to the State. In building the Barracks at Aseerghur and in carrying out other public works at that Station, it was found impracticable to obtain a sufficient number of native workmen, and a party of Soldiers was employed with great advantage in many occupations requiring both skilled and unskilled labor. Rates of pay varying from eight annas to one rupee four annas a day, were given to the men, and in several instances the works were carried out within the estimated rates, and in some cases more cheaply than if they had been executed by native labor. The Supervising Officer of the Public Works Department reported that "the men have worked well, and conducted themselves admirably, always sober on the works without exception, and strictly obedient in the performance of whatever work may be pointed out to them; without the aid of the Troops it is almost impossible to say when the barracks would be completed." The Government considered that similar measures to those carried out at Aseerghur might often be adopted, and that although during the hotter months the greater

* Resolution, Government of India, Public Works Department, No. $\frac{938}{5815}$ M, dated 7th December 1864.

part of such operations must doubtless be performed by native labor, yet there will still be much room for the employment of the Troops. "The Governor General in Council is of opinion that if the European Troops, at Stations where new Barracks are about to be built, were, as fully as possible, employed on the building operations during the cold seasons, their utility would be greatly increased permanently, and that capabilities for performing similar work hereafter might be developed, which, under a proper system, could be maintained at no expense to the State, and with very great improvement both to the personal condition of the Soldier, and to his utility to the Government."*

In noticing the efforts that have been made to give employment to the Soldiers, mention must also be made of the work that has been performed by them in the construction and improvement of the mountain road in the Himalaya between the Stations of Murree and Abbottabad in the Punjab.† The experiment of employing English Soldiers on Hill roads was tried in 1863 on a small scale, and was pronounced by the Local and Supreme Governments to have been very satisfactory in its results, except in a financial point of view. During 1864 the experiment was carried on upon a larger scale. The strength of the working parties was 600 men, consisting of detachments of the Regiments stationed at Rawul Pindee, and the men were employed for a period of nearly six months from May to October. They were under canvas for four months, and for two months in the rainy season they were accommodated in roughly built but commodious huts, at elevations of from 7,600 to 8,400 feet above the sea. The health of the men was excellent, and they appeared to derive great benefit from their employment in a fine climate. During the six months, there were only two deaths among 632 men, one caused by fever contracted at Peshawur, and the other by an accident resulting from intemperance, in which state a man, out of working hours, fell down a precipice. Financially, there was an apparent excess of expenditure, amounting to £397, over the sum which the work would have cost if the Soldiers had not been employed, the total money value at average rates of the work done being £2,941, while the amount of working pay to the Soldiers was £3,338. But as a set-off against this apparent loss, it has to be considered that if these men had remained in the plains, it would have been necessary to provide additional temporary accommodation for them, unless the Barracks at Rawul Pindee had been crowded to an extent which would have endangered the health of the whole of the European Troops quartered there; and that either the work on these Hill roads will not be done at all, or that the workmen, if hired, might have to be withdrawn from the construction of the Barracks at Rawul Pindee. It is hoped that, under improved arrangements, even the small loss that has actually occurred will be avoided in future. The Government has sanctioned the continuance of the experiment of employing Soldiers on this work for another year.‡

* Resolution of Government of India, Public Works Department.

† The foregoing account of these operations is taken from the Report by Lieutenant-Colonel S. H. J. Davies, Executive Engineer in charge of the work.

‡ Resolution, Government of India, Public Works Department, No. $\frac{129-30}{783}$ M, dated 13th February 1865.

58. The Royal Commission recommended the establishment of "Soldiers' Gardens, in connection with the Station, wherever practicable." The Commission does not appear to have been aware of the great and successful efforts which had been made with this object by His Excellency Sir Hugh Rose, long before the publication of its Report. The progress made in the establishment of Soldiers' Gardens has been so rapid that, in the General Orders of the Commander-in-Chief dated 5th July 1864, publishing Rules for their construction, working, and maintenance, Sir Hugh Rose was able to express the hope "that with the liberal aid afforded by Government, every barrack square in India will shortly be similarly improved and ornamented."

"Soldiers' Gardens"—we quote from the General Order just referred to—"are of two kinds; 1st, small garden plots immediately in front or rear of each Company, Sub-Division, or Married Barrack; and 2nd, large gardens situated at a convenient distance from the barracks. This latter description of garden is usually laid out with taste, and affords a pleasant and agreeable lounge for the Soldier. Gardens of the first description are usually irrigated by the surplus water from the lavatories, and as they are of small extent, the produce obtained for them is only sufficient to supply some trifling addition to the cultivator's ration. Experience, however, has proved that gardens of the second description, if of sufficient size, will, under judicious management, and provided they have been fairly started, not only pay their own expenses, but leave a considerable surplus."

A separate Fund, called the Garden Fund, has been established in each Regiment of Cavalry and Infantry, in each Division or Battery of Artillery, and at each Convalescent Depôt. The first expense of turning up the soil, and enclosing the garden with a fence or wall, is borne by the Government. The necessary arrangements for maintaining a sufficient supply of water for irrigating the gardens, for keeping the wells, reservoirs, and water-courses in proper order, for supplying gardening tools, and vegetable and flower seeds, are also made at the expense of the Government. So far as is practicable, the Commissariat Department is bound to have recourse to the Soldiers' Gardens in providing vegetables to the Troops, and to pay a fair price for the vegetables furnished. Prizes are given every year to the Soldiers who have been the most industrious and successful in gardening; the day on which the prizes are distributed is made a general holiday for the Regiment, "the band playing at the place of distribution, and the Regimental School children attending while the distribution takes place," and Sir Hugh Rose hoped that all the Officers would make a point of being present. When a Regiment leaves a Station, native gardeners are entertained to keep up the garden until it is taken over by another Regiment.

59. Among the subjects affecting the health and comfort of the European Troops which have been taken up by the Government of India during the past year, the improvement of the beds and bedding is one of much importance. For a long time past, there has been great and reasonable complaint on this head. The bedsteads have generally been very unsatisfactory, being mostly made of wood and infested with vermin to an extent which can hardly be exaggerated.

The bedding also has been very bad; no mattresses or paillasses or bolsters have been allowed, although they are furnished to the Soldiers in England and in all the Colonies; wadded cotton quilts which cannot be washed, and which are frequently in a more or less filthy and unwholesome condition, have been supplied, with blankets of Indian manufacture and very inferior quality. The number of sheets allowed has been insufficient for cleanliness or decency, and their quality has been bad. The bedding, when once issued to the Soldiers has been considered his property, and, under the system which has prevailed, there has been no security, and indeed hardly a possibility, that the bedding should be kept clean and in proper order. Our Commission has recommended to the Government the introduction of a system similar to that in force in England and in the Colonies, under which bedding is not given to the Soldier as his property, but is furnished by the Barrack Department in the same manner in which furniture and all other Barrack stores are issued. Barrack Masters are there responsible for keeping the whole of the bedding in a proper state of cleanliness and repair, for ensuring that every Soldier has a comfortable bed, and for providing him with clean articles of bedding whenever necessary. These recommendations have been approved by the Government, and orders have been issued for carrying them into effect. Every Soldier will be provided with a good iron cot, and every bed will be furnished with a comfortable paillasse, a bolster, a small setree or cotton rug, two sheets, two English blankets, and a leather strap. It is believed that this most useful reform will be carried out not only without any additional annual expenditure, but that it will lead to an actual saving of money. Similar important improvement will be carried out in the system of supplying bedding to the Hospitals. Some of these have been already sanctioned, but as the question of Hospital bedding has not been entirely disposed of, we shall not now enter into further details.

Orders have also been issued for placing on a more satisfactory footing the supply of bedding to Troops on board-ship, proceeding to England. The men have hitherto taken with them their Indian bedding, consisting of the ordinary wadded cotton quilts and country blankets. The quilts were found to be most inconvenient on account of their bulk, and were often so offensive that it was necessary to throw them overboard. English blankets will now be furnished to all men proceeding home, and to Invalids, and to Soldiers' wives according to the scale laid down in the Regulations for Her Majesty's Transport Service.

60. A revised system of camp equipage for the Army in India was proposed during the past year by His Excellency the Commander-in-Chief, and measures have been taken which, it is hoped, will lead to great improvements in the pattern of the tents supplied to the Troops. Although the tents furnished in India are probably far superior to those allowed to any other Army in the world, their ventilation has hitherto been defective, and there are considerable practical difficulties to be overcome before this will be completely remedied.

61. In the provision of Ablution and Bath accommodation there has been great improvement since the evidence before the Royal Commission was taken. Ablution rooms are everywhere provided, with a fair supply of water, and as we have noticed in

another part of this Report, four separate rooms where men can bathe privately have been furnished during the past year for each Company. These will be increased hereafter to seven or eight, when Ablution rooms are built according to the plans that have been lately sanctioned. Swimming baths have been very generally constructed at the Stations for European Troops, and under the new orders, to which reference has been made elsewhere, there will be a bath of this kind for each wing of every Regiment.

Although very much has been done to improve the Ablution and Bath accommodation, it will not become really satisfactory until better arrangements are made for affording a more ample supply of water than is now usually available at our Indian Stations. It is proposed that experiments on a large scale shall be undertaken at some of the principal Stations with the view of ascertaining what plans are practically the best. Measures of this kind were sanctioned last year for Fort William, and these have already made great progress towards completion. The scheme that has been adopted was prepared by Captain Trevor, R. E., Garrison Engineer. The best water in Calcutta has been proved by analysis and by experience to be that of carefully preserved tanks on the maidan. These, therefore, will be the source of supply for drinking, cooking, and ablutionary purposes, and twenty gallons per day will be furnished for 5,000 persons, a number much larger than the actual population of the Fort. This water will be supplied partly at a high and partly at a low level. The water for the high level service will be pumped into iron reservoirs placed on the roof of the Dalhousie Barrack, and capable, in the aggregate, of containing a sufficient supply for all the upper-roomed Barracks of the Fort. The low level supply will be pumped into a reservoir in a suitable situation, and the water will be distributed by means of iron pipes, with taps and stand-pipes in convenient places. In addition to this water supplied for personal requirements, thirty gallons per head, for 5,000 persons, will be pumped up from the river, and, after filtration, will be distributed by means of open masonry aqueducts carried along the main roads, with small reservoirs in convenient positions.

62. One of the recommendations made in the Report of the Royal Commission is "that all existing water sources be subjected to analysis, and those rejected which contain matters injurious to health." There can be no doubt of the importance of this subject, and regarding it we have already addressed the Government. It has been under the careful consideration of our Commission, and we have consulted many experienced chemists and other authorities regarding the manner in which the necessary measures should be carried out. The obstacles in this country in the way of an inquiry of this kind are very great. There are few Officers competent to undertake the work, which is one of much difficulty, requiring for its satisfactory performance altogether special qualifications, and we have found the differences of opinion among the highest authorities almost irreconcilable, as to the manner in which even the purely chemical part of the investigation ought to be carried on. Nor will any mere chemical analysis be sufficient to enable us to determine, in the majority of cases, either whether the water is wholesome, or what practical measures ought to be taken for the improvement of existing sources of supply. We have been unable hitherto to make any final recommenda-

tions to the Government regarding the procedure which ought uniformly to be followed with the view of obtaining the greatest amount of advantage, but we hope before long to do so. Meanwhile the discussion of the question by our Commission has not been fruitless. An analysis of the water supplied to the Troops at the principal Stations of the North-Western Provinces and the Punjab has been already ordered to be undertaken, and the inquiry has been going on for some months. We have hitherto received hardly any reports of what has actually been done. These operations, although they will certainly not be in themselves sufficient, will be a very useful preparation for the more complete measures which we hope to see carried out.

63. The Royal Commission appears to have been under the impression that no means of filtration were adopted in barracks and hospitals. This is incorrect, so far at least as this Presidency is concerned. For some years past, two filters have been supplied to every barrack and hospital, whenever the medical authorities have recommended their use. It is believed that they are now everywhere furnished. These filters are made according to the method very commonly followed in this country. Each filter consists of three earthen jars, the two upper ones being partially filled with sand and charcoal. For the removal of impurities in suspension, these filters are very effectual, if proper care be taken of them, but they cannot be considered always to afford sufficient means for the purification of the water supplied to the troops.

64. The subject of the diet of the Troops in India received much attention in the Report of the Royal Commission. It is one of so much importance, and so much discussion has taken place regarding it, that it is desirable that we should show in detail what has been done. The following memorandum has been prepared for this purpose by Dr. C. A. Gordon, one of the Members of our Commission. There can, we think, be no doubt that when the orders issued by the Government during the past year have been completely carried into effect, hardly anything will remain to be done for the improvement of the diet of the Troops:—

"Since 1853, the daily ration of the Soldier in India has consisted of the following articles,

G. O. G. G., 28th October 1853, and G. O. C. C., 11th November 1853.	namely:—			
	Bread	-	-	1 lb.
	Meat	-	-	1 "
	Vegetables	-	-	1 "
	Rice	-	-	4 ozs.
	Sugar	-	-	2½ "
	Tea	-	-	½ "
	Salt	-	-	1 "

"In 1864, a few modifications in the quantities of some of these items were authorised. These will be alluded to hereafter; but it is desirable that, for the present, we consider the ration as it existed at the time the Royal Commission on the Sanitary state of the Army in India was sitting.

"The meat ration consists of Beef during five days per week, and Mutton on the two remaining, as had been the case for several years previous. The meat to be cut up in joints, the ribs and upper joints of the fore-elgs excluded. The bread to be of the best quality, and equal to that provided for Hospital

diet. The vegetables to be such as are procurable at different Stations and in different seasons. The ration of tea to consist, as a rule, of one-third green and two-thirds black. Coffee might, however, be substituted for tea, in the proportion of 2 lbs. of the former to 1 lb. of the latter.

"For the purpose of cooking this ration, a daily allowance of fire-wood equal to 3 lbs. per man was allowed. Cooking is performed by natives, who, as a rule, are men reared up from boyhood with Regiments, and who, although actually untrained, understand nevertheless the particular taste of the Soldiers, and are seldom unable, even under the most adverse circumstances of field service, to serve up a savory and palatable, if not a very elegant meal. The means of cooking this ration were described before the Royal Commission as 'of the rudest

order; a small square out-house, sometimes without a chimney, often far from clean, is the regimental kitchen. As for boilers and ovens, considered indispensable at home, there are none. A few holes to put the fire in, and moveable utensils to hold over them, are all that India thinks it wants.' The hours at which, as a rule, meals were served up, were as follow, namely:—7 to 8 A. M., Breakfast. 1 P. M., Dinner. 5 P. M., Tea. There has hitherto been no modification in this scale, either according to season or according to station, except that inasmuch as the quality of the meat ration is in some parts of India much better than at others, and that European esculents and vegetables which grow in profusion in some parts of the country can in others be reared only in small quantity, the ration necessarily varied in this respect.

"In regard to the dietary so constituted, the Royal Commission expressed the opinion that, with reference to the amount of work the Soldier in India has to perform, it is injurious to his health; and the Government might try to induce the men, by varying the ration with reference to hot and cold weather, to use more vegetable diet and fruit, and less animal food.

"That the ration does not constitute the whole quantity of food consumed by a Soldier daily is well known to all Regimental Officers. There is, in fact, in almost all Regiments a system, of what is called extra messing, on account of which a sum varying from half an anna to two annas per man is daily stopped. From the amount of these stoppages, milk, curry stuff, eggs, spices for puddings, and other little articles of luxury are obtained, and the cooks paid. In fact, ample evidence to this effect is given before the Royal Commission. Thus, one

Qs. 3134—3200. witness informs that body that the Soldier, especially if he be married, purchases salt, pork, or bacon in the bazaar; and adds that, if his family be large, he obtains fresh meat of an inferior kind. Another states that the men not unfrequently purchase bazaar pork and bacon, which, from the foul feeding of the animals, is unwholesome.

"Dr. Parkes gives, in a tabular form, the relative proportions of the alimentary constituents in the ordinary diet of the Soldier at home and in India, and from his tables the following have been prepared, namely:—

	At home.	India.
	oz.	oz.
Of water	38.88	30.07
Nitrogenous substances	3.86	4.36
Fat	1.30	1.38
Carbo-hydrates	17.35	14.47
Salts	.80	1.54
Totals	62.19	51.82

"It is clear according to this table that, as regards mere bulk, the ration of the Soldier in India is very nearly one-sixth less than it is at home; in order therefore to exhibit the cause of his difference, it may be well to place in a table, side by side, the proportion of the above con-

stituents stated to be contained in each ingredient of the Soldier's diet. This is accordingly done in the succeeding table:—

	WATER.		NITROGENOUS.		FAT.		CARBO-HYDRATES.		SALTS.	
	Home.	India.	Home.	India.	Home.	India.	Home.	India.	Home.	India.
Meat	7.2	9.6	1.44	1.92	.8	1.07	...	...	.154	.2
Bread	9.6	6.4	1.92	1.28	.36	.24	11.73	7.8	.312	.2
Potatoes	11.84	13.6	.24	.96	.02	.04	3.75	.93	.020	.11
Other Vegetables	7.28	...	.16	...	.04	...	.46	...	.050	...
Rice	...	.4	...	.20	...	.03	...	3.33	...	.02
Milk	2.92	...	.1	...	.08	...	.13	...	.016	...
Sugar	0.04	.075	...	...	...	...	1.28	2.41	.006	.012
Salt	...	...	...	...	...	...	...	...	.25	1.
Totals	38.88	30.075	3.86	4.36	1.30	1.38	17.35	14.47	.808	1.542

"With reference to the constituents of the diets, Dr. Parkes remarks that it is slightly more nitrogenous in India, and less rich in starches: and he thinks that although, no doubt, it would be too much for a perfectly idle man, it would not be so were the amount of exercise that of the home standard. At page 145 of his work already quoted, however, he thus expresses himself. 'The ration of the English Soldier at home therefore appears to be deficient to a certain extent in albumates; to be very poor in fat and to be in excess in starches. The fresh vegetables are sufficient. It would be improved by the addition of some meat, or what perhaps would be better, two ounces of cheese, some fatty food such as bacon, butter, or by greater use of oil in cooking; and by a larger employment of beans and peas.' He would also with Robert Jackson continue a ration of vinegar.

"Two important facts may here be noted in regard to the Soldiers' ration at home, namely, that according to the opinion of Dr. Parkes, it is in time of war quite insufficient; and that the articles in which he considers the ration is most deficient are precisely those which, as already observed, the Soldier in India most seeks after, namely, cheese and fatty food, such as bacon. The circumstance is further of importance as illustrating a remark made by Messrs. Lewis and Gilbert to the effect that the under-fed laboring classes manifest an instinctive preference to fat meat, such as pork, over those meats that are thinner and more nitrogenous.

"Numerous opinions of a conflicting nature, as regards the supposed superabundance or deficiency of the Soldiers' ration in India, have been given; thus Colonel Swatman considered it was not enough, and that in damp climates experience taught that men should be better fed.

"According to Dr. Reed, men should be well dieted, the appetite being capricious, and he adds his reason for this opinion, to which special attention ought to be given, namely, that 'the waste of constitution being greater in hot climates the diet should be more nutritious.' No doubt he here means, more easily assimilated.

"Again, Brigadier General Russell, C. B., stated that the 84th Regiment, when in Burmah, had a contract for 8oz. of Mutton and 4oz. of Bread beyond the regular ration.

"The Medical Member of the Commissariat Commission in India believed that an increase of the meat ration to the extent of lb. $\frac{1}{4}$ in the cold weather would tend more speedily to recover the men from the prostration entailed by severe heats and render them more capable of enduring the fatigue required of them during the drill season.

"On the other hand, Dr. Macnamara has found fatty and otherwise diseased liver to a great extent among men thus overfed; and attributes these diseases to the circumstance of the men being overfed. While the opinion given by the Commissariat Commission seems merely to express that that body considered the ration authorised by Government, if properly carried out, is sufficient to preserve the Soldier in health and vigor, and is on a more liberal scale than exists in any other part of the world.

"This Commission does not seem, however, to have noted the fact that in our Colonies the Soldiers have the advantage of an occasional Salt ration, which in India they have not, although evidence exists which indicates the advantage of such a variety: thus, it is on record that in Burmah, Soldiers and Sailors were employed on the same expedition inland. The former had 16oz. of lean tough beef, the Sailor 9 $\frac{1}{2}$ ounces of salt pork. Here the Sailor, although exposed to the climate night and day, while the Soldiers were well housed, suffered less from climate and disease than the latter, who it is said looked with longing eyes on the pea-soup and plum puddings which the Sailors cooked just as if they were on board-ship.

"The opinion of the President of the late Cholera Commission on this subject, is thus given: 'The quantity of meat allowed daily to the Soldier has often been declared by high Medical Authorities to be too great for a tropical climate, and it has been recommended that the meat ration should be diminished during the hot season, vegetable food being substituted. I believe that almost all that is said upon this subject is purely theoretical, and quite valueless for any practical purpose.'

"So also in reference to the implied dependence of Hepatic disease among Soldiers in India, to the quantity of meat they consume during the hot season, it may be well to note that Dr. Hooker found that herbivorous animals brought to the plains of India from elevated and therefore cold ranges speedily became affected with similar affections.

"An argument is often brought forward that the habits of natives of particular countries, as being the best for the circumstances of these people, ought to be adopted by foreigners, and there are not wanting men of very great eminence who strenuously advocate this doctrine. It seems, however, a somewhat dangerous principle to attribute the habits of any particular country to the effects of climate alone; we know in fact that not only climate, but religious prejudices, agricultural capabilities of the country, and financial prosperity or otherwise of the people, combine with more or less force to establish these habits. Thus we find natives of corresponding latitudes have very different habits as regards animal food: thus the aborigines of tropical Africa are large eaters of flesh, and those of tropical China, instead of living, as does the poor Hindoo, on cereals with or without additions as the latter can afford, devours enormous quantities of the fattest of fat pork, geese and ducks.

"Nor is it always safe to assume that because the mass of a people adopt a particular dietary, it is therefore the best suited to their personal requirements as regards health; far less to the requirements of foreigners residing temporarily among them: thus thousands of Irish subsist chiefly upon potatoes and milk, millions of Hindoos on rice and rancid butter.

"As to the effects of this defective diet upon the Irish, Dr. Carpenter states that the Manual of Physiology, races who are restricted to it have, within a period of two hundred years, degenerated so as to be now of low stature, to have pot bellies and bow legs; whilst their open projecting mouths, prominent teeth, exposed gums,

advancing cheek bones, and depressed noses bear barbarism in their very front. And with regard to the Hindoo, Lewis informs us that large as is the stomach of the ryot, it could not with impunity take in and digest the quantity of rice which would be sufficient day by day to supply the wants of the system; and that, unless one-fourth to one-third of pulse or dried fish be added to supply the nitrogenous elements, these people become diseased, acquire pot bellies, and show signs of starvation in every feature. The fact is notorious that so soon as the pecuniary condition of the Hindoo begins to improve, he indulges in such quantities of fats, such as clarified butter and vegetable oils, as his finances afford; thus as far as practicable adopting the same nutritious elements as exist in a different form in the food of the Soldier.

"But whatever theory may suggest in respect to this matter, we find in reality that the Soldier in India will absolutely refuse to exchange the habits in which he was reared for those of the natives by whom he is surrounded. 'As a matter of fact,' says Mr. Strachey, 'Europeans are no more inclined to adopt a vegetable diet in India than they are in Europe.' 'Bread and fruit and vegetables are generally in India of indifferent quality.' 'Not very palatable.' 'And although it may be true in theory that we all eat too much animal food, we feel in practice that we shall eat it or nothing.' 'European appetites in India during extreme heat are constantly in an abnormal state and more or less capricious, and it is useless to place people upon a diet which they dislike, however excellent it may be theoretically. It must be added that the hot and rainy season, when meat is supposed to be especially objectionable, is the very time when there are hardly any vegetables which an Englishman can eat.'

Appendix J., para. 24, p. 6.
Report of Commissariat Commission.

"Let us now consider how far the purely chemical theory of food is to be trusted. Mr. Lewis informs his readers that a great mistake is made when it is imagined that the nutritive value of foods can chiefly reside in the amounts of Carbon, Nitrogen, Oxygen and Salts which they contain. It resides as he well observes in the relation which the several substances bear to the organism they are to nourish; thus, the indications of chemistry in regard to the relative values of food are often at variance with the results of experience. For example he mentions that wheat contains only 2.3 per cent. of Nitrogen; beans, 5.5; lentils, 4.4; and peas, 4.3; and yet, wheat is in reality superior in nutritive value to beans, lentils, or peas.

"So in regard to the often repeated assertion that in a cold climate, the carbonaceous or respiratory elements are most requisite, and in a hot, the nitrogenous. He informs his readers that the Sicilian and Neapolitan eat more oil than the Swede; that according to theory the Hindoo should eat very little non-nitrogenous food; whereas, according to fact, he eats very little nitrogenous food and a great deal of heat making food.

"But even granting that the chemical theory is so far correct that recent waste of tissues requires to be met by nitrogenous elements of food, there is sufficient in the circumstances of the Soldier's existence in India to justify his being supplied with a liberal ration of this description.

"It is true that he does not, as a rule, undergo the same amount of bodily exertion as he does on home service. It is no less true, however, that destruction of his tissues takes place with a rapidity unknown in temperate climates. Nitrogenous matters in the form of the salts eliminated in perspiration are plentifully discharged by the skin as well as by the other ordinary channels; muscular fibre becomes lax and fatty, and the process of wear and tear, although not amenable to chemical tests, proceeds with a rapidity and to an extent unknown to be produced by the greatest bodily exertion in a temperate climate. Hence, on this ground, if nitrogenous food be intended to supply the expenditure of tissue, a liberal allowance of it is indicated in India. But it is not only nutriment that the system demands; a certain amount of bulk is necessary in order that digestion may proceed; hence experience shows that when food is nutritious in its character but of small bulk, advantage is obtained from mixing it with more nitrogenous substances in order to

Carpenter's Manual of Physiology, para. 485.

give it bulk and solidity. Nor must we forget that in regard to food, original tastes and habits exercise a most powerful influence upon the Soldiers, as indeed upon all other classes, and that to effect a change in these, even were it otherwise practicable to do so, would not be effected without much personal inconvenience and even injury to individuals.

"Various circumstances which may be looked upon as exceptional combine to render the question of rationing Troops in India a matter of more than usual difficulty.

"Thus in regard to meat, the fact is to be noticed that breeding of cattle for shambles forms no part of the occupation of the Hindoo, and the prejudices of the people are opposed to their being reared and sold for slaughter. The demands of agriculture too, and for transport of produce, are so great that a scarcity of cattle in some parts of India already exists. For several months in the year fodder and grass are scarce. The natives have not yet learned the art of improving breeds of cattle. The animals supplied to meat contractors if not so young as to be immature, and their meat thus wanting in the full proportion of nutritive elements, have been severely worked in the cart or at the plough, while their food has been insufficient in quantity and often deficient in nourishing qualities. Hence as might be expected the flesh is dry, fibrous, tough, deficient in gelatinous matter, and wanting in aroma. Indeed, Dr.

Health of European
Soldiers, p. 112.

Chevers is of opinion that unless well and carefully fed, the flesh of oxen and sheep is unwholesome.

"Nor it is at all times certain that the Soldier receives the full amount of his ration, for Mr. Strachey states that 'of the frauds of the contractors in this respect he himself saw an example at Meean Meer. Merely by cutting off a smaller quantity of bone than that

Appendix J, p. 6 para. 24 of
Presidency Commissariat
Commission.

permitted by regulations, the contractor saved lbs. 16 of meat from each Carcase', thus giving the contractor a profit of lbs. 20 from one Regiment.

"Mutton is poor, thin, and unpalatable; nor is this all. Sheep in India, contrary to their nature in Britain, are known to be sometimes fed upon matters little, if at all, less filthy in their nature than those that constitute the food of pigs, and the latter as is now well known are brought up on food so loathsome in its nature that tape-worm and other diseases are rapidly

A. G. H. M.'s Force.
Circular, 9th July 1858.

engendered in those who partake of their flesh. In fact so well was this known, several years ago, in India, that in 1858, its use by Soldiers was prohibited.

"The Commissariat Commission took into its serious consideration the practicability or otherwise of improving the quality of the Soldiers' rations in India. They considered the question in its financial bearings, and have entered into some particulars that may be of interest as showing the enormous expense incurred by the mere dieting of Troops in the Bengal Presidency.

"By the Report of this Commission it appears that the sum actually paid by the Soldier in India for his ration is at the rate of Rs. 6-5-4 per month, whereas its actual cost to Government is Rs. 9-5-5½, making a cost per annum of above £175,000.

"Were cattle and sheep to be stall fed, a period of six months would be required to effect sufficient improvement in them to render the measure of any use, as it appears that for some time after animals experimented upon have been submitted to the process their condition actually falls off. This then would occasion an extra expense of not less than £187,674-18 per annum; or, in all, to supply the Troops with stall fed meat, 111,009

Para. 91, page 26.

head of horned cattle and 195,590 sheep, at an aggregate cost of £362,674-18, would be required; which, for an approximate strength of 39,000 effectives, would give £9-4, per man, per annum, for meat alone.

"It may be here noted that with reference to the proposal made by some Officers that the

Para. 89, page 26.

Soldier should during the cold season have lb. ¼ of meat beyond that now allowed to him, the Commission calculated its cost to amount to £12,099-14, an expense according to the Report 'the necessity of which is not sufficiently apparent to induce the Commission to recommend it.'

"The bread issued to Soldiers has of late years undergone very great improvements, and further improvements in its quality are contemplated. The 'Soojée' from which it is manufactured contains a considerable amount of gluten, and the juice of the palm tree having been often used in substitution of yeast, the loaves were during the hot and damp weather liable to become sour during the after portion of the day.

"The supply of good vegetables to the Troops is a difficulty, which it is far from easy to get over. During the hot weather and rains there are almost no vegetables that Europeans care to eat. With the exception of potatoes there are very few vegetables, either European or Native,

Appendix to Commissariat
Commission Report J.,
page 5, para. 22.

which the Soldiers think worth eating, and a large portion of the vegetable ration is never consumed by them. The Commissariat Commission allows that there is a period during the hot weather and rains when no arrangement can secure even a ration of potatoes for the Soldier; the heat and damp of the climate being such as to render their transport through the plains so wasteful as to be practically impossible. The same Commission reports that from 15th June

Para. 210, page 55.

to 15th October potatoes are not considered wholesome; and gives a list showing in detail the Stations and Divisions at which the greatest difficulty is experienced in procuring a supply. According to that list, it would seem that in the Cawnpore and Lucknow Divisions, potatoes are only procurable during

Appendix 2.

the months from July to November inclusive, by being brought from the Hills at a loss of 50 per cent. At Meerut they are unwholesome and unfit for food from 15th June to 1st October; at Lahore they are not eatable in July and August; at Sealkote, not obtainable in July, August, and September; at Peshawur, not obtainable in July and August; while at Mooltan the supply is impracticable in August, September, and October; and at the Hill Stations of Kussowlie, Subathoo, Dugshai, and Jutogh, potatoes are not good from June to September inclusive. With reference to these observations, however, it may be noted that at the Hill Stations named, various European vegetables are in season during the time that potatoes are not procurable, and that the daily extending facilities afforded by the Railway are rapidly diminishing the difficulties here complained of. For example, in 1863, potatoes were issued throughout the whole year to the Troops at Mooltan.

"It now becomes necessary to give a brief summary of the measures that have from time to time been taken by the Government of India, and by His Excellency the Commander-in-Chief to effect the greatest amount of improvement in the victualling of the Soldier that the circumstances of the country rendered practicable.

"With regard to the general subject of rations, the following are the more important of the measures that have been promulgated.

"In 1861 the then Commander-in-Chief observed that in almost every Corps the messing of the Soldier was not sufficiently attended to. His Excellency therefore directed that the utmost attention should be paid to it; that Officers should use their endeavors to induce the men to expend a small sum towards bettering their ration, and that Commanding Officers should see that the articles provided are of good quality.

"In 1862 a Special Commission was formed under the orders of Government to inquire into and report upon the entire question of rationing the Troops. In 1864 the conclusions at which it arrived were published, and such of them as were approved by Government directed to be adopted. On this occasion Government endorsed the opinion expressed by the Commission that the ration was

A. G. Circular, 24th July
1861.

G. O. C. C., 13th May 1864.

itself sufficient, and that any assertion that may have been made that the health of the Troops had suffered from defect in quantity or quality of food was without foundation. It approved the suggestions, that Commissariat Officers be themselves responsible for the quality of rations; that fair and remunerative rates be paid for meat of all kinds, the better to encourage competition; that to prevent undue pressure being put on the supply of mutton, the Troops have a ration of it only once a week; and that to prevent the destruction of brood stock, not more than one-third of the sheep killed for rations be ewes.

"The only modifications that appeared necessary were that, with reference to the large quantity of rice allowed to the Soldier, an equal quantity of flour be substituted for it at the option of the Soldier; the arrangement being made for a fixed period of not less than fifteen days at a time. That for the future the entire ration of tea consist, as a general rule, of black. That the daily allowance of Salt be reduced to two-thirds of an ounce. That to enable the Soldier to have a cup of tea or coffee in the early morning, arrangements to be made with Regimental Canteens so as to ensure good and clean utensils for the purpose. And that a store of groceries be kept on hand by each Regiment, equal to fifteen days' consumption.

"Orders were issued to the effect that the breakfast hour for the Soldiers should be 8½ A. M., A. G. Circular, 161 E., 16th dinner at 2½ P. M.; those who desire to have a pint of Beer, to have December 1864. it issued to them so as to be taken at the same time; and that the time for tea should be immediately after evening parade: these hours to be adhered to throughout the year.

"Proposals have been submitted that cooking be performed under the superintendence of Standing Orders, May 1864, trained Europeans, and that kitchens with all necessary appliances p. 95. be built; and the Public Works Department have had this matter referred to them in view to the necessary plans being prepared.

"With a view to obtain an improved meat ration, the Commissariat Commission recommended that the Slaughter-Houses be visited by the Sanitary Officer at least once a fortnight; and that, as was the case from 1822 to 1853, a qualified Non-Commissioned Officer be appointed for the purpose of inspecting the issue of fodder, and attending to all matters connected with the selection and slaughter of cattle required for the meat ration.

Para. 287.
G. O. G. G., 25th October 1822, 704, 9th September 1853.
G. O. G. G., 136 of 6th February 1865.

"And in order to effect improvement in the bread, it has been recommended that it be henceforward prepared by Commissariat Agency; that instead of being made as heretofore from Soojee, it be made from flour ground in proper mills; hop and potatoe yeast being substituted for palm juice, and Stephen's Kneading Machines brought into use. Also that proper bakeries be erected, and Bovell's Blast Mills imported for the purpose of grinding the flour. With reference to this recommendation, it is right to record the fact that early in June 1865, the writer of this memorandum, tasted a loaf prepared from country flour, as recommended by the Commission, Colonel Macpherson, C. B., Commissary General, having had samples sent to him from Dinapore. This sample was sweet, light, well-raised, and although kept during two days in the moist heat of Calcutta, perfectly fresh and very palatable at the end of that time. So far, then, the experiment has been a success.

Para. 346, Report of Commission.

"The custom has hitherto been to give as substitutes for vegetables dhall, that is, ground pulse, when indigenous vegetables were not procurable; but so long as these could be obtained, they were looked upon as sufficient substitutes for potatoes. Neither of these, however, are, anti-scorbutic, and could not be looked upon as substitutes for such vegetables as have these properties. Hence, there has never been any doubt as to the desirability for arrangements to secure to the Soldiers greater variety than they had hitherto enjoyed in regard to this important

Qy. of Royal Commission. 1432-1458, 1523-1524.

portion of their ration. Various measures have from time to time been proposed with a view to obtain for the Soldier an improved supply. In 1860, the supply to Regiments of seeds of English and country vegetables was sanctioned for Soldiers' gardens. In 1864 further instructions on the same subject were given in orders, and authority given for the supply of vegetable seeds on requisition: the English vegetable seeds to consist of cauliflower and lettuce, the indigenous of the egg plant, and pumpkin. In September of the following year a Government General Order directed, among other points, that steps should be taken at particular Stations to show the probable quantity of vegetables of different kinds that could be supplied during each month from Soldiers' gardens, to fix a suitable price to be paid to the Soldier for these, and to determine, if the supply from this source cannot be depended upon, what description and quantity can be obtained from other sources during the different months. With a view, as far as possible, to encourage the cultivation of those vegetables held in greatest esteem by the Soldier, Government has adopted the suggestion of the Commission that fairs be held and prizes awarded for the best specimens exhibited; and also that, as far as practicable, vegetables shall be raised in gardens attached to jails; being purchased from these by the Commissariat Department so long as the arrangement shall not interfere with the interests of contractors.

G. O. C. C., 3rd April 1860.

G. O. C. C., 5th July.
7th September, published in G. O. C. C., 8th October 1860.

"A recommendation has also been submitted by several Commanding and Medical Officers that cruciferous vegetables be pickled during the cold season and issued during the hot. The Commissariat Commission, however, does not support the suggestion, although the grounds upon which they refuse to adopt it do not appear. In the dietary of the Russian Soldier, pickled vegetables form an important item, as do other anti-scorbutic ingredients, and, as Dr. Parkes observes, we might take a lesson from the Russians in this respect.

Para. 211.

"The ration he thus alludes to contains, black bread, lb 1; meat, lb. 1; Kawass, i. e., fermented drink, 1.1 quart; sour cabbage, 3½ gills; barley 3½ gills; salt 1½ oz.; horse radish, 4 grains; pepper, 4 grains; vinegar, 1½ gills. All authorities agree that variety in the nature and description of food is absolutely necessary for the due maintenance of health; and that the necessity for this was acknowledged in India prior to the date of the Commissariat Commission is apparent. From the circumstances of the country, however, difficulties have ever existed in obtaining for the Soldier that variety which at Home and in the Colonies is readily available. The Commission had its attention specially drawn to this important matter, and among its recommendations that have received the sanction of Government is, that greater attention be paid to the variety of food, to the mode in which the men's meals are served up, and that messes be put upon a more becoming footing.

Practical Hygiene, para. 142.

"So long ago as 1860, the Commander-in-Chief expressed a desire that salt pork should be retained in store, so as not only to be available for issue, on occasions of the ordinary meat ration being condemned, but to afford the men an agreeable variety in their diet. The Commissariat Commission, however, did not support the recommendation, although evidently upon financial and not sanitary grounds.

Paras. 300 to 305 of Commissariat Report.

"A scheme was in 1861 and 1862 laid before the Government of India by the Finance Department, the object of which was to show that changes in the diet of men might, without extra expense, be introduced, provided the Commanding Officer and Commissariat Officer were to make their arrangements in concert. In this way salt meat, fish, butter, cheese and condiments of different sorts might be supplied either directly by the Commissariat, or the money value of rations that men did not want might be made over to the Regimental Authorities for the purpose of being expended upon articles of food that were agreeable to the men.

A. G. to Military Secretary to Government, No. 97 A, 23rd September.
Letter to Secretary to Government of India, No. 566, 6th August 1861, quoted in App. 2, to President of Commissariat Commission.

"In 1863, the Commander-in-Chief, with the concurrence of Government, announced that arrangements might be made with Commissariat Officers for decreasing for a time the Soldier's ration of meat, when the Commanding and Medical Officers considered such a change necessary, and the sanction of His Excellency shall have been received for the arrangement being carried into effect. It does not appear, however, that, up to the time this paper is being written, this recommendation has been in any instance acted upon.

"The Commissariat Commission having the same object in view laid down what they deemed the best means of variety. This consisted in serving up on different days the dinners cooked in particular ways. Thus these meals would be as follows, namely:—

- 1st day, soup and boiled meat.
- 2nd day, pies and curries.
- 3rd day, baked joints with potatoes under them.
- 4th day, soup and meat salted with Carson's machine, dhall or peas pudding.

"Very lengthy instructions in regard to cooking were published in 1863 by order of His Excellency the Commander-in-Chief. Among the recommendations therein contained are the establishment of regular messes among the men, and the appointment of Soldier orderlies to superintend the cooking.

"Detailed instructions are also given in regard to how a variety of dishes are to be prepared. A bare enumeration of these dishes is all that can be given here, namely,

- a.—A ration of beef, onions, rice and pumpkins for 60 men.
- b.—A ration of beef, onions, rice and sweet potatoes.
- c.—A ration of beef, onions and yams, with curry powder added.
- d.—A ration of beef, rice, and yams, with pepper and flour.
- e.—A ration of salt beef and yams.
- f.—Salt pork.
- g.—To boil greens or spinach.
- h.—To dress pumpkins and cucumbers.
- i.—To make tea and coffee on the line of march.
- j.—To make coffee.
- k.—To prepare soup.
- l.—To make a plain pudding.

"Regimental Medical Officers have from time to time recommended that in order to give variety to the diet of Troops, the cooking be varied by haricot stews, salt ration, puddings of sago or arrowroot, and that where fruits are obtainable, they have these in a dried or fresh state.

"There are few circumstances under which a good wholesome soup may not be prepared in India, and this, if it contain barley and vegetables, will always serve for a large portion of one meal, and, as observed by Sir George Ballingall, besides the various kinds of cabbage, carrots, turnips, &c., the produce of the garden, there are various kinds of cresses, sorrel, and other vegetables growing wild in the fields, which make no unwholesome or unpleasant additions to soup. Doubtless to select these would require a knowledge and great interest in the subject on the part of Officers; yet that such a variety may be, under certain circumstances, obtained, is daily evinced by Troops of the French Army, and the Medical History of the recent war in America indicates that such was also the case in that country.

"The system of extra messing should, according to the suggestion of the Commission approved by Government, be encouraged, the sum so charged being laid out on the purchase of milk, puddings, fruit, cheese, spices, &c. These articles could, as in the case of the

35th Foot, be obtained from a morning market established in the vicinity of the Barracks, and under the superintendence of the Regimental Authorities. In 1863 His Excellency the Commander-in-Chief issued instructions in regard to this subject, directing that orderlies be appointed from Companies, as is the custom at home, and that the duties of these men shall be to purchase such articles of extra messing as will give the men considerable variety of diet, such as butter, milk, eggs, fowls, &c.

"It will be seen from the foregoing remarks that the means for improving the rations of the Soldier in India have obtained the best consideration by the Government of India and by His Excellency the Commander-in-Chief, and that in reality little if any thing further is required than that the recommendations and orders laid down on the subject during the past year be carried out.

"The one great difficulty which for the present stands in the way is that of procuring, during several months of the year, a supply of the vegetables that Soldiers would use. It is feared that some considerable time must elapse before this can be effectually removed, but, in the interim, much may be done by local arrangements to meet the difficulty. The rapid extension of Railways may also be taken advantage of to convey vegetables to distances that were formerly impracticable, and although compressed or pickled vegetables are not a complete substitute for those in a fresh state, it is beyond doubt that they are very valuable adjuncts to diet and as anti-scorbutics. Every endeavor should therefore be made to obtain a supply of them.

"At some Stations, for example Mooltan, lime-juice has been issued with the greatest benefit during absence or scarcity of succulent vegetables, and similar good results would doubtless accrue at other Stations where vegetables are at times unobtainable.

"The following are the principal recommendations made by various authorities on the subject of improving the rations of Soldiers in India in regard to which action has already been taken, and the complete adoption of which is deemed desirable, viz:—

"1. That Soldiers be encouraged to expend a small sum on extra messing, and orderlies appointed by Companies as at home to purchase such articles as are likely to be relished.

"2. That the responsibility for the quality of the rations rest entirely upon the Commissariat Officer.

"3. The appointment of a Non-Commissioned Officer to superintend the feeding of cattle and attending to the shambles.

"4. That arrangements be made to enable the Troops to have a cup of tea or coffee before going to parade.

"5. That, as at present ordered, a small stock of groceries be kept on hand by Regiments.

"6. That the hours for meals continue as at present, viz., Breakfast at 8½ A.M., Dinner at 2½ P.M., and Tea after evening parade.

"7. That the bread be baked at all Stations under Commissariat agency; that flour be used and proper yeast employed, the flour being ground in suitable mills, the dough kneaded by machinery, and proper bakeries erected.

"8. That the cultivation of vegetables in gardens connected with Jails be as far as practicable carried into effect.

"9. The encouragement among Soldiers of cultivating vegetables, by paying them for such quantities as they raise, and by holding exhibitions.

"10. That greater attention be paid to the manner in which Soldiers' meals are served up, and that messes be put upon a proper footing.

"11. Various rules have been laid down for cooking different kinds of dishes from the ordinary ration of the Soldier, and such items of extra diet as are available to him; and these, if carried out, would doubtless afford him much of that variety which has been hitherto unobtainable.

"Various other recommendations have been made by the Military Authorities, by the Commissariat Commission, and by Officers of standing. Some of these have partly been acted upon; others have not been formally brought forward, or if they have, do not seem to have attracted particular attention.

Undoubtedly, however, their adoption would in some instances tend much to perfect the improvements in the rationing of the Soldier, in so far as this is practicable. The points alluded to are as follow, viz:—

"1. That properly fitted kitchens be erected, and suitable cooking vessels supplied.

"2. That trained European Cooks be appointed to Regiments.

"3. The recommendation that arrangements be made for compressing or pickling vegetables, although it does not emanate from the Commissariat Commission, appears of great importance, and one which, if carried into effect, would be productive of very beneficial effects.

"4. The issue to the Soldier of an occasional ration of salt pork does not form one of the recommendations of the Commissariat Commission, yet the measure is one which on sanitary grounds commends itself.

"5. The optional change of a certain portion of meat for an increased quantity of bread which, under certain circumstances, has been made practicable, has not apparently been taken advantage of by the Soldiers. Hence there is reason to doubt if they feel the necessity for it.

"6. As one of the most important ingredients of good soup is barley, Soldiers ought to have facilities of obtaining it whenever they choose.

"7. That fruits, dry, or fresh, be allowed, whenever practicable, to the men.

"8. That when vegetables, either fresh, preserved, or pickled, are not procurable, the Soldiers have the advantage of obtaining lime-juice."

65. There has been much difference of opinion regarding the plans of
Cooking. cook-houses that ought to be adopted for barracks and hospitals, and regarding the arrangements for

cooking. A series of experiments has been ordered by the Government to be carried out, which, it is hoped, will afford the means of disposing satisfactorily of the whole subject. The provision of cook-room furniture on a fixed scale has been ordered. Although there is still much room for improvement in the cooking in this country, there can be no doubt that when Regimental arrangements are good, the men are upon the whole better fed, so far, at any rate, as the quality and variety of cooking are concerned, than they are at home. This, however, only applies to the men in barracks. The cooking in the hospitals is very often unsatisfactory. The question is now under consideration of extending to all British Regiments in India the system of appointing Cook Sergeants who have obtained the Aldershot certificate of qualification, and have undergone the prescribed probation.

66. The construction of proper Slaughter-houses has been ordered at all
Slaughter-houses. Stations for European Troops, and the principles

have been laid down by the Government according to which all Slaughter-houses are to be in future constructed, or which are to be attended to in modifying existing buildings of the kind.

67. The Rules and Regulations proposed by our Commission for the sanitary administration of Military Cantonments will, if they are put in force, give the means of enforcing all measures that are necessary for the prevention of the sale of unwholesome food in Cantonments. They provide for the constant and vigilant inspection of all food and drink offered for sale, and for the seizure and destruction of all such food or drink as may be unfit for human consumption.

We have addressed the Government in a separate Report regarding the necessity of preventing the sale of unwholesome pork, which, there is reason for supposing, is sometimes the cause of serious disease. The disgusting but common practice of deliberately feeding not only pigs but sheep and cattle upon filth of the worst description has been brought to the notice of the Government, and measures have been taken for preventing it in our Cantonments and in places under the direct control of Government Officers. These practices are an evident cause of danger. It has been conclusively proved by the researches of modern science that the serious diseases caused by the presence of *Tania* or tape-worm, of *Trichina Spiralis*, and of other parasites, owe their origin to such causes as this. It has been proved in Europe that a large amount of formidable and fatal disease, presenting symptoms apparently similar to those of typhoid fever, and of other serious diseases, have been in reality due to the presence of *Trichina*. This dangerous parasite has been observed by Dr. Fayrer in a European patient in one of the Calcutta hospitals, and it has been suspected that it may have been the cause of serious disease which has been recorded under other names. The necessity of measures for the prevention of diseases of this class has been strongly insisted on in Europe, and there is no doubt that the filthy practices to which we have alluded render such measures still more necessary in India.

68. Other subjects connected with the question of the food and drink supplied to the Troops have been under consideration during the past year. Among these may be noticed the arrangements for supplying aerated drinks, such as soda water, lemonade, and ginger beer. The consumption of these is extremely large, and if care be not taken to supervise their preparation, they are sometimes very unwholesome. Measures have been proposed by which it is hoped that an ample supply of wholesome beverages of this kind may be provided for the Soldiers at a cheap rate. The means for cooling water and other drinks are also very necessary. The use of machines for the manufacture of ice is gradually extending in India, and we may reasonably expect that these will before long be furnished at a price which will often make it possible to supply ice to the Troops. One of these machines has been purchased by the Government, in order that an experiment with this object may be tried. Ice has already been supplied, to a considerable extent, to the Regimental hospitals. We believe that nothing would have a more powerful effect in diminishing the consumption of spirituous liquors by the men in the hot season than the supply of iced water and aerated drinks. Ice in a tropical climate is not a mere luxury, and there can be no doubt that its use, which has greatly extended during the last twenty years, has been of great benefit to the health of those classes of the European community which have been able to obtain it.

69. It was recommended by the Royal Commission that the hospital diet tables, cooking, and tables in use at Home Stations should be adopted in attendance in Hospitals. India as far as practicable. This had already been done before the Report of the Commission was issued. During the past year further improvements have been made, and the permanent adoption of the revised diet scales has been ordered. The new tables are more elaborate than those in force at Home and in the Colonies. The arrangements in the hospitals in this country are certainly in many respects in an unsatisfactory condition, and they are for the most part very inferior to those which exist at Home and in the Colonies. There is a deficiency of many things required for the comfort of the sick, and which are supplied in all civilized hospitals; the cooking is often very bad; and there are no properly trained attendants. The last subject is one of much importance, and it was specially noticed by the Royal Commission. On these matters we hope soon to submit a separate Report to the Government.

70. The Royal Commission noticed in its Report the necessity of introducing female Nurses into all large General Hospitals. Female nursing in General Hospitals. in India.

A satisfactory commencement in carrying this out has already been made. In the General Hospital, and in the Medical College Hospital in Calcutta, the two principal Institutions of the kind in this Presidency, female Nurses have been employed during the last four years with great benefit. They have supplied, to use the words of Dr. Chevers, a great want, and have been of inestimable value to the sick. These Nurses have been under the management of the Calcutta Hospital Nurse Institution, a body supported principally by private subscriptions, with the assistance of a monthly contribution from the Government. The Sanitary Commission has been in communication, during the past year, with the Committee of the Institution with the object of determining the manner in which the advantages of female nursing in hospitals can be extended to the greatest practicable extent. We submitted to the Government of India the following general propositions: 1st, that in all large General Hospitals maintained by the Government, the introduction of nursing by females is necessary; 2nd, that whatever expense it is necessary to incur for this purpose, should be met as willingly as that of the other establishments organized for the care and treatment of the sick. The principles involved in those propositions have been admitted by the Government, and the Commission hopes to be able before long, with the assistance of the Committee of the Calcutta Hospital Nurse Institution, and of the Medical Department, to submit a complete scheme for the orders of the Government. In this work the Commission will have the benefit of the advice of the highest living authority, Miss Nightingale.

During the past year another step has been taken towards the more general introduction of female nursing. The Government of India has sanctioned the provision of Nurses for the female wards of all Regimental Hospitals, and it is hoped that plans may be devised for their proper training in combination with the scheme to which reference has just been made.

71. The organization of General Hospitals at the principal European Establishments of General Hospitals at large Stations. Stations was recommended by the Royal Commission. On this subject we propose to submit a separate Report to the Government.

72. Another subject of importance which has lately been under the consideration of Government, and which may properly be noticed in this place, is the supply of Ambulances for the transport of the sick. Hitherto these have been little used in India. The opinion has been generally expressed by the highest authorities that however advantageous it may be to supply Ambulance waggons in addition to the doolees that are now allowed, it will only be on ordinary marches along good roads that it will be desirable to substitute Ambulances for doolees as the means of transport for the sick. On an ordinary line of march there can be no doubt that a large proportion of the sick may conveniently and economically be carried in Ambulances, but they cannot safely be depended upon for Troops on field service. Ambulances are already supplied at most of the principal Stations for the purpose of taking out convalescents in hospital for an airing. Elephants are frequently employed for the same object, when the patients are able to bear the motion.

73. The system of rationing Troops on board-ship has been altered during the past year. The Admiralty scale of victualling for men, women, and children, in health, and for invalids, and of medical comforts, &c., laid down in Her Majesty's Regulations, has been adopted by the Government of India, with this modification that no spirits are to be issued except under the orders of the Officer in Medical charge of the Troops, porter being issued instead.* This has been the practice followed by the Government of India since 1859. A recommendation that this should be ordered, was made in the Report of the Royal Commission under the erroneous impression that a different system was in force.

74. One of the most important measures taken during the past year was the reduction of the amount of spirits issued daily to the Soldiers from Canteens. The former practice has been fully described in the Report of the Royal Commission. The following Extracts show the reasons for which it has been followed, and the conclusions of the Royal Commission upon the subject.

“According to existing regulations, every Soldier has a right to purchase, at his Regimental Canteen, two drams of spirits of good quality, generally rum or arrack, supplied by the Commissariat; or he may substitute malt liquor, wholly or partially, for spirit. The quantity of malt liquor issued in lieu of spirit varies in different Regiments, but generally it appears to be a quart in lieu of a dram. * * * The whole tenor of the evidence goes to prove that the consumption of ardent spirits by the Troops is a very potent cause of disease in India, and that much benefit to the efficiency of the Army would accrue from discontinuing its use, if it were practicable to do so. It is upon the practicability of effecting this great reform that the whole question turns. The use of spirits habitually is an acquired taste, which after a time becomes confirmed. The habit exists throughout the British Army, and is carried with it to every Station at which it serves, whatever may be the climate or its dangers. It is this depraved taste which lies at the root of the whole matter, and which renders it so difficult to deal with the question. * * * At most foreign Stations, and throughout the whole of India, it has been considered

* Secretary Government of India, to Quarter Master General, No. 391 dated 25th July 1864.

"advisable to permit the sale of ardent spirits, under restrictions as to quality and amount, in all Canteens; because bad, adulterated, and, in some cases, poisonous spirits only could be otherwise obtained by the Soldier. The permissive authorized sale of spirits, the use of which by the Troops we have shown to be an indirect cause of a large amount of disease and mortality, thus becomes a direct encouragement to intemperance and disease, while its avowed object is to prevent disease by supplying men with a less injurious spirit than they could otherwise obtain." The conclusion of the Royal Commission was "that the sale of spirits at Canteens should be discontinued, except in specific cases on the recommendation of the Medical Officer, and only malt liquor or light wines allowed; and that the sale of spirits in Military bazars be made illegal, and, as far as practicable, suppressed." The opinion is, however, stated in the body of the Report that "any change would have to be gradually introduced, beginning with young Soldiers, and discouraging to the utmost the use of spirits, until the stigma of spirit drinking be wiped off from the British Army."

Under the General Order issued by His Excellency the Commander-in-Chief, Sir Hugh Rose, on the 21st June 1864, the issue of rum from Canteens was reduced from two drams to one dram daily per man. The time has not yet arrived at which we can form a judgment regarding the actual results of this change, but they can hardly fail to be ultimately beneficial, and it may be anticipated that these measures will be followed hereafter by others of a similar character. The cost to the State of this reform has been serious, because it involved the necessity of increasing the supply of malt liquor, which is furnished to the Soldiers by the Government at a rate below the actual cost. In the Memorandum of the Accountant General, Military Department, dated 27th March 1865, annexed to Sir Charles Trevelyan's Financial Statement for 1865-66, it is stated that "the increased consumption of malt liquor, chiefly caused by the reduction of the issue of spirits, involves an addition of no less than Rs. 22,87,861 (£228,786) in the cost of the liquor as landed at the several ports, and of Rs. 12,61,518 (£126,151) for local carriage and contingencies, making a total increase of Rs. 35,49,379 (£354,937)."

According to the Military Estimates for 1865-66, the total charges for malt liquor and spirits in the three Presidencies will be as follows:—

	£
Malt liquor	495,245
Spirits	48,327
Total	<u>£543,572</u>

75. Valuable statistics will, it is hoped, be obtained after the close of the present year, to show the comparative health and immunity from fatal disease enjoyed by the temperate and intemperate Soldiers. total abstainers from liquor, by the temperate, and by the intemperate, among the Soldiers of the British Army in the Bengal Presidency. Orders were issued by His Excellency the Commander-in-Chief at the close of the last year, under which all Commanding Officers were instructed to keep up daily Returns with this object.

76. The recommendation of the Royal Commission that "the sale of spirits in Military bazars should be made illegal, and, as far as practicable, suppressed" had been acted upon in all parts of this Presidency for many years before the recommendation was made, but the prevention of the unauthorized sale of spirits to the Soldiers has always been a matter of great difficulty, in consequence of the constant demand for them that exists, and the large profits that are always to be made by supplying them. The law on the subject has been made still more stringent during the past year, by the enactment of Act XXII of 1864. Severe penalties, including imprisonment and whipping, are laid down for the sale in any Military Cantonment, unless under the written license of the Officer Commanding, of any spirituous liquors or intoxicating drugs to or for the use of any European Soldiers, or their wives, and this provision may be extended, at the discretion of the Local Government, to any limits around the Cantonment. The mere possession of spirituous liquor in Cantonments is, under certain circumstances, punishable. It is hoped that means may be found for carrying out the provisions of the law with greater stringency and success than has hitherto been found possible.

77. The Royal Commission has stated in its Report that "the boots Supply of Boots to the Troops which at present are issued to the Soldier do not fit well. They are made at Home on a very few models and sizes, and when sent out to India are found in very many cases not to be wearable." We have addressed the Government separately upon this subject, with the object of ascertaining whether there is any ground for complaint on this account at the present time. So far as we have been able to learn, we believe that whatever may have been the case formerly, the boots that are now supplied are excellent. We have been informed by a distinguished Officer, who has had the best possible opportunity of knowing the truth, that "there are no better boots in the world than those supplied by Government to the Soldier in this Presidency."

78. During the last few years, the conservancy of barracks and hospitals in this Presidency has received much attention, and great improvements have been effected. All these have originated in the abolition of sewage drains, and in the substitution of the dry system, which consists in the immediate removal of all filth in air-tight receptacles, and its burial at a distance from human habitations. Owing to the almost immediate commencement of putrefaction in the hot and rainy seasons, this is the only plan which has been found to be inoffensive. The system of dry conservancy, introduced by Dr. Hathaway into the Punjab Jails in 1852, was the application to the requirements of large bodies of men of the simple arrangements which had long been found to be perfectly successful in private life. Nothing could possibly be more satisfactory than the results obtained under this system in the Jails of the Punjab and of the North-Western Provinces. Objection has been frequently made to it by persons who have not seen it in actual operation, but it may be confidently stated that under no system which has ever been followed in the most civilized countries have the results been more successful. When the system is properly carried out, there is perfect cleanliness, and entire absence of all nuisance. In December 1861,

the Commander-in-Chief, impressed with the excellence of the arrangements which he had seen carried out in the Central Prison at Lahore, ordered their adoption in several Military Stations, and, in February 1863,* the system was extended to all our Cantonments. Although there is still in many places great room for improvement, the conservancy of our Cantonments is, generally speaking, incomparably more satisfactory than it was, and the just causes of complaint which existed a few years ago have, for the most part, been removed.

During the past year the system has been further developed by the introduction of the use of dry earth as a deodorizer, in the manner recommended by the Revd. H. Moule, in a paper read before the Society of Arts on the 5th May 1862. The general adoption of this plan was strongly recommended by the Indian Jail Committee, after careful inquiry, and after complete practical proof had been obtained of its efficacy. The Sanitary Commission entirely concurred in these conclusions, and advised that the dry earth system should be tried upon a large scale. During the past year experiments have been carried on in nearly all the Jails and Military Stations between Peshawur and Singapore, and there is an almost complete concurrence of opinion that, when properly managed, its success has been most remarkable. We have deferred making a final report upon this subject, because additional expense will necessarily be incurred by the general introduction of the system, and we have been desirous of learning by full experience how the objects in view can be attained in the most economical manner.

The Royal Commission recommended that, "wherever practicable, iron or earthenware water latrines, supplied with water and drained to an outlet, be introduced instead of the present system; that where this is impracticable, all cess-pits be abolished, and metal or earthenware vessels, to be removed twice a day, substituted." So far as the abolition of cess-pits and the daily removal of filth is concerned, the recommendation has been fully carried out, but the introduction of a system of water latrines is a measure which we, in common with all Indian authorities, have found it impossible to support. The question is not one which it is necessary to discuss in this place. It is sufficient now to state that it is a question which has received our frequent consideration. There is, so far as we have been able to ascertain, no difference of opinion among those persons who have studied the subject in this country with the greatest care, and who by practical experience are best qualified to form a sound judgment regarding it, that the difficulties and objections in the way of carrying out the recommendation of the Royal Commission are insuperable.

Despatch of Recruits to India.

79. There are a few other subjects noticed by the Royal Commission, which it is desirable to mention here.

The first recommendation of the Commission is, "that no Recruit be sent to India under 21 years of age, nor until he has completed his drill at Home; and that Recruits be sent direct from Home to India, so as to land there early in November." The latter part of this recommendation is sufficiently acted upon, for all Troops, except under some special circumstances, now reach India in the cold season. The former part of the recommendation falls within the province of the

* Quarter Master General's Circular No. 227 B, dated 7th February 1863.

Home Authorities, and we have been unable to learn whether it has been under their consideration.

80. The recommendation of the Royal Commission* "that until the mortality be reduced, the period of service in India be limited to ten years," is in accordance with existing practice.

81. The recommendation† that "Medical candidates be required to undergo the course of instruction, including Military hygiene at the Army Medical School" has been carried into effect.

With respect to the recommendation‡ "that every cadet of Engineers should attend a course of sanitary instruction at Chatham," we have no information to show what has been done by the Home Authorities.

82. The recommendation that§ "in order to render available for India the experience obtained in dealing with all classes of sanitary questions in England, two Officers of the Indian Government be appointed in England, to be associated with the War Office Commission for this special purpose," has been carried out.

83. The recommendation|| "that the system of Army Medical Statistics at present in use at Home Stations, be extended to all Stations in India," had been acted upon before the publication of the Report of the Commission.

84. An Act¶ which, it may be anticipated, will have an important influence upon the health of the Troops, and of our Cantonments generally, was passed by the Legislature in 1864. This law has made many changes in the system of administration which had previously been in force in Military Cantonments. Among other provisions, the Local Government has been authorized, with the sanction of the Government of India, to make Rules and Regulations for numerous matters of local importance, which, in places subject to the ordinary Civil jurisdiction, would commonly be regulated by municipal bye-laws. These Rules and Regulations will provide for the following matters affecting the public health, safety, and convenience:—

For the detection and prohibition of public nuisances; for the maintenance, generally, of the Cantonment in a proper sanitary condition; for the prevention and cure of disease; for the management and regulation of the public roads, of conservancy, and drainage; for the regulation and inspection of public and private necessities, urinals, cess-pools, drains, and all places in which filth or rubbish is deposited; of slaughter-houses, public markets, burial and burning grounds, and of all offensive or dangerous trades and occupations.

For inspecting and controlling houses of ill-fame, and for preventing the spread of venereal diseases.

* Recommendation 6.
§ Recommendation 36.

† Recommendation 33.
|| Recommendation 38.

‡ Recommendation 34.
¶ Act XXII of 1864.

For the supervision and regulation of public wells, tanks, springs, or other sources from which water is or may be made available for public use.

For the execution and promotion of works of public utility and convenience.

For the registration of deaths, and for making and recording observations and facts important for the public health and interests.

The Sanitary Commission has submitted to the Local Governments a draft of the general Rules and Regulations for matters affecting the public health, which it recommends for adoption under the Act in all Military Cantonments. It has also laid before the Government of India recommendations regarding many other subjects which appear to require regulation. The Rules proposed by the Commission declare the general powers and responsibilities of the Officer Commanding the Cantonment in matters affecting the public health; they provide for the appointment in every Cantonment of a Sanitary Officer, and describe the duties which he is expected to perform; they carry out the recommendation of the Royal Commission that those parts of the new Medical Regulations of October 7th, 1859, which define the sanitary duties of regimental, garrison, and inspecting Medical Officers, should be adopted to all Indian Stations; they describe the means provided for carrying out measures necessary for the protection of the health of the Troops and of the Cantonment generally; and they embody those parts of the existing Regulations of the Government which bear upon questions of sanitary administration.

The whole subject of the measures required for carrying into effect the provisions of Act XXII of 1864 is under the consideration of the Government. When it is finally disposed of, a great step will have been taken towards the completion of the Code of Regulations for the Indian Sanitary Service, the preparation of which was recommended by the Royal Commission, and ordered by the Secretary of State for India.

85. In the orders under which the Commission was constituted, we were directed to submit to the Government of India plans for carrying on and supervising a general system of sanitary administration throughout this Presidency, it being understood that the actual executive work must be carried out by the Local Governments and by the Local Civil and Military Authorities.

The organization of such a system in the towns and districts in all parts of the country has engaged the attention of our Commission, and recommendations have been made to the Government of India on the subject. Even if we look no further than the protection of the health of the European Soldiers, it will be evidently insufficient if we endeavour to improve the sanitary condition of our Cantonments alone, and ignore the existence of the masses of the native population by which our Troops are surrounded.

It is evidently neither expedient nor possible that the Government should undertake to carry out, generally, at its own expense, works of sanitary improvement in the towns and districts of India, and the cost of such works must ordinarily be borne by local and municipal funds. We believe that except in Bengal, for which Province a new law was passed last year, (Act III of 1864, Bengal Council), known as the "District Municipal Improvement Act," which is likely to work satisfactorily, fresh legislation will be required to make it

possible to enforce all the regulations necessary for the protection of the public health. We have recommended the establishment in all districts of Local Boards for carrying on the municipal and sanitary service, the appointment of Health Officers, and the adoption of other measures for ensuring a proper supervision, throughout the country, of the sanitary condition of the people. The proposals that we have made are now under the consideration of the Government.

86. It was recommended by the Royal Commission "that a system of registering deaths and the causes of death be established in the large Cities of India, and be gradually extended, so as to determine the effects of local causes on the mortality of the Native as well as of the European population." The measures which have been taken for this purpose in Calcutta have been noticed separately. In all the Provinces of this Presidency, action has been taken in the matter. The Local Governments and Administrations have generally considered that there will be no difficulty in making at least a beginning towards the introduction of registration, by means of the ordinary Police and Municipal Establishments, and of the village putwarees. Arrangements have been made for giving effect to the proposed system. For some time to come the measures taken will be little more than experimental, but it is hoped that they will lead to the establishment hereafter, without expense to the Government, or vexation to the people, of a really useful registration of deaths.

87. The only class of the Native population for which any useful statistics of sickness and mortality are now available is that among prisoners in Jails. Unfortunately, however, in consequence of the imperfection of the method according to which prison statistics have hitherto been prepared, it is impossible for us to draw any clear conclusions regarding the actual mortality that has occurred. The Returns throw no light upon the amount of sickness and mortality among the Native population at large, nor can we make any comparison between the healthiness of the prisoners and of the Native and European Troops. We have addressed the Government separately on this subject, but it is desirable that we should also notice it here, lest the Returns of the mortality in Jails which are given in the Appendix to this Report should be misunderstood.

In calculating the death-rate in Indian Prisons, the actual number of deaths is not distributed over the whole prison population, that is, the number of persons imprisoned during the year, but over the daily average strength, or the number derived from dividing the aggregate of the daily number of prisoners by the number of days in the year. This is in fact the same method which is applied in calculating the rates of mortality in the Army. In the latter case the results may usually be considered fairly comparable with those for the ordinary Civil population, because, as a general rule, there is little alteration during the year in the strength and constitution of Regiments. Even in the Army, however, this general rule is not always true, and there can be no doubt that the same cause which operates in the case of the Jails sometimes has the effect of greatly exaggerating the apparent rate of mortality among small bodies of Soldiers.

The units which constitute the "daily average strength" in the calculations for the Jails are not real, but imaginary men. To make up a daily average strength of 100 prisoners, 100 or 1,000 men may have been actually imprisoned.

Thus, an "average man" (as he may be called) may have been 1 man who was imprisoned for 12 months, or 2 men for 6 months, or 12 men for 1 month, or 52 men for 1 week, or 365 men for 1 day. But in calculating the death-rate, no importance is attached to this fact, and whatever number of men it may have taken to make up one unit of the daily average strength, each death is looked upon as that of one actual man. The exaggerating effect of the present method may be illustrated by an actual case, taken from the Report on the Jails of the Lower Provinces for 1863. During the calendar year in one of the Jails, the actual number of persons imprisoned was 76, viz., 19 present on 1st January and 57 admitted during the year. Among these 76 men there were 21 deaths; consequently the death-rate calculated on the total prison population was 27.6 per cent. But the average daily number of prisoners during the year was only 24, and there having been among this number 21 deaths, the death-rate is recorded as 87.5 per cent. It will be seen that it might have been far less or far greater according to the duration of the imprisonment, before expiry of sentence or death, of the 76 prisoners. In one sense, the figures resulting from this method of calculation are mathematically correct, but they hardly represent any fact that can be readily understood. We have proposed, in a separate Report, that the opinion of the War Office Sanitary Commission be requested as to the best mode of calculating death-rate in Jails, and we have made recommendations to the Government, with the object of obtaining, in future, sufficient data for an intelligent criticism of the real mortality.

It will therefore be understood that the Returns of the sickness and mortality in the Jails given in the Appendix to this Report and in the following Table, are in reality in no way comparable to those of the European and Native Troops, and that the death-rate resulting from the method of calculation that has been followed, will convey to the mind, unless care be taken to appreciate its real significance, a very exaggerated idea of the mortality that has actually occurred. According to these Returns, the rate of mortality in the Jails of the several Provinces of this Presidency during the last four years has been as follows:—

TABLE XIX.

PROVINCE.	1861.				1862.				1863.				1864.			
	Average Strength.	DIED PER 1,000 OF AVERAGE STRENGTH.			Average Strength.	DIED PER 1,000 OF AVERAGE STRENGTH.			Average Strength.	DIED PER 1,000 OF AVERAGE STRENGTH.			Average Strength.	DIED PER 1,000 OF AVERAGE STRENGTH.		
		Cholera.	Jail Fever.	All Causes.		Cholera.	Jail Fever.	All Causes.		Cholera.	Jail Fever.	All Causes.		Cholera.	Jail Fever.	All Causes.
Bengal Proper and Assam ...	13,924	13.2	...	87.7	14,692	9.9	...	78.6	15,087	20.2	...	92.7	14,441	17.3	...	66.4
Behar, Benares, Oudh, Eastern Doab, and Bundelkhand ...	11,398	11.8	...	76.1	13,975	8	...	51.3	14,664	23.9	...	97.7	15,450	8.2	...	67.1
Nagpore and Central India ...	5,089	2.4	...	34.0	5,316	4.7	...	39.7	4,975	10.1	7.8	73.4	5,448	11.6	...	51.4
Rohilkhand, Meerut, and Agra ...	9,669	44.3	51.9	183.7	8,534	2.0	40.6	97.0	8,043	5.7	41.4	82.8	7,641	...	...	73.8
Punjab ...	10,355	4.4	20.2	81.6	10,354	9.0	18.5	59.7	9,632	...	21.4	66.0	9,630	1	...	86.2
Bengal Presidency ...	915 50.	15.2	16.1	90.7	52,871	5.5	11.2	66.8	52,401	14.8	11.7	85.8	52,598	8.4	*	69.8

* Returns of Jail Fever in 1864 not received.

88. Although, as we have stated, these death-rates are not comparable with those prevailing in the Army, or among the free population, and although they give an exaggerated representation of the real mortality, there can be no doubt whatever that the mortality has been excessively high. Cholera and typhus fever have in particular been most fatal. In illustration of the excessive virulence of the latter disease, we may quote the case of the Agra Jail, in which, during the three months of March, April, and May 1864, with an average strength of about 2,400 prisoners, 1,340 prisoners were attacked and 250 died. Other instances could easily be given in which the mortality has been little if at all inferior.

We have addressed the Government on several occasions regarding the mortality in Indian Jails, and it is not necessary that we should now enter into this question in detail. It is desirable, however, to notice that the subject of the condition of prisoners and of jail discipline has been carefully considered during the past year. Early in 1864, a Special Committee was appointed to report upon the whole subject, and their recommendations have been laid before the Government.

We can hardly speak too highly, in many respects, of the constant care which has been given for some years past to the prisoners in our Jails, especially in the North-Western Provinces and in the Punjab, where better buildings generally exist than in Bengal. It would be difficult, more particularly in the larger or Central Prisons, to surpass the excellence of the conservancy arrangements; the food and clothing of the prisoners have ordinarily been far better than those of the lower classes of the free population, and the amount of labor exacted has been moderate. In spite of all this care, the mortality has been excessive, and we believe that this must be chiefly accounted for by the fact that the prisoners have, as a general rule, been over-crowded. This evil has more than counteracted all the efforts that have been made to improve the sanitary condition of our Jails, and it is one that has gone on increasing with the increase in the number of criminals and with the development of the system under which all prisoners sentenced to labor are employed in manufactures and other useful occupations within the walls of the Jail. It is only during the last few years that typhus fever of a most virulent and contagious character has attacked the Jails in Northern India, and this formidable disease has shown very strongly the dangers that follow upon over-crowding. We do not mean to say that this fever, or Cholera, or any other serious epidemic disease is actually caused by over-crowding, or indeed by any sanitary defects, however great. All that can be said is, that when, through some cause of which we are ignorant, diseases of this kind appear in over-crowded or otherwise unwholesome localities, they find the conditions most favorable for their propagation.

We have on several occasions addressed the Government on the subject of this fever, more especially with reference to the possibility of its attacking the European Soldiers. We think that the attention of Medical and other Officers cannot be too strongly and constantly given to the necessity of taking every possible precaution for the protection of the European Troops against this formidable disease. We fear that we have no right to assume that this is an imaginary danger, although the improvement in the sanitary state of barracks and hospitals and of our Cantonments generally has been so great that we may

Hope that the conditions under which the European Soldiers now live are not favorable to the propagation of such a disease as this.

89. This fever has been by no means peculiar to the Jails, but has attacked the general population in many districts of the Epidemic fever in Bengal. Upper Provinces with great virulence. It has been supposed by some authorities that it may be connected with the epidemic fever which has lately proved so extremely fatal in some of the Districts of Bengal. This, however, remains in doubt. Early in 1864, a Special Commission was appointed by the Government of Bengal for the purpose of investigating this Epidemic fever. The Report of the Commission gives a lamentable account of the ravages of the disease in the Districts of Burdwan, Hooghly, Nuddea, and the 24-Pergunnahs. This fever, although apparently not really a new disease, has only attracted special attention during the last few years. There is nothing to show the fatal mortality caused by it, but in many places it has been fatal to an extent which would be almost incredible if the facts were less completely established. The following statement is extracted from the Report of the Commission of Inquiry, para. 38:—"Many large *baries*, in which there were formerly thirty or forty residents, have now been left with perhaps one solitary occupant; whole mohullas and streets have been deserted, and large villages which formerly told their residents by thousands, can now almost number them by hundreds. The total population of Oollah was stated to have been 18,000 to 20,000 before it was attacked, and it was calculated that at least 12,000 of these had fallen victims within six years. The village of Sreenugger has been almost depopulated. At Culna three-fourths of the inhabitants have been carried off. Upon the whole, we believe that about 30 per cent. of the whole population of the infected area have died."

In the orders of the Government of Bengal passed upon the Report of the Commission of Inquiry, the following account is given of the common condition of the villages of this part of Bengal* :—

"The surface of the land within the village is covered with low jungle. The villages are laid out on no plan, and without any reference to conservancy arrangements. The houses or huts are built of earth taken from a hole close by, which becomes a receptacle for all kinds of filth. All ventilation is kept out by the hedge of jungle with which every hut or collection of huts is surrounded. Filth is deposited indiscriminately in the nearest available spot. There are no public or private necessities, and the people resort to the jungles and open fields in the neighbourhood of their houses. The houses are unventilated and over-crowded; the poorer classes sleep on mats on the raised mud floor, sometimes not more than a foot from the ground; and from the brick houses in which the better classes reside, the filth is allowed to trickle through some opening on the floor and brick-work, and to lie beneath the walls. The tanks near the villages are used indiscriminately for bathing, washing, cooking, and drinking purposes, and being also used as receptacles for all kinds of refuse and filth, the water they contain is unfit for domestic purposes." In the Mahomedan quarters of villages, (we quote from the Report of the

Commission) "the dead are constantly buried on the very borders of the tanks. Here and there cemeteries are to be found, but even in those places they are not exclusively resorted to. Graves may be seen scattered about in every direction, and these graves are seldom made sufficiently deep to ensure the people against poisonous exhalations from the interred bodies. The bodies lie so near the surface that, sometimes, as is well known, they are disinterred by jackals and dogs. The Hindoos, in ordinary times, pretend to burn their dead, but even at such times only a few bodies are effectually destroyed. In most cases the half burnt remains are left to be devoured by birds and animals, and many bodies are simply thrown away without funeral rites of any kind into nullahs and rivers. In times of great mortality, Hindoos and Mussulmans alike abandon all attempt to dispose of their dead with respect and decency, and bodies are recklessly thrown out in all directions, poisoning the air for miles with the foulest effluvia."

The Commission of Inquiry recorded its opinion that the main causes of the fatal fever which has prevailed are miasm; polluted drinking water; vitiated air, and deficient ventilation; excessive use of farinaceous food; and to a slight extent contagion. Although we are not prepared to agree altogether in these conclusions, believing as we do that it is far more probable that the disease has its origin in a certain specific poison propagated from man to man, than that it is produced by any sanitary conditions, however unfavorable, we have been unable to suggest any practical measures in addition to those which have been recommended by the Commission and adopted by the Government of Bengal. Whatever be the origin of the disease, or the manner in which it spreads, we may conclude with certainty that it finds the best possible conditions for its propagation in the horrible and almost incredible filth in the midst of which the people live. We have described elsewhere the state of Calcutta, the capital city of these same Bengalees, and have declared that no parallel to its filthiness can be found in any other part of India with which we have any acquaintance. It will be seen from the foregoing extracts, from the orders of Government, and from the Report of the Commission of Inquiry, that the state of the people in the town is more than equalled by that of the people in the country. We find, too, in the country as in the town, that the difficulties of contending against these great evils are aggravated to an incalculable extent by the utter apathy of the better classes of the community. "The sympathies of the wealthier classes," (write the Commissioners,) "have been to a very slight degree enlisted in favor of their poorer neighbours. Indeed, in most places, the efforts made by the Zemindars, and other well-to-do people in the Mofussil, to assist their ryots, may be without injustice described as *nil*. It is to be feared that, in some instances, where collections of money have been made to defray the expense of sanitary improvements, contributions have been extorted from those who were ill able to pay them, while the richer inhabitants put their names down in the subscription list for sums of the insignificance of which they ought to be ashamed, and the full amounts of which they did not, in point of fact, subsequently pay up. These remarks must not, indeed, be considered of universal application. Some exceptions stand out in pleasing relief."

The Government of Bengal has taken such measures as were in its power to reverse or mitigate the worst of the sanitary evils that have been described,

* Letter No. 1479 T., dated 12th July 1864, from Secretary to Government of Bengal, to President of the Commission of Enquiry on the Epidemic Fever.

and the enactment of the "District Municipal Improvement Act," which has been noticed elsewhere, will greatly increase the means of action at the disposal of the authorities. But the complete removal of these evils is a work far beyond the powers of any Government. Liberal assistance has been promised by the Government in the execution of any works of obvious advantage which may be immediately undertaken with benefit to the public health. It has been asserted that the construction of railways and roads has aggravated the sickness by intercepting the drainage. A special inquiry is in progress with the view of ascertaining the extent to which the drainage of the country has really been interfered with, and of showing what measures ought to be adopted for its improvement.

90. At the commencement of the present year, an Act (No. IV of 1865) was passed by the Bengal Legislature for the prohibition of the practice of inoculation in the town and suburbs of Calcutta. The Act may be extended to other places under certain conditions, when it appears to the Lieutenant-Governor of Bengal that sufficient arrangements have been made for the protection of the inhabitants by vaccination. Under this Act any person performing inoculation is liable to imprisonment for three months, or to a fine of two hundred Rupees, and the same penalties are laid down against any person who, having been inoculated, shall enter any place in which the Act is in force until forty days have elapsed from the date of inoculation, or without a certificate from a qualified Medical Officer that such person is no longer likely to cause contagion. The reasons for this enactment are given in the preamble as follows:—"Whereas it is found that small-pox is spread by inoculators who infect persons living in towns without adopting any precaution against contagion; and whereas proper and sufficient arrangements have been made in the town of Calcutta and in its suburbs, and in certain other towns in the Province of Bengal, for the vaccination or inoculation with the cow-pox of the inhabitants thereof respectively; and it is desirable to prohibit by law the practice of inoculation with the small-pox in such towns and places; it is enacted as follows:—" &c, &c.

No reference having been made to the Sanitary Commission on the subject of this Act, our knowledge of the reasons for which it was considered expedient is altogether imperfect. We therefore do not wish at present to give any opinion regarding the propriety of the measures that have been adopted. But we think that very careful consideration ought to be given to the question before this Act is extended to other places. We have been informed on very high authority that it may be estimated that 85 per cent. of the Hindoo population in Calcutta and its neighbourhood were protected by inoculation before this Act was passed. The people generally utterly disbelieve in the efficacy of vaccination, and whatever may be the case in Calcutta, there can be no doubt that in most other parts of the country this disbelief has been completely justifiable, because the vaccination that has ordinarily been afforded has been worse than useless. Our reasons for this belief have been given in a separate Report. In the Hill Province of Gurhwal, the result of the admirable measures of Dr. Pearson has been that the whole population has been protected against small-pox by vaccination, and inoculation has almost ceased, not because it has been prohibited, but because the people have become convinced of the superiority of vaccination. But in the cool

climate of the hills vaccination can be carried on almost throughout the year; the population is scanty; and having learned by experience the advantages of vaccination, the people are not only willing but eager to obtain them. In the plains of India, on the other hand, vaccination can usually only be practised with success during the cold season. If, as Dr. Pearson has shown, the people can be taught to believe in the efficacy of vaccination, they will themselves adopt the practice, but it is visionary to suppose that the Government can, by its own action, protect by vaccination more than a hundred millions of people. We do not overlook the fact that the practice of inoculation may lead to the introduction of small-pox into places which would otherwise have been free from the disease, nor do we deny that, under certain circumstances, its prohibition by law may be not only proper, but necessary. We do not doubt, for example, that such prohibition ought to be enforced at the present time in England. But whether, under the circumstances which now exist in those parts of India in which inoculation has been commonly practised, any prohibition of the kind is desirable appears to be very questionable.

91. In the orders under which this Commission was constituted, the improvement of the sanitary state of the city of Calcutta was specially noticed as a matter of pressing importance, and this was one of the first subjects which came under our consideration. In a Minute, dated the 5th March 1864, the President of the Commission gave a sketch of the sanitary state of the Northern or Native Division of the Town. He stated that in the filthiest quarters of the filthiest Towns that he had ever seen in other parts of India or in other countries, he had never seen any thing to be compared with the filthiness of Calcutta, and that this was true, not only of the parts of the city inhabited by the poorer classes, but of the quarters filled with the houses of the richest and most influential portion of the Native community. He stated that the condition of the river upon the banks of which Calcutta stands was as abominable as that of the city itself; that five thousand human corpses had been every year thrown from Calcutta into the river, which supplies the greater part of the inhabitants with water for all domestic purposes, and that fifteen hundred corpses had been thrown into the river in one year from the Government hospitals alone. Mr. Strachey declared the state of the Capital of British India, one of the greatest and wealthiest cities in the world, to be a scandal and a disgrace to a civilized Government.

If the language used by the President of this Commission in describing the filthy condition of the Native quarter of Calcutta had been still stronger, it would not have been misplaced. Evidence of this assertion may be found in every page of the Report of the Health Officer of the Municipality for the past year. The greater part of that Report consists of descriptions of perhaps the most abominable series of nuisances that were ever allowed to grow up in the principal city of a civilized Government. The efforts of the Municipality and of their energetic Health Officer, Dr. Tonnerre, to improve matters have not been fruitless, but the difficulties to be contended against have been excessive. Among these difficulties not the least serious are those caused by the indifference or passive resistance to all improvement on the part of the upper classes of the Native community. In other countries, and even in other parts of India, it is only the lowest and poorest section of the community that is content to live in the

midst of nuisances and filth. This is not the case in Calcutta. "The most respectable and wealthy of the Natives," writes the Health Officer, "inhabit the second and third Divisions, and yet the nuisances are more numerous and worse than in any other District.* * I have no words to describe the nuisances which I have discovered in some places, chiefly in the neighbourhood of Burra Bazar. As it was impossible to find out some of the most abominable nuisances without trespassing on private grounds, offenders had hitherto enjoyed an impunity which had rendered them more and more indifferent to the most common principles of cleanliness and decency.* * The Police records will show that the most numerous and heaviest fines were inflicted upon some of the wealthiest Natives in the above localities. The drains in that part of the Town, though cleared every day, are most disgusting owing to the immense quantity of offensive matter which is let off daily into them from the houses.* * No nuisances in the other Divisions ever equalled those I discovered in some places in this.* Any fine below the maximum fixed by the Act is of no effect, as the accumulation of filth is so great in some of these places that the parties prefer paying the fines to clearing their premises, which would require considerable labour and great expenditure of money."* These facts serve to show how great are the difficulties with which the work of sanitary improvement in Calcutta has to contend. It may be added, that there could hardly be found a better illustration of the truth of the assertion made by the President of our Commission in the Minute to which reference has been already made, that in such a state of society as this of Calcutta, a system of administration, based upon the model of English municipal institutions, must be unsuitable and inefficient.

92. It would, however, be most unjust to say that there has been no improvement during the past year. On the contrary, although matters are still, in some respects, almost as bad as ever, very great progress has been made.

93. The practice of throwing the dead bodies of men and animals from the city into the river has been entirely stopped. The hospitals and prisons of the Government no longer dispose of their dead in this shameful manner, and the bodies of all Hindoo paupers are burned at the expense of the Municipality. This great reform has been effected without the slightest difficulty or opposition of any kind, and at a trifling expense. The question which arose during the earlier part of the past year regarding the proposed removal from Calcutta of the places set apart for burning the dead to situations outside the city, is only noticed here because it created at the time considerable interest and led to much discussion. A most exaggerated importance was given to the subject, not, however, by the Native community, for the notion, that the Hindoos looked with apprehension upon the action taken by the Government as an attack upon their religion, had no foundation. The Municipality of Calcutta was allowed by the Government of Bengal to dispose of the question in its own way. That the practice of burning the dead in the midst of the city is indecent and objectionable is evident to every Englishman, and in almost any other part of India but Calcutta this would be the opinion of the better classes of the Native community.

Looking upon the matter, however, as one that concerns the public health, it has little real importance, and measures are being carried out by the Municipality which will probably remove all objection of this kind.

94. During the year a sanitary survey of the whole Town was made by the Health Officer, Dr. Tonnerre, with the object of carrying into immediate execution the most urgent reforms, and of ascertaining the best mode of suppressing the more common nuisances. The drains and sewers of the town which were choked up with the accumulated filth of many years have been cleared out. The amount of filth and silt and rubbish is enormous that has been thus removed from many parts of the town. Some of the most important drains had become altogether obliterated, with this result, that during the rainy season a considerable part of the most populous and wealthy quarters of the town was often under water. These have been re-opened, and the benefit will be great.

Many offensive trades and occupations which caused insufferable and dangerous nuisances have, for the first time, been banished from the interior of the city. The practices which the Health Officer discovered and which have now been stopped were most abominable. Measures have also been taken for the regulation of the public latrines, and although these are still in many cases disgusting nuisances, they are not so bad as they used to be.

One hundred urinals are in course of construction in the principal thoroughfares. They will, it is hoped, be kept in good order, and means of de-odorising them will be provided. It may be anticipated, as the Health Officer has observed, that the erection of these buildings will not only improve the sanitary condition of the streets, but will make it possible to enforce common rules of decency, which are now totally disregarded.

95. In the Conservancy Department the establishments have been largely increased. The refuse of the town is now carted away from the streets daily, instead of being left exposed for days or weeks; the offal which was formerly thrown into tanks and holes within the town or into the river, and the carcasses of animals, are now taken away daily to a distance of three miles and burned in a kiln without any offensive odour, thus, as the Health Officer says, "freeing the town from one of its most noxious and disgraceful nuisances." A still greater improvement has been undertaken and partially carried out in the removal of the night soil, the greater portion of which formerly found its way into the open drains of the streets. This will be taken to waste ground at a distance of three miles beyond the eastern boundary of the town, and there buried, and arrangements have been made for removing the filth in air-tight vessels so that no nuisance shall be caused. The destruction caused by the hurricane in October caused delay in carrying out the new scheme of operations, but it has already been partly introduced, and it is hoped that before the coming rainy season the practice of throwing night soil into the river will have altogether ceased. The Municipality has further made arrangements for

constructing a Railway for conservancy purposes. This is now in progress and it will greatly facilitate the task of getting rid of the filth and rubbish of the town.

96. It may properly be noticed here that the great drainage and sewerage works of Calcutta have made good progress during the year. It is hoped that it will be possible, before very long, to bring into use a considerable portion of the new system, and better means will then be afforded than any which now exist of judging how far this great and costly undertaking is likely to prove successful. The time has past for criticising these works. They have now made such progress that they must clearly be carried on to completion, and we can only hope that the fears expressed by many high authorities will be shown by experience to have been unfounded, and that this great system of drainage will prove, as some anticipate, a remedy for the most serious of the present sanitary evils of Calcutta.

97. The sale of unwholesome food and drink in Calcutta has been the subject of much consideration during the past year. The inquiries of Dr. Chevers and of other Officers have shown that there is reason for believing that much of the liquor sold in Calcutta is adulterated and drugged to a dangerous extent, and that the European Sailors and Soldiers are among the chief sufferers from these practices. The sale of food unfit for human consumption has also been undoubtedly very common. Measures have, for the first time, been taken during the past year for dealing with this important subject. A special establishment has been appointed with the object of enabling the Health Officer to carry out the systematic inspection of food and drink exposed for sale in shops and public markets, and to ensure the seizure of unwholesome articles. Large quantities of food and drink unfit for consumption have been confiscated since these measures were commenced, and although much remains to be done, there can be no doubt that much good has been effected.

98. The disgusting condition of the slaughter-houses from which all the meat consumed in Calcutta is supplied, was brought prominently to the notice of the Government of Bengal by the Sanitary Commission in March 1864. Not a single properly regulated Slaughter-house exists, and nothing could possibly be more filthy and revolting than their condition when we inspected them. It is satisfactory to be able to report that measures have been taken which it is hoped will lead to the speedy and complete removal of one of the worst of the sanitary evils of Calcutta. The Municipality has undertaken to construct at once a large public slaughter-house in the suburbs of Calcutta, according to approved European models, and to carry on the management by means of its own servants. The existing law not providing the necessary powers for the proper superintendence and regulation of such establishments, an Act (No. VII of 1865) has been passed by the Bengal Council for this purpose. This Act prohibits the use in the suburbs of Calcutta of any unlicensed slaughter-house; it provides for the adoption in all cases of proper conservancy arrangements; for making bye-laws for the management and inspection of slaughter-houses and markets; and for the seizure of unwholesome meat or fish. The provisions of this Act

may be extended to other places in Bengal, and there can be no doubt that they will prove extremely useful.

99. Another measure of the very first importance to the public health has at last, after many years of fruitless discussion, reached a point at which we may reasonably hope that we are about to obtain an actual result. We refer to the scheme which has been matured by Mr. Clarke, the Engineer of the Municipality, for supplying the City of Calcutta with water, at an estimated cost of more than £600,000. The Municipality has declared that it is able and ready to commence immediately the execution of the plan, and although the propositions that have been made have not, so far as we are informed, been finally sanctioned by the Government of Bengal, and although in some respects the project may possibly receive considerable modification, it may be expected that action of some kind will soon be taken.* Of all the measures that are required for the improvement of Calcutta, the provision of an ample supply of water is perhaps the most important. It is not necessary that we should now describe in detail the project which has been adopted by the Municipality. The source of supply will be the Hooghly at Pulta, about 14 miles above Calcutta, and, after being passed through filtering beds, the water will be conveyed in a covered channel to all parts of the city. It is much to be regretted that the quality of the water at Pulta is not more satisfactory, and our Commission very unwillingly accepted the conclusion that no other source of supply is practicable. A reference has lately been made to the Home Government at our suggestion, with the object of obtaining the opinion of the War Office Sanitary Commission regarding the methods of filtration which ought to be adopted.

100. Towards the end of 1864, and during the earlier months of the present year, Small-pox was excessively prevalent in Calcutta, and there has been an epidemic of this disease over a great part of the Bengal Presidency. A Small-pox Hospital was established in Calcutta, and proved very useful. Dr. Chuckerbutty, who had the management of the Hospital, has given an interesting account of the facts observed. Between the 23rd December 1864 and 13th April 1865, 627 persons were admitted into the Hospital. Of these, 354 were unprotected by inoculation or vaccination, and among them there were 185 deaths, or 52 per cent. One hundred and sixty persons were admitted after previous vaccination, and among them 43 died, or 29 per cent; among 12 of these admissions in which vaccination had been twice performed, there were no deaths. Sixty-five persons were admitted after inoculation, and among them 20 died, or 30 per cent.—“This result,” writes Dr. Chuckerbutty, “obtained in a country where inoculation has been the rule, and vaccination the exemption, is a most significant fact. The diminution of the risk is greater from inoculation than vaccination, and the popular belief in this case is perfectly correct.”

The Establishment of the Small-pox Hospital in Calcutta was followed by another useful measure, the provision, at each of the Police Stations, of means of conveying to Hospital persons suffering from Small-pox and other contagious diseases, and the issue of orders to the Police prohibiting them from supplying any public conveyance for such purposes.

* We understand that, since this was written, the project has been sanctioned by the Government of Bengal.

101. The state of the Calcutta Jail and House of Correction formed the subject of a special Report to the Government during the past year. These Jails were certainly the filthiest and the worst managed of any that could be found on this side of India. We need not now repeat the account that was formerly given of them. It is sufficient to state that great improvements have been carried out, and that an Act of the Legislature has given to the Government of Bengal the power, which it did not possess before, of establishing in these Jails a proper system of management and supervision.

102. A worse scandal than the condition of the Calcutta Jail was that of the Calcutta Police Hospital. The state of filth in which the buildings of this Institution were found at the beginning of the past year was shameful, and the accounts that have been given of the mismanagement and actual cruelty that went on would hardly be credible were the evidence less conclusive. It would be difficult to find a more discreditable history than that of the Police Hospital of Calcutta, which the Sanitary Commission had to report last year to the Government. Matters have long ago been placed on a more satisfactory footing, and the erection of a new Hospital, instead of the present inconvenient and unsuitable buildings, has been ordered.

103. The other Hospitals of Calcutta have, we need hardly say, been managed very differently. But, as Dr. Fayrer has justly observed, however excellent may be the Medical care and supervision afforded, every Hospital in Calcutta is defective in the most important essentials of arrangement and construction. "The Hospitals of Calcutta," he writes, "were built before Hospital construction had received the scientific consideration to which it has been deemed entitled of late years, and though we have more than one noble Institution, we cannot strictly be said to have really one good Hospital."*

We have noticed elsewhere the arrangements that have been made for introducing Female Nursing into the Calcutta Hospitals, and the plans which are now under consideration for the further extension of the system.

104. A Chair of Hygiene was established during the past year in connection with the Calcutta Medical College, and the Secretary to the Sanitary Commission was appointed to be the first Professor. Lectures on many subjects affecting the public health were delivered during the season.

105. The registration of births and deaths has been established in Calcutta during the past year. Considering the novelty of the system and the ignorance of the people, no great accuracy of registration could at first be expected. The Returns of births have hitherto been of little value, and those of deaths probably exhibit no great approximation to the truth. A good beginning has however been made, and there is no reason for doubting that the Returns will go on improving in value. Their utility will not properly be felt so long as there is no census of the population of the town. The estimates of population that have been made during the last fifty years have varied from 200,000 to 700,000, and there is nothing to show

the real number of inhabitants. The best authorities at present consider that the population is about 400,000 or 500,000. It is hoped that the want of a census will be supplied during the present year. In the present state of ignorance it is useless to attempt to estimate the actual rate of mortality in Calcutta among any class of the population. Even, however, in their present imperfect state, the Returns possess considerable interest. The following table is taken from them. The figures show the number of deaths from various causes recorded during the last nine months of 1864:—

RELIGION.	ALL CAUSES.		SMALL-POX.		DYSENTERY.		DIARRHŒA.		CHOLERA.		FEVER.		PHTHISIS.		HEPATITIS.	
	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.	Male.	Female.
Christians ...	302	219	12	13	28	16	6	17	92	29	28	23	19	11	5	...
Hindoos ...	4,671	3,047	221	189	594	522	104	161	1,562	615	1,131	763	147	81	3	2
Mahomedans ...	1,778	982	84	83	223	158	19	29	515	162	568	338	61	31	...	...

106. More than 80 per cent. of the recorded deaths were caused by Mortality from Cholera in zymotic diseases. Cholera, Dysentery, and Fever, Calcutta. were the most fatal. No less than 23 per cent. of the deaths among Christians, 28 per cent. among Hindoos, and 25 per cent. among Mahomedans were due to Cholera. Nor was this any peculiarity of the past year. The inquiries of Dr. Hugh Macpherson have shown that during the twenty years ending with 1860, Cholera has never been absent from Calcutta. "It reaches," says the Report of the Cholera Commission, "its lowest point in August, when about 150 out of every thousand deaths among the Native population are attributable to it. It then gradually rises through the autumn and winter, reaches its climax in April, and then again falls regularly until August. When the disease is at its highest point of intensity, it causes every year more than half of the total number of deaths."

These facts and figures, however, do not, so far as we are able to judge, give a correct representation of the average mortality for Cholera among the fixed European population of Calcutta. The Report of the Cholera Commission, basing its conclusions on Dr. Hugh Macpherson's Researches, states that "in the five years ending with 1860, there were 716 deaths from Cholera among the European Protestant population. This was one-fourth of the deaths recorded from all causes; of these 716 deaths, 76 per cent. occurred among the floating population; consisting chiefly of Sailors visiting the port. * * In the five years in question, out of a total number of 1,170 deaths from all causes among the European floating population, no less than 46 per cent. occurred from Cholera, while among the resident male population, out of a total number of 822 deaths, only 13·7 were due to that cause."

107. The Commission has frequently, during the past year, had occasion Mortality among Sailors in to notice the excessive mortality among the Sailors Calcutta. in the port of Calcutta, and it has addressed the Municipality and the Government of Bengal on the subject. Although there

* Surgery in Bengal: an address to the Bengal Branch of the British Medical Association 1865. p. 10.

is ample evidence to show that the rate of mortality is very high, there are no available statistics in which complete confidence can be placed. We have pointed out the great importance of supplying this want, and we believe that there need be no difficulty whatever in causing proper registers to be maintained, which should at all times show the number of Sailors in the port, and the mortality that occurs among them. The almost total absence of means for protecting the lives and health of European Sailors in Calcutta, is, at the present time, very greatly to be regretted. There are practical difficulties to be overcome before an effectual remedy will be applied to existing evils, but there is no reason why they should be considered insuperable. Our Commission hopes that it may be able before long to make further recommendations to the Government on this subject.

108. We think that it will be evident from the foregoing account that, however serious may be the evils which remain, there has been great progress made in carrying out sanitary improvements during the past year in Calcutta. Among the causes which have promoted this result, not the least important has been the adoption of a measure which was formerly recommended by our Commission, the appointment of the Chairman of the Municipality to be also the Head of the Police Establishments. This has provided a stronger executive authority than before existed, and the old and mischievous antagonism between the Municipal and Police Authorities has been got rid of. Other measures recommended by the Commission have also been authorized by special legislation for increasing the power of the local Magistrates in dealing summarily with offences affecting the public health and convenience, and in preventing nuisances. It is one of the signs of the increased vigour of administration that, whereas in 1863 the total amount of fines paid through the Police to the Municipality did not exceed five thousand Rupees, the amount in 1864, on account of the Conservancy Department alone, was upwards of thirty thousand Rupees.*

109. We have noticed in the present Report only the more important subjects which have come before our Commission during the past year. On many other questions affecting the health of the Army, or of other classes of the population, separate Reports have been submitted to the Government, or other action has been taken. The indication of defects will always be the chief ordinary duty of a body such as ours, and it is, therefore, not to be wondered at while we have found many occasions for blame since our Commission was appointed, we have found comparatively few for praise. When, however, we look back upon the past, we believe that it may be said, with perfect truth, that in carrying out or in laying the foundation of great sanitary improvements, no Government has ever done more in an equally short space of time than the Government of India has done during the last few years.

* Health Officer's Report, 1865, page 9.

Scurvy at Mooltan.

112.

Read again Minutes Nos. 35, 54, and 60 of the Proceedings of the Commission during 1865.

Read Military Department docket No. 38, dated 3rd June 1865, forwarding for the information of the Commission, with reference to the President's letter No. 153 of 30th March 1865, a copy of the following letter No. 37, dated 3rd June 1865, from the Secretary to the Government of India, Military Department, to the Adjutant General.

"I am directed to acknowledge your letter No. 260 E., dated 19th May 1865, on the subject of the health of the troops serving at Mooltan, and the measures to be adopted for preserving it.

"2. In reply I am to acquaint you, for the information of His Excellency the Commander-in-Chief, that the Right Hon'ble the Governor General in Council concurs in the opinion of His Excellency, and of Mr. Strachey, that there is no sufficient cause shown why British Regiments should be removed from Mooltan, after having been stationed there one year only.

"3. His Excellency in Council will impress upon the Commissariat Department the importance of every effort being made to secure a long and sufficient supply of fresh potatoes for the use of the Garrison.

"4. With regard to the issue of preserved potatoes with the milk and butter which are reported necessary adjuncts of that article, the Governor General in Council will issue no orders until the result of the Commissariat endeavours to procure fresh vegetables by railway and local produce is ascertained.

"5. Indeed the supply of preserved vegetables is extremely limited. The Home Government has not yet complied with the indent made on them for these articles, and the Commissariat is therefore dependant on the local markets for them. Great economy will, therefore, have to be observed in their distribution, should it be found necessary to serve them out.

"6. The issue of anti-scorbutic articles, such as lime-juice and pickles, has already been sanctioned.

"7. As a prophylactic measure His Excellency in Council sanctions the daily issue of quinine to the Soldiers, but His Excellency in Council is not, I am to state, prepared to sanction its preparation as "Quinine wine" for issue, involving, as it would, the importation of wine from the Cape or elsewhere. It is, I am to remark, inexpedient to multiply, except on clear necessity, the articles the Government has to import for the use of the troops. This issue of quinine, the Governor General in Council assumes, is only intended to be made during the months when fever may be expected to be prevalent.

113.

Calculation of Prison Death-rates.

Read the following Memorandum by Mr. J. P. Walker, the Secretary to the Commission, on the present defective method of calculating prison death-rates:—

1. In calculating the death-rate in Indian prisons, the actual number of deaths is not distributed, or at least not generally so, over the prison population, i. e., the number of prisoners exposed to risk during the year, but over what is

termed the "daily average strength" (*i. e.*, the aggregate of the daily number of prisoners divided by the number of days in the year).

2. By the former method a simple, constant result is obtained, intelligible to every one, the basis of the calculation being that a man is neither more nor less than a single individual, who having but one life can die but once.

3. By the latter method an exaggerated and inconstant result is necessarily obtained from the basis of the calculation being that the unit of "daily average strength" is an "average man," an ideal being sometimes having any number of lives—from one to three hundred and sixty-five—either to be enjoyed or parted with during the calendar year.

4. The varying constitution of the "average man" is shown below:—

- A. 1 prisoner in jail for 12 months is an average man.
- B. 2 prisoners in jail for 6 months are an average man.
- C. 4 prisoners in jail for 3 months are an average man.
- D. 6 prisoners in jail for 2 months are an average man.
- E. 12 prisoners in jail for 1 month are an average man.
- F. 52 prisoners in jail for 1 week are an average man.
- G. 365 prisoners in jail for 1 day are an average man.

5. In the Prison Mortality Returns although it may require—according to time—1, or 2, or 4, or 6, or 12, or 52, or 365 individuals to make a living "average man," and although in calculating the death-rate percentage, no importance is attached to whether the hundred average men are represented by one hundred or one thousand individuals, still a dead prisoner is regarded as neither more nor less than one man.

6. If during any calendar year 365 men were imprisoned, each for one day, in a given jail, the result would be that one "average man" had been imprisoned for a year, and if—what is possible but not probable—all these men died while in jail, the "average man" would have died 365 times, with a corresponding high rate of mortality.

7. The exaggeration, inconstancy, and worthlessness of death-rates deduced by distributing the actual deaths over the "daily average strength" in custody during the year will be apparent from the following Table, in which the letters A, B, C, D, E, F, and G, represent seven Lock-ups, each having the same "daily average strength," *viz.*, one man during the year, but having that one man variously constituted, as indicated by the corresponding letters in the preceding Table:—

During the Calendar year one prisoner is supposed to have died in each Lock-up.				Death-rate calculated on daily average strength.	Death-rate calculated in prison population.
A.	1 prisoner	× 12 months	...	100·00 p. c.	100·00 p. c.
B.	2	× 6 "	...	100·00 p. c.	50·00 p. c.
C.	4	× 3 "	...	100·00 p. c.	25·00 p. c.
D.	6	× 2 "	...	100·00 p. c.	16·66 p. c.
E.	12	× 1 "	...	100·00 p. c.	8·33 p. c.
F.	52	× 1 week	...	100·00 p. c.	1·92 p. c.
G.	365	× 1 day	...	100·00 p. c.	0·27 p. c.

8. The exaggerating effect of the present defective method of calculating the death-rate in prisons may be illustrated from an actual case, taken from the Report on the Jails of the Lower Provinces for 1863, wherein it is shown that during the calendar year the prison population of the Kassiah Hills Jail was 76 (*viz.*, 19 present on 1st January, plus 57 admissions); amongst these 21 deaths occurred; consequently the death-rate was 27·63 per cent. ($76 : 21 :: 100 : 27·63$). This is intelligible, yet the death-rate ("ratio per cent. of deaths to average strength") is recorded as 87·50 per cent.

9. The exaggerated death-rate of 87·50 per cent. is based on the daily average number of prisoners in custody during the year having been 24 (aggregated daily number $8726 \div 365 = 23·9$). It might have been one-third less or ten times greater, according to the duration of the imprisonment before release by death or expiry of sentence of the 76 prisoners. Had all the 76 prisoners been present in Jail throughout the year, and the 21 deaths occurred on the night of the 31st December, the aggregate of the daily number in custody would have increased to 27,740 (76×365), the daily strength of prisoners would have been 76, and the death-rate 27·63 per cent.

On the other hand had the 57 admissions occurred on the 1st January 1863, and all been sentenced to one day's imprisonment, and had the 21 deaths occurred that day amongst the 76 prisoners present in Jail, the daily average strength of prisoners in custody during the year would have been 0·2—two-tenths of one man—($76 \div 365 = 0·2$), and if according to the practice in force the 21 deaths were distributed over the fifth part of an "average man" an absurdly high and impossible death-rate would result. In such a case the wanting four-fifths would have been added to complete the "average man," and his capacity for dying restricted to twenty-one times during the year.

I. The subject of the mortality of prisoners in Indian Jails has been frequently considered by the Sanitary Commission. Although there can be no doubt that the actual mortality has commonly been excessively high, it is of opinion that the mode of calculation, which is now, it is believed, universally followed, frequently gives a very false representation of the real mortality. The grounds upon which this opinion has been formed is explained in the memorandum by the Secretary.

II. Of the methods of calculating prison death-rates discussed in the Secretary's memorandum, that now in vogue, which may be called daily average strength system, takes cognizance of the period passed by the prisoners in Jail during the year under review, but it gives with the same number of deaths a constant rate of mortality, although the number of prisoners actually imprisoned in the different Jails during the year may vary very widely. Further it takes no notice of the period passed by the prisoners in Jail previous to the commencement of the year under review. The other—or the total prison population system—is altogether independent of the duration of the periods of imprisonment, whether in the year under review or previously.

By the first method is derived a rate of mortality per annum which is mathematically correct; by the second is obtained the ratio of deaths to the actual number of prisoners in Jail during the year, irrespective of the time passed by them in jail. The latter method is chiefly open to objection, because the result

which it gives is likely to be confounded with a *per annum* death-rate, the standard adopted all over the civilized world, but to which it is clearly unconformable: thus, if 100 men were imprisoned for a week only, and lost ten of their number, the percentage of deaths would, according to the last mentioned method, be 10 per cent., but according to the former no less than 520 per cent. per annum.

III. Dr. Mouat, the Inspector General of Jails, Lower Provinces, has referred to this subject in his annual reports for 1863 and 1863-64, as well as in reports for previous years. He has long maintained that the present method of calculation should be abandoned, and he has expressed the opinion that if the arithmetic mean between the ratio of mortality among the whole prison population of the year, and the rate calculated upon the daily average strength be taken, a true average will be obtained for estimating the real risks of imprisonment. The calculation in the former case exhibits the death-rate in too favourable, and in the latter in too unfavourable a light, but the Commission thinks it obvious that Dr. Mouat's proposal for an arithmetic mean does not rest on any sound basis, and its adoption cannot be recommended.

IV. It is apprehended that the question of calculating death-rates in prisons must have been discussed in Europe, and before making any final recommendations to Government regarding it, the Commission is desirous of learning what method of calculating the death-rate is followed in calculating the death-rate in the prisons of England and of France. The Commission has failed to ascertain this, and therefore considers that the best means of obtaining the required information and advice would be to solicit the Government of India, in the Military Department, to move the Right Hon'ble the Secretary of State to make a reference on the subject to the War Office Sanitary Commission.

V. Pending the result of a reference to England, the Commission considers it desirable to recommend for the consideration of the Government of India, that the Local Governments and Administrations be requested to issue instructions to the Jail Authorities to give in their future Reports a Statistical Table with contiguous columns showing the following information:—

- (1). Total prison population during the year.
- (2). Average duration of imprisonment.
- (3). Total number of deaths during the year.
- (4). Average duration of imprisonment of those who died.
- (5). Percentage of deaths to total prison population.
- (6). Percentage of deaths per annum calculated on daily average strength.

VI. Thus the data for an intelligent criticism of the mortality in our Jails will be afforded, thus also the inutility of comparing unlike things be made evident, for it requires little argument to demonstrate the absurdity of comparing, except under proper classification, the rate of mortality in a central Jail, with that in a district Jail, or a Lock-up, in all three of which the prisoners are under altogether different circumstances.

VII. Independently of the obvious reasons which make it important that this subject should be placed upon a proper footing, the Commission thinks that it is unwise and mischievous to proclaim to the world, as is now being done, that our prisoners are dying at a rate which among the free population is absolutely unheard of. Thus to take the example given in para. 8 of the Secretary's memorandum, the Government has now, in the opinion of the public, to bear the

discredit of having allowed in one of its Jails no less than 87·5 per cent. of the prison population to die in one year, the truth being that these figures—although in one sense mathematically correct—really represent no fact that has any useful significance.

114. Returns of Epidemic Sickness among British Troops.

Read letter No. 169, dated 17th October 1864, from the Secretary to the Government of India, Military Department, to the Adjutant General, regarding the transmission daily and bi-weekly of information regarding Epidemic Cholera to the Government of India.

Read General Order by His Excellency the Commander-in-Chief, dated 27th June 1865, prescribing forms of Returns to be submitted by Regiments of British Cavalry and Infantry, and Batteries of Royal Artillery, when cholera prevails epidemically.

OPINION.

I. The Commission considers that one of the most important duties of Medical and Sanitary Officers in this Presidency at the present time, is to watch carefully the operation of the rules recommended by the Cholera Commission, and sanctioned by the Government of India, with the object of preventing the spread of cholera among the European troops. It is only by this means that the points on which the rules are defective can be learned as a preliminary to their amendment.

II. It appears very desirable that the Commission should at all times receive full information on this subject. But it is at the same time unwilling to propose any thing which would throw more labour in preparing Reports and Returns upon Medical Officers who, during seasons of epidemic sickness, have already quite as much work of this kind as can properly be expected from them.

III. In letter No. 169, dated 17th October 1864, from the Secretary to the Government of India, Military Department, to the Adjutant General, it was ordered that whenever the Government is located at the same place as Army Head Quarters, all information received by His Excellency the Commander-in-Chief regarding the progress of epidemic cholera should be sent daily to Government, or as often as may be received; similar information being sent at least twice every week under similar circumstances when His Excellency the Commander-in-Chief is separated from the Government. It is presumed that under these orders the Returns and Reports prescribed in G. O. C. C., dated 7th June 1865, will be forwarded to the Government. Should these papers not be required to be kept in the Military Department, it would be desirable that they should be sent to this Commission as soon after their receipt as possible, unless, indeed, it should be considered preferable that the Government should receive them through this Commission.

IV. It also appears very desirable that this Commission should receive from the Heads of both the Indian and Her Majesty's Medical Services all other general Reports regarding epidemics of cholera or other serious diseases, whether among the European or Native troops, prisoners in Jail, or the civil population, which may reach them; for, in addition to the ordinary Reports and Returns furnished to His Excellency the Commander-in-Chief and forwarded by him to the

Government, there are always special Reports furnished to the Heads of the Medical Departments after any serious outbreak of sickness. These might be sent to the Commission either in original or copied, as most convenient, and the same course might be followed with other reports containing information regarding epidemic sickness.

V. The President was requested to embody the views of the Commission on the subject in a communication for the information of the Government of India, in the Military Department.

Routine.

The Commission adjourned.

(Signed) JOHN STRACHEY, *President,*
Sanitary Commission for Bengal.

(True Copy)

[Signature]
Secretary.

M. D.
1865
Rev = 47/66

PROCEEDINGS OF MEETINGS
OF THE
SANITARY COMMISSION
FOR BENGAL,
DURING THE MONTH OF JUNE 1865.

15th Aug/66
Q 108
Rev. Nov. 15th Aug/66 du L 209

PROCEEDINGS OF A MEETING OF THE SANITARY COMMISSION
FOR BENGAL, ON THE 14TH JULY 1865, AT SIMLA.

PRESENT :

*JOHN STRACHEY, Esq., C. S. President.
SURGEON MAJOR J. P. WALKER, M. D. Member and Secretary.

115. Excessive mortality among British Troops at Barrackpore in 1864.

I. The Commission observes that during the year 1864 the rate of mortality among the European Troops at Barrackpore was, with one exception, higher than in any station in the Bengal Presidency.

II. The mortality appears to have reached nearly 40 per thousand, being about double the average rate in the Army for the year, and more than double the rates (excluding deaths out of hospital) which prevailed in the neighbouring stations of Dum-Dum and Fort William.

III. The mortality from all causes among the European Troops at Barrackpore during the last six years was as follows :—

1859	...	...	...	...	...	...	44.82
1860	...	...	...	...	...	...	25.99
1861	...	...	...	...	...	...	35.93
1862	...	...	...	...	...	...	16.63
1863	...	...	...	...	...	...	20.50
1864	...	...	...	...	...	...	39.56

IV. The Commission has been unable to discover the causes of this high rate of mortality, and begs to recommend to the Government of India that His Excellency the Commander-in-Chief may be moved to institute an enquiry regarding the exceptional circumstances which it is apprehended must have conducted to such an excessively high death-rate.

116. Conservancy of Slaughter-houses.—Effect of dry earth on offal, and lime on blood.

Read again Minute No. 223 of the Proceedings of the Commission, on the 12th September 1864.

Read Commission's letter No. 640, dated 14th September 1864, transmitting, for the information

* Les intestines et matières excrémentielles devraient être divisés et mélangés avec deux fois environ leur volume de terre, puis mis en tas et recouverts de fumier ordinaire, hors de la ville, dans les exploitations rurales. Au bout de quelques mois, ces masses, étendues sur les terres, formeraient d'excellents engrais.
Le sang devrait être recueilli dans les bassins arrondis, en pierre, en fonte, on en fer ; et, au fur et à mesure des saignées, mélangé avec 4 ou 5 per 100 de chaux éteinte en poudre (l'extinction s'opère en jetant sur la chaux vive, en cinq ou six minutes, environ $\frac{1}{2}$ on $\frac{2}{3}$ de son poids d'eau).
Ce mélange de chaux et sang se solidifie promptement ; il peut être des-éché étendu à l'air, sous des hangars, sans se putréfier ; écrasé pendant sa dessiccation avec une batte en bois, il est obtenu en poudre grenue ; on peut l'expédier aux fermiers, en sacs, en barilou en couffe de jonc, comme un engrais riche, valant presque le guano, surtout si on l'ajoute aux fumieres usuelles, ordinairement insuffisantes. Trebuchet—Moyens d'utiliser à Constantinople les debris d'animaux.

tion of the Commissary General, an extract from the 16th volume of the Annales D'Hygiène Publique, * showing how the blood and offal of slaughter animals are disposed of in Constantinople by lime and dry earth, and soliciting the

favour of his having experiments instituted as to the effect of dry earth on the blood, excrement, and offal of slaughtered animals, to enable the Commission to come to a definite conclusion as to its applicability to slaughter-houses in India.

Read letter No. 2738, dated 1st July 1865, from the Commissary

Dinapore, No. 114, dated 2nd May 1865.
 Bagackpore, No. 100, dated 6th May 1865.
 Cawnpore, No. 160, dated 8th May 1865.
 Benares, No. 102, dated 5th June 1865.
 Fort William, No. 214, dated 27th June 1865.

General in reply, forwarding for the information of the Commission the reports of the Executive Commissariat Officers noted in the margin, on the trial made by them,

and intimating that the result in every case has been satisfactory.

The Sub-Assistant Commissary General at Dinapore reports that "dry earth has been tried at the slaughter-house, Dinapore, during the last month, in treating the blood, &c., of animals slaughtered, and that it has succeeded admirably, not the slightest smell being perceptible."

The Assistant Commissary General at Fort William gives the following extract from a letter by the slaughter-house Sergeant :—

"As a means of preserving cleanliness and a healthy atmosphere in the vicinity of a slaughter-house, which could only otherwise be obtained by removing the offal to a distance, I consider it successful, as the matter which has been so treated here having been exposed to the influences, successively of sun and rain, has never emitted effluvia perceptible at five yards' distance.

"The quantity of earth ordered to be used seems to me, however, to be greater than is necessary. I think if the blood and intestines only were mixed with twice their quantity of earth, and this in its turn with the contents of the intestines, the whole to be covered with the dung removed from the cattle pens, the purpose would be equally well served, the manure thus obtained if less in quantity would be of greater proportionate value, and large excavations, which might sometimes be objectionable, would be so far avoided."

Regarding the use of lime for the blood, the Deputy Assistant Commissary General reports as follows :—

"1st. I collected 15 seers (say 30 lbs) of blood in a naund, or earthen receptacle, and mixed into it while still hot 5 per cent. of fresh slack-lime, and exposed it to the action of the air, but under cover, for one month, the result is exactly as explained in the translation which accompanied the correspondence, viz., the blood never putrified, nor became offensive, but gradually dried up when it was easily pounded into a powder.

"This description of manure must doubtless be of considerable value to scientific farmers in Europe, and would be, I imagine, of particular value in the production of green crops, but in this country, where the inhabitants are superstitious and prejudiced in the extreme, such manure is valueless. The native cultivator considers having the dry blood of the sacred cow sprinkled over his land likely to bring a curse on it, engender disease in his household, and bring famine in the land.

"There would be some expense attached to such a process, as it would be necessary to have a receptacle for each day in the month, and one for every five or six head of cattle killed.

"The dry earth process also succeeds, but, for the same reasons as above mentioned, is rendered useless to the Indian cultivator."

OPINION.

I. The Commission concurs with the Commissary General in considering the results obtained both with dry earth and with lime in the conservancy operations of slaughter-houses very satisfactory.

II. The utility of lime may be taken advantage of in exceptional circumstances, but the utility of dry earth as an antiseptic deodorant should be availed of in all slaughter-houses for absorbing putrifiable matters, and thus admitting of their complete removal after the day's operations, so as to prevent vitiation of the air by the products of decomposition; and also for enabling the sewage to be

daily removed for final disposal by burial outside cantonments in an inoffensive manner both as regards sight and smell.

III. Under exceptional circumstances—as in entrenched camps and forts during war, and especially during sieges—when conservancy arrangements for the prompt disposal of sewage are difficult or impossible, the use of dry earth and lime would prove of great service in admitting of the sewage from slaughter places, and dead animals generally, being temporarily disposed of without proving noisome and noxious.

IV. The thanks of the Commission are due to Colonel J. D. Macpherson, c. B., the Commissary General, for the institution of experiments at its suggestion, and favouring it with the results.

117. Over-crowding in Hospitals for European Troops.

Read again Minute No. 48 of the Proceedings of the Commission on the 30th March 1865 on over-crowding in hospitals for European Troops.

Read the following Circular No. 59 of 1865 issued by the Government of India, in the Public Works Department.

Proceedings of the Governor General of India in Council, Public Works Department, dated Simla, the 23rd June 1865.

READ again the following papers :—

Public Works Department Circular No. 14, dated 15th February 1865, on the subject of obviating the over-crowding of barracks and sleeping apartments of British soldiers.

Memorandum dated 25th August 1864, by Lieutenant Colonel Crommelin, upon some of the principles which should be attended to in designing Hospitals of European Troops in India.

Read a letter No. 152, dated 30th March 1865, from the President of the Sanitary Commission for Bengal.

RESOLUTION.—In the letter No. 152 above read, the Sanitary Commission for Bengal recommends that orders for prevention of over-crowding of Hospitals, by the immediate provision of a sufficient amount of temporary accommodation, should be issued similar to those laid down in Public Works Department Circular No. 14 of 1865 in regard to barracks.

"2. The Commission consider that hospital accommodation is insufficient "when it does not provide for 12 per cent. of the average strength of the troops, at the rate of 130 superficial feet per patient;" this percentage and space being recommended in the Memorandum by Lieutenant Colonel Crommelin on hospitals for European troops, and approved by the Commission.

The Governor General in Council observes that whilst it is very desirable that hospital accommodation for the European troops should be provided to such an extent as to prevent over-crowding, it is at the same time important, before arriving at a final conclusion on any general measure such as that proposed by the Sanitary Commission, to consider whether it is absolutely necessary to authorize the full extent of space now recommended.

"4. From an analysis of the Return for February 1865 of the sick in the hospitals of the various arms of the service, it is observed that the general

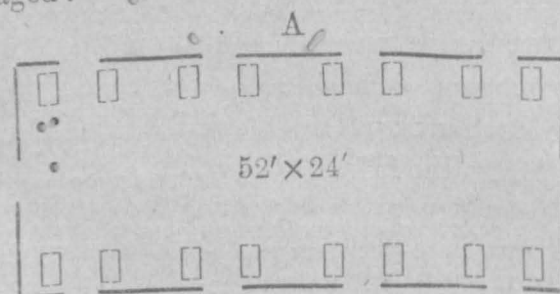
average of patients is about 5 per cent. But the month of February being one of the healthiest months, and some of the corps having in that month 7, 8, and even 9 per cent. as an average daily ratio of sick in hospital, the Governor General in Council does not consider 12 per cent. too high a ratio to assume, with reference to that which it is advisable to prepare for during the more sickly months of the year.

"5. With regard to the space to be allowed to each patient, the Governor General in Council observes that this must, in a great measure, be regulated by the nature and extent of accommodation available in the wards of existing hospitals. In all new hospitals that may hereafter be constructed, it will of course be easy to arrange that each patient shall have the space now recommended (*viz.*, 130 superficial feet,) should it be eventually decided that such space ought to be given; but the adoption, at the outset, of this full allowance, with reference to existing accommodation, would, from the peculiar construction of present hospitals, not only entail the immediate necessity of constructing a vast amount of temporary accommodation, but would deprive many patients of good shelter, for though the full allowance may be desirable, still it can hardly be said to be absolutely necessary.

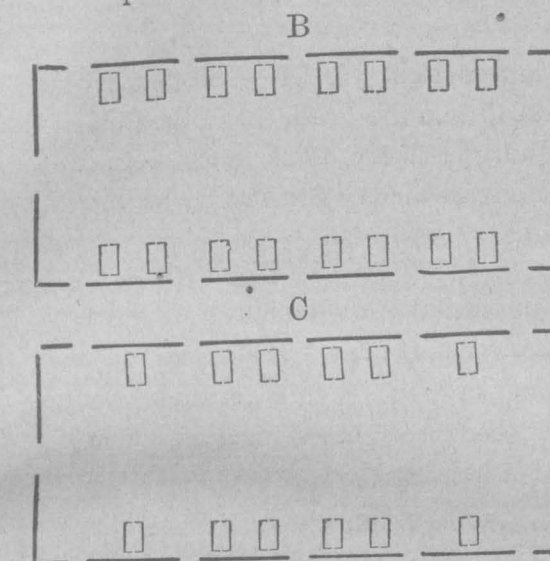
"6. In illustration of the foregoing remark, the Governor General in Council observes that, in Colonel Crommelin's Memorandum on hospitals, reasons are given to show that the wards should be 26 feet wide, that the wall space between two doors should be 15 feet, and the doors 5 feet wide. These dimensions give to each patient 10 running feet and 13 feet in width of the ward, or 130 superficial feet. In existing hospitals, however, the wall space will rarely be found to exceed 10 feet, and will often be as little as 8 feet; the width of ward will, as a rule, be 24 feet. Thus the allowance for each patient will vary from $7\frac{1}{2}$ to $6\frac{1}{2}$ running feet, and from 90 to 78 superficial feet.

"7. The Governor General in Council considers, on the whole, that a space of 100 superficial feet per patient will be sufficient to meet the present exigency, and desires that some arrangement may be adopted for regulating the complement of patients for existing hospitals, so that the total space in each ward may, in every possible case, afford this allowance as a minimum. Temporary accommodation should then be provided for the difference between the number of patients for whom there is space according to this allowance, and the number requiring accommodation at the rate of 12 per cent. on the actual strength of each regiment or detachment.

"8. The two following methods are instanced to show how the arrangement of the proper complement of patients in existing over-crowded hospital wards may be managed:—



1st.—Diagram A represents a ward of a hospital, according to existing standard plan. The dimensions of this ward are 52 feet x 24 feet=1,248 superficial feet, which gives an allowance of 78 superficial feet per patient. If the corner beds are removed, the allowance for the remaining patients would be rather more than 100 superficial feet per bed.



2nd.—Another arrangement of the beds in a ward is shown in Diagram B. The necessary reduction might be made by placing only one instead of two beds in each of the four end wall spaces, as shown in Diagram C.

"9. In conclusion, the Governor General in Council desires that special attention may be directed to that portion of the Sanitary Commission's communication which inculcates the advisability of not admitting slight cases into hospital in times of great sickness."

ORDERED, that the foregoing observations, together with copy of the

Governments of Madras, Bombay, Bengal, North-Western Provinces, and Punjab.
Chief Commissioners, Oudh, Central Provinces, and British Burmah.
Governor, Straits Settlements.
Resident, Hyderabad.
Agents, Governor General, Central India, and Rajpootana.
Military Department.
Adjutant General.
Quarter Master General.
Sanitary Commission for Bengal.

letter from the Sanitary Commission, be forwarded to the Local Governments and Administrations and Heads of Departments noted in the margin, for information and guidance, and with instructions that early reports may be submitted to the Government of India of the measures proposed to

be adopted in view to the carrying out of the present orders at each Military Cantonment.

118. Establishment of Central Prisons at Hazareebaugh and Deegah.

Read Military Department docket forwarding for the information of the Commission Memorandum No. 1929, dated 8th July 1865, from the Quarter Master General, and enclosures, regarding the sanitary effect of the establishment of central prisons at Hazareebaugh and Deegah on the health of the British Troops in the neighbouring Cantonments of Hazareebaugh and Dinapore.

119. Prevention of venereal disease among British Troops.

Read letter No. 126, dated 10th instant, from the Secretary to the Government of India, Military Department, forwarding a copy of letter No. 1516A,

dated 28th April last, from the Government of the North-Western Provinces, and requesting with reference thereto the opinion of the Commission as to whether it is desirable that the Local Governments and Administrations should postpone all action in respect to the adoption of measures for the prevention of venereal disease among British Troops, until the Cantonment Act Committee may be able to submit its report.

Read again letters Nos. 19, 245, and 245A, dated respectively 21st March and 2nd May 1864, from the President of the Commission, to the Secretary to the Government of India, Military Department, regarding measures necessary for preventing venereal disease among British Troops.

OPINION.

I. As the Cantonment Act Committee, of which the President and two Members of this Commission at Simla are Members, will submit to Government, almost immediately, a draft of proposed rules for the prevention of venereal disease among British Troops, it therefore appears unnecessary at present to invite the Local Governments and Administrations to take further action in the matter.

II. This Commission is of opinion that it is much to be regretted that nothing should have been done by the Local Authorities to carry out the recommendations made by the Commission more than a year ago, for if the plan then suggested had been acted upon, there would now be available a most valuable mass of information, which would have enabled the Government of India to deal finally and confidently with the whole question.

Routine.

The Commission adjourned.

(Signed) JOHN STRACHEY, *President,*
Sanitary Commission for Bengal.

PROCEEDINGS OF A MEETING OF THE SANITARY COMMISSION FOR BENGAL, ON THE 31st JULY 1865, AT SIMLA.

PRESENT:

JOHN STRACHEY, Esq., C. S.	...	...	President.
SURGEON MAJOR J. P. WALKER, M. D.	...	...	Member and Secretary.
CAPTAIN E. C. S. WILLIAMS, R. E.	...	...	Member.

120. Out-break of Plague in the Pahlumpoor Districts.

Read letter No. 304, dated 26th instant, from the Secretary to the Principal Inspector General, Medical Department

Letter No. 1063, dated 23rd May 1865, from the Principal Inspector General, Medical Department, Bombay.

Letter No. 3, dated 23rd May 1865, from Staff Surgeon, Deesa, to the Major of Brigade, Deesa.

Letter No. 1182, dated 10th July 1865, from the Principal Inspector General, Medical Department, to the Secretary to the Government of Bombay, Military Department.

forwarding for the perusal of the Commission the correspondence marginally noted, relative to

a disease stated to have the character of the plague, which lately appeared in the Pahlumpoor Districts.

The Government of Bombay having requested the Principal Inspector General, Medical Department, to submit information regarding the plague at Palee in 1838, and a similar visitation which occurred a few years previously in Kattiawar, and also to make suggestions regarding the present epidemic, he reported as follows:—

“The earliest record I can find of the existence of any disease within the limits of this Presidency, alleged to be identical with the plague of Egypt and the Levant, is contained in a Report by Dr. McAdam, dated November 1816.

“It appears from this report that fifty years ago a disease of this nature, the origin of which was involved in great obscurity, was first noticed at Kuntakote in May 1815, and that it spread to several other towns in the Wagur Districts. After ceasing to prevail in Wagur, it made its appearance, in May 1816, in the town of Moorvee on the Kattiawar side of the Run. In August the disease repassed the Run to Buchaee and Khodanpoor, and extended its ravages to Sind. No case of the disease came under Dr. McAdam's own observation, but from the description he received of its symptoms and character he looked upon it ‘as the same disease which, under the name of plague, annually prevails in other parts of Asia and Africa.’

“At the date of Dr. McAdam's Report, the disease had abated both in Buchaee and Moorvee, the only two places in which it still remained either in Kattiawar or Wagur.

“The next notice of the disease is by Dr. Gilder, who, in 1820, reported that it made its appearance in Guzerat in 1817, having been introduced from Moorvee in Kattiawar into Dhollera, from which place it spread over the neighbouring villages and reached Dandool-ree. It then appears to have subsided for a time, but re-appeared in 1819 near Dhollera, and extended to the neighbouring villages, and to the Limree Districts, where its ravages appear to have been very great. I presume it then disappeared, as I cannot find any accounts of its further extension.

“Dr. Gilder, who had opportunities of seeing the disease, denied that it was the plague, and pronounced it to be ‘an aggravated description of typhus fever.’

“Assistant Surgeon Whyte, however, who also had opportunities of seeing the disease in 1817, stated that in his opinion it was the ‘plague.’ Part of his Report, however, is somewhat contradictory on this point, for after mentioning certain facts in proof of its non-conta-

gion in many respects, he says, 'If this disease be plague, some of the facts, above related, are sadly at variance with this opinion.'

"Nothing more seems to have been heard of any disease resembling the above till 1836, when it was reported that the plague had made its appearance at Palee. Assistant Surgeon Forbes appears to have been especially deputed to report on the disease after personal observation. Out of 48 cases, which he saw at Palee, he detailed particulars of 14, and recorded his opinion that the 'pestilence was the same as the plague of Egypt, and the Levant.' The disease prevailed more or less at Palee from 1836 to 1838, when it appears to have subsided, after destroying some 10,000 of the inhabitants out of a population of 45,000. Eight thousand of these died during the first four months.

"In 1856 the subject again attracted attention. Early in April of that year the authorities at Ahmedabad received a Report from the Medical Officer of the Magwar Bheel Corps that the disease, termed the 'Palee Plague,' had made its appearance 6 miles from Khairwara on the Ahmedabad road.

"For the purpose of guarding against the extension of the disease into the Baroda, Kaira, Ahmedabad, and Deesa Districts, by means of contagion, which it was apprehended might be communicated by travellers, the authorities at Ahmedabad saw fit to order out parties of Guzerat Horse for the purpose of forming a 'Cordon sanitaire' with the view of preventing intercourse with the Khairwara districts.

"The disease, however, whatever was its real nature, remained quite localized, caused very few deaths, and so rapidly subsided, that before the end of the month the Cordon appears to have been withdrawn.

"While these arrangements for cutting off communication with the diseased districts were being carried into effect, Colonel Trevelyan, the Political Agent in the Mahee Kanta, made the following remarks on the impossibility of doing so effectually, and as it appears from the correspondence forwarded by you that the Military authorities in Guzerat are now prepared to establish a Cordon of mounted men, I would beg the particular attention of Government to the subject, as the statement of so experienced an Officer seems deserving of great weight.

"Colonel Trevelyan remarked as follows:—'The so-called Palee plague, I recollect well in 1836, nothing could be more stringent than the orders given, but the "Cordon sanitaire" signally failed. There were always ways and means of evading these Cordons, whatever pains were taken to render them really effectual, and with the greatest possible care, *zoolum* will be committed on trades and travellers, and we cannot help it.'

"Government endorsed this opinion by stating that, 'the Right Hon'ble the Governor in Council is not disposed to believe that any advantage will be gained by the establishment of a Cordon sanitaire.'

Letter from Government No. 1899, dated 21st August 1856.

"Under these circumstances, Government will perhaps be pleased to decide whether or not a Cordon should be formed. If it *could* be established so as effectually to cut off communication with a district suffering from contagious disease, much good would no doubt result, but if, as stated by Colonel Trevelyan, this is an impossibility, such Cordon would probably lead to great inconvenience and oppression, without effecting any counterbalancing advantage.

"In the present state of matters, I have no further suggestion to offer. At this moment, indeed, I am in ignorance of the nature and extent of the disease. The information given in the correspondence forwarded by you, is based entirely on the report of a Carkoon to the Political Superintendent, Pahlumpoor, and is very limited."

Staff Surgeon T. E. P. Marten was deputed in May 1865 to visit the Thurrad districts where the disease prevailed. The epidemic having ceased he had not an opportunity of seeing any cases, but he carefully inspected great

numbers who had been of severely affected and with the characteristic tumour still in existence, and found such full means of acquiring information that he considered a mistake in judgment as to the nature of the disease was well nigh impossible. He reported:—

"During the months of March and April, there had been an epidemic of malarious fever, complicated very generally with excessive disorder of the liver, the organ being in many cases enlarged. This affection is technically known as Bilious Remittent Fever—one of the most common diseases in the country. The enlargement was felt as a tumour or '*gant*' in the vena-cular; and from this single circumstance the fear was entertained that the disease might be the plague. There were no swellings in the groin, or in any other situation.

"The disease was general; scarcely a village which was personally inspected, or about which reliable information could be obtained from the thakoors, had escaped. The mortality was excessive * * *

"The sickness ran its course without any medical treatment, and at Thurrad, the most important place visited, containing about 1,200 inhabitants, and where the number of deaths was said to amount to one hundred within a month, it had been noted that the disease was stayed by the purification of the air after a succession of sand-storms * * *

"I feel justified in stating the undoubted facts, that an epidemic of Bilious Remittent Fever was active in the whole line of country west of Deesa to Wow, in March last; that mortality from it was excessive within a given time; that one of its prominent features was an enlargement of the liver giving rise to a tumour, or *gant*, a very common complication of fever, and that no symptoms were found which could be supposed to bear a resemblance to a contagious and mortal pestilence.

"The condition of the villages in point of cleanliness was generally as bad as native habits uninfluenced by European energy could bring about.

"Such an absence of conservancy, such extreme filthiness as was occasionally noticed, especially in Thurrad, coupled with the scarcity and dearth of the necessities of life, is sufficient to account for the virulence of the malarious epidemic. * * *

On the Report from which the foregoing extracts were made, the Principal Inspector General suggested to the Government of Bombay that the filthy condition of the villages points to the urgent necessity of attention being paid to the subject.

121. Sickness and Mortality among Native Troops at Sylhet.

Read Military Department docket No. 393, dated 29th instant, forwarding for the information

Letter No. 587 U, dated 26th July 1865, from the Adjutant General, to the Secretary to the Government of India, Military Department, and enclosures.

Letter No. 392, dated 29th idem, in reply.

of the Commission the correspondence noted in the margin, regarding the state of health of the Regiment of Native Infantry stationed at Sylhet.

122. Number of Sheets required in Hospitals for British Troops.

Read the following letter No. 311, dated 26th instant, addressed by the President to the Secretary to the Government of India, Military Department:—

"I have the honor to reply to your letter No. 458, dated 12th April last, forwarding for report, in communication with the Principal Inspector General, Medical Department, correspondence with the Bombay Government regarding the scale of 400 sheets allowed in this Presidency for the Hospital of a British Infantry Regiment, and which in Bombay is considered insufficient.

"2. So far as this Presidency is concerned, we concur with the Principal Inspector General in considering that 400 sheets is sufficient, as Dr. Bruce has stated in his letter to your address No. 726, dated 9th December 1864, if at any time the supply proves insufficient, 'it is only necessary to entertain additional washermen, and instil activity into the Steward's Department to ensure a steady supply of the article clear and ready for use.' With the object of removing all possible doubt upon the point whether the scale in force in this Presidency has been practically sufficient or not, I requested the Inspector General of Hospitals, Her Majesty's British Forces, to inform me whether it had ever come to his notice that complaints have been made regarding the insufficiency of sheets allowed under the existing regulations. It will be seen from para. 4 of Dr. Beatson's memorandum herewith forwarded, that, although the quality of the bedding is complained of, there is no complaint regarding the quantity.

"3. In Bombay 800 sheets are declared to be essentially necessary for the Hospital of each British Infantry Regiment. Possibly, in Bombay, the facilities for washing may not be so great as in this Presidency. This is a point upon which we have no information. On this side of India, there is practically never any difficulty, on an emergency, of obtaining any required number of washermen for extra work. If this be not the case in Bombay, it is possible that the allowance of sheets found sufficient here may be insufficient there. It is apparently only on this supposition that the supply of a larger number of sheets in Bombay can be justified.

"4. With reference to para. 4 of Dr. Beatson's memorandum, stating that by the Medical Regulations in Madras, 'sheets are only allowed for 12 per cent. of the average sick in Hospital so as to provide for the worst cases,' a copy of Dr. Beatson's remarks has been sent to the Sanitary Commission at Madras for such notice as it may think necessary. Our Commission has no knowledge of the facts, nor would it fall within our province to comment upon them.

"5. With regard to the complaints of the quality of Hospital clothing and bedding made in Dr. Beatson's memorandum, it is right to notice that some of his objections will be removed when the orders of Government are carried into effect, sanctioning the recommendations on the subject of Soldier's bedding contained in my letter to your address, No. 664, dated 27th September last. But we think that it cannot be denied that Dr. Beatson is right in considering that the equipment of Hospitals in this country is in many respects unsatisfactory, and that it is inferior to that which is allowed in England and in the Colonies. If the Government think it desirable that we should furnish a Report upon this subject, we shall be prepared to do so. * * *

McDougall's Disinfecting Powder.

123.

Read Military Department Office Memorandum No. 87, dated 7th June 1865, forwarding to the Commission Despatch No. 135, dated 29th April 1865, and enclosures from the Right Hon'ble the Secretary of State for India, regarding the use experimentally of ten tons of McDougall's Disinfecting Powder sent out from England for that purpose, and requesting a Report as to the best means for giving the fullest effect to the experiment.

Read Military Department docket No. 677, dated 28th June 1865, forwarding a letter No. 156, dated 14th June 1864, from the Principal Inspector General of the Medical Department, communicating his opinion on experiments made at Bombay with McDougall's Disinfecting Powder.

Read again Minute No. 129 of the Proceedings of the Commission, on the 27th June 1864, on carbolic acid and McDougall's Disinfecting Powder.

Read the following note by the Secretary to the Commission on the experimental use of McDougall's Disinfectant Powder.

"The following objects should be borne in mind by the Officers concerned in directing and reporting on the experiments with McDougall's Disinfecting Powder:—

"I. *Its absolute efficiency as an antiseptic disinfectant and deodorizer.*—Antiseptics are those substances which restrain the decomposition of organic matters for longer or shorter periods, or put a stop to its further progress when it has already begun. By restraining the decomposition of putrifiable matter, the noxious and offensive emanations from it when in a state of putrescence may be avoided. Carbolic acid (an empyreumatic product of coal-tar, as kreosote is of wood-tar,) the active ingredient in McDougall's Disinfecting Powder, is known to be a powerful restrainer of decomposition, and has been recommended where the object is to keep sewage from putrifying, so that no disagreeable odour may be evolved from it in the course of its discharge, and admit of its removal without danger from noxious emanations. The effect is only temporary when moderate quantities are used; the greater the quantity of the antiseptic used the longer its restraining influence is manifested, but its economical employment consists in using the minimum quantity sufficient to meet the necessities of the case, and this is a point which has yet to be determined under various conditions of climate, season, character of sewage, and duration of its retention previous to final disposal, manner of disposal, &c., &c.

Disinfectants, properly so called, *true disinfectants*, have the power (in chemical language) of more or less rapidly promoting the oxidation of organic matter, or, in other words, of hastening the transformation of animal and vegetable matters into imputrifiable products incapable of evolving disagreeable and noxious gases. In such a transformation contagious matters lose their specific qualities, and cease to be capable of transmitting specific diseases from person to person by direct or indirect contact.

Deodorizers are bodies which possess the property of destroying offensive odours without necessarily having the power of affecting their sources, though some deodorizers are also antiseptics, and are thus enabled, in addition to abating existing nuisance, to restrain for a time the further evolution of offensive effluvia. McDougall's Disinfecting Powder appears to possess this double quality. Some deodorizers are also true disinfectants, and these not only purify the contaminated air, but render the source permanently incapable of contaminating. Simple deodorizers are very useful for abating a nuisance, the source of which cannot practicably be reached, or has been removed, or is in course of removal, but they are of doubtful utility where they conceal the warning stench of noxious emanations which prompt man either to avoid the source or dispose of it innocuously.

"II. *Its comparative efficacy as a disinfectant, in the fullest sense of the term.*—The relative merits in point of efficiency of dry earth, quick-lime, charcoal, and McDougall's Disinfecting Powder as deodorizers for conservancy purposes, founded on actual experience in latrines, urinals and filth-depôts under varying conditions, have yet to be determined.

"III. *The duration of its effect,*—in relation to the nature of the sewage, its state at the time of application, and the quantity of the powder employed.

"IV. *The quantity required.*—Throughout the experiments weighed quantities of the powder should be employed and a record kept of the effect of the increased and decreased applications made in determining the proper quantity.

Assuming McDougall's Disinfecting Powder to possess all the qualities it is said to have, for its economical use it is desirable to know what is the minimum quantity that will suffice for various kinds of sewage, when retained for the minimum time requisite in routine practice for its removal for final disposal. Doubtless the general rule applicable to other antiseptic disinfectants and deodorizers will be found to apply, viz., that the duration of effect corresponds with the quantity employed for a given quantity of sewage. But as it is of primary importance in all conservancy arrangements that matters susceptible of putrefaction be promptly removed, and if possible, before putrefaction commences, it is not necessary that a larger quantity of the antiseptic be employed than will restrain putrefaction until the regular times for removal and disposal arrive. To exceed this minimum quantity would be an extravagant expenditure of material and money, productive of harm by admitting of the unnecessarily prolonged retention of sewage prior to its removal and disposal. The Barrack and Hospital Improvement Committee has truly observed that 'disinfectants are a palliation and excuse for defective works and neglect of duty in nine cases out of ten.' The Right Honorable the Secretary of State in sanctioning the supply of McDougall's Disinfecting Powder, anticipating such a contingency, wishes it to be clearly understood, and impressed upon the Officers to whom the carrying out of the experiment may be entrusted, that it is to be considered not as a substitute for, but rather as an aid to proper sanitary arrangements, and particularly calls attention to the remarks of the Barrack and Hospital Commission at the War Office, contained in paras. 9 to 12 of their Report, and to which reference should be made.

"V. *Its mode of application.*—This may have to be varied according to the nature and state of the sewage, the duration of the restraining influence desired, and whether a simply deodorizing effect is desired, or an antiseptic restraint to prevent decomposition or arrest the further progress of putrefaction. It is believed that the application of the Powder by means of a dredger with fine holes will be found the most efficient and economical arrangement. Both efficiency and economy are involved in the determination of the best mode of application, for it is probable that a large quantity in lumps enveloped in the interior of a mass of sewage would not have a tithe of the deodorizing power of a very small quantity applied in a finely divided state over the surface.

"VI. *Its expense.*—The average cost of the Powder of stations may be estimated at £14 sterling per ton, being three half pence or one anna per pound

weight. The experiments having been made with weighed quantities, the diaries of results should be so methodically arranged and kept as to admit of conclusions on this and every other point being based on recorded facts. The absolute cost per man in and out of Hospital, and the daily, monthly, and annual cost per Regiment, Troop, Battery, Station, Jail Stable, Slaughter-house, &c., &c., should be estimated. The comparative expense of McDougall's Disinfecting Powder should also be estimated, as it is desirable to know the relative cost of other arrangements, as the dry-earth sewage system.

RECOMMENDATIONS.

I. Regarding the means which should be adopted for carrying out the proposed experiments with the ten tons of McDougall's Disinfecting Powder which have been sent out to India by the Right Honorable the Secretary of State, the Commission considers that a few well conducted experiments in the different climates of Bengal and the North-Western Provinces will be sufficient. To multiply unnecessarily the number of experiments will lead to no useful results.

II. The following distribution of the Powder is recommended—

One ton to the Officer Commanding the Presidency Division, for trial in Fort William.

One ton to Dr. Fawcus, Superintendent of the Alipore Jail and Deputy Inspector General of Jails, Lower Provinces, for trial in the Alipore Jail and Calcutta House of Correction.

One ton to the Principal Inspector General, Medical Department, for trial on both the Civil and Military sides of the General Hospital in Calcutta.

One ton to the Principal of the Calcutta Medical College, for trial in the dysentery-wards of the College Hospital.

Five tons to the Officer Commanding the Meerut Division, for trial in the latrines and urinals of a British Infantry Regiment, in the stables of a Cavalry Regiment, in the Cantonment Slaughter-house, and in the Public latrines of the Sudder Bazar at Meerut.

One ton to Dr. Stewart Clark, the Inspector General of Prisons, North-Western Provinces, for trial in the Central Prison at Meerut.

III. Dr. Stewart Clark is more capable than any other Officer the Commission knows of for furnishing a complete Report, such as that which the Secretary of State has called for, and it recommends that the Military Authorities at Meerut be requested to carry out the experiment in co-operation with him.

IV. It is desirable that the Officers to whom the Powder is sent should be requested to make the most careful selection possible of the Officers by whom the actual experiments are directed, and by whom the reports on the results obtained are to be furnished.

V. As it is desirable that all available information on the subject should be given to the Officers who are entrusted with the experiments, the Commission recommends that copies of the undermentioned papers be furnished to them.

(A.) Copy of Military Despatch from the Right Hon'ble the Secretary of State, No. 135, dated 29th April 1865, to the Right Hon'ble the Governor

General in Council, with the accompanying correspondence printed by order of the House of Commons on 6th March 1865.

(B.) Minute No. 129, of the Proceedings of the Sanitary Commission for Bengal on the 27th June 1864, on carbolic acid and McDougall's Disinfecting Powder.

(C.) Extract from "Practical Observations on the Hygiene of the Army in India" by Dr. Stewart Clark, Inspector General of Prisons, N. W. P.—Section on the "Use of Antiseptics," pp. 103 to 107.

(D.) The note drawn up by Dr. J. P. Walker, the Secretary to this Commission, printed above, stating the principal objects which should be borne in mind in conducting the experiments.

124. Excessive mortality among British Troops at Lucknow in 1864.

Read the following extract from the Annual Report of the Sanitary Commission for Bengal for last year:—

The rate of mortality at Lucknow during 1864 was higher than in any station in this Presidency, being 44·5 per 1,000; out of which amount 15·8 was due to Cholera alone. The troops at Lucknow consisted of the 107th and 36th Regiments, 5th Lancers, and 4 Batteries of Artillery. The 107th is an old and seasoned Regiment. It lost 22 men out of an average strength of 894, or 24·6 per 1,000, and one-half of the deaths occurred in one week from Cholera. The Artillery lost only five men. The 36th Regiment arrived from England at the end of 1863 and reached Lucknow in a tolerably healthy condition in January. "It continued," writes the Surgeon of the Regiment Dr. Bell, "in a good sanitary state till April, when the increasing heat of the weather began to tell on the young unseasoned soldiers, and fever became prevalent. They presented no great variety; a few have been returned as common continued; there were only 24 cases of 'intermittent,' the rest were returned as remittent, but of these at least ten cases might with equal correctness be called typhoid. The result is one for which I was wholly unprepared from my six years' experience in Madras, viz., that a typhoid fever, almost identical with that of Europe, with a ulceration of Peyers glands, prevails in this country, and is fatal as at home. It seems the same disease in every respect, but that there are no petechia, and there is greater tendency to remissions. From the enquiries I have made, I believe it to be a new disease in this country, and it is certainly a very fatal one. This disease prevailed all through the hot season from July to October, and proved fatal in seven cases." There were six cases of Heat Apoplexy, all of them fatal except one. They all occurred during the hottest weather of the year, and in the opinion of the Medical Officers were caused entirely by the intense heat. On the 15th September, Cholera attacked the Regiment and proved fatal in 27 cases, all of which, with one exception, occurred within a week after the first outbreak of the disease. There were six fatal cases of Phthisis, and 39 men were invalided from the same cause. In 19 cases this disease was a sequela of fever. It has been thought that many of these cases which were recorded as Phthisis may have been closely related to the fatal fever which has been noticed above, and there has been a suspicion that the great mortality from these diseases in this Regiment may have been really due to an attack of the same fever which, as we have stated elsewhere, has proved so

fatal in some of the jails. This, however, is a point which cannot at present be cleared up. Altogether, the 36th Regiment lost 60 men during the year. We have made a special reference to the Indian Medical Department and to the Inspector General of Her Majesty's Hospitals on the subject of the fevers which proved so fatal at Lucknow and upon other points connected with the health of the troops at the station, and we hope that further information may be obtained. The 5th Lancers also suffered severely, losing 20 men during the year. A fever which was apparently similar to that which prevailed in the 36th Regiment proved fatal in five cases. There were three fatal cases of Heat Apoplexy and one of Cholera. The causes independently of Cholera, which led to the large mortality in the 36th Regiment and in the 5th Lancers, while the Artillery and the 107th Regiment escaped with comparatively little sickness, have not been explained except by the fact that the two former were new to the country and unacclimatized. It may be doubted whether this explanation is sufficient. We have not been able to discover that the local sanitary conditions, under which the Regiment were placed, differed to any important extent, or that there were any special differences in the management of the men. We hope that further information on these points may be obtained. In all cases the amount of space allowed in barracks and hospitals appears to have been ample. The attack of Cholera, which was so fatal, happily lasted for only a few days. Immediately on its appearance the men were removed into camp, and there can be no doubt this measure had the almost immediate effect of stopping the disease. Lucknow has, on several former occasions, suffered severely from Cholera; but, with the exception of 1863, when the rate of mortality was 28·5 per 1,000, the station has been for some years past healthier than the average. In 1861 the mortality was only 14 per 1,000, and in 1862 it was 15·3 per 1,000."

OPINION.

I. The above extract gives a summary of such information as the Commission possesses regarding the sickness and mortality among the troops at Lucknow in 1863. The great difference in the amount of sickness and mortality in 1864 among the several Regiments at that station is a subject which appears to deserve special enquiry, and the Commission considers it desirable with that object that the excessive mortality among British troops there be brought to the notice of the Government of India.

125. Contagious fever among European troops.

OPINION.

I. The Commission in its correspondence has repeatedly expressed the opinion that too much care cannot be taken to guard against the possible introduction among the British troops of the highly contagious typhus fever which for some years past has proved so extremely fatal in several of the jails and districts of the North-Western Provinces and of the Punjab.

II. It has been suggested to the Commission that the fever which last year attacked H. M.'s 36th Regiment, and the 5th Lancers at Lucknow, may possibly have been a form of this fever, and it has been asserted that the disease was carried to Lucknow from Mooltan during a march of nearly three months by the 2nd Regiment of Native Infantry. Two cases of typhus fever are also said to have occurred in a Company of H. M.'s 90th Regiment which has been in the Fort

of Lahore, and the disease is reported to have been very prevalent in the neighbourhood of that city and of Umritsur. It is not impossible that some of the sickness in H. M.'s 94th Regiment at Umritsur may have been due to the same cause. The 4th Goorkha Regiment is also said to have suffered from relapsing typhus on the march from the North-Western Frontier to Almorah.

II. The Commission is not in possession of any facts which throw satisfactory light upon this question, but it is one of much importance, and it is not one which ought to remain in doubt. It seems therefore proper to bring the circumstance to the notice of the Government of India, and to suggest the desirability of His Excellency the Commander-in-Chief being moved to have enquiries instituted, and facts collected as to the prevalence of a contagious fever, under any form, prevailing among European troops generally, and especially at Lahore, Umritsur, and Lucknow, with a view to the result being ultimately communicated to the Commission.

126. Prevention of Cholera amongst troops by moving into Camp.

Read letter No. 333, dated 25th instant, from the Secretary to the Government of India, in the Military Department, requesting the opinion of the Commission regarding a Circular which His Excellency the Commander-in-Chief proposes to issue on the subject of moving troops into camp on the appearance of cholera.

His Excellency considers that mischief has resulted from the two absolute reading of paragraphs 3 and 4 of G. O. C. C., dated 7th April 1863, laying down certain precautionary measures to be adopted on the appearance of cholera at any of the stations occupied by the Army, by troops having been thrown hurriedly into camp by Commanding Officers on account of isolated or sporadic cases of the disease without due reflection on evils which might come from a hasty adoption of this course without regard to other considerations. The consequences having been not only serious hardship but lamentable sickness, and even mortality, immediately caused by sudden exposure in tents to the deadly heat of May and June, and to damp in the rainy months. His Excellency is desirous that isolated cases of cholera occurring in cantonments (the surrounding country being free of the disease) should not be considered sufficient reason for moving the troops into camp, a measure only to be adopted to get out of the track of the disease, when traceable by its gradual progress from one part of a district to another, or when the disease at its first outbreak in a cantonment assumes an epidemic form.

OPINION.

I. The Commission entirely agrees with the opinion expressed by His Excellency the Commander-in-Chief that it is most objectionable to throw troops hurriedly into camp during the hot and rainy seasons on account of isolated or sporadic cases of cholera, when there is no good reason for supposing that the disease is prevailing in an epidemic form in the surrounding country. There can be no doubt that the General Order of the Commander-in-Chief, dated 7th April 1862, leaves far too little discretion in the matter to the local Military Authorities.

II. The Commission has hitherto been under the impression that the orders issued in 1862 had been completely superseded by the orders of the Government of India, in the Military Department, No. 11, dated 1st September last,

directing in future the strict observance of the rules and measures of precaution recommended by the Cholera Commission, and modified in some few cases by this Commission. There is nothing in G. O. C. C., dated 7th April 1862, which is

* Extensively circulated in a pamphlet entitled "Measures for the Prevention of Cholera among troops in Northern India."

not completely provided for in the Rules of the Cholera Commission,* and the latter do not appear to be open to the objection which has been justly made by

His Excellency Sir William Mansfield to the practice that has been followed under the orders of 1862. The Commission therefore suggests that those orders might properly be cancelled altogether.

III. It seems desirable to point out how the Rules of the Cholera Commission provide against the evils which His Excellency Sir William Mansfield has noticed. Paragraph 477 of the Report says:—

"It is, on the one hand, certain that if cholera in an epidemic form attack a body of troops, there is only one remedy in which confidence can be placed,—removal from the infected locality. On the other hand, it is clear that the application of this principle requires care and judgment. To send men unnecessarily away from their cantonments into camp, at perhaps the hottest and most unhealthy season of the year, is on many grounds seriously objectionable."

The rules go on to say that the question whether the removal of troops is or is not necessary depends entirely upon the point whether there is or is not reason to believe that cholera has appeared among the men in an epidemic form. "The decision of this question must rest with the Principal Medical Officer on the spot. If he be of opinion that the cases that have occurred are in all probability sporadic, and that no cause is apparent for supposing them to be epidemic, removal from cantonments need not take place." (Paragraph 478.) The only check placed upon the Principal Medical Officer in deciding this question is the following:—"to obviate the possibility of this most important measure (*i. e.*, removal of the men when cholera has appeared among them in an epidemic form) being improperly delayed by any peculiar views regarding the epidemic character of the disease, it must be ordered that if, within one week after the first case of cholera, two or more other cases occur, it shall be considered that the disease has assumed an epidemic form, and the men must be removed accordingly." The necessity of this proviso was most clearly shown in 1861, when the removal of troops was delayed in several instances with most lamentable results in consequence of doubts whether the disease was epidemic. In one case the Medical Officer actually declared that cholera was not epidemic, and that proposals to move into camp were premature, when there had been no less than 70 cases of cholera in one Regiment." (See paragraph 221 of the original Report of the Cholera Commission).

IV. There is reason to believe that the rules which have been laid down by the Cholera Commission regarding the removal of men from places that have been attacked by cholera are not unfrequently misunderstood. It may be convenient to state briefly what they provide:—

(1.) If an *isolated* or *sporadic* case of cholera occur, the room or portion of the rooms in which it occurred should, if this be possible, without great inconvenience, be vacated, and not be occupied again until it has been completely purified. It is left to the Medical Officer to determine, in a case of this kind, how far the abandonment of any room or building is necessary. (Paragraphs 473 A, 474 A, 475 A.)

(2.) If a case of epidemic cholera occur, the room or building in which it has occurred must be vacated, and the inmates of that particular building must be removed from the cantonment. The troops in other buildings or in other parts of the cantonment need not be moved unless it be found that these measures have not stopped the progress of the disease, or there is obvious reason to fear that they will be insufficient. (Paragraphs 480 to 482.)

V. The two rules given in the last paragraph contain the substance of all the rules upon this subject that have been laid down by the Cholera Commission. They certainly do not err in the direction of prescribing too much, or of leaving too little to the discretion of the Military and Medical Authorities on the spot. It was the object of the Cholera Commission to impose a minimum amount of obligation, and to leave as much latitude to the local officers as it had been shown by experience could properly be left to them. The Report of the Commission says: "It does not follow because the local authorities must not do less than we prescribe, that they may not do more. The precautions which we advise are those that appear essential in all cases, and we believe that they will ordinarily be sufficient. But it may happen that an outbreak of cholera commences virulently; that cases occur in rapid succession among different bodies of men in various parts of the Cantonment; or that for some other reason there is cause for apprehending that the disease may become generally prevalent. Under such circumstances the minimum of precaution that we prescribe may not be enough, and it may become the duty of the Military and Medical Authorities to take vigorous measures for the immediate removal of the whole of the troops, including those among whom no cases of Cholera have actually occurred." (Paragraph 482.)

VI. It appears to the Commission, therefore, that if His Excellency the Commander-in-Chief should think fit to cancel the General Orders dated 7th April 1862, and to call attention to those parts of the Rules of the Cholera Commission which have been above noticed, and which have received the sanction of the Government, the objects which His Excellency has now in view might be obtained more completely than by modifying the Orders of 1862, which for all useful purposes have become obsolete. The Commission thinks that on other grounds it would be very desirable at the present time to direct the attention of all Military and Medical Officers to the necessity of strict observance of the rules which have been laid down, for the season is now close at hand at which the danger from epidemic cholera in the Upper Provinces is greatest.

127. Relative advantages of coir mattresses and paillasse for European troops in India.

Read again that portion of Minute No. 242 of the Proceedings of the Commission on the 29th September 1864, which includes the following extract from the President's letter No. 684, dated 27th idem, to the Secretary to the Government of India, Military Department.

"11. No mattresses or paillasse have hitherto been supplied to soldiers in barracks in this country; there is little available information on the subject, and there is some difficulty in determining what material ought to be chosen. In Madras, the use of coir, or cocoanut fibre, has lately been proposed by the Government. There can be no doubt that, when proper care is taken to procure it of good quality,

coir is an excellent material for stuffing mattresses. Dr. Leith, President of the Sanitary Commission, states that 'well washed coir nearly equals the more expensive horse-hair, in comfort, and is nearly as durable.'

"12. We think, however, that good paillasse would be much more suitable for use in barracks than any mattresses, and they will be cheaper. Paillasse preferable to mattresses for use in barracks. Whatever care be taken, a mattress will never be kept as clean as a paillasse, the contents of which can be entirely renewed at short intervals, and mattresses in barracks will always be liable to be infested with vermin. It appears from Dr. Leith's Report, above quoted, that, in the Bombay Presidency, paillasse stuffed with straw are considered superior to mattresses, even for hospital use, on account of their superior cleanliness. It is said that much of the straw that is procurable in this Presidency is unsuitable for paillasse, that it is uncomfortable to lie upon, and sometimes unwholesome. Although we cannot at present say what kinds of straw are best for this purpose, we have no doubt that good paillasse may easily be made. There are also other materials which deserve a trial. In Italy, for example, a thoroughly comfortable, clean, and wholesome paillasse or mattress, made with the leaves of Indian corn, is in general use, and this plan might be found successful and cheap in many parts of India. In the North of Scotland, again, chaff is commonly used as a stuffing for beds and answers extremely well.

"13. We recommend that the Commissariat Department be desired to make enquiries and experiments in various parts of the country, with the object of ascertaining and reporting what are the best materials for paillasse.

"14. No bolsters are allowed to soldiers in barracks in this country, although they are given at home and in all the colonies. It appears to us that they are quite as necessary in the one case as the other. The best covering, both for paillasse and bolsters, is canvas. Bolsters should be stuffed with the same material used for the paillasse."

Read Military Department docket No. 26, dated 1st June 1865, forwarding for information a copy of letter No. 1801, dated 12th May 1865, and enclosures, from the Secretary to the Government, Fort Saint George, on the subject of bedding for British troops serving in India.

The following extract from a letter No. 678, dated 25th April 1865, from the President of the Sanitary Commission for Madras, to the Secretary to the Government of Fort Saint George, expresses the views of that Commission on the subject of bedding:—

"7. Bedding.—This Commission entirely concurs in the opinion expressed by the Bengal Sanitary Commission that much remains to be done for the improvement of the soldiers' bedding. The only point upon which this Commission differs from that of Bengal is on the preference given in Bengal to paillasse over mattresses.

"8. This Commission is entirely opposed to the use of paillasse stuffed with straw, and, without hesitation, recommend that mattresses stuffed with good coir be universally used in both barracks and hospitals.

"9. The experiment of the cost, durability, and comfort of coir mattresses has been most carefully made in this Presidency by Dr. Jephson, the Medical Officer of the King's Dragoon Guards, lately stationed at Bangalore, and the result of this experiment has most conclusively shown that coir mattresses are admirably suited for barracks and hospitals in this part of India.

"10. The mattress recommended by Dr. Jephson has been approved by His Excellency the Commander-in-Chief. It can be made at a cost ranging from four to five Rupees. Such a mattress will last for eight or ten years; it can be easily opened, the coir and ticking washed, and the bed re-made. Such a mattress is in all respects superior to a straw paillasse which

never makes a comfortable bed. The coir is not in any way injured by washing, and if sufficiently often 'teased,' this mattress is as comfortable in all respects as a horse-hair mattress.

"11. This Commission fully concurs in the necessity for bolsters as recommended by the Bengal Sanitary Commission. These bolsters should be covered with canvas and be stuffed with the same material, coir, as the mattresses. Soft pillows should be provided to the extent of 25 per cent. of the average sick in hospital. These should be of silk-cotton, feathers, or curled hair."

The Government of Fort Saint George concurs in the opinion of the Madras Sanitary Commission that mattresses of coir are in every respect preferable to paillasses.

Read letter No. 314, dated 26th ultimo, from the Secretary to this Commission to the Secretary to the Sanitary Commission for Bombay, requesting an opinion on the relative advantages of mattresses and paillasses, and requesting information regarding the materials used in Bombay for stuffing paillasses for hospital use, also requesting an opinion regarding the material that should be used for stuffing soft pillows for use in hospitals.

Read the following letter No. 315, dated 26th ultimo, from the Secretary to this Commission to the Secretary to the Sanitary Commission for Madras:—

"This Commission, having under consideration the use of coir for stuffing barrack mattresses, is desirous of learning how it can be suitably prepared, as owing to the article not being much used in this Presidency the art of preparing it seems to be very imperfectly known. The specimens which the Commission has seen were very imperfectly cleaned, the fibres being incompletely separated and divested of intervening tissue, and consequently unsuited for stuffing for soldiers' mattresses.

"2. We are under the impression that coir is extensively used, and its preparation thoroughly understood in the Madras Presidency, and I am desired by the President to request that the President of your Commission may be moved to favor us with full information regarding every point connected with the preparation of cocoanut fibre for bed stuffing necessary to be known to enable the fibre to be properly prepared in this Presidency.

"3. I am also to request that we may be favored with any available information regarding the art of stuffing mattresses with coir, so that they may be equally elastic, and preserve their elasticity for a long time; how frequently they require to be re-stuffed; how the condensed fibre is teased out; how dirty or contaminated coir is cleaned and purified; what is the length, breadth, and thickness of approved mattresses and pillows stuffed with coir, for European barrack and hospital use; the nature of the mattress ticking and its cost; the detailed expense of new mattresses and pillows; the quantity, by weight, of coir fibre required; and the charges for re-cleaning and re-stuffing. The introduction of a superior kind of bedding to that now in use involves a great expense to the State, and this Commission is desirous of possessing every kind of information which may enable so important a change, if sanctioned, to be effected with the utmost economy, and in the most efficient manner.

"4. I am to add that we shall be much obliged by receiving any suggestions on the subject of mattresses and pillows suitable for British troops in and out of hospital."

128. Saddlery and Harness Rooms for Artillery and Cavalry Barracks.

Read the following letter No. 297, dated 4th July 1865, addressed by the President to the Secretary to the Government of India, Military Department:—

"One of the recommendations of the Royal Commission was to the effect that saddlery rooms should be provided in all cavalry barracks, and that saddles should be removed out of the barrack-rooms. The Barrack and Hospital Improvement Commission have lately referred to the same subject in their remarks on Dr. Leith's Report on the Sanitary state of the Bombay Army. I have the honor to request that the Commission may be informed to what extent the provision of separate saddlery and harness rooms for cavalry and artillery has been actually carried out or ordered, and in what cases, if any, saddles and harness are still kept in the barracks. We believe that the provision of separate rooms for these purposes has long been recognized by the Government as a matter of course, and that if there are still any cases in which the remarks of the Home Commissioners are applicable, they must be quite exceptionable."

Read Military Department docket No. 150, dated 12th instant, forwarding for the information of the Commission correspondence showing that the subject has been receiving the attention of the Government of India since 1863. On the 2nd October 1863, the Under Secretary in the Public Works Department submitted to the Military Department a plan for a harness room for a troop of a British Cavalry Regiment on the standard design for a Battery of Artillery (three being allowed for a Light Field Battery), with a view to the opinion of a Committee then sitting should be obtained as to the fitness or otherwise of the proposed building, and also as to whether a separate building for each troop is required, or whether the accommodation necessary for a whole regiment might not be combined in one or two buildings. On the 26th December 1863, the Quarter Master General submitted to the Military Department the approval of the plan by a Committee composed of the Officers Commanding Her Majesty's 7th Hussars, 8th Hussars, 20th Hussars, and 7th Dragoon Guards, with the recommendation of His Excellency the Commander-in-Chief that each troop should be provided with a saddle and store-room according to the approved design, but when practicable a double saddle and store-room might be constructed for each squadron with a view to reducing the expenditure and the number of detached buildings; the site being midway between the barracks and stables, should there be no local difficulty or objection. It was at the same time recommended that as under existing orders troopers have to clean their own saddlery, cover should be provided in enclosed verandahs on three sides fitted with punkahs. The Government of India, in the Military Department, sanctioned the modifications proposed in the plan, with the exception of the punkahs which were not considered necessary.

On the 12th instant, His Excellency the Commander-in-Chief was moved to furnish the information required by the Sanitary Commission as to the extent to which harness rooms, &c., have been supplied, as well as what other provision exists for separate harness and saddlery rooms.

129. Measures required for the protection of the Health of Seamen frequenting the Port of Calcutta.

Read again Minute No. 52 of the Proceedings of the Commission on the 30th March 1865, regarding the occurrence of scurvy among European Sailors generally, and in the case of the "Consul" of Liverpool particularly.

Read letter No. 2553, dated 3rd April 1865, from the Secretary to the Government of Bengal, intimating that enquiry has been ordered regarding the "Consul," the result of which will be communicated.

With reference to the remark of the Commission that, "It is quite possible that upright owners and masters of vessels may unwittingly supply to their crews useless lime-juice for which they may have paid the usual market rate, but it is to be feared that the demand for a cheap article has led to the manufacture of adulterated and spurious lime-juice to suit the price offered," the Government of Bengal observes "that the lime-juice which is taken on board of merchant vessels is or may be inspected under the Law, at the port of embarkation."

Read the following letter No. 317, dated 28th instant, addressed by the Secretary to the Commission to the Secretary to the Government of Bengal.

"Various questions connected with the condition of the European Sailors in the Port of Calcutta have come before our Commission, and it has for some time past been our hope that we might be able to submit a Report upon the subject, for the consideration of the Honorable the Lieutenant Governor. Major Malleson, one of the Members of the Commission, has lately been specially engaged in enquiries with this object. The subject of the improvement of the condition of sailors is, however, one that cannot be taken up on purely sanitary grounds, and questions are involved which hardly fall within the proper province of a Sanitary Commission. Before proceeding further, it therefore seems proper to bring the subject to the notice of His Honor the Lieutenant Governor. If His Honor should approve of the Commission submitting to the Government of Bengal a Report upon the whole question, with the object of suggesting practical remedies for the notorious evils which now exist, I hope that we may be able to do so. In this case His Honor would perhaps not object to desire the various departments which are concerned in the management of the port and shipping to afford every information and assistance in their power to Major Malleson in particular, in the prosecution of the further enquiries which it may be necessary to make."

130. Cholera in the Malwa Bheel Corps at Sirdarpore.

Read Proceeding No. 399, dated 29th July 1865, of the Right Hon'ble the Governor General in Council, ordering the documents marginally noted on the subject of the recent outbreak of cholera in the Malwa Bheel Corps at Sirdarpore to be forwarded

Letter No. 69, dated 1st June 1865, from the Deputy Inspector General of Hospitals, Agra Circle.
Docket No. 72, dated 6th June 1865, from Military Department to Foreign Department.
Docket No. 282, dated 21st July 1865, from Foreign Department to Military Department.

for the information of the Sanitary Commission.

From the correspondence it appears that cholera was prevalent over Central India since the middle of April, and probably not a town or village in the plateau of Malwa escaped a more or less severe visitation, while in some—as at Jowra, Mundissore, Oojein—its ravages were very severe. At one time the deaths from the disease in the City of Indore were stated at from 30 to 40 per diem.

On the return of a detachment of the Malwa Bheel Corps from the Satpoorah Hills in the Burwance Territory to Regimental Head Quarters at Sirdarpore, in the latter part of May 1865, cholera appeared; twelve cases (8 men and 4 women) having been admitted into hospital between the 26th May and 2nd June, and eleven of these (7 men and 4 women) belonged to the detachment. Twenty-five per cent. of these cases died and 75 per cent. recovered. The disease disappeared

for a time, but subsequently seven cases occurred, two being prisoners in the Jail, and one the hospital sweeper's boy, the latter being the only fatal case.

131. Typhus Fever in the Jubbulpore Jail.

Read again Minute No. 53 of the Proceedings of the Commission on the 30th March 1865.

Read letter No. 1595-120, dated 10th April 1865, from the Secretary to the Chief Commissioner of the Central Provinces.

Letter No. 1506-121, dated 4th April 1865, from Secretary to Chief Commissioner Central Provinces, to Commissioner Jubbulpore Division.

Letter No. 2212, dated 25th idem, in reply.

Letter No. 704, dated 12th May 1865, from Inspector of Jails, Central Provinces, to Secretary to Chief Commissioner, Central Provinces.

Read letter No. 2619-224, dated 19th June 1865, from the Secretary to the Chief Commissioner of the Central Provinces, forwarding the correspondence noted in the margin regarding typhus fever in the Jail at Jubbulpore.

Having had his attention directed to the insanitary state of the Jail by the Sanitary Commission's letter No. 129, dated 17th March last, the Chief Commissioner of the Central Provinces directed the Inspector of Jails to proceed to the spot for the purpose of directing the necessary measures for improving the salubrity of the jail and reporting on the epidemic visitation. On the 12th May that Officer intimated that no fresh cases had been admitted into hospital since the 25th April; that the defects noticed by him during his inspections in February had been remedied; that the conservancy and bathing arrangements were as good as they could be; that the general health of the prisoners had greatly improved; and that it was hoped that the prisoners then in camp might in a few days be moved back into jail, in which additional accommodation had been provided by the completion of two new wards ordered to be erected in November 1864. In submitting his Report to the Chief Commissioner, he intimated that the disease on which it treats was confined to the jail, and did not make its appearance among the free population.

132. Dry Earth Sewage System for British Regiments.

The Commission was engaged in considering the subject.

133. Over-crowding in barracks for European Troops.

Read Military Department docket No. 343 A, forwarding for the information of the Commission the following Circular which His Excellency the Commander-in-Chief, with the approval of the Government of India, was about to issue.

Circular Memorandum addressed to Officers Commanding Divisions and Districts, No. 48, dated Head Quarters Simla, 7th July 1865.

The attention of the Commander-in-Chief has, on more than one occasion, been drawn to the manner in which effect has been given to the orders of Government cited marginally.

1. Quarter Master General's Circular Memo. No. 880 C, dated 14th March 1865, and annexures.
Military Department despatch No. 262, dated 6th February 1865, covering Public Works Department No. 333 M, dated 10th December 1864. Proceedings of the Governor General in Council, Military Works. Over-crowding of Barracks.

2. Quarter Master General's Circular Memo. No. 21, dated 19th April 1865, and annexures. Military Department No. 1536, dated 29th March 1865.—Additional temporary accommodation.

3. Quarter Master General's Circular Memo. No. 38, dated 12th June 1865, and annexure. Public Works Department Circular No. 48, of 1865.—Allotment of Barrack accommodation for Hill Stations, 77 superficial feet per man allowed.

might have been avoided, and the State has been put to unnecessary extra expense.

3. Sir William Mansfield would invite General Officers and Officers Commanding Regiments to consider all such orders in a reasonable manner, and with regard to the object held in view by Government, namely, the welfare, moral and physical, of the men, while extravagance is avoided.

4. Thus, in reading these orders, it is right to consider the average number of men which the barracks are liable to hold, and not the merely nominal numbers which are always greatly in excess of actual wants.

5. Thus, taking all the year round, there is an average of about five per cent. in Hospital. During the hot and rainy months, the percentage rises to 6, 10, and even 15 sometimes. There is also a further percentage of men in prison, or of casual absentees from other causes.

6. Therefore, without reckoning the men on guard, it is quite safe to calculate the strength of the single men of a Regiment for whom the allotment of 90 feet, as superficial space, is required at about 7 per cent. below the nominal strength at Head Quarters.

7. If a Company or a Squad be exceptionally free from sick men or casual absentees, other Companies or Squads will have a surplus of such casualties. In such case, it is for the Regimental Commander to equalise space, and to correct the temporary inequality of the Companies requiring barrack room, by detaching three or four men of one Company to another. The organization of a Regiment admits of this with great convenience, although such simplicity of arrangement is often forgotten, owing to a too pedantic consideration of the unity of Companies.

8. Institutions, such as recreation, reading and coffee rooms, should not be broken up, without a prior reference in each case on its merits being made to Army Head Quarters.

134. Sanitary Survey of Military Stations.

Read again President's letter No. 255, dated 10th June 1865, to the Secretary to the Government of India, Military Department.

Read letter No. 338, dated 23rd June 1865, from the Secretary to the Government of India, Military Department, requesting—with reference to paragraph 3 of the President's letter No. 255, dated 10th idem—that the Government may receive an estimate of the expense which such a tour as that proposed would entail, as well as of the time it would take.

Read the following extract from letter No. 308, dated 19th instant, from the President of the Commission in reply:—

"Upon further consideration of the subject, I beg to recommend that no further action in the matter be taken at present. The examination in detail of Military Stations, with the view of preparing a complete statement of every thing desirable for their improvement, would evidently be a work of great magnitude. It would lead to much expense, and would take a very long time to complete. The work is not one which the Sanitary Commission would undertake, unless a large amount of assistance were given by the Public Works Department. Under existing circumstances, an enquiry of this kind might probably—instead of hastening the execution of useful works—lead in practice to their indefinite delay. For there would be a tendency while such an enquiry as this was going on to postpone all action until the expected Reports were received. In point of fact,

the Government is doing at the present time as much as it can possibly undertake for the improvement of Military Stations. The amount of work and the expenditure of money now going on with this object are enormous, and the Government is, in reality, more likely to be blamed for attempting too much than for doing too little."

Read letter No. 335, dated 25th instant, from the Secretary to the Government of India, Military Department, in reply, intimating that the Right Hon'ble the Governor General in Council entirely concurs with the President in considering that it will be better that no inspection of the nature proposed in his letter of the 10th June should take place at present.

135. Uniform system of Statistical Returns for all India.

Read letter No. 131, dated 16th June 1865, from the Officiating President of the Sanitary Commission for Madras, on the subject of a system of Statistical Returns for all India.

The Commission was engaged in considering the subject in connection with Minutes Nos. 102 and 113 of the Proceedings of the Commission on the 12th and 30th June last.

136. General Hospitals for British Troops in India.

Read a Memorandum on Hospitals by Dr. C. A. Gordon, c. b., Deputy Inspector General of Hospitals, Her Majesty's British Forces, Member of the Commission.

The Commission was engaged in considering the subject.

137. Returns of Epidemic sickness among European Troops.

Read again Minute No. 114, of the Proceedings of the Commission, on the 30th June 1865.

Read Military Department docket No. 180, dated 14th instant, forwarding a copy of letter No. 179 of same date, addressed to the Adjutant General by the Secretary to the Government of India, Military Department, requesting that His Excellency the Commander-in-Chief may be moved to express an opinion as to how the wishes of the Sanitary Commission, regarding information of the progress of epidemics, can best be met. At the same time it was intimated that neither of the proposals contained in the 3rd paragraph of the President's letter No. 299, dated

4th instant, appears expedient, as the regular Returns are required as records in the Military Department, and cannot therefore be permanently withdrawn; while for the Government to receive them through the Sanitary Commission would necessarily tend to retard the

(Vide Minute No. 114.)

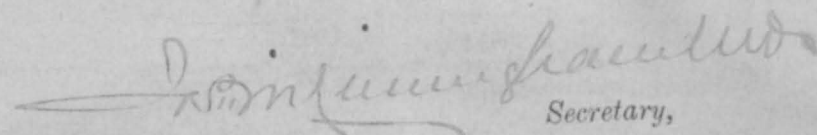
information to an inconvenient extent, even when the Commission was at Government Head Quarters, and when absent, as it frequently may be, the Returns would lose all their value.

Routine.

The Commission was engaged in considering the subject.

(Signed) JOHN STRACHEY, *President,*
Sanitary Commission for Bengal.

(True Copy)


Secretary,
Sanitary Commission for Bengal,

M.D.
1st Div of 1865
Rev-127/66

PROCEEDINGS OF MEETINGS
 OF THE
 SANITARY COMMISSION
 FOR BENGAL,
 DURING THE MONTH OF JULY 1865.

MILITARY DEPARTMENT.
 PROCEEDINGS OF THE MADRAS GOVERNMENT.

Read the following letter:—
 From the President of the Sanitary Commission for Bengal, Calcutta, 20th November 1865, No. 416; to the Secretary to Government, Military Department, Fort Saint George.

I have the honor to intimate that I have this day dispatched per banghy dak, in three separate parcels, the Minutes of Proceedings of this Commission for the months of May, June and July 1865.

ORDER, No. 4736, 22nd December 1865.

Ordered that copies of the Minutes referred to in the foregoing letter, be forwarded to each of the Departments furnished with the previous Proceedings of the Bengal Sanitary Commission.

(True Extract.)

Marshall
 Secretary to Government

To the President Sanitary Commission, with 3 copies of the Minutes.
 „ Adjutant General, with 3 do.
 „ Quarter Master General, with 3 do.
 „ Revenue Department, with 3 do.
 „ Judicial Department, with 3 do.

With 5 separate Copies of each

Ed. A. W. Cooke.

Per-1866 O/s part
Pro: of Govt for January
No. 47.
Proceedings of the Madras
Govt. in the Military
O/s part.

Dated 22^d Decemr/65.
Received 4th Jan/66.
No. 4736.
C-3.

Forwarding
three copies of the minutes
of Pro: of the Bengal Sa-
nitary Comm for May,
June and July 1865.

Pro Military Deptd 6 July 66
C N 438-

RECORDED.

N. 209 & 210.

15 Jan 66 L