

**ORIGINAL COMMUNICATIONS.**

**NERVE STRETCHING IN ANÆSTHETIC LEPROSY.**

By EDWARD LAWRIE, M. D.,  
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 Resident Surgeon, Medical College Hospital, and Professor  
 of Physiology, Calcutta Medical College.*

HURRY CHURN PAL, native doctor, ætat 40, was sent to the Medical College Hospital on the 1st July 1878 to be reported on. He was suffering from anæsthetic leprosy, and was directed to attend the out-door dispensary for treatment.

The history of this case was as follows:—A year previously a patch resembling ringworm appeared on the back of the right wrist. Sensation in the affected area became impaired and gradually disappeared, and the patch extended till it occupied nearly all the back of the hand as well as the wrist. The hand became weak, and tingling set in over its anterior inner half and posterior two-thirds. This condition, varied by occasional attacks of pain in the hand and fore-arm, has continued up to the present time.

On admission there was complete loss of sensation all over the patch; the patient could only grasp feebly with the right hand; and the ulnar nerve was very much thickened from below the inner condyle of the humerus to about half-way up the arm. The nerve was stretched the same day under chloroform.

No regular notes of the case were taken afterwards. The patient attended very irregularly, and would never admit that his condition was improved, though the affected skin became visibly healthier. After a long interval he presented himself on the 5th August, and it is recorded that "the skin of the hand and fore-arm is uniformly healthy; sensation is perfect throughout the area that had been anæsthetic; and the thickening of the ulnar nerve has entirely disappeared. The patient admits that the tingling and pain no longer trouble him, and that his hand is much stronger."

I have now stretched the ulnar nerve in about thirty cases of anæsthetic leprosy, and have incomplete notes of all of them. In every case the operation was followed by benefit, as far as the area supplied by this particular nerve was concerned, which appeared likely to be permanent. The patients ceased attending the dispensary whenever the relief they experienced seemed to them decisive, and therefore no notes of their final condition were obtainable, except in the present instance. But the result in this one case, it appears to me, fully justifies the anticipation of the distinguished surgeon who originally proposed nerve stretching as a method of treatment for this disease.\*

\* Vide *Indian Medical Gazette*, July 2nd, 1877.

**REPORT OF AN OUTBREAK OF CHOLERA IN DETACHMENTS OF THE 41ST REGIMENT NATIVE INFANTRY AND 7TH BENGAL CAVALRY, MORAR.**

[The following papers, which give an accurate and complete account of a severe outbreak of cholera which took place in May last in a treasure escort composed of detachments of the 7th Bengal Cavalry and 41st Native Infantry, have been placed at our disposal by the Surgeon-General, Indian Medical Department. At the same time that the events which these reports describe were transpiring cholera prevailed among the European troops stationed in Morar, and the native followers attached to them. The returns submitted to the Quarter-Master General of the Army indicate that between the 1st and the 27th of May the following cases and deaths occurred:—

	Cases.			Deaths.		
	M.	W.	C.	M.	W.	C.
Europeans ...	46	1	4	30	1	3
Native Soldiers ..	115	0	0	58	0	0
Followers ...	35	0	0	24	0	0

More recently the disease has again broken out among European soldiers at this station. The number of attacks and deaths in this second outbreak has, up to the latest date, been:—

	Cases.			Deaths.		
	M.	W.	C.	M.	W.	C.
Europeans ...	9	1	1	6	0	0

Cholera has also lately broken out in various stations of the North-West Provinces and Central India, cases having been reported from Agra, Banda, Jhansi, Deolee, Gorakhpur and Allahabad.]

No. 1311 of 1878.

From—*The Deputy Surgeon-General, Agra Circle,  
 To—The Secretary, Surgeon-General, Indian Medical  
 Department, Calcutta.*

Agra, 12th July 1878.

SIR,—I have the honor to forward, for consideration of the Surgeon-General, Indian Medical Department, Reports by Surgeon-Major J. Browne, M. D., and Surgeon G. Kellie upon the outbreak of cholera which took place on the 12th May 1878 and subsequent days among the men of a treasure escort on the road from Dholepore to Morar.

These reports form an interesting account of the occurrence, and have been very carefully prepared.

2. A body of men, consisting of 3 officers and 326 sepoy of the 41st Regiment Native Infantry, with 166 camp-followers and 50 sowars of the 7th Bengal Cavalry with 44 camp-followers, marched from Morar in good health and condition on the 6th May 1878, and arrived on the 9th at Dholepore, where they halted on the usual encamping ground.

The treasure was taken over at the railway station on the forenoon of the 10th May, and the escort commenced the return march the same evening, reaching the Old Residency camp, five miles from Morar, on the 12th, and on that evening the outbreak commenced.

3. Surgeon Kellie has shown how 150 sepoy and 25 sowars were hard at work from 11 A. M. to 3-30 P. M. on the 10th at the railway station taking over the treasure amounting to 26 lacs of rupees, and how the same night the whole detachment of sepoy underwent prolonged labour and fatigue in crossing the Chumbul, and subsequently were exposed to storms of dust and rain with considerable changes of temperature. It has also been shown that cases of cholera had been heard of on the road and at Dholepore.

I think, therefore, it can be no matter of surprise that a severe outbreak of cholera should have taken place under the circumstances.

4. It will be noticed that the men of the detachment, 41st Native Infantry, who took over the treasure at the railway station, had a larger proportion of cases than their comrades who remained on the encamping ground, and that the sepoy suffered much more than the sowars and camp-followers.

Every third man of them was attacked, whereas only one in ten of the sowars, one in fifteen of the camp-followers, 41st Native Infantry, and one in eleven of the camp-followers 7th Bengal Cavalry, suffered. The sepoy had prolonged marches, accoutred and more or less under the constraints of duty, while the sowars escaped fatigue by riding, and the camp-followers took no share in the fatigue duty at the railway station, and could travel at their ease.

It seems, therefore, fair to presume that, though the whole body of men were exposed to the influences producing cholera, the effect was most severe upon those who had undergone the greatest amount of exposure and fatigue.

5. It is remarkable that of the eleven deaths among the 166 camp-followers, 41st Native Infantry, the loss fell principally on the officers' servants, eight of whom were carried off.

6. I do not venture to express any opinion as to the causes and communicability of cholera, but would merely call attention to such facts as seem to bear on the subject:—

1st.—The one man who reported himself ill during the march was suffering from diarrhoea the day before the outbreak, and was carried in a doolie to the camp at the old Residency; *he was the only sepoy sent at once to the station for treatment, and no harm came of this to him or to others.*

2nd.—A recruiting party of eighteen individuals came from Agra by rail; they met the treasure detachment at Dholepore, but were not on the same ground and did not encamp with them. These men left on the 9th for Morar, and joined head-quarters, 41st Regiment Native Infantry, without any case of cholera occurring.

3rd.—Another party of eighteen soldiers, with a number of bullock-drivers and lascars, encamped on the very ground the detachment had left, and followed it two days after; these people left the main road at Noorabad and made a long cross-country march to Morar without any case of cholera occurring among them, or conveying the disease to the station.

4th.—The attendants on the sick numbered 59. From

among these only two cases occurred, and these were orderlies, who were attacked at the beginning of the outbreak.

5th.—Some officers' servants came from Morar on 15th May to join the camp at Mhow: three of these died,—one at Baolie on 16th, one on the road to hospital on 17th, and one in hospital, Camp Morar, on 18th. Did these men get the disease in Morar, where cholera prevailed, or at Mhow?

7. I think, whatever be the cause of cholera, that the whole of the sepoy were subjected to the cholera influence at the same time at Dholepore, and that subsequent events—fatigue, changes of temperature, storms, rain and damp ground—modified the effect on individuals.

8. The movements made by the Infantry detachment do not appear to have had any immediate effect in checking the disease; but it is to be noticed that it ceased in three days in the Cavalry, who were separately encamped, and had much diminished in severity on the 17th in the Infantry detachment.

On the 18th however, at Mhow, the greatest number of cases occurred: this was after a severe storm of rain, and may have been a fresh outbreak, under new exciting causes, among men who had in the first instance been exposed to the cholera influence at Dholepore.

9. On proceeding to Morar on the 21st of May, I found the hospital camp on a low rocky eminence near the road about three miles from Morar, the detachment 41st Native Infantry being at Tikri, seven miles off. Surgeon-Major J. Browne was in charge, and as the tents had been blown down and wetted he had caused grass huts to be erected which answered the purpose entirely: the patients were doing well under Dr. Browne's care, and wanted for nothing that could be given to them under the circumstances. These men ultimately proceeded to their homes on sick leave, a proceeding which, independently of the question of risk to the general community at Morar, which seemed to be considered a serious one, was a wise arrangement for the sufferers themselves, whose recovery was impeded by prolonged exposure to heat at the most trying time of the year.

10. I visited the camp at Tikri on the 24th May 1878, distant about six miles from the northern flank of the station of Morar. The sick were then recovering, and the sepoy had so far regained their physical tone as to be ready to take part in shooting with their officers. They had passed through a very trying time, but were in good spirits, and ultimately were permitted to return to Morar on the 5th, and to their lines on the 9th June.

11. Upon Surgeon Kellie fell the duties on the first appearance of the outbreak, and I have every reason to believe that this young medical officer, inexperienced in such serious emergencies, acquitted himself with energy and devotion: he was relieved by Dr. Browne on the 15th May for the sake of rest, and returned to duty on the 19th, remaining with the detachment to the end.

12. Dr. Browne was entirely alone with the sick at Baolie for a fortnight, and I can personally testify that the position was one requiring patience and endurance. His services were most cheerfully rendered, and, though his health suffered in some degree, he did not make over charge to Surgeon W. B. Smyth till it was clear he was not further required.

13. Surgeon Smyth, whom I sent from Agra to Morar to assist, took medical charge of the head-quarters, 41st Native Infantry, during Dr. Browne's absence, and relieved him on 31st May at Baolie: he then attended to the despatch of the men to their homes, and returned to Morar when that duty was completed.

14. In connection with this subject I should mention that, for the treatment of the cases among the Civil population at Morar, in which place cholera prevailed among the Europeans and Civil community from 6th May onwards, Surgeon-Major J. W. R. Amesbury, Staff Surgeon, made arrangements which I found to be very satisfactory. This officer also visited the camps as Principal Medical Officer, and directed the arrangements with energy and judgment.

15. The Subordinate Medical Staff was strengthened with all the available men I could send from Agra, viz., one Hospital Assistant and two Passed Medical pupils. \* \* \* \* \*

I have the honor to be,

SIR,

Your most obedient servant,

A. CHRISTISON, M. D.,

Deputy Surgeon-General, Agra Circle.

From—Surgeon G. J. KELLIE,

To—The Deputy Surgeon-General, Agra Circle.

Morar, 20th June 1878.

SIR,—I have the honor to forward the following report on the cholera epidemic which occurred in the detachment of the 41st Native Infantry when under my medical charge:—

I.—The date of commencement of the outbreak was May the 12th, 1878. Nearly about 7-30 P. M. the first case occurred. The last case occurred on May 22nd at 7 A. M.; the duration of the outbreak therefore was nine days and a half.

II.—The number of persons attacked and the number of deaths which occurred are as follows:—

MAY.	41st N. I.						7th B. C.			
	FOLLOWERS.						Sowars. Followers.			
	SEPOYS.		Male.		Female.		Sowars.		Followers.	
	A.	D.	A.	D.	A.	D.	A.	D.	A.	D.
13th up to 6 A. M. ...	11	1	2	0	0	0	4	0	1	0
14th " " ...	18	13	1	2	0	0	1	2	2	1
15th " " ...	16	8	0	1	0	0	0	1	1	0
16th " " ...	9	6	1	0	0	0	0	0	0	3
17th " " ...	6	0	1	0	0	0	0	0	0	0
18th " " ...	22	8	3	1	0	0	0	0	0	0
19th " " ...	17	4	0	0	0	0	0	0	0	9
20th " " ...	7	3	1	1	0	0	0	0	0	0
21st " " ...	1	6	2	0	0	0	0	0	0	0
22nd " " ...	1	5	0	0	0	0	0	0	0	0
23rd " " ...	1	0	0	0	0	0	0	0	0	0
24th " " ...	...	1	0	0	0	0	0	0	0	0
	109	55	11	5	0	0	5	3	4	4

Of camp-followers belonging to the 41st eleven were

attacked; five died on the different camps. The remaining six went to the Station Hospital. Four of these are known to have died: of the other two I have no knowledge.

SECTION I.—CIRCUMSTANCES.

A.—The detachment consisted of eight European officers and 326 men. It was accompanied by 50 sowars of the 7th Bengal Cavalry. The detachment left Morar on May 6th about 2-30 A. M., and marched to Dholepore for the purpose of escorting treasure from Dholepore to Morar. The men composing the detachment were all healthy men, all weakly men being left at Morar and men from the other wing (right wing) being substituted for them. On the march to Dholepore nothing of importance occurred. The men continued in good health, with two or three exceptions. These were slight cases of fever. The detachment arrived at Dholepore on the 9th May, in the early morning, and encamped on the usual camping ground. This day the men rested. On the 10th the treasure was taken over at the Railway Station; the men told off for this purpose numbered 157. They were accompanied by twenty-five sowars of the 7th Bengal Cavalry. The time occupied in this work was from 11 A. M. to 3-30 P. M. The work was hard, as the treasure amounted to twenty-six lakhs of rupees. There was very little shelter from the sun. The men returned to camp at 4 o'clock; the detachment marched from Dholepore at 6-30 P. M. The march from Dholepore was very fatiguing. The distance to Deoree is 11½ miles; the time occupied in performing this march was about eight hours. The passage of the River Chambal gave the men a great amount of labour. The men had to hold on to the carts to prevent them going down too rapidly the steep slope towards the bridge, and each cart had to be taken over separately.

The detachment arrived at Deoree about 2-30 A. M., May 11th. No cases of sickness occurred. On the evening of the 11th May the detachment marched to Noorabad. This march was also tedious, as the carts went very slowly, and every now and again would get out of order. The detachment arrived at Noorabad on the 11th May, about 11-30 P. M.

On May 12th, in the evening, the detachment marched to the Old Residency camping ground. The night was very stormy, and dust-storms almost constant the whole march. The men showed signs of great thirst, and drank a large quantity of water, especially at a small village a short way out from Noorabad. It was on this march that the first case of cholera occurred. The outbreak came on very suddenly, the men having marched apparently quite healthy from Noorabad.

B.—When the detachment left Morar no cases had been reported in that station amongst the troops. When the detachment arrived at Dholepore there were some cases of cholera in that place amongst the inhabitants. Shortly after leaving Dholepore telegraphic information was received that cholera was "on the Agra Road." No spot was mentioned. Cholera broke out in Morar previous to its appearance in the detachment.

C.—There was only one case of diarrhoea under treatment in the detachment previous to the outbreak of cholera,

This case occurred between Deoree and Noorabad. He had to be carried in the dhoolie. On the outbreak of cholera he was dismissed to the lines, and has continued in perfect health up to this time. This was the only case that came under my notice. On enquiry I find that the men suffered more or less from diarrhoea from the time of leaving Dholepore. The diarrhoea was not severe, and no one came for treatment, though I had issued a warning to that effect. During the outbreak diarrhoea was prevalent. Both European officers and sepoy's suffered; not very severely however.

**D.**—The weather was very unsettled from the time of leaving Dholepore. Dust-storms occurred nearly every evening up to the date I left, May 16th. Just before leaving Deoree on May 11th, rain fell, and, as the tents had nearly all been struck, some of the men got wetted. It rained but a short time. The rain fell again after the march had been commenced. The camping ground at Noorabad was dry when the detachment arrived there. The night of the 12th was extremely stormy; dust-storms continued all the way. The rain fell heavily at intervals: thunder and lightning also occurred. The prevailing wind during the march was from the East. All the dust and rain came from the opposite quarter. The temperature on the night of the 12th was low, being down to 75°. The temperature of the air varied considerably that night. We seemed to encounter alternate gusts of hot and cold air.

**E.**—The camping grounds were all fairly clean. The camping ground at the Old Residency at the time of arrival of the detachment there was damp, and rain was falling, but not heavily. The tents were also wet; there was not any overcrowding. The water-supply was fair and simple; the food was good.

**F.**—None of the tents escaped. In some more cases occurred than in others. There is nothing to account for this except that the men were of the same caste, and eat and drank together. All the tents were equally exposed to atmospheric influence.

**G.**—On the evening of the 13th the detachment marched from the Old Residency camping ground to a place called Baoli, a rising ground on the road to Morar, about the fourth mile-stone: this was about two miles from the Old Residency. The detachment remained here till the morning of the 14th. This move had no influence in diminishing the severity of the outbreak, as, up to 6 A. M., May 14th, eighteen cases were admitted and thirteen cases died. This camping ground was well situated with good water close at hand, and it was dry as there was a good slope towards the road.

On the morning of the 14th, the detachment moved to a new ground off the road near the third mile-stone. This was a fairly good ground and its sanitary condition fair. This move had no effect on the outbreak, as, up to the morning of 15th, sixteen new cases were admitted. Up to this date the hospital had remained at the Old Residency camping ground, a very unsuitable place. It was removed on the evening of the 14th to Baoli, where it has remained until the end of the outbreak. This was a fairly good place, but much exposed to the wind; once or twice the tents were blown down. The wea-

ther here was unfavourable: wind and rain occurred often.

On the morning of the 15th the detachment marched to Mau, a village about two miles from Baoli. I was this day relieved by Surgeon-Major Browne, who will give the further history of the detachment at this place.

On the 19th May, in the early morning, the detachment moved to Tikri, about seven miles from Baoli and six and a half from Morar. I met the detachment on the march and took over medical charge.

The camping ground was good. The detachment was divided into two. One portion occupied the summit of a small hill; the other division was encamped at the base of the larger range of hills, of which the hill mentioned was a part.

The detachment remained at Tikri until the 5th of June. The number of cases diminished after leaving Mau. Three cases occurred on the march to Tikri.

**H.**—In all twelve cases occurred at Tikri, and six of these died. None of the cases presented any very serious symptoms, and all promised recovery. The heat was very great however, and this seems to have brought about the fatal results. The hospital accommodation was good; all the men now had charpoys. This must have exercised a great good, as now they would no longer have to sleep on damp ground. The weather at first was stormy, but towards the end of the stay it became very hot. The cases occurred in the following order:—

	Cases.	Deaths.
May 19th, up to 6 A. M. ...	3	0
20th " ...	6	0
21st " ...	1	1
22nd " ...	1	4
23rd " ...	1	0
24th " ...	0	1
Total ...	12	6

Diarrhoea was prevalent during this time, and there was one case of dysentery.

On the morning of the 5th June the detachment marched to Morar. All the beds and bedding belonging to the sick were burned. The strings and curtains of the dhoolies were also burned. The convalescing men were sent to Baoli. The detachment arrived in Morar at 6 A. M.; and the camp was pitched on the Regimental Rifle Range. The detachment remained here until the morning of the 6th, when the men were allowed into the lines.

#### SECTION II.—CAUSES.

**A.**—It seems to me likely that the disease was originally acquired at Dholepore, and that the cause was not due to any atmospheric changes. The following facts seem to me to favour this view.

Cholera existed at Dholepore at the time that the detachment was encamped there. The men, with the exception of the party employed at the Railway Station, had but little intercourse with the civil population however.

The party employed at the Railway Station consisted of 157 sepoys of the 41st Native Infantry and twenty-five sowars of the 7th Bengal Cavalry. Out of the former number of men fifty-eight were afterwards attacked and thirty-two died. The following list shows the number of men present from each company, and the number of cases and deaths:—

Company.		Number.	Cases.	Deaths.
A.	...	5	2	1
B.	...	26	5	4
C.	...	5	1	0
D.	...	21	9	7
E.	...	25	14	8
F.	...	23	9	4
G.	...	27	9	7
H.	...	25	9	1
		<hr/>	<hr/>	<hr/>
		157	58	32

Amongst the remaining 179 men there occurred fifty-one cases, and of these twenty-three died.

The shortness of the time which elapsed from the departure from Dholepore to the termination of the outbreak makes it probable that all the men acquired the disease at or about the same time. The period from departure from Dholepore to occurrence of the last case was twelve days; the majority of cases, ninety-seven, having occurred before the 19th May.

The Cavalry detachment which accompanied the 41st Native Infantry suffered very slightly from cholera. Out of fifty men only five cases occurred, and of these three died. The Cavalry were exposed to the same atmospheric influences as the 41st Native Infantry. They had not, however, the hard work which the latter had to perform. Only twenty-five sowars were present at the Railway Station, and they had nothing to do but to keep guard, and would not therefore be exposed to the same risks of contagion as the sepoys, who were naturally brought more into contact with the civil population. Two other facts tend to show that the disease was not caused by the state of the atmosphere. They are these: A recruiting party marched along the road from Dholepore to Morar just before the detachment: this party consisted of one native officer, two sepoys and fifteen recruits for the 41st Native Infantry. They met the detachment in Dholepore, and left that place before it and marched two marches ahead. These men must have been exposed to much the same atmospheric influences as the detachment. No cases of cholera occurred in this party. Again another party, consisting of one Havildar, one Naick and sixteen sepoys, 41st Native Infantry, with a number of bullock-drivers and lascars, marched about two marches behind the detachment. These men made a long march from Noorabad to the station camping ground, avoiding the Old Residency. No cases of cholera occurred in this party.

The men themselves consider that it was at Dholepore that they were attacked, and state that the Railway Station was where the disease was acquired. They say they suffered more or less from diarrhoea from that time.

The severity of the outbreak was probably due to the fatiguing nature of the march from Dholepore to Deoree, preceded as it was by the work at the Railway Station.

B.—I am of opinion that nearly all the cases of cholera acquired that disease at the same time. This opinion is arrived at from the fact that the majority of cases occurred within a very short space of time. In the space of five days nearly eighty cases occurred. It is quite possible that all these men may have acquired the disease at the same place.

This also seems to be supported from the fact of so many cases occurring in each day. I am unable to come to any decided opinion as to the spread of the disease. Whether atmospheric changes were the active causes of the spreading of the disease or not, it is a fact that after a severe storm with rain, a fresh outbreak as it were occurred, and twenty-two cases were admitted in the twenty-four hours following: a larger number of admissions than on any other day. There is no evidence to show that the water was polluted by cholera discharges. All wells were at some distance from the camps, and from their position it would be impossible for any cholera discharges to drain into them. A possible way by which the wells may have been polluted is, that the natives wash themselves and clothing close to the wells. Their clothing would in this way be a very likely method of carrying cholera discharges to the wells. There was nothing in the sanitary arrangements of the camps which would cause any spread of the disease. The persons who were in immediate contact with the sick were singularly free from the disease. This is remarkable, because at the first outbreak, owing to its suddenness, it was impossible to get at once a sufficient number of sweepers to remove the discharges from the hospital tent. In fact the first day there was but one sweeper, and he had to attend to some twelve or fifteen cases. The number of individuals who attended on the sick and the number attacked is as follows:—

European Medical officers...	...	...	3
Hospital Assistants	...	...	3
Medical Pupil ...	...	...	1
Orderlies	...	...	16
Sweepers	...	...	9
Cooks	...	...	6
Dhoolie Bearers attending on sick	...	...	12
Ditto do. for removing dead	...	...	6
Bhistees	...	...	2
Hospital Havildar	...	...	1
			<hr/>
Total	...	...	59

Out of this number only two cases of cholera occurred. The two cases were orderlies who were in immediate attendance on the sick: they were attacked on the 13th May.

None of the sweepers employed in collecting and removing cholera excreta were attacked by the disease.

There was nothing in the circumstances connected with the attacks among the attendants which would lead to the conclusion that the disease was the consequence of such attendance. The two persons attacked, were attacked early in the epidemic, and there is no reason why they should not have acquired the disease before.

C.—The movements taken by the detachment do not appear to have had any beneficial effect on the disease. The movements were so soon one after the other that it is impossible to draw any conclusion from them. After the move to Tikri the disease abated. This move was probably a beneficial one, as the ground at Mau was low, and after the rain a great number of cases occurred there.

D.—The movements of the detachment did not cause any other disease.

E.—There seems to me three causes why the officers did not suffer from the disease whilst the men suffered so severely :—

(1.) They were not so much exposed to the disease at its starting point. They would have little contact with the natives at Dholepore, and when at the Railway Station, did not drink any water from that place.

(2.) They were not so much exposed to fatigue on the march, and having charpoys did not sleep on the damp ground, and were always able to put on dry clothing.

(3.) They did not drink water except in the shape of tea : this having been boiled, would not be likely to carry the cholera germs.

The reasons why the detachment suffered more than the troops in Morar are :—

(1.) It was a large body of men marching along a road on which cholera was known to exist.

(2.) They were exposed to very great fatigue on the march from Dholepore to Deoree.

(3.) They were much exposed to rain, and had to sleep on ground which was damp.

F.—Age or previous sickness had no effect in increasing the liability of the individual to the disease. Most of the men attacked were fine powerful men.

I have the honor to be,

Sir,

Your most obedient servant,

GEORGE J. KELLIE, Surgeon.

REPORT ON THE CHOLERA HOSPITAL AT BAOLIE, FROM THE 16TH TO THE 30TH OF MAY INCLUSIVE.

By SURGEON-MAJOR J. BROWNE, M. D.

I.—Have been described by Surgeon Kellie in his report.

I arrived at Baolie on the afternoon of the 15th May, and relieved Surgeon Kellie, who returned to Morar the next morning. My duties in the cholera hospital commenced on the morning of the 16th and terminated on the morning of the 31st of May, when I was relieved by Surgeon W. B. Smyth, I. M. D. On the 31st of May, and for some days previously, the patients with one exception were convalescent.

On the morning of the 16th May there were 26 cholera patients of the detachment 41st Regiment Bengal Infantry in hospital, as well as two sowars (cholera cases) of the detachment of the 7th Regiment Bengal Cavalry and two men of the detachment of the 41st Regiment Bengal Infantry who suffered from diarrhoea, making a total of 30.

II.—Surgeon Kellie, in his report, gives the total number of persons attacked and the deaths, from the commencement to the termination of the outbreak. In the following statement I only enter the admissions and deaths for the period I was in charge of the Baolie Hospital :—

DATE.	SEPOYS.		CAMP-FOLLOWERS.			
			Males.		Females.	
	A.	D.	A.	D.	A.	D.
From 6 A. M. 16th to 6 A. M. 17th May ..	6	0	0	0	..	..
„ 17th „ 18th „ ..	22	8	1	1	..	..
„ 18th „ 19th „ ..	14	4	0	0	..	..
„ 19th „ 20th „ ..	1	3	0	0	..	..
„ 20th „ 21st „ ..	0	5	0	0	..	..
„ 21st „ 22nd „ ..	0	1	0	0	..	..
There were no admissions after the 20th;* nor deaths after the 22nd.						
Total ..	43	21	1	1	..	..

III.—SECTION I.

A) Information under these headings has been supplied by Surgeon G. J. Kellie in his report.

B) Surgeon Kellie has discussed these points in his report.

C) I shall draw attention to what I observed at Baolie.

D) Section II. It will be seen in the foregoing table that, from 6 o'clock A. M. on the 16th up to 6 o'clock A. M. of the 17th, there were but six cholera patients admitted, while from the 17th up to the 18th (6 o'clock A. M. on each date) there were no fewer than 22 admissions. I do not believe that this fresh outbreak of cholera was in any way due to importation, but I think there can be little doubt that it was intimately connected with the heavy rain which fell on the afternoon of the 16th, and may have been caused by malarious exhalations which, in consequence of the coldness of the night air, were condensed and lay close to the surface of the ground in a very concentrated form. That this was probable may be gathered from a consideration of the following circumstances in connexion with the two camps, viz., in the cholera camp at Baolie we had the same conditions of temperature and rain which were experienced in the camp of the detachment at Mhow (situated about one mile or so north-east of Baolie), from which the cholera cases were admitted; but, in addition to the Baolie hospital camp, there was the ground more or less polluted by cholera excreta in every stage of activity, whether fresh, stale, putrefying or *in poudrette*, besides which every one had been thoroughly drenched by the rain and suffered great exposure; nevertheless the cholera patients did not suffer in the least, nor was there a single case of sickness or of cholera amongst the camp followers or attendants on the cholera-stricken patients, while the men in Colonel Ekings' and Captain Wemyss'

\* The detachment marched on the morning of the 19th to Tikri, about five miles distant from Baolie, at which place there was a detachment hospital.

detachments were suffering severely from the latter disease.

This remarkable exemption from the outbreak of any sickness in the cholera camp was, I consider, due to its being placed on the side of the Baolie hill from which the surface water ran off immediately. In the other camps the surface water was got rid of by evaporation and by ground absorption, the combined action of which may have set free those exhalations which perhaps are the principal if not the sole causes of cholera.

B.—I do not consider that this outbreak of cholera on the 17th and following days was in any way due to water polluted with cholera discharges, or to any infection from the sick. It was connected solely, I believe, with the rain-fall of the 16th.

The following persons were employed in attending on the cholera patients, *viz.*, myself, a hospital assistant, a native medical pupil, eight doolie bearers, six sweepers, three cooks, one orderly, and six bearers, who were employed in carrying the dead to the place of burial. Of the *foregoing attendants not one* was attacked by cholera. Of the *six sweepers* who were employed in collecting and removing the excreta, *not one* was seized by cholera.

$\left. \begin{matrix} C \\ D \\ E \\ F \end{matrix} \right\}$  Reported on by Surgeon G. J. Kellie.

It is perhaps probable that this outbreak of sickness was due to marching the Treasure Escort party of the 41st Regiment Bengal Infantry and 7th Bengal Cavalry from Morar to Dholepore at an unseasonable time of year, more particularly so if it was known at the time that cases of cholera had occurred along the route of communication between these places. It is also likely that troops would have a better chance of getting rid of cholera by being encamped on the hills, of which there are many in the neighbourhood, rather than on the flat ground below them.

JAS. BROWNE, M. D.,  
Surgeon-Major,  
41st Regiment Bengal Infantry.

Morar, 24th June 1878.

P. S.—The cholera hospital at Baolie was broken up on the 9th of June. As it was considered inadvisable on sanitary grounds, as well as in deference to the prevailing opinion of the extreme communicability of cholera, that none of the convalescent patients should return to Morar, they were sent home on medical certificate until the 31st October. All the necessary precautions against the spread of cholera by these men were taken, such as disinfecting and boiling their clothes, &c., and they were sent away from the Baolie camp in batches of twelve at a time, with two or three days' interval between the departure of each party.

JAS. BROWNE, M. D.

From—Surgeon G. J. KELLIE,  
To—The Deputy Surgeon-General, Agra Circle.

Morar, July 3rd, 1878.

SIR,—I have the honor to forward the following information, in reply to the questions relating to the late

outbreak of cholera in the 41st Native Infantry and 7th Bengal Cavalry.

(1.) The total number of camp-followers of the 41st Native Infantry was 166, classified as follows:—

Officers' servants	...	...	...	39
Camel drivers	...	...	...	29
Kahars	...	...	...	62
Barbers	...	...	...	4
Bhistees	...	...	...	8
Bunniah	...	...	...	4
Goorgas	...	...	...	6
Classies	...	...	...	4
Cooks	...	...	...	5
Dhobies	...	...	...	5

(2.) The camp-followers who died belonged to the class of officers' servants, with the exception of one Bunniah and two Kahars.

The total number of camp-followers of the 7th Bengal Cavalry was forty-four. The camp-followers who died were syces and grass-cutters.

(3.) None of the camp-followers shared in the fatigue undergone by the sepoys at the railway station.

(4.) The hospital attendants who accompanied the detachment to Dholepore were one native doctor and the orderlies; all the others were entertained later on. One medical pupil and three sweepers joined at the Old Residency on the 13th.

Two hospital assistants joined on the 14th at the camp ground, near the third mile-stone on the Agra road. The remainder were entertained at the Baolie camp on the 16th May.

Captain Wemyss joined the detachment at Mau on the 15th May from Morar. On the night of the 16th a severe storm with rain occurred. One of his servants, who was sleeping in close proximity to his tent, was attacked and died the next day at Baolie. On the 17th, two more of his servants were attacked when lying under the walls of his tent; one of these men died in the Cholera Hospital, Morar, on the 18th. The other man died on his way to the hospital. No servants joined the camp at Tikri, and no servants were attacked there.

The first party mentioned in my report came from Agra by rail, and did not encamp at Dholepore. They met the detachment when at Dholepore, but were never on the same ground together. They left Dholepore on the 9th, and were two days before the detachment on the return march.

The second party encamped on the same ground as the detachment, but did not encamp at the Old Residency at all.

I have the honor to be,

Sir,

Your most obedient servant,

GEORGE J. KELLIE,

Surgeon, 41st Native Infantry.