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CIRCULAR No. 5.

WAR DEPARTMENT, SURGEON GENERAL'S OFFICE,

MAY 4th, 1867.

REPORT ON EPIDEMIC CHOLERA.



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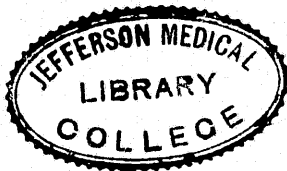
*Washington, D. C., May 4, 1867.*

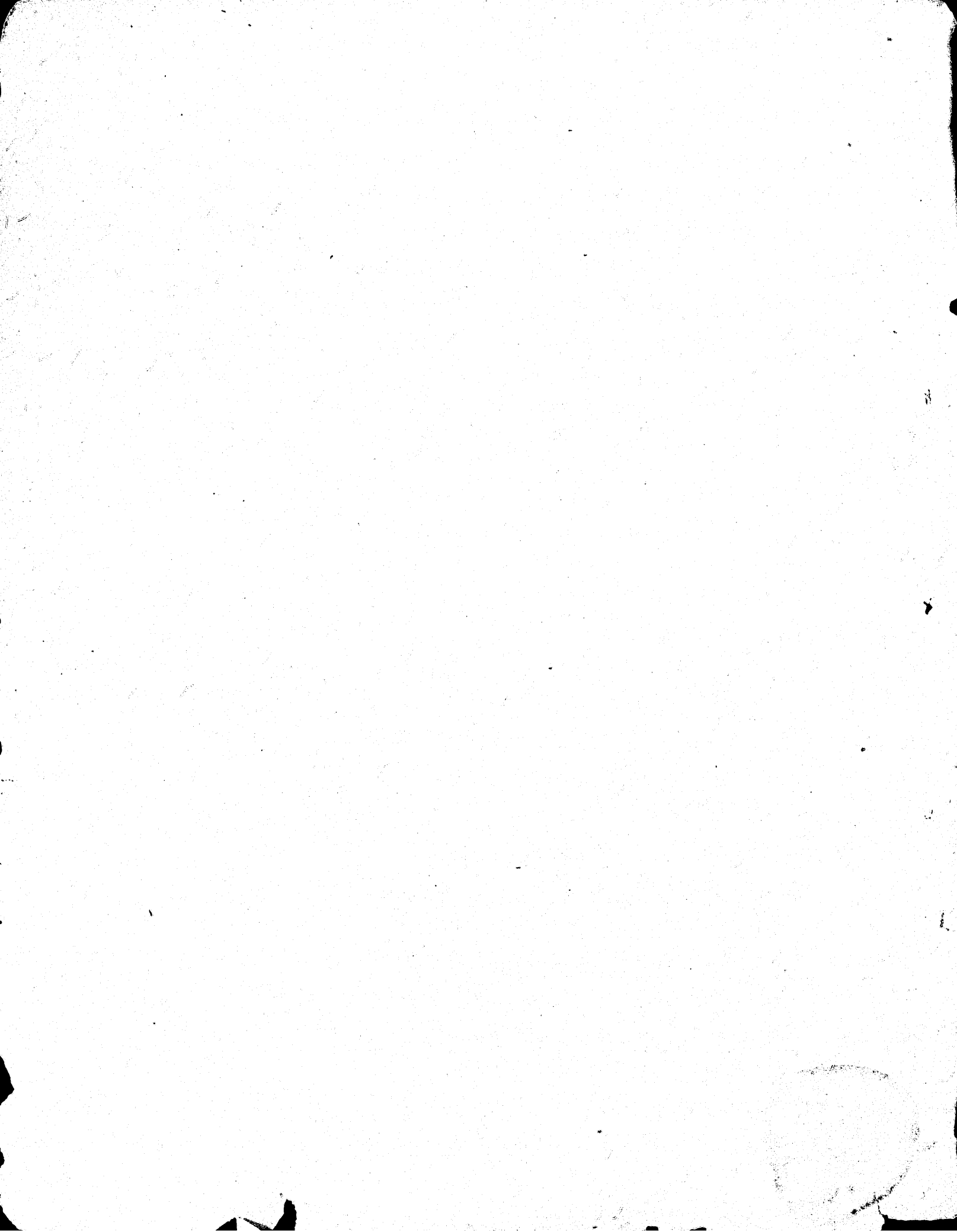
The following report on the epidemic of cholera, as it occurred in the army last year, is published for the information and guidance of medical officers.

JOSEPH K. BARNES,

*Surgeon General.*

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REPORT  
ON  
EPIDEMIC CHOLERA  
IN THE  
ARMY OF THE UNITED STATES,  
DURING THE YEAR 1866.

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By Brevet Lieut. Col. J. J. Woodward, Assistant Surgeon U. S. A.

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SURGEON GENERAL'S OFFICE, *May 1, 1867.*

GENERAL: In accordance with your instructions, I have the honor to submit the following brief statement of the prevalence of cholera in the United States Army during the last six months of the year 1866. In preparing this statement, the official reports have been carefully examined and compared, and the greatest pains have been taken to secure accuracy. Appended are statistical tables exhibiting the monthly number of cases and deaths of cholera, and of the allied bowel affections for each post where the disease prevailed, and such extracts from the official reports on the subject as have been thought to possess professional interest, whether as vouchers for the statements here made or otherwise.

Although the total number of cases is not very great, yet they bear so large a proportion to the number of troops exposed to the disease, and the circumstances attending the transmission of the epidemic from post to post are, in most instances, so well known, and of such significance in connection with the question of quarantine, that the history here presented appears well worthy of the attention of all interested in problems of public hygiene.

The first reported case of cholera in the army during 1866 occurred at Fort Columbus, Governor's island, New York Harbor, on the evening of July 3rd. The patient was a recruit from the recruiting rendezvous at Minneapolis, Minnesota, of whose previous history and exposure nothing is known. He had

been but three days at the post. About an hour after his admission into hospital another case occurred, also a recruit of unknown previous history. Cholera was at this time prevailing in New York city.\*

Recruits from Governor's island carried cholera to Hart's island, where the first case occurred on the 8th of July. The epidemic becoming severe among the troops at this post they were moved on the 20th to David's island, where the disease subsequently prevailed to a limited extent among the troops thus transferred. These cases are reported from the De Camp Hospital, David's island, where they were sent for treatment. A single case also occurred at Fort Schuyler, New York Harbor. The patient was a lieutenant of the first United States artillery who had slept on board the steamboat used the day before in transporting the infected troops from Hart's island to David's island. No cases occurred in the garrisons of Forts Hamilton, Lafayette, and Wadsworth, the fort at Sandy Hook, Madison barracks, or Willett's Point, New York Harbor. Moreover, there were none among the officers and men on detached duty in New York City, Jersey City, and Williamsburg. The total number of cases reported among the troops in New York Harbor was 181, with 78 deaths.

On the 19th of July a soldier died of cholera at the "Soldier's Rest," Boston, Massachusetts. This man arrived in Boston on the morning of the 19th from Hart's island, where he had been on duty as a wardmaster in the cholera hospital. No further military cases occurred in Boston.

On the 14th of July the steamship San Salvador left New York with 70 or 80 cabin passengers, and 60 in the crew and steerage. She touched at Governor's island and took on board 476 recruits for the seventh United States infantry. The men were lodged between decks, and were greatly overcrowded. On the second day out cholera appeared among the recruits, and when the vessel arrived at quarantine, near Savannah, Georgia, three deaths had occurred, and there were 25 ill of the disease. The troops were landed on Tybee island and a hospital extemporized. Cholera continued to prevail on the island during July and the first few days of August. Altogether there were 202 cases and 116 deaths, including 18 deserters, reported as having died in the woods of Tybee Island, and one who escaped from the island and died in the Whitmarsh quarantine hospital. The cabin passengers and crew of the San Salvador appear to have escaped, but of the ten white citizens residing on Tybee Island, nine were seized with cholera shortly after the arrival of the infected ship and five died. The tenth fled from the island, and is reported to have died of cholera somewhere in the interior of Georgia. No cases of cholera occurred among the troops stationed in Savannah.

Recruits from New York Harbor arrived at New Orleans on the 8th and

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\* See annual report of the Metropolitan Board of Health, 1866.

16th of July, others from Carlisle Barracks, by way of New York Harbor, on the 23d. One of these detachments on the steamship Herman Livingston brought recruits from Hart's island, which she left on the 7th. On the 8th a case of cholera occurred which proved fatal next day. A week subsequently another fatal case occurred. The vessel arrived off quarantine in the Mississippi river on the 15th and put off two recruits said to have diarrhœa. On the 16th the command disembarked at Jackson Barracks, six miles below New Orleans, where two recruits were sent to hospital with choleraic diarrhœa. The command remained three days in New Orleans, and on the 19th of July embarked on the steamship Texas for Galveston.

The first case reported among the troops at New Orleans was on the 22nd of July in company G, sixth United States cavalry, stationed at Holmes's Foundry. The patient was a recruit recently enlisted in New Orleans. It is not known whether he had been in communication with the New York recruits. On the 25th of July, a case occurred at Jackson Barracks, six miles below New Orleans. The patient was one of the recruits recently arrived from New York Harbor on the Herman Livingston. A number of cases subsequently occurred among the troops at this post, and in company G of the sixth United States cavalry.

On the 25th of July, also, a soldier of the eighty-first United States colored infantry at the Louisiana cotton press in the first district of New Orleans was seized with symptoms of cholera and sent to hospital; he died on the 26th. On the 27th another man of the same regiment, who had been on guard duty at Bull's Head stables, near the levee in the fourth district, was brought into camp with cholera and died the same day. The disease spread rapidly through the regiment. Cholera already existed among the citizens of New Orleans, and a number of the early victims among the troops were out of camp when attacked, many of them being brought in a state of collapse from hovels in the city.

The health ordinance in New Orleans did not become a law until after cholera had manifested itself, and it is difficult, therefore, to tell when the first cases among the citizens occurred.

In the seventh, ninth, thirty-ninth and one hundred and sixteenth colored regiments, the disease had appeared while on duty in Texas; the large majority of the cases reported in New Orleans, however, occurred in company G, sixth United States cavalry, and in the eighty-first United States colored infantry.

Altogether 93 cases and 24 deaths were reported among the white troops at New Orleans, and 254 cases and 149 deaths among the colored troops.

The disease was carried to the colored troops at Forts St. Philip and Jackson, below New Orleans on the Mississippi river, by detachments returning to those

posts after having been on duty in New Orleans during the riot. The first case appeared on the 10th of August, and during the rest of the month and September there were 17 cases and 11 deaths.

At Ship island, Mississippi, the first case occurred September 8th. There was one fatal case among the colored troops at the post during September, and others among the hired men, convicts, &c.

On the 17th of August the first case was reported at Baton Rouge, Louisiana, in the sixty-fifth United States colored troops. During August, September, and October, there were 69 cases and 43 deaths. There was also a fatal case in August, and one during October, in the detachment of ordnance (white) stationed at the post.

The reports do not indicate the mode in which cholera arrived at Ship island or Baton Rouge.

The first case at Shreveport, Louisiana, on the Red river, occurred September 22nd. in the eightieth United States colored troops; for nearly a month previously cholera cases had been reported on the plantations below, and in the city of Shreveport just above the post. During September and October there were 11 cases and 4 deaths in the command.

The steamship Texas, with recruits from Hart's Island, for the seventeenth United States infantry, left New Orleans, as already stated, July 19th, and arrived Galveston, Texas, on the 22nd. The day after their arrival one of the recruits was attacked with cholera, and died in thirty-six hours. In the outbreak which followed, 44 cases and 24 deaths are reported among the white troops at Galveston, and one fatal case of a colored soldier in the post hospital during August.

The subsequent progress of the epidemic in Texas was as follows:

The first fatal case among the colored troops at Brazos Santiago occurred August 21st; in all, 90 cases and 47 deaths were reported.

Among the colored troops at White's Ranch, the first fatal case was on the 13th of August; 98 cases and 37 deaths being reported during the month.

Among the colored troops at Brownsville, the first case was on the 20th of August, and proved fatal the same day. In all, there were 99 cases and 57 deaths reported during August and September. Among the white troops at the same post, the disease also appeared in the latter part of August. The first death was on the 1st of September; 24 cases and 8 deaths are reported.

Among the colored troops at Indianola, the disease appeared in the latter part of August. The first fatal case was on the 6th of September; 39 cases and 7 deaths are reported.

At San Antonio, the first case occurred on the 10th of September, in the fourth United States cavalry, (white.) The regiment was moving at the time, part of it being in San Antonio and part in camp on the Medina river, about





REPORT ON EPIDEMIC CHOLERA.

IX

fifteen miles distant. In the latter detachment three cases appeared from the 7th to the 10th, in the former, two cases on the 11th. The first death occurred September 10th. Cholera was prevailing among the citizens of San Antonio at the time, the first case having occurred September 2nd, at San Juan mission, about six miles distant; the patient had just arrived from the Rio Grande, where the disease was epidemic. A detachment of the seventeenth United States infantry at San Antonio escaped until after it was moved from town, September 16th, to camp on the Medina, near the cavalry camp. Cholera appeared in this detachment a few days afterwards, however, having apparently been introduced by two Mexican teamsters who came from San Antonio, stopped for the night near the camp, and died of the disease. The total number of cases reported among the white troops at and near San Antonio during September was 387, with 64 deaths.

Among the white troops at Austin, to which place the disease was carried by recruits who arrived by way of Indianola, the first death was on the 18th of September. During September and November 12 fatal cases are reported.

It is much to be regretted that several of the October reports of sick and wounded from Texas miscarried, and have not been received at the Surgeon General's Office up to the date of this report. It is probable that a small number of cases of cholera were lost, especially in the reports from Austin. (See letter of Assistant Surgeon C. Bacon, jr., Brevet Major United States Army, Appendix, page 42.)

At Richmond, Virginia, the first case occurred at Camp Grant, on the 12th of August. Recruits had been received during July and August from New York Harbor and Newport Barracks. It appears, however, that the earliest cases were not among those recruits, but among soldiers who had been at Richmond the entire summer. Cholera appeared in the city of Richmond about the same time. The total number of cases was 271, with 103 deaths, all white.

On the 21st of August the third battalion of the eleventh United States infantry was sent from Camp Grant to Norfolk, Fortress Monroe, and Yorktown. Four cases and two deaths occurred during September and October among the companies thus removed to Norfolk.

August 12th, a death from cholera occurred at Carlisle Barracks, and another on the 20th. Both were Swiss recruits from Philadelphia, where cholera was prevailing to a moderate extent. One of the attendants on these men was attacked but recovered. Two cases also occurred in September, but recovered. These men were attacked immediately after their return from Jefferson Barracks, Missouri, where cholera was prevailing. On the 17th of October a cavalry recruit was attacked and died in thirty-six hours. He had

arrived the day before his attack, from Chicago, Illinois, where cholera was then prevailing. No other case occurred at this post.

A detachment of recruits from Governor's Island, New York Harbor, arrived at Newport barracks, Kentucky, July 12th; recruits were also received during the latter part of July and first of August from St. Louis, Missouri, and Cincinnati, Ohio; from the latter place almost daily after July 13th. The first case of cholera at this post occurred August 12th. The patient was a recruit who had been doing duty as a teamster, and visiting Cincinnati daily. Cholera was, at this time, epidemic in the city of Cincinnati.\* From this time to the close of November there were 9 cases and 5 deaths of cholera reported at the station.

During September cholera also appeared at Atlanta and Augusta, Georgia, among recruits who went from Newport barracks by way of Nashville. The disease was limited to the recruits. The first fatal case at Atlanta was on the 9th of September, and 19 cases, with 7 deaths, occurred during the month. At Augusta, the first fatal cases were also on the 9th, and the total number during the month was 8 cases, of whom 7 died.

At Louisville, Kentucky, the first case occurred July 29th. The patient was a recruit from Governor's island, New York Harbor; 364 recruits from Governor's island arrived at Taylor Barracks, Louisville, between the 16th and 19th of the month. Cases of cholera occurred first among these recruits, but subsequently among the rest of the garrison. The first case in the garrison (excluding New York recruits) occurred August 18th. The total number of cases at Louisville was 36, with 23 deaths.

On the 21st of August, company E, second United States infantry, was ordered from Taylor Barracks to Bowling Green, Kentucky. Six cases of cholera occurred in this company during the remaining days of August, and two in September. None were fatal.

During the last days of August and the first of September, squads of recruits, numbering ninety each, arrived at Nashville, Tennessee, from Newport barracks, Kentucky, and were quartered for quarantine purposes in the immediate vicinity of the post hospital. The first three cases occurred among these recruits—the first fatal case being on September 2d. About this time, also, cholera began to prevail among the citizens of Nashville, and it would appear probable that it was from this source that the disease was introduced into the detachment at Sibley Barracks, as the first two cases at this post were men who had been on a debauch in the town. Altogether, there were 72 cases and 39 deaths among the white troops.

Two deaths of colored soldiers also occurred in September, in the Nashville post hospital.

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\* Cincinnati Lancet and Observer, vol. IX, p. 561.

The first case among the white troops at Memphis, Tennessee, occurred September 6th, and died the next day. The patient was a recruit who had arrived the day before the attack, from Nashville. Altogether, there were 21 cases and 16 deaths during September among the white troops at Memphis. On the 15th of August, however, a fatal case had occurred in the post hospital at Memphis. The patient was a soldier of the fifty-sixth United States colored troops, who was taken from on board the steamer Continental passing up the river from Helena, Arkansas.

The first case among the white troops at Vicksburg, Mississippi, occurred on the 22nd of August, on which day two soldiers were attacked. The colored barber had died of the disease the day before. There were, in all, 59 cases and 25 deaths in Vicksburg. A detachment of 145 recruits had been received July 11th, from Fort Columbus, New York Harbor. Cholera also appeared in a detached company (E) of the fifteenth United States infantry, stationed at Jackson, Mississippi, where, during August and September, there were 8 cases and 6 deaths. A detachment of fifty-one recruits had been received at Jackson, July 17th, from Fort Columbus, New York Harbor.

The fifty-sixth colored infantry left Helena, Arkansas, in two detachments—the first on the steamer Continental, August 9th; the second on the Platte Valley, August 10th. A death, probably of cholera, occurred on the Platte Valley about twenty-four hours after starting, and another while between Cairo and St. Louis. The disease, however, was not recognized until the morning of the 14th at St. Louis, when the vessel was ordered to the quarantine grounds at Jefferson Barracks. Cholera broke out on the Continental shortly after leaving Helena. A case was put on shore at Memphis, and died in the post hospital. This vessel also went into quarantine at Jefferson Barracks, where she arrived before the Platte Valley. During August and September, 256 cases and 134 deaths were reported in this regiment; this number, however, does not include those who died on the river before reaching Jefferson Barracks. The disease spread to but a limited extent among the white troops at Jefferson Barracks. The first fatal case was August 15th, several days after the arrival of the 56th United States colored infantry. Altogether there were 8 cases and 7 deaths. Four cases and three deaths also occurred during August and September in the ordnance detachment at St. Louis Arsenal, the first fatal case dying on the 17th of August.

On the 25th of August 384 cavalry recruits (white,) from Carlisle Barracks, Pennsylvania, by way of St. Louis, arrived at Fort Riley, Kansas. One of them died of cholera August 30th. From this time to October 16th, 59 cases and 27 deaths occurred, all among the recruits, the rest of the garrison escaping.

At Fort Leavenworth, Kansas, (white troops,) the first case occurred September 18th; the patient died next day. Altogether there were 7 cases and

5 deaths at this post. A few days before the appearance of cholera, about twenty cases were reported among the citizens at Leavenworth city, two miles south of the garrison. Intercourse between the city and the post was unrestricted.

One case, not fatal, was reported at Albuquerque, New Mexico, in October; particulars not known.

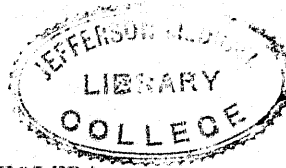
At Helena, Arkansas, the first fatal case (white troops) occurred August 30th, and during August and September there were 10 cases and 6 deaths. A detachment of 28 recruits was received at this post August 3rd, supposed to be a portion of a detachment of recruits which left Newport barracks, Kentucky, for Little Rock, Arkansas, July 28th.

At Little Rock, Arkansas, the first case occurred September 12th. Altogether there were 131 cases and 64 deaths among the white troops. A company of the fifty-fourth United States colored infantry, stationed at the same post, had 3 cases and 1 death in September, and 4 cases and 1 death in October, the first fatal case among them being September 27th. Nine recruits for the nineteenth United States infantry arrived at Little Rock, August 10th, from Newport barracks, Kentucky. It does not, however, appear probable that cholera was imported into Little Rock by this detachment of recruits. The report of Brevet Lieutenant Colonel J. R. Smith, Surgeon United States Army and Medical Director, would rather seem to show that it was carried there by steamboats coming up the river from infected points. Surgeon Smith says: "From time to time during the month of August, steamboats arrived both at Little Rock, on the Arkansas, and Duvall's Bluff, on White river, on which rumor said that cases of cholera either existed or had occurred. Examination made by other physicians here and at Duvall's Bluff, as well as by myself, failed to confirm the report of the present existence of cholera on board these boats, *although I was satisfied, in several instances, from the histories related to me, that fatal cases of cholera had occurred during their trip from Memphis to Little Rock.*"

At Huntersville, a suburb of Little Rock, Arkansas, there were 21 cases and 9 deaths during September, in the fifty-fourth colored infantry, the first case occurring September 15th, and proving fatal the next day.

At Fort Smith, Arkansas, there were 2 cases in September, and 6 cases and 2 deaths in October, among the white troops. Four cases and two deaths among the colored troops for the same time. The disease was carried to Fort Smith on a steamer from Little Rock.

Three cases and two deaths occurred at Fort Gibson, Cherokee Nation, during October; the first case occurred October 15th. Two of these cases were soldiers belonging to company F nineteenth infantry, which arrived at Fort Gibson October 12th from Fort Smith, Arkansas. The third had attended them during their illness. One fatal case occurred during November.



Finally, the latest appearance of cholera during the year was in a party of recruits who left New York for San Francisco, November 20th. On the 16th of December cholera appeared, the vessel then being on the San Juan river. On the 20th the command reached La Virgin, on Lake Nicaragua, about twelve miles from the Pacific; went into camp and established a hospital. Altogether there were 54 cases and 27 deaths during the month.

The foregoing brief statement will serve to give a summary view of the progress of cholera through the army. The reports reproduced in Appendix B will furnish many interesting details.

Appendix A, presents a brief statistical synopsis for each post, for the total white troops at infected points, the total colored troops, and a general summary embracing, so far as the reports permit, all the troops exposed.

In preparing these statistical tables, the reports used for each post embrace the month during which cholera appeared, and all subsequent months for which reports were received, to December 1866, inclusive. The reports are believed to be very nearly complete; blanks subsequent to the appearance of cholera being generally due to change of station, or, in the case of colored troops, to the muster-out of the command. The only important deficiency is in the case of the October reports for certain stations in Texas, which have been indicated in the tables by an appropriate foot-note. This deficiency, however, does not probably represent any very considerable number of cases.

The mean strengths given in the summaries for white and colored troops, and in the general summary, only represent the troops embraced in the reports, and have nothing to do with the strength of that part of the army not exposed to the epidemic.

It appears from these tables that out of a total mean strength of 12,780 men, there were 2,708 cases of cholera reported, and 1,207 deaths. Of these there were 1,749 cases and 706 deaths out of a mean strength of 9,083 white troops; and 959 cases and 501 deaths out of a mean strength of 3,697 colored troops. Besides these, there were 4 cases and 3 deaths of white, and 12 cases and 7 deaths of colored soldiers at various isolated points, as set forth in the table VI, Appendix A, making a total of 2,724 cases and 1,217 deaths of cholera for the six months.

In the following considerations no count has been made of these last 16 cases, which have been ignored in order that the ratios presented might have a definite relation to strength.

The three summary tables here presented show the prevalence of sickness and mortality among the troops exposed to the epidemic, expressed in the ratio of cases and deaths per 1,000 of mean strength, for cholera, diarrhœal diseases, and all other diseases, for each month, and for the six months. From these

tables it will be seen that for the white troops, the number of cases of cholera reported during the six months was 192.6, with 77.7 deaths per 1,000 of strength. Of diarrhoeal diseases there were 741.8 cases, and 7.5 deaths per 1,000; of all other diseases, 1328. cases, and 15.5 deaths per 1,000.

For the colored troops the number of cases of cholera reported was 259.4, with 135.5 deaths per 1,000 of strength. Of diarrhoeal diseases 574.5 cases, and 3.5 deaths per 1,000; of all other diseases, 833.9 cases, and 11.4 deaths per 1,000.

*Tables showing the prevalence and mortality of cholera and other diseases among the troops exposed during the last six months of 1866, expressed in ratio per 1,000 of mean strength.*

## 1. WHITE TROOPS.

	July.		August.		September.		October.		November.		December.		Total for the six months.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....	78.6	37.7	33.7	16.8	82.6	26.8	6.1	3.2	3.2	2.0	5.9	2.9	192.6	77.7
Diarrhoeal diseases .....	185.8	1.0	214.1	2.7	149.6	1.3	125.4	1.4	74.0	.7	47.0	.7	741.8	7.5
All other diseases .....	178.1	1.8	277.4	3.9	245.6	3.6	269.8	2.9	196.2	2.2	155.5	1.0	1,328.0	15.5

## 2. COLORED TROOPS.

	July.		August.		September.		October.		November.		December.		Total for the six months.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....	2.5	2.5	115.5	58.2	40.9	23.2	17.8	11.3	15.0	5.7	2.2	1.1	259.4	135.5
Diarrhoeal diseases .....	15.0	.....	142.0	.4	97.7	.....	75.4	1.4	92.5	1.0	61.3	.7	574.5	3.5
All other diseases .....	70.0	6.3	142.0	.2	113.3	1.7	147.5	2.0	172.8	2.2	149.2	3.6	833.9	11.4

## 3. WHITE AND COLORED.

	July.		August.		September.		October.		November.		December.		Total for the six months.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....	68.1	32.8	66.1	33.2	68.3	25.6	9.3	5.4	6.5	3.1	5.1	2.6	211.9	94.4
Diarrhoeal diseases .....	162.3	.9	185.5	1.8	131.7	.9	111.9	1.4	79.1	.8	50.0	.7	693.4	6.3
All other diseases .....	163.2	2.4	223.8	2.4	200.0	2.9	236.6	2.7	189.6	2.2	154.2	1.5	1,185.1	14.3

The ratio of deaths to cases was as follows :

For cholera, 403.7 deaths per 1,000 cases, or one death to 2.5 cases among white troops ; among colored troops, 522.4 deaths per 1,000 cases, or one death to 1.9 cases ; so that somewhat less than half the white, and somewhat more than half the colored soldiers attacked with cholera died.

For diarrhoeal diseases the mortality was small, 10.1 deaths per 1,000 cases for white, and 6.1 per 1,000 for colored troops.

For all other diseases the mortality was 11.7 per 1,000 cases for white, and 13.6 per 1,000 for colored troops.

As to the duration of the disease in fatal cases, there are reports from Camp Grant, Richmond, Virginia ; Tybee Island, Georgia ; and Little Rock, Arkansas. It would appear from these reports that the great majority of patients die on the first or second day of the disease. The greatest duration of any fatal case being to the fifteenth day.

*Table showing the duration of fatal cases of cholera at Camp Grant, Richmond, Virginia, at Tybee Island, Georgia, and at Little Rock, Arkansas.*

Died on the—	Camp Grant.	Tybee Isl'nd.	Little Rock.
First day .....	29	43	35
Second day .....	22	26	12
Third day .....	5	7	3
Fourth day .....	4	5	3
Fifth day .....		4	4
Sixth day .....	4	4	1
Seventh day .....	2	3	2
Eighth day .....	3		2
Ninth day .....	3	1	
Tenth day .....	1	1	1
Eleventh day .....	1		
Fourteenth day .....			1
Fifteenth day .....			1
Total .....	74	94	65

A thoughtful consideration of the facts embraced in the foregoing brief general statement, and in the appended reports, shows that they possess a two-fold significance ; on the one side in connection with the question of quarantine, on the other, in connection with that of local hygienic and therapeutic agencies.

As to the question of quarantine the facts are not perhaps conclusive, yet they are too numerous and too important to be overlooked, and although certain breaks in the chain of evidence exist, there can be doubt as to the general facts of the case.

The epidemic appears from the record to have radiated distinctly from two chief centres.

Originating in the overcrowded barracks, of Governor's island, New York Harbor, in the immediate vicinity of an infected city, through which recruits

passed with more or less delay before arrival, the infection spread by readily traceable steps to Hart's island and other posts in the harbor, to Tybee island, Georgia; to Louisiana, by way of New Orleans; to Texas, by way of Galveston; to Louisville, Kentucky; to Richmond, Virginia, and to La Virgin, Nicaragua bay. From Richmond it was carried to Norfolk, Virginia; from Louisville to Bowling Green, Kentucky. The probabilities appear to be that the disease was carried from New Orleans up the Mississippi river to various points on that stream, and west of it, and though the whole chain of evidence is not complete, yet there are a sufficient number of known cases of the transfer of the epidemic from one post to another in this region to put this view of the whole movement beyond reasonable doubt.

The other principal centre appears to have been Newport barracks, Kentucky, where the disease was plainly introduced from the infected city of Cincinnati, on the opposite side of the Ohio river. Although it did not prevail to any great extent at this post, yet it is in evidence that it was carried thence to Augusta and Atlanta, Georgia, to Nashville and Memphis, Tennessee.

At several points, as, for example, at Augusta and Atlanta, Georgia, the epidemic did not extend beyond the infected recruits by whom it was imported. In many cases, however, it involved the rest of the command, and it is highly probable that this would have been the case far more generally but for the stringent hygienic precautions adopted.

As a particular example of the value of such precautions, attention may be appropriately drawn to the appended extracts from the reports of Brevet Major E. McClellan, Assistant Surgeon United States Army, (Appendix p. 60,) from which it appears that cholera broke out at various points in the vicinity of Fort Delaware, in fact, encircling the post, but did not invade the garrison, although one case, which recovered, occurred in the family of an officer on the island.

On the whole, it must be admitted that the general tenor of army experience, during 1866, is strongly in favor of quarantine, and especially points to the danger to the army incurred by the distribution of recruits or other bodies of men from infected points.

As to the question of therapeutic agencies, it cannot be said that any new light has been shed upon the existing obscurity of the subject by the army experience. The chief modes of treatment employed are indicated in the appended reports, and the general tendency of the facts recorded must be to direct attention rather to hygienic precautions, intended to mitigate the violence of the epidemic, than to methods of treatment which have hitherto unhappily proved so unsuccessful. Among these hygienic precautions, besides cleanliness, the use of disinfectants, ventilation, proper air-space, &c., especial attention is directed in the report of Brevet Brigadier General T. A. McParlin, Surgeon United States



Army, to the efficacy of the use of pure drinking water in arresting the spread of the disease, even after it has made its appearance. The troops exposed in New Orleans were, by his direction, supplied with cistern water, (rain water,) as far as practicable, and where this could not be obtained, distilled water was, in some instances, purchased by the quartermaster's department. The disease did not spread to any extent among the troops thus supplied, and the majority of the cases at New Orleans occurred in the detachments of the sixth United States cavalry and first United States infantry, and in the eighty-first colored. at times when these troops were so situated as, for the most part, to be obliged to use the water of the Mississippi river for drinking purposes. The interesting details of this important practical experiment will be found in the appended reports of Surgeon McParlin, and of Assistant Surgeon Hartsuff.

The importance of the character of the drinking water used during epidemics of cholera had attracted attention in Europe before the date of the recent outbreak in this country, and it had been shown by the Registrar General of England that the prevalence of the disease in the several districts of London bore a direct proportion to the amount of the organic impurities of the water furnished. Accordingly, when the epidemic made its appearance in New York Harbor, attention was at once directed to the character of the drinking water used by the troops, and samples sent to this office were analyzed in the laboratory by Dr. B. F. Craig. (See Appendix B, p. 61, for Dr. Craig's report.) All these waters contained a considerable quantity of organic impurity, sufficient, under the circumstances, to justify the recommendation of means of purification. This recommendation, so far as known, was not acted upon, and the only point where practical attention was directed to supplying pure water was at New Orleans, as above stated. The success there obtained has been such as to direct attention anew to Dr. Craig's recommendations.

Although rain water collected in proper cisterns, is, of course, much more free from organic impurities than river or well water, it is nevertheless seldom entirely free from them, and it is not often practicable to obtain pure and sufficiently aerated distilled water in the necessary quantities. An agent which is capable of destroying the contained organic matters, without impairing the flavor or other good qualities of drinking-water, is therefore of the first importance, and such an agent is found in the per-manganate of potassa. Dr. Craig says:

"A good practical rule for purifying water is to add any solution of the per-manganate until the water, as seen in an ordinary sized tumbler, appears perceptibly pink. This corresponds to the addition of from half a grain to one grain per gallon. After standing for a few hours the color disappears, and the water is left pure as far as regards organic matter. If, after two hours standing, the water has a pinkish color when received in a large white dish or in a

bucket of polished tin, the amount of per-manganate used has been sufficient, and if a pink color still remains after twenty-four hours, it has been used in excess."

The water is ready for use after standing twenty-four hours. A slight excess of the per-manganate is injurious only to the appearance of the fluid.

An interesting and valuable discussion of the general question of the use of disinfectants during epidemics of cholera will be found in the report on this subject, also, by Doctor B. F. Craig, which is presented in Appendix B, page 63. This report contains a brief practical discussion of the merits of the more important disinfectants, their mode of action, and the conditions which call for the use of each. It contains, in fact, a brief summary of the most important facts which have been established in connection with this subject, and will be found well worthy of thoughtful consideration.

The following medical officers died of cholera while engaged in the active performance of their duties in connection with the epidemic :

1st. Brevet Major J. T. Calhoun, Assistant Surgeon United States Army, died of cholera July 20th, 1866, at Hart's island, New York Harbor.

2d. John E. McDonald, Assistant Surgeon United States Army, died of cholera September 10th, 1866, at St. Louis, Missouri.

3d. Acting Assistant Surgeon J. F. Burdett died of cholera August 6th, 1866, at Tybee island, Georgia.

4th. Acting Assistant Surgeon Samuel Catlin died of cholera November 27th, 1866, at New Orleans, Louisiana.

5th. Benjamin Hobbs, Surgeon one hundred and sixteenth United States colored troops, died of gastro-enteritis (?) August 28th, 1866, after rising from a sick bed to attend cholera cases in his regiment at White's Ranch, Texas.

I have the honor to be, general, very respectfully, your obedient servant,

J. J. WOODWARD,

*Assistant Surgeon and Brevet Lieut. Col. U. S. Army, in charge of the  
Record and Pension Division, Surgeon General's Office,  
and of the Medical Section of the Army Medical Museum.*

Brevet Major General J. K. BARNES,

*Surgeon General United States Army.*



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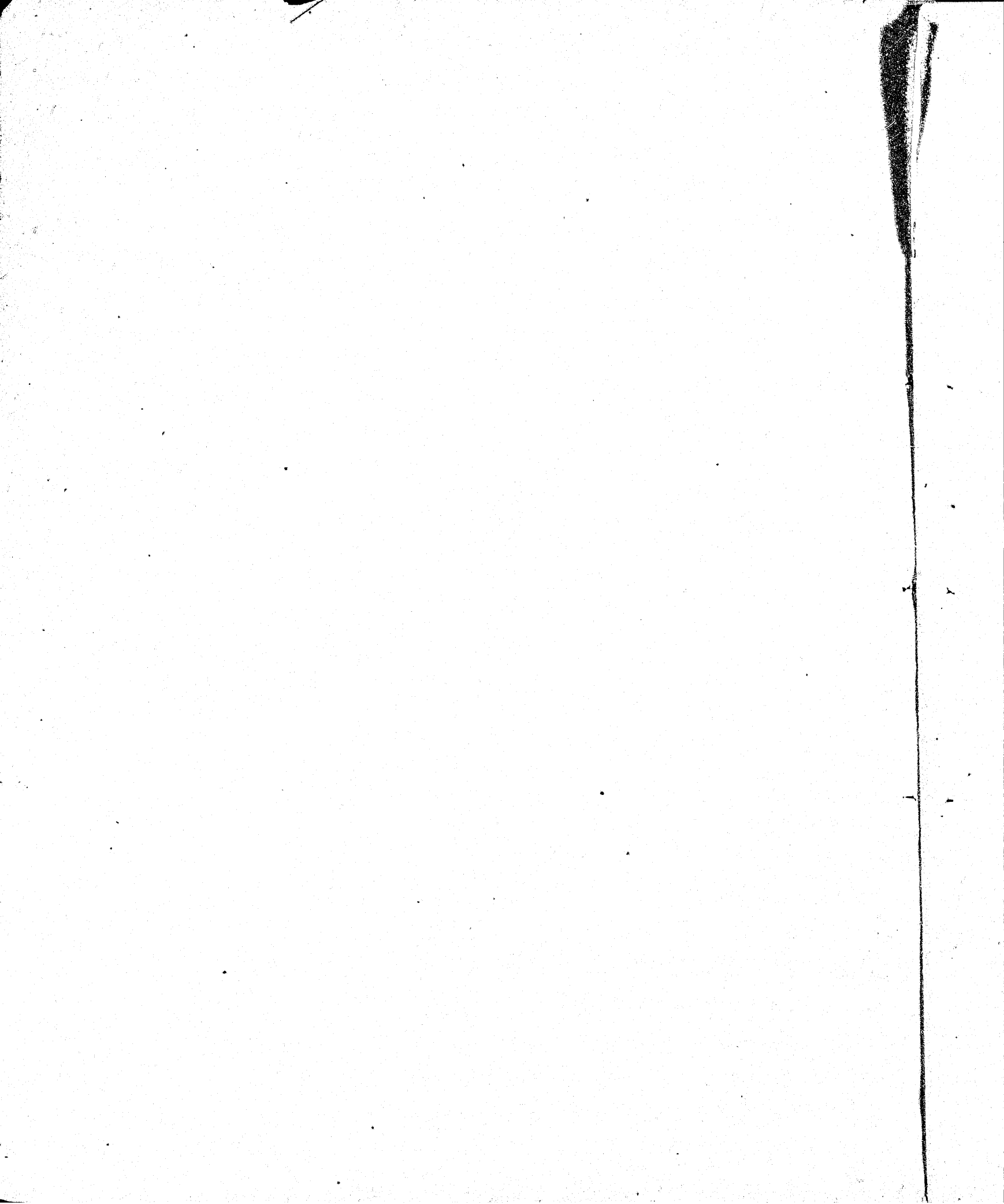
## APPENDIX.

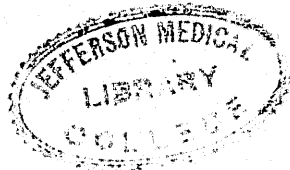
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A.—STATISTICAL TABLES.

B.—EXTRACTS FROM OFFICIAL REPORTS.

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## APPENDIX A.—STATISTICAL TABLES.

### I. WHITE TROOPS AT INDIVIDUAL POSTS.

#### 1. FORT COLUMBUS, GOVERNOR'S ISLAND, NEW YORK HARBOR.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength .....	1,013		1,152		1,268		1,046		866		1,022		1,061	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....	92	25	25	13	.....	.....	6	3	.....	.....	.....	.....	123	41
Cholera morbus .....	.....	.....	10	.....	4	.....	3	.....	.....	.....	.....	.....	17	.....
Acute diarrhœa .....	297	.....	245	.....	110	.....	111	.....	26	.....	20	.....	209	.....
Chronic diarrhœa .....	.....	.....	.....	.....	.....	.....	4	.....	.....	.....	.....	.....	4	.....
Acute dysentery .....	.....	.....	19	.....	2	.....	3	.....	2	.....	1	.....	27	.....
Chronic dysentery .....	3	1	6	4	1	.....	1	1	.....	.....	.....	.....	11	6
<b>Total .....</b>	<b>392</b>	<b>26</b>	<b>305</b>	<b>17</b>	<b>117</b>	<b>.....</b>	<b>128</b>	<b>4</b>	<b>28</b>	<b>.....</b>	<b>21</b>	<b>.....</b>	<b>991</b>	<b>47</b>
<b>All other diseases .....</b>	<b>186</b>	<b>2</b>	<b>195</b>	<b>.....</b>	<b>128</b>	<b>6</b>	<b>136</b>	<b>4</b>	<b>130</b>	<b>1</b>	<b>146</b>	<b>1</b>	<b>921</b>	<b>14</b>
<b>Aggregate .....</b>	<b>578</b>	<b>28</b>	<b>500</b>	<b>17</b>	<b>245</b>	<b>6</b>	<b>264</b>	<b>8</b>	<b>158</b>	<b>1</b>	<b>167</b>	<b>1</b>	<b>1,912</b>	<b>61</b>

#### 2. HART'S ISLAND, NEW YORK HARBOR.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength .....	510		.....		.....		.....		.....		.....		.....	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....	39	30	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	39	30
Cholera morbus .....	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8	.....
Acute diarrhœa .....	203	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	203	.....
Chronic diarrhœa .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Acute dysentery .....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....
Chronic dysentery .....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
<b>Total .....</b>	<b>251</b>	<b>30</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>251</b>	<b>30</b>
<b>All other diseases .....</b>	<b>122</b>	<b>2</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>122</b>	<b>2</b>
<b>Aggregate .....</b>	<b>373</b>	<b>32</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>.....</b>	<b>373</b>	<b>32</b>

## STATISTICAL TABLES.

## 3. DE CAMP HOSPITAL, DAVID'S ISLAND, NEW YORK HARBOR.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....														
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....	11	7	4		2									
Cholera morbus.....	4		19		1				1				18	7
Acute diarrhoea.....	58		74		6	1			6				144	1
Chronic diarrhoea.....									3				3	
Acute dysentery.....	1												1	
Chronic dysentery.....														
Total.....	74	7	97		9	1			10				190	8
All other diseases.....	31	1	24	3	1	1			23				79	5
Aggregate.....	105	8	121	3	10	2			33				269	13

## 4. FORT SCHUYLER, NEW YORK HARBOR.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....	121													
	132													
	133													
	126													
	197													
	238													
	158													
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....	1													
Cholera morbus.....	1												1	
Acute diarrhoea.....	8		12		10		1		2		3		36	1
Chronic diarrhoea.....											3		3	
Acute dysentery.....			2										2	
Chronic dysentery.....											1		1	
Total.....	10		14		10		1		2		7		44	
All other diseases.....	10		13		11		10		14		39		97	
Aggregate.....	20		27		21		11		16		46		141	

## 5. RECRUITS ON STEAMER SAN SALVADOR, AND AT TYBEE ISLAND, GA.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....	402													
	335													
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....	198	112	4	4									202	116
Cholera morbus.....														
Acute diarrhoea.....	12		19										31	
Chronic diarrhoea.....														
Acute dysentery.....	1		2										3	
Chronic dysentery.....														
Total.....	211	112	25	4									236	116
All other diseases.....	4		1										5	
Aggregate.....	215	112	26	4									241	116

WHITE TROOPS.

5

6. NEW ORLEANS, LA.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....	1,444		914		961		923		844		931		7,003	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....	44	8	37	14	7	2			2		3		93	24
Cholera morbus.....	8		10		10		8				1		37	
Acute diarrhoea.....	132	1	235		152	1	82		77		53		731	2
Chronic diarrhoea.....	1	1			1	1	8	3		1	2	2	12	8
Acute dysentery.....	1		3		6		1	1	7		1	1	19	2
Chronic dysentery.....														
Total.....	186	10	225	14	176	4	99	4	86	1	60	3	892	36
All other diseases.....	217	3	302	4	350	1	306	3	197		119		1,491	11
Aggregate.....	403	13	527	18	526	5	405	7	283	1	179	3	2,383	47

7. GALVESTON, TEXAS.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.*		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....	1,103		968		968				246		246			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....	7	6	31	14					6	4			44	24
Cholera morbus.....			2		3				2				7	
Acute diarrhoea.....	125	1	133	5	15				50	2	18	1	341	9
Chronic diarrhoea.....			2	1	2				5				9	1
Acute dysentery.....	2	1	27		9	1			8				46	2
Chronic dysentery.....			2		2								4	
Total.....	134	8	197	20	31	1			71	6	18	1	451	36
All other diseases.....	194	1	327	6	220	5			44	2	28	3	813	17
Aggregate.....	328	9	524	26	251	6			115	8	46	4	1,264	53

8. BROWNSVILLE, TEXAS.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.*		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....			82		191				291		279			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....			5		12	3			2	1	5	4	24	8
Cholera morbus.....			1		3								4	
Acute diarrhoea.....			10		12				40		40		102	
Chronic diarrhoea.....											1		1	
Acute dysentery.....														
Chronic dysentery.....														
Total.....			16		27	3			42	1	46	4	131	8
All other diseases.....			34		51	1			43	1	45		173	2
Aggregate.....			50		78	4			85	2	91	4	304	10

\* No reports received.

## STATISTICAL TABLES.

## 9. AT AND NEAR SAN ANTONIO, TEXAS.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength .....	727													
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....					387	64							387	64
Cholera morbus .....					1	1							1	1
Acute diarrhoea .....					66								66	
Chronic diarrhoea .....					5	2							5	2
Acute dysentery .....														
Chronic dysentery .....					2	2							2	2
Total .....					461	69							461	69
All other diseases .....					95	2							95	2
Aggregate .....					556	71							556	71

## 10. AUSTIN, TEXAS.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.*		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength .....	442													
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....					2	2			10	10			12	12
Cholera morbus .....									58		8		70	
Acute diarrhoea .....					4				1				3	1
Chronic diarrhoea .....					3	1							1	
Acute dysentery .....									1				1	
Chronic dysentery .....					1								1	
Total .....					10	3			69	10	8		87	13
All other diseases .....					29				84		21	2	134	2
Aggregate .....					39	3			153	10	29	2	221	15

## 11. RICHMOND, VA.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength .....	1,586													
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....			56	33	215	70							271	103
Cholera morbus .....			17		8				1				26	
Acute diarrhoea .....			293		198		63		29		16		592	
Chronic diarrhoea .....			4		4		24		6		10		48	
Acute dysentery .....			8		11		31		13		5		68	
Chronic dysentery .....							9						9	
Total .....			378	33	436	70	127		42		31		1,014	103
All other diseases .....			382	2	240	2	210	3	105	3	102		1,039	10
Aggregate .....			760	35	676	72	337	3	147	3	133		2,053	113

\* No report received.



WHITE TROOPS.

7

12. NORFOLK, VA.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....					355		355		147					
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....					1	1	3	1					4	2
Cholera morbus.....														
Acute diarrhoea.....					16		9		6				31	
Chronic diarrhoea.....														
Acute dysentery.....														
Chronic dysentery.....														
Total.....					17	1	12	1	6				35	2
All other diseases.....					47		24		13				24	
Aggregate.....					64	1	36	1	19				119	2

13. CARLISLE BARRACKS, PA.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....			324		350		535		325		505			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....			3	2	2		1	1					6	3
Cholera morbus.....			2		4		3						9	
Acute diarrhoea.....			19		23		28		7		9		86	
Chronic diarrhoea.....														
Acute dysentery.....			2		2				2				6	
Chronic dysentery.....														
Total.....			26	2	31		32	1	9		9		107	3
All other diseases.....			70		76		126		98	1	124		494	1
Aggregate.....			96	2	107		158	1	107	1	133		601	4

14. NEWPORT BARRACKS, KY.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....			286		386		440		454		400			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....			3	2	1	1	4	1	1	1			9	5
Cholera morbus.....			1		2		2		1				6	
Acute diarrhoea.....			28		22		16		26		11		103	
Chronic diarrhoea.....														
Acute dysentery.....			4		4		3						11	
Chronic dysentery.....									6				6	
Total.....			36	2	29	1	25	1	34	1	11		135	5
All other diseases.....			37		57		64	1	66		55		279	1
Aggregate.....			73	2	86	1	89	2	100	1	66		414	6

## STATISTICAL TABLES.

## 15. ATLANTA, GA.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....					93		72		75		107			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....					19	7							19	7
Cholera morbus.....							1						1	
Acute diarrhœa.....					5		1		2		2		10	
Chronic diarrhœa.....														
Acute dysentery.....					1		1		1		1		4	
Chronic dysentery.....							1						1	
Total.....					25	7	4		3		3		35	7
All other diseases.....					22	1	24		26		26		98	1
Aggregate.....					47	8	28		29		29		133	8

## 16. AUGUSTA, GA.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....					122		138		181		238			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....					8	7							8	7
Cholera morbus.....														
Acute diarrhœa.....					13		15		19		9		56	
Chronic diarrhœa.....					3		2		3		3		11	
Acute dysentery.....														
Chronic dysentery.....					1				1				2	
Total.....					25	7	17		23		12		77	7
All other diseases.....					33	1	37		50		40		160	1
Aggregate.....					58	8	54		73		52		237	8

## 17. LOUISVILLE, KY.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....	422		505		376		289		334		327		376	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....	2	1	33	21					1	1			36	23
Cholera morbus.....	1		7		2		1						11	
Acute diarrhœa.....	62		118		41		13		5		9		248	
Chronic diarrhœa.....			1	1									1	1
Acute dysentery.....	3		4		4		2		2				15	
Chronic dysentery.....														
Total.....	68	1	163	22	47		16		8	1	9		311	24
All other diseases.....	129		246	3	232	2	155	1	123		100	1	985	7
Aggregate.....	197	1	409	25	279	2	171	1	131	1	109	1	1,296	31

WHITE TROOPS.

9

18. BOWLING GREEN, KY.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....			68		44		33		34		45			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....			6		2								8	
Cholera morbus.....			1										1	
Acute diarrhoea.....			2		3				1		10		16	
Chronic diarrhoea.....							1				2		5	
Acute dysentery.....			1		1									
Chronic dysentery.....														
Total.....			10		6		1		1		12		30	
All other diseases.....			5		9		3				7		24	
Aggregate.....			15		15		4		1		19		54	

19. NASHVILLE, TENN.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....					762		743		766		763			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....					58	33	14	6					72	39
Cholera morbus.....					2		1		2				5	
Acute diarrhoea.....					136		74		28		3		241	
Chronic diarrhoea.....									2				2	
Acute dysentery.....					5		8	1	4		3		20	1
Chronic dysentery.....														
Total.....					201	33	97	7	36		6		340	40
All other diseases.....					136	1	209	1	126	1	25		556	3
Aggregate.....					337	34	306	8	162	1	91		896	43

20. MEMPHIS, TENN.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....					337		439		459		378			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....					21	16							21	16
Cholera morbus.....							21		18		4		110	
Acute diarrhoea.....					67		1	1					2	2
Chronic diarrhoea.....					1	1	1	1					14	
Acute dysentery.....					5		4		5				2	
Chronic dysentery.....					1				1					
Total.....					95	17	26	1	24		4		149	18
All other diseases.....					62	4	150	2	96	1	76		384	7
Aggregate.....					157	21	176	3	120	1	80		533	25

## STATISTICAL TABLES.

## 21. VICKSBURG, MISS.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....			544		591		507		648		461			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....			34	15	16	8	1		8	2			59	25
Cholera morbus.....							2		2				4	
Acute diarrhoea.....			100	1	62		39	1	6		6		213	2
Chronic diarrhoea.....			3	3	5		11	3	3	1			22	7
Acute dysentery.....			27	6	14	2	14		6				61	8
Chronic dysentery.....														
Total.....			164	25	97	10	67	4	25	3	6		359	42
All other diseases.....			186	10	213	4	191	7	144	4	62		796	25
Aggregate.....			350	35	310	14	258	11	169	7	68		1,155	67

## 22. JACKSON, MISS.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....			78		72		58		63		64			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....			1	1	7	5							8	6
Cholera morbus.....			1				2						3	
Acute diarrhoea.....			10		20		4		3		3		40	
Chronic diarrhoea.....														
Acute dysentery.....			1		2		1		1		4		9	
Chronic dysentery.....														
Total.....			13	1	29	5	7		4		7		60	6
All other diseases.....			48		45	1	38	1	16		32		179	2
Aggregate.....			61	1	74	6	45	1	20		39		239	8

## 23. JEFFERSON BARRACKS, MO.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....			284		344		313		316		301			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....			6	5	2	2							8	7
Cholera morbus.....					1								1	
Acute diarrhoea.....			103		103		70		44		51		371	
Chronic diarrhoea.....														
Acute dysentery.....			3		5		1		4		3		16	
Chronic dysentery.....														
Total.....			112	5	111	2	71		48		54		396	7
All other diseases.....			114		212		160		114		99		699	
Aggregate.....			226	5	323	2	231		162		153		1,095	7

WHITE TROOPS.

24. DETACHMENT OF ORDNANCE AT ST. LOUIS ARSENAL, MO.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength .....			99		100		101		118		129			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....			3	2	1	1							4	3
Cholera morbus .....			2										2	
Acute diarrhoea .....			14		20				7		5		46	
Chronic diarrhoea .....					1								1	
Acute dysentery .....			1				1						2	
Chronic dysentery .....														
Total .....			20	2	22	1	1		7		5		55	3
All other diseases .....			44	1	30		17		27		24	1	142	9
Aggregate .....			64	3	52	1	18		34		29	1	197	5

25. FORT RILEY, KANSAS.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength .....			227		583		780		449		438			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....			1	1	46	19	12	7					59	27
Cholera morbus .....														
Acute diarrhoea .....			27		301		192		62		53		635	
Chronic diarrhoea .....													6	
Acute dysentery .....			2		2				1		1			
Chronic dysentery .....														
Total .....			30	1	349	19	204	7	63		54		700	27
All other diseases .....			63		140		156		94	2	105		558	2
Aggregate .....			93	1	489	19	360	7	157	2	159		1,258	29

26. FORT LEAVENWORTH, KANSAS.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength .....					530		594		771		806			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....					2	1	4	3	1	1			7	5
Cholera morbus .....									4				4	
Acute diarrhoea .....					14		110		105		63		292	
Chronic diarrhoea .....							8		2		1	1	11	1
Acute dysentery .....					1	1	2		2				5	1
Chronic dysentery .....							1				2	2	3	2
Total .....					17	2	125	3	114	1	66	3	322	9
All other diseases .....					80	1	157	1	166	3	136	1	539	6
Aggregate .....					97	3	282	4	280	4	202	4	861	15

## STATISTICAL TABLES.

## 27. HELENA, ARK.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength .....			109		109									
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....			7	2	3	4							10	6
Cholera morbus .....														
Acute diarrhoea .....			4		6	1							10	1
Chronic diarrhoea .....					1								1	
Acute dysentery .....			4		1								5	
Chronic dysentery .....														
Total .....			15	2	11	5							26	7
All other diseases .....			43	1	14	3							57	4
Aggregate .....			58	3	25	8							83	11

## 28. LITTLE ROCK, ARK.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength .....					389		331		362		354			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....					127	60	4	4					131	64
Cholera morbus .....														
Acute diarrhoea .....					78		59		13		8		158	
Chronic diarrhoea .....							1		1				2	1
Acute dysentery .....							8		5		3		16	
Chronic dysentery .....														
Total .....					205	60	72	4	19	1	11		307	65
All other diseases .....					124	3	233	2	135	1	117	1	609	7
Aggregate .....					329	63	305	6	154	2	128	1	916	72

## 29. FORT SMITH, ARK.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength .....					139		108		101					
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....					2		6	2					8	2
Cholera morbus .....							1		1				2	
Acute diarrhoea .....					45		50		15				110	
Chronic diarrhoea .....									1				1	
Acute dysentery .....					9		8		3				20	
Chronic dysentery .....														
Total .....					56		65	2	20				141	2
All other diseases .....					146	2	43	1	60	3			249	6
Aggregate .....					202	2	108	3	80	3			390	8

WHITE TROOPS.

30. FORT GIBSON, C. N.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....							510		394		377			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....							3	2	1	1			4	3
Cholera morbus.....							8						8	
Acute diarrhoea.....							14	1					14	1
Chronic diarrhoea.....							5	1		2			5	3
Acute dysentery.....							23		4		3		30	
Chronic dysentery.....														
Total.....							53	4	5	3	3		61	7
All other diseases.....							115	1	38		26		179	1
Aggregate.....							168	5	43	3	29		240	8

31. RECRUITS AT LA VIRGIN, NICARAGUA BAY.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....											356			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....											54	27	54	27
Cholera morbus.....														
Acute diarrhoea.....											39		39	
Chronic diarrhoea.....														
Acute dysentery.....														
Chronic dysentery.....														
Total.....											93	27	93	27
All other diseases.....											22		22	
Aggregate.....											115	27	115	27

## STATISTICAL TABLES.

## II. TOTAL WHITE TROOPS.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL FOR SIX MONTHS.	
Mean strength .....	5,015		7,693		11,411		9,503		10,358		10,518		9,083	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....	334	189	259	129	943	306	58	30	33	21	62	31	1,749	706
Cholera morbus .....	22	.....	73	.....	41	1	32	.....	13	.....	1	.....	182	1
Acute diarrhoea .....	897	2	1,446	6	1,548	3	972	2	648	2	443	1	5,954	16
Chronic diarrhoea .....	1	1	10	5	26	5	64	8	26	5	20	3	147	27
Acute dysentery .....	9	1	110	6	84	4	112	2	71	.....	27	1	413	14
Chronic dysentery .....	3	1	8	4	8	2	12	1	8	.....	3	2	42	10
Total .....	1,326	194	1,906	150	2,650	321	1,250	43	799	28	556	38	8,487	774
All other diseases .....	893	9	2,134	30	2,803	41	2,564	28	2,032	23	1,636	10	12,062	141
Aggregate .....	2,219	203	4,040	180	5,453	362	3,814	71	2,831	51	2,192	48	20,549	915



III. COLORED TROOPS AT INDIVIDUAL POSTS.

1. NEW ORLEANS, LA.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....	800		645		1,068		1,534		2,309		1,104		1,243	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....	2	2	115	64	45	34	27	24	59	22	6	3	254	149
Cholera morbus.....							1		5				6	
Acute diarrhoea.....	12		71		52		114		223	1	84		550	1
Chronic diarrhoea.....														
Acute dysentery.....					4		7		40	1	27		78	1
Chronic dysentery.....			1										1	
Total.....	14	2	187	64	101	34	149	24	327	24	117	3	895	151
All other diseases.....	56	5	44	1	84	3	213	4	403	6	195	7	1,000	26
Aggregate.....	70	7	231	65	185	37	362	28	735	30	312	10	1,895	177

2. FORTS ST. PHILIP AND JACKSON.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....			289		210		139		132		131			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....			16	10	1	1							17	11
Cholera morbus.....														
Acute diarrhoea.....			64	1	11		4		4		1		84	1
Chronic diarrhoea.....														
Acute dysentery.....			1		2								3	
Chronic dysentery.....			1										1	
Total.....			82	11	14	1	4		4		1		105	12
All other diseases.....			107		109		47		38		38		339	
Aggregate.....			189	11	123	1	51		42		39		444	12

3. SHIP ISLAND, MISS.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....					243		215		213		208			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....					1	1							1	1
Cholera morbus.....														
Acute diarrhoea.....					6		3		3		1		13	
Chronic diarrhoea.....											1		1	
Acute dysentery.....					1				1		3		5	
Chronic dysentery.....							4				1		5	
Total.....					8	1	7		4		6		25	1
All other diseases.....					17		27		11		14		69	
Aggregate.....					25	1	34		15		20		94	1

## STATISTICAL TABLES.

## 4. BATON ROUGE, LA.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....			526		822		846		841		820			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....			14	8	33	22	22	13					69	43
Cholera morbus.....														
Acute diarrhoea.....			59		62		83	1	56		16		276	1
Chronic diarrhoea.....							3						3	
Acute dysentery.....			16	1	13		3	3	5	1	10	1	47	6
Chronic dysentery.....							1						1	
Total.....			89	9	108	22	112	17	61	1	26	1	396	50
All other diseases.....			105		103	2	182	3	153	1	110	3	653	9
Aggregate.....			194	9	211	24	294	20	214	2	136	4	1,049	59

## 5. SHREVEPORT, LA.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....					359		132		117		182			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....					9	2	2	2					11	4
Cholera morbus.....					21		3						24	
Acute diarrhoea.....					16		26		1		1		44	
Chronic diarrhoea.....														
Acute dysentery.....							1	1					1	1
Chronic dysentery.....														
Total.....					46	2	32	3	1		1		80	5
All other diseases.....					32		33		18	1	18		101	1
Aggregate.....					78	2	65	3	19	1	19		181	6

## 6. BRAZOS SANTIAGO, TEXAS.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....			684		608				373		343			
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....			38	14	51	32			1	1			90	47
Cholera morbus.....			8						2		1		11	
Acute diarrhoea.....			22		133				28		23		206	
Chronic diarrhoea.....											1	1	1	1
Acute dysentery.....			8		13				2		1		24	
Chronic dysentery.....										1				1
Total.....			76	14	197	32			33	2	26	1	332	49
All other diseases.....			50		47				63	1	41		201	1
Aggregate.....			126	14	244	32			96	3	67	1	533	50

\* No report.

COLORED TROOPS.

7. BROWNSVILLE, TEXAS.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....			933		1,033									
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....			50	30	49	27							99	57
Cholera morbus.....					3								3	
Acute diarrhoea.....			162		194								356	
Chronic diarrhoea.....														
Acute dysentery.....			1		4								5	
Chronic dysentery.....														
Total.....			213	30	250	27							463	57
All other diseases.....			211		160	3							371	3
Aggregate.....			424	30	410	30							834	60

8. WHITE'S RANCH, TEXAS.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....			675											
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....			98	37									98	37
Cholera morbus.....														
Acute diarrhoea.....			46										46	
Chronic diarrhoea.....			3										3	
Acute dysentery.....			10										10	
Chronic dysentery.....			2										2	
Total.....			159	37									159	37
All other diseases.....			54										54	
Aggregate.....			213	37									213	37

9. INDIANOLA, TEXAS.

Months.....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength.....			673		661		648							
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera.....			1		28	7	10						39	7
Cholera morbus.....			8		4								12	
Acute diarrhoea.....			2		6		9						17	
Chronic diarrhoea.....			1				2						3	
Acute dysentery.....			1		4								5	
Chronic dysentery.....														
Total.....			13		42	7	21						76	7
All other diseases.....			52		45	1	19						116	1
Aggregate.....			65		87	8	40						192	8

## STATISTICAL TABLES.

## 10. JEFFERSON BARRACKS, MO.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength .....			623		621									
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....			251	131	5	3							256	134
Cholera morbus .....														
Acute diarrhoea .....			230		4								234	
Chronic diarrhoea .....														
Acute dysentery .....														
Chronic dysentery .....														
Total .....			481	131	9	3							490	134
All other diseases .....			94		3								97	
Aggregate .....			575	131	12	3							587	134

## 11. LITTLE ROCK, (HUNTERSVILLE,) ARK.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength .....					344									
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....					21	9							21	9
Cholera morbus .....														
Acute diarrhoea .....					31								31	
Chronic diarrhoea .....														
Acute dysentery .....														
Chronic dysentery .....														
Total .....					52	9							52	9
All other diseases .....					77	1							77	1
Aggregate .....					129	10							129	10

## 12. FORT SMITH, ARK.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
Mean strength .....					26		25		26					
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera .....					2	1	2	1					4	2
Cholera morbus .....														
Acute diarrhoea .....					2		3		1				6	
Chronic diarrhoea .....														
Acute dysentery .....														
Chronic dysentery .....														
Total .....					4	1	5	1	1				10	2
All other diseases .....					2		1		2				5	
Aggregate .....					6	1	6	1	3				15	2

**IV. TOTAL COLORED TROOPS.**

Months. ....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL FOR SIX MONTHS.	
Mean strength. ....	800		5,048		5,995		3,539		4,011		2,788		3,697	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera. ....	2	2	583	294	245	139	63	40	60	23	6	3	959	501
Cholera morbus. ....			16		28		4		7		1		56	
Acute diarrhoea. ....	12		656	1	517		242	1	316	1	126		1,869	3
Chronic diarrhoea. ....			4				5				2	1	11	1
Acute dysentery. ....			37	1	41		11	4	48	2	41	1	178	8
Chronic dysentery. ....			4				5				1	1	10	1
Total. ....	14	2	1,300	296	831	139	330	45	431	27	177	5	3,083	514
All other diseases. ....	56	5	717	1	679	10	522	7	693	9	416	10	3,083	42
Aggregate. ....	70	7	2,017	297	1,510	149	852	52	1,124	36	593	15	6,166	556

**V. TOTAL WHITE AND COLORED TROOPS.**

Months. ....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL FOR SIX MONTHS.	
Mean strength. ....	5,815		12,741		17,406		13,042		14,369		13,306		12,780	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Cholera. ....	396	191	842	423	1,188	445	121	70	93	44	68	34	2,708	1,207
Cholera morbus. ....	22		89		69	1	35		20		2		238	1
Acute diarrhoea. ....	909	2	2,102	7	2,065	3	1,214	3	964	3	569	1	7,823	19
Chronic diarrhoea. ....	1	1	14	5	26	5	69	8	26	5	22	4	158	28
Acute dysentery. ....	9	1	147	7	125	4	123	6	119	2	68	2	591	22
Chronic dysentery. ....	3	1	12	4	8	2	17	1	8	1	4	2	52	11
Total. ....	1,340	196	3,206	446	3,481	460	1,580	88	1,230	55	733	43	11,570	1,288
All other diseases. ....	949	14	2,851	31	3,482	51	3,086	35	2,725	32	2,052	20	15,145	183
Aggregate. ....	2,289	210	6,057	477	6,963	511	4,666	123	3,955	87	2,785	63	26,715	1,471

## STATISTICAL TABLES.

## VI. Cases of cholera during the last six months of 1866 not included in the foregoing tables.

Months .....	JULY.		AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		TOTAL.	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
<b>WHITE TROOPS.</b>														
Soldiers Rest, Boston, Mass.	1	1											1	1
Baton Rouge, La.....			1	1			1	1					2	2
Albuquerque, N. M.....							1						1	
Total white troops.....	1	1	1	1			2	1					4	3
<b>COLORED TROOPS.</b>														
Galveston, Texas.....			1	1									1	1
Nashville, Tenn.....					2	2							2	2
Memphis, Tenn.....			1	1									1	1
Vicksburg, Miss.....			1	1									1	1
Little Rock, Ark.....					3	1	4	1					7	2
Total colored troops.....			3	3	5	3	4	1					12	7
Total white and colored..	1	1	4	4	5	3	6	2					16	10



## APPENDIX B.—EXTRACTS FROM OFFICIAL REPORTS.

### I. NEW YORK HARBOR.

[Extracts.]

MEDICAL DIRECTOR'S OFFICE, DEPARTMENT OF THE EAST,  
No. 125 Bleecker Street, New York, July 11, 1866.

GENERAL:

I have also to report that the first detachment for the seventeenth infantry left Hart's island on Saturday for Texas, and that on the succeeding days, Sunday and Monday, there were five cases of cholera at the post, three being fatal. I visited the island yesterday, and there had been no new cases, and all the necessary precautions had been adopted.

The sailing of the second detachment of the seventeenth infantry has been delayed to await further developments, upon the advice of the medical officer of the post, which I approved.

Very respectfully, your obedient servant,

WILLIAM J. SLOAN,

*Brevet Colonel and Surgeon U. S. A., Medical Director Department of the East.*

*Brevet Major General J. K. BARNES, Surgeon General.*

DEPOT HOSPITAL, FORT COLUMBUS,  
New York Harbor, July 26, 1866.

COLONEL: In accordance with instructions from your office of the 24th instant, this day received by me, I have the honor to make, for the information of the Surgeon General, the following statement of the prevalence of cholera at this post.

During the latter part of the month of June the cases of diarrhoea commenced steadily to increase in number and persistency, but not more than was to be expected from the intense heat of the weather and the irrepressible imprudences of the raw recruits, who were pouring into the depot from all sections until the aggregate strength of the command reached, on the 30th of June, 1,189 men. Several detachments were sent away about the first of the present month, relieving, in some measure, the over-crowded quarters. On the evening of the 3d of July a case presenting all the characteristics of well-marked cholera was brought into the hospital. He was profoundly collapsed when admitted, and died the next morning. This man had been but three days at this post, and came direct from the recruiting rendezvous at Minneapolis, Minnesota. Nothing of his previous history could be learned, though I well remember remarking the cadaverous and wasted appearance of this man when inspected the day previous to his attack. About an hour after the admission of this man, a second man was brought from the same company (D recruits) to hospital, with cramps, rice-water discharges, vomiting, and commencing collapse. Twenty grains of calomel were promptly administered and repeated, with the effect of checking the vomiting and discharges and producing reaction and eventual recovery. No connection could be traced between these cases. The next cases, admitted on the 5th instant, were two prisoners from the guard-house with well-marked cholera; but, under the above treatment, they both recovered. Three cases were admitted on the 6th, two on the 8th, one on the 10th, two on the 12th, six on the 15th, when the next fatal case occurred.

The assignment of recruits to regiments and their transfer from this depot seemed to be, for some reason, again interrupted, so that a steady accumulation from the influx of the new recruits, at the rate of about seventy-five per diem, was the consequence, until the number present on the island reached, on the 14th instant, 1,216. The capacity of the quarters was not sufficient to accommodate so large a number of men, and the results of this over-crowding were difficult to contend against. In this connection I beg leave to call attention to a report made by me on the first day of June, 1866, a copy of which I herewith enclose. The sanitary condition of this island, with this exception, was excellent; and every attention to this subject, by frequent inspections, directions, and advice was given by me. The water used by the men was not considered injurious, as far as I could observe its effects, except in the instance of the pump inside of Fort Columbus. The use of this water was immediately discontinued, and the pump-handle removed from the pump by my advice and direction. Several cases now occurred among the prisoners, and by my advice the guard-house was almost entirely vacated, the prisoners being sent to Castle Williams to sleep. This measure seemed to have a beneficial effect. The next cases occurred among the music boys of company B at the south battery. It was immediately recommended that these boys be placed in tents and their quarters measurably vacated and disinfected. This plan was also at once followed by beneficial results. Attention is called to a communication addressed to the commanding officer relative to the over-crowded condition of these quarters, a copy of which is here-

## EXTRACTS FROM OFFICIAL REPORTS.

with transmitted. The recent favorable change in the weather, together with the various sanitary changes and precautions taken, has produced a marked decline in the number of virulent and fatal cases, though the number of cases of diarrhoea is still steadily on the increase, as the following abstract from the morning report for the past week will demonstrate:

Date.	Hospital.	Quarters.	Total.
Friday, July 20.....	57	53	110
Saturday, " 21.....	57	50	107
Sunday, " 22.....	54	55	109
Monday, " 23.....	52	52	104
Tuesday, " 24.....	53	65	118
Wednesday, " 25.....	57	75	132
Thursday, " 26.....	63	80	143

The treatment has been nearly the same as that witnessed and practiced so successfully by myself, under the direction of Surgeon J. J. B. Wright, United States army, at Jefferson Barracks during the cholera epidemic of 1855. The preliminary diarrhoea is treated by the administration of Squibb's mixture, purgative, or aromatic spirits of ammonia, as required, and rest. Incipient collapse is promptly met by the exhibition of large doses of calomel, either alone or followed by a bolus of powdered capsicum; sinapisms and frictions are used to alleviate pain and cramps. No benefit has been found to result from the exhibition of opium or alcoholic stimulants, confirming our previous experiences, and the use of these remedies in fully-developed cholera has been entirely abandoned here. The results of this treatment are as follows: Cases of cholera up to date, 59; deaths, 15. A number of these deaths have occurred after recovering from collapse, two of them having been, in my opinion, well-marked cases of uremia from total and persistent suppression of the secretion of urine. One fatal case has occurred to-day, the first since the morning of the 24th instant, in a patient in hospital, ward B; one other case only has occurred among the patients in hospital under treatment for other diseases. Every precaution is taken to disinfect and properly dispose of the dejections of the cholera patients, who are isolated from the convalescents, and these again from the ordinary sick in hospital. The wards are regularly disinfected and kept clean, and the bedding and bed sumps continually changed and renewed.

A more full report will be made at a future time.

Very respectfully, your obedient servant,

JOSEPH B. BROWN,  
Brevet Colonel and Surgeon U. S. A., in charge.

Brevet Colonel W. J. SLOAN, Surgeon U. S. A.

[Enclosure No. 1 in the foregoing.]

FORT COLUMBUS, NEW YORK HARBOR, June 1, 1866.

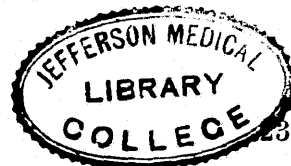
COLONEL: In accordance with your instructions directing me to submit my views relative to the proposed accumulation of recruits at this depot in excess of the present barrack accommodations, I have the honor to present the following sanitary considerations: The crowding together of many men in circumscribed areas under any circumstances, even the most favorable, is indisputably a dangerous experiment, and experience has fully shown, in frequent instances, the most appalling consequences. Recruits certainly should not be submitted to such an ordeal. Entirely reckless as they are of all that pertains to personal cleanliness, and uninstructed in the performance of essential police duties, and undisciplined in their observance, they should never be congregated in larger masses than absolute necessity compels. At the present time, when cholera may be expected, every contingency should be avoided, instead of being overlooked. Recruits are sent to this depot from various recruiting stations in many of the largest cities in the country, and the chances are certainly multiplied that if there be any probability in the infection of cholera, it may be introduced here. To introduce it to an over-crowded garrison on a limited area would unquestionably be a serious matter. The records of the hospital show that during every year in which our shores have been visited by cholera, cases have occurred at this post; and it seems to me that the clear lesson taught by this experience should be to distribute the recruits from the island at this time with more than usual promptness, instead of accumulating them. If the exigencies of the service require that recruits be sent here faster than they can be distributed, I would respectfully recommend that a portion of them be transferred to Bedloe's island in preference to any further accumulation at this depot. I understand that this plan, under similar circumstances, has been adopted. Placing the recruits in camp on this island would be liable to all the objections above mentioned, with the additional disadvantage of want of room to make those frequent changes of locality which would be indispensable in case cholera should appear among them.

Very respectfully, your obedient servant,

JOSEPH B. BROWN,  
Brevet Colonel and Surgeon U. S. A., in charge.

Brevet Colonel J. HAYDEN, U. S. A., Commanding Post.





NEW YORK HARBOR.

[Enclosure No. 2 in the foregoing.]

DEPOT HOSPITAL, FORT COLUMBUS,  
New York Harbor, July 24, 1866.

COLONEL: I have the honor to represent that the quarters occupied by the music boys at this depot are, in their present condition, entirely unsuited for the purpose.

The following statement will show the arrangement now in existence, and will demonstrate, I think, that the case demands immediate attention, and admits of ready improvement:

South Battery, first floor, four rooms, Nos. 1, 2, 3, and 4, each 18 feet 6 inches by 18 feet 6 inches, by 9 feet 9 inches, occupied by boys, as follows: No. 1, 15 boys; No. 2, 23 boys; No. 3, 22 boys; No. 4, 24 boys. These rooms contain each 312½ square feet—3,339½ cubic feet—giving in No. 4 *little over 14 square feet and 139 cubic feet to each boy.* In addition to this they are badly ventilated, having only one small window on one side, and two on the side opposite. It is not surprising, under these conditions, that cholera has recently made its appearance in these quarters. The records of the hospital also show that typhoid fever, yellow fever, and in previous epidemics cholera has invariably been developed in these same rooms. I respectfully recommend that the boys be continued in tents, as directed, at my suggestion, by Lieutenant Colonel Conrad, United States Army, commanding depot in your absence, and that the present occasion be taken to remove the partitions which divide this lower floor of the South Battery barracks into so many small and cell-like sections.

Very respectfully, your obedient servant,

JOSEPH B. BROWN,  
Brevet Colonel and Surgeon U. S. A., in charge.

Brevet Colonel J. H. HAYDEN, U. S. A., *Commanding Post.*

*Extract from monthly report of sick and wounded, Hart's island, New York harbor, June, 1866, Brevet Major J. T. Calhoun, Assistant Surgeon United States Army.*

In view of the dreaded approach of cholera and the wide-spread interest felt in all diseases of the intestinal canal, a few remarks touching the numerous cases of diarrhoea and cholera morbus this month reported may not be without interest. This command has been made up during the past month of two regiments (returned from the Gulf coast for muster out, and which remained but for a few days, and gave us but a few cases) and of a large number of recruits for the seventeenth United States infantry. These recruits have been just enlisted, and are suddenly thrown together into provisional companies, without any non-commissioned officers, except such as were very hastily improvised for the occasion, and without experienced cooks. They have drilled several hours a day under a very hot sun, and have been subjected to the restraints of discipline, to which most of them were hitherto total strangers. Ninety-three cases of diarrhoea are reported. These cases were mostly characterized by headache, giddiness, nausea, abdominal pains, and diarrhoeic stools, which, however, were not very frequent, and as a rule were decidedly fecal. The treatment adopted has been a mild cathartic to unload the alimentary canal, followed by rest and small doses of opium, or opium and camphor. To this treatment the cases yielded readily. Only three of the cases partook of a dysenteric character. Of the forty-eight cases of cholera morbus nearly all occurred on one day, (the 28th,) between the hours of 9 and 11 p. m. The recruits of D and E barracks were the subjects. The attacks were very sudden, one man after another being suddenly stricken down with severe abdominal pains and cramps, vomiting, and slight diarrhoea. Of course, the ignorant, undisciplined recruits supposed that they were seized with Asiatic cholera, and as one after another was carried to the hospital a panic seized upon them, which can be more readily imagined than described. My treatment was preventative as well as remedial. I assured the men in the barracks that the cases were not Asiatic cholera; that there was no danger and nothing to be afraid of. I spoke most confidently and reassured many of the frightened. The patients sent to the hospital were given combinations of ginger, opium, camphor, &c., with large sinapisms to the abdomen, and with the happiest results. Many were returned to duty the next day, and in the few cases which were left with headache and nausea, a dose of castor oil was all that was needed to complete the cure. The vomited matter gave a clue to the origin of the sudden attack, which subsequent investigation proved to be correct. Half-cooked beans were the cause of all the trouble. None of the vomited matters or intestinal discharges evinced any of the rice-water characteristics of cholera, and it is also worthy of note that none of our diarrhoeas have been *painless*, nearly all the patients mentioning pain as a prominent symptom.

[Extracts.]

HART ISLAND, NEW YORK HARBOR, July 17, 1866.

COLONEL: I have the honor to report five cases of cholera admitted within the past twenty-four hours, and four deaths from that disease. It must be borne in mind that the cases reported are only those in the stage of collapse. The diarrhoeal tendency still continues, and many cases are cut short before reaching the alarming stage.

I have directed the steward to burn all bedding soiled with the vomit or evacuations of the patients. Such as is not soiled I disinfect, then boil, then wash. Should you not coincide with this plan, please express your disapproval. I make requisition for more bedding to supply deficiencies and to meet contingencies.

I have the honor to be, very respectfully, your obedient servant,

J. THEODORE CALHOUN,  
Brevet Major and Assistant Surgeon U. S. A., Post Surgeon.

Brevet Colonel W. J. SLOAN, Surgeon U. S. A., Medical Director Department of the East.

## EXTRACTS FROM OFFICIAL REPORTS.

MEDICAL DIRECTOR'S OFFICE, DEPARTMENT OF THE EAST,  
No. 125 Bleecker street, New York, July 19, 1866.

GENERAL: I have the honor to report that the cholera at Hart's island, New York harbor, is increasing, and that I have intelligence this afternoon that Dr. Calhoun, in charge, was seized this morning, and his case is hopeless. Dr. Webster and his assistant, from David's island, are there rendering valuable assistance.

Very respectfully, your obedient servant,

WM. J. SLOAN,

*Brevet Colonel and Surgeon U. S. A., Medical Director Department of the East.*  
Brevet Major General J. K. BARNES, *Surgeon General.*

MEDICAL DIRECTOR'S OFFICE, DEPARTMENT OF THE EAST,  
No. 125 Bleecker street, New York, July 23, 1866.

GENERAL: I have the honor to report that when, on July 19th, it was reported to me that Assistant Surgeon Rowe, at Hart's island, was seriously ill, I took immediate measures for sending additional medical aid. During the day I received further intelligence that Assistant Surgeon Calhoun was also fatally ill with cholera at that post. I immediately despatched Surgeon Milhau from this city, and Assistant Surgeon Gibson from Willett's Point, both of these officers arriving with great promptness.

It was very fortunate that in this emergency Assistant Surgeon Webster and his assistant from David's island were present, as they had been constantly, as their duties permitted, rendering every assistance.

Measures were at once taken for providing a medical officer for temporary service at Willett's Point and others for Hart's island. I also secured additional nurses, though there has been great difficulty in procuring either physicians or nurses, on account of the panic and the temporary nature of the service.

During the excitement at Hart's island, consequent upon the death of Dr. Calhoun, Surgeon Milhau, in concurrence with Dr. Webster, recommended the transfer of all the well troops, females, and children from Hart's island to David's island. The commanding general was telegraphed and gave the order. It was hoped that the moral effect would be most advantageous, as the disease seemed domiciliated at Hart's island. The troops were all transferred on Friday evening, except a company of the Veteran Reserve Corps (sixty-nine men) as guard. Unfortunately, eight cases of cholera occurred soon after the landing, and I have no doubt it will continue to increase to a limited extent. From the 7th to the 21st of July there were thirty-three cases at Hart's island and twenty-three deaths. No reliance should be placed in the newspaper accounts.

There are now three medical officers at Hart's island, and four at De Camp hospital. All the supplies required have been promptly furnished by General Satterlee, without regard to the supply table, and you can rest assured that nothing shall be omitted or neglected that can be made available during this crisis.

I have not time now for a detailed report of the character and nature of this epidemic, being anxious only to keep you advised of what is being done to mitigate its violence and maintain the good record of the medical department. I wish to commend the promptness of Surgeon Milhau and Assistant Surgeon Gibson in following their instructions, and the voluntary and efficient aid given by Dr. Webster, United States Army, and Acting Assistant Surgeon Thompson from De Camp hospital. Equal credit is due Assistant Surgeon Rowe, United States Army, until his illness. He is now convalescent, and on duty with the troops at De Camp hospital.

I respectfully ask authority to secure the services of six contract physicians, as a reserve corps for prompt detail to points where they may be needed.

I spent last Saturday at the posts above referred to, giving the necessary counsel and instructions.

Very respectfully, your obedient servant,

WILLIAM J. SLOAN,

*Brevet Colonel and Surgeon U. S. A., Medical Director Department of the East.*  
Brevet Major General J. K. BARNES, *Surgeon General.*

MEDICAL DIRECTOR'S OFFICE, DEPARTMENT OF THE EAST,  
No. 125 Bleecker street, New York, July 27, 1866.

GENERAL: I have the honor to report that there is a decrease in the number of cases of cholera at Hart's island, all the well persons who could be spared having been removed. Assistant Surgeon McGill, United States Army, was assigned in charge on the 25th instant, and Surgeon Milhau and Assistant Surgeon Gibson ordered to be relieved and resume their duties in this city and at Willett's Point.

Cases continue to occur at David's island, to which place the recruits of the seventeenth infantry were transferred. The new cases average about three per day. Dr. Webster's report of yesterday morning is more encouraging, there being fewer cases of diarrhoea and no new cases during the previous night. Surgeon Heger, United States Army, reported yesterday morning, but being affected with slight diarrhoea, was not placed on duty; nor was there any special occasion for his services. He will be held in readiness for any emergency.

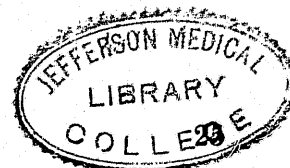
There has been no excitement at Governor's island, nor has any assistance been asked for.

Very respectfully, your obedient servant,

WILLIAM J. SLOAN,

*Brevet Colonel and Surgeon U. S. A., Medical Director Department of the East.*  
Brevet Major General J. K. BARNES, *Surgeon General.*

NEW YORK HARBOR.



NEW YORK, July 31, 1866.

COLONEL: I have the honor to make the following report of my tour of duty at Hart's island :

On receipt of your order of the 19th instant, I proceeded to Hart's island, reaching there at 6½ p. m. July 19. I found Dr. Calhoun dead; Dr. Rowe convalescing, but in bed; Dr. Webster worn out. In the hospital were eight patients sick with cholera, well marked, and of a malignant type, six deaths having occurred within the previous thirty-six hours. The hospital was in shocking police and in utter confusion; the *personnel* broken down and demoralized, the stewards sick, and the ward-master dead. My first care was to police the wards and to regulate the hospital. Assistant Surgeon J. R. Gibson reported at 8½ p. m., and immediately went on duty in the hospital.

Brevet Major J. Theodore Calhoun, assistant surgeon United States Army, died July 19, at 1 p. m., of cholera, after an illness of ten hours. He was faithfully attended to by Brevet Major Warren Webster. Owing to the rapid decomposition, I was compelled to recommend the burial of the remains at 10 o'clock that night. The funeral cortege consisted of officers only, six of whom bore the coffin to the grave on the island. Thus ended the career of a kind-hearted, energetic, conscientious, and intelligent medical officer, whose services in the field and at the post had endeared him to all with whom he had served. He was stricken down while in the zealous discharge of his duties, and his memory will long be cherished by his old associates and by his former patients.

On looking at the condition of the command, I found diarrhoea very prevalent and the *morale* of the men much affected. The malignancy of the disease induced me to think that some endemic cause must exist; a rigid police had been enforced, fumigations and disinfectants most liberally used everywhere, still the disease was on the increase. On investigation it was found that the barracks had been occupied for over four years by troops in transitu, and were infested with vermin, that swarmed out of the wood during fumigation. The fibres of the wood are charged with crowd poison. The southern end of the island, at present not used, was occupied for years as a conscript camp and a rebel pen, where thousands of prisoners have been confined; a luxuriant growth of rank weeds over the ground indicates a fertility not natural to the island, and shows that a large quantity of accumulated filth lies hidden from view, ready to give forth noxious vapors under a July sun.

In consideration of the above facts, and after a free consultation with Doctors Webster and Gibson, I made, early on the morning of the 20th, the following recommendation:

"HART'S ISLAND, NEW YORK HARBOR, July 20, 1866.

"Brevet Brigadier General A. D. DOUBLEDAY, *Commanding Hart's Island* :

"SIR: With a view of preventing the further spreading of cholera in this command, I have the honor to recommend that the well men and officers be transferred to David's island as early as practicable. Previous to leaving, the bed-sacks in use, with the straw, should be burned, the blankets and clothing thoroughly fumigated, and every precaution taken to prevent the transfer to the new quarters of any article of clothing, bedding, or baggage that has not been thoroughly disinfected by active chemical agents. I deem the above measures imperative to prevent the extension of the disease."

The fumigations were superintended by the officer of the day and the medical officer. Sulphurous acid, nitrous acid, and chlorine were all used in disinfecting.

On the evening of the 20th, six companies of the seventeenth United States infantry (520 officers and men) were transferred to David's island, leaving on Hart's island the sick, a detail of attendants, and the sixth company first battalion Veteran Reserve Corps, to guard property, in all about eighty-five officers and men. On the evening of the 20th Dr. Carey, contract surgeon, and Hospital Steward Brumer reported for duty. During the night Brevet Major Warren Webster reached Hart's island with seven cholera (?) patients, taken sick shortly after landing on David's island. The commanding officer of Hart's island, Captain Bayne, Veteran Reserve Corps, refused to receive them, and they were sent back to David's island. Fearing that the cholera would now continue among the troops at David's island, I sent Dr. Carey and Steward Brumer to assist Dr. Webster.

Notwithstanding the diminished garrison at Hart's island the disease still kept on, attacking the nurses about the sick and showing itself in the Veteran Reserve Corps company, which up to this time had enjoyed an immunity. Several teamsters fell ill with cholera, one after another; they had carried off the dead; but I think the cause of their illness was attributable to their living in the stables. The two stewards became ill, and were confined to bed. Their disease not being cholera, I sent them to David's island to recover. On the night of the 21st Dr. Browne, contract surgeon, and eight contract nurses reported for duty. On the 22d I recalled Steward Brumer from David's island. This enabled me to relieve and send to David's island a number of soldier attendants, who had been very faithful and required rest.

Being satisfied that, owing to irremediable local causes, the disease would still continue, I, on the 23d, recommended that every well person not needed on the island should be sent off. I reduced the hospital attendants to the utmost limit consistent with the care of the sick; but the officer temporarily in command sent off nearly the whole company of the Veteran Reserve Corps, thus leaving the island without proper guard or police party; consequently, on the 25th, I was obliged to call for a detail from David's island, and on the 26th the Veteran Reserve Corps returned, and I had them encamped on the parade grounds, their *morale* and condition having been much improved by their short absence from the post.

The following is a tabular statement of the cases of cholera at Hart's island, New York harbor, from July 20, 1866, to July 26, 1866:

In hospital July 19, 6½ p. m., cases.....	8
New cases received up to July 26.....	11
Total.....	19
Deaths.....	13
Remaining in hospital July 26.....	6

Of whom five are convalescing; three of these five were in the ward when I took charge. In addition to the above should be counted two citizens, both of whom died.

## EXTRACTS FROM OFFICIAL REPORTS.

The disease was undoubtedly cholera Asiatica, presenting all the symptoms of a malignant form, viz., diarrhoea, vomiting and purging of rice water, cramps, collapse, cold surface, cold extremities, cold tongue, cold breath, quick and weak pulse, leaden hue of surface, shrunken features, anxious expression, sunken eyes with dark hole, inelasticity of skin, incessant thirst, sensation of heat of body and extremities, entire suppression of urine, jactitation, nervous agitation, sometimes slight delirium, finally coma from uræmia, loss of pulse, and death. After death, in many cases, the elevation of the temperature of the body and the muscular movements were very striking.

Owing to the multiplicity of duties imposed upon the medical officers in attempting to avert death and to prevent further illness, no autopsies were made. There being no microscope at the post, but little information would have been obtained in making simple post mortems.

The cholera ward became so infected with the cholera poison that every patient brought thither for several days died, notwithstanding the floors were kept covered with chloride of lime and sulphate of iron, and the utmost police enforced. I therefore, on the 24th, closed the ward, using the convalescent ward for choleraics, and removing the convalescent patients to the finest building on the island—the library. The improved condition of all the patients on the following morning showed the propriety of the move.

Brevet Major and Assistant Surgeon McGill reported on the evening of the 24th. He immediately went on duty, examining the patients and the records, and from him may be expected a very full report of all the cases since the incipency of the disease.

July 26 I was relieved by Brevet Major McGill, in compliance with your order.

During my tour the medical officers had to be constantly in the hospital superintending the care of the sick and the police, the administration of medicines, stimulants, and food, and for a time had to dispense the medicines.

Although the medical officers devoted themselves to these duties, it was discouraging to see the patients die, one after another, in spite of their most assiduous efforts, the malignancy being due to some endemic cause.

In reference to treatment, the results were unfavorable, owing to the fact that collapse came on so soon after the commencement of the choleraic symptoms that medicine had no time to act, and symptoms were treated as they arose. After faithfully trying ice bags, hot bags, heaters, sinapisms, embrocations, &c, the plan of treatment which gave the most satisfaction was to follow the indications: First, a mustard emetic, then to allay vomiting by creosote, cracked ice; to arrest purging by injections of brandy, infusion of tea, and acetate of lead; to ease cramps and jactitation by hypodermic injections of morphia; to restore heat of surface gradually by gentle heat, extreme heat to be avoided; to restore secretion of urine by spirits of nitre or spirits of turpentine; to prevent collapse or avert death by stimulants, small quantities often repeated; when thirst is great, a little ice tea, or simply ice.

But nursing and constant attention are more important than medication. The patient should be kept in bed lightly covered, should use the bed pan, the stools and vomits should be immediately removed, and the utmost cleanliness observed about the patient and his bedding; a nurse should be constantly at his bedside attending to his wants.

I cannot lay too much stress upon the police and ventilation of the cholera ward, and the ward changed when there is evidence of an accumulation of the poison.

I cannot close this report without mentioning the untiring and zealous manner in which Brevet Major J. R. Gibson, Assistant Surgeon United States Army, discharged his duties. Brevet Major McGill and Acting Assistant Surgeon Browne deserve great credit for their prompt and efficient services. To Brevet Major Warren Webster, Assistant Surgeon United States Army, I wish to return thanks for his efficient and ready co-operation in furnishing stewards and nurses.

Very respectfully, your obedient servant,

JOHN J. MILHAU,  
Brevet Lieutenant Colonel and Surgeon U. S. A.

Brevet Colonel WM. J. SLOAN, U. S. A.,  
Medical Director Department of the East.

*Extract from monthly report of sick and wounded, Hart's island, New York harbor, July, 1866, Brevet Major George M. McGill, Assistant Surgeon United States Army.*

The causes of cholera have consisted—first, in the condition of barracks, sinks, and persons of men as to cleanliness; second, in the character of the island, sand upon rock, fitted to retain in its soil and furnish to the surface the products of slow decomposition; third, the ages and habits of those attacked; fourth, the exciting infection; this reached Hart island without influencing intermediate posts, (such as Willett's Point and Fort Schuyler,) in the systems of recruits sent from Governor's island.

The symptoms have been choleric, very variable in its characters, terminating in cramp in the right calf and foot, in both calves, in the arms, and in the neck, &c., vomiting and purging, rice-water discharges, water salts—epithelium, and crystals of blood, hæmatoidine, suppression of urine, coldness and clamminess of the extremities, coma, (properly so called, from which a patient could be roused,) with contractions of pupils, and diverging strabismus, cyanosis, turbid circulation, cold breath and tongue, involuntary discharges, jactitation, the most extreme prostration of strength, uræmia, and death.

In cases terminating favorably, the suppression of urine yielded to treatment, the first secretion drawn from the bladder being loaded with tube casts, (in and among the epithelium of which were blood crystals,) and containing, of course, albumen; the rice water passages became more, then shreddy, then very dark, vomiting ceased, cramp ceased, the abdomen became tender, the tongue dry, and a delirium resembling that of typhoid fever set in, which was readily controlled by morphia; red corpuscles of the blood were close set, the white were conspicuous, and in a few minutes after blood for examination was drawn from the veins blood crystals were observed.

The treatment has been varied. Hypodermic injections of sulphate of morphia and atropia ( $\frac{1}{4}$  to  $\frac{1}{16}$ ) have appeared to do the greatest good. Ergot and camphor yielded negative results. Opium alone effected little. Emetics and astringent injections have seemed to avail nothing. Turpentine stupes, sinapisms, hot-air applications, have been used. Acetate of potash and inhalations of the vapor of turpentine have appeared to act well. In one case of suppression of urine calomel in large doses was tried with no good results.

The most perfect rest has been enjoined and enforced, and in the last case (a successful one) a perforated mattress was used to secure it.

*Extracts from report of Brevet Lieutenant Colonel George M. McGill, assistant surgeon United States army.*

DAVID'S ISLAND, NEW YORK HARBOR, February 25, 1867.

Hart's island was originally wooded. Soon after the trees were cut down and cultivation attempted it was found that the island could not be made profitable. So it came to be in a measure abandoned. Its soil was sandy, underlaid by sienite, granite and metamorphic sandstone, and as such received what organic remains were cast upon it in its whole thickness, and, finally, where fresh water lay, in hollows of the rocky substratum.

While Hart's island was used as a rendezvous for troops recruited or to be mustered out, and as a prison, from the winter of 1863-'64 to the spring of 1866, five thousand men a day received their rations and cast their excretions (in great part certainly) upon its surface. I have been informed that at certain times so frequent were the fecal deposits that it was very disgusting to walk out of the main paths and roads.

On its western extremity, where barracks were constructed, the soil, being comparatively thick, received organic remains and yielded products of their slow decomposition. When the atmosphere on the surface was confined and damp, these products accumulated and recombined. This confinement and dampness obtained under the barracks. These, constructed on simple shelter principles, with little or no regard to ventilation and drainage, were built, as it were, on ground-hoods, being raised to various heights, but all weather-boarded to the surface and close-floored within. What cracks there were in the floors served to receive filth and water, and to give vent upwards into the barracks to the depressing products of slow decomposition in the soil beneath.

In such buildings as these seven companies of the seventeenth infantry, one of the Veteran Reserve Corps, and two of unassigned recruits were lodged in June, 1866. Little attention was given to police of the post. Among other evils the filth of years was left as accumulated upon the northern steep slope of the island. The food was not prepared with due care, nor can I think, judging from personal observation and after inquiry, that personal cleanliness was duly cared for.

The command of the seventeenth infantry was composed of recruits, young and tender or full-aged and intemperate men.

The fire was lit by sparks from Governor's island. Recruits were sent from where cholera was to Hart's island.

The weather had not been oppressively hot. Every day sea breezes had refreshed the men. Attracted, I presume, by the accumulated organic remains, the island was swarming with flies.

*Extracts from monthly report of sick and wounded in De Camp United States Army general hospital, David's island, New York harbor, July, 1866, Brevet Lieutenant Colonel Anthony Heger, Surgeon United States Army.*

The seventeenth regiment United States infantry reached David's island on the evening of July 20, 1866. Two privates were seized with symptoms of cholera during the voyage. One died on the following day, the other on the third day after arrival. There have been twelve cases to date, nine of which had all the stages of the disease in its most violent form. One of these was a laundress of company C, who is now convalescing and is in a fair way to recover. There have been seven deaths so far from the disease.

None of the original occupants or patients of the island have been attacked by the disease, and the standard of health among them remains good. There have been fifty-eight cases of diarrhoea among the troops of the seventeenth United States infantry. These cases were immediately taken into general hospital upon the appearance of the first symptoms, and were put upon prompt treatment. The island is thoroughly policed daily, and dietetic and sanitary measures rigidly enforced.

*Report of Surgeon and Brevet Lieutenant Colonel J. F. Hammond, United States Army, on the precautions taken to prevent cholera among the officers and enlisted men on duty in New York city.*

No. 24 WEST ELEVENTH STREET, NEW YORK, September 25, 1866.

In addition to the general sanitary police regulations, instituted by the Metropolitan Board of Health, special measures were taken early in June with reference to the preservation of the health of the officers and men of the army within the limits of this city, Williamsburg, and Jersey City, against epidemic cholera, which was then at quarantine, but had not appeared in

the city. Special instructions were given, and they were brought frequently to the notice of each person concerned, with regard to diet, including alcoholic drinks, to cleanliness of person, to police, ventilation, and disinfection of quarters, offices, and depots, and their water-closets; to clothing, exercise, exposure, and to the medicines for curing or checking the disease in its earlier stages. The disinfectants employed were sulphate of iron, chlorinated lime, Squibb's calx powder, chlorinium, per-manganate of potash and ozone, generated by phosphorus. The medicines used were dilute sulphuric acid where the diarrhoea was prevailing generally, and Squibb's compound tincture of opium or diarrhoea mixture. The former was given in twenty minims doses three times daily, and the latter was put into labelled vials and placed so that each man could obtain a dose of it within a few minutes after having a loose operation from the bowels; and the men were required to read carefully the labels and other instructions, or hear them read, every few days.

At department headquarters, including the mustering offices, corner Seventh avenue and Fourteenth street, there were about fifteen officers and men; at the quartermaster's office, on State street, there were eighty-five officers and men; at the quartermaster's depot of clothing and equipage, on Laight and Washington streets, there were eighty to one hundred officers and men; at the commissary's office, on State street, there were about sixteen officers and men; at the paymaster's office, on Eighth street, there were fifteen officers and men; at the engineer's office, on Bowling Green, there were nine officers and men; at the ordnance office, on Worth street, there were about twenty-five officers and men; and in the offices and rendezvous of the superintendent of general recruiting service, including those in New York city, Williamsburg, and Jersey City, there were about sixty officers and men; in all, exclusive of families and transient officers and families, about three hundred and twenty-five. To all of these and to many transient officers and families, Squibb's diarrhoea mixture was issued. Dilute sulphuric acid was issued to the depot of clothing and equipage chiefly. Disinfectants were not issued to transients, nor were they issued to the quartermaster's offices in State street nor to any of the offices nor rendezvous of the superintendent of recruiting; they purchased the disinfectants. The bulk of the supplies were drawn from the medical purveyor.

There was more or less diarrhoea at every office and rendezvous. Two fatal cases of cholera occurred the night of the 8th of July six doors from the recruiting rendezvous of Colonel Penrose, in Jersey City, but the epidemic did not extend to his party. The depot of clothing and equipage covers nearly an entire block. It is at a garbage wharf on the North river. A fatal case of epidemic cholera in a woman occurred the latter part of July, in a house forming a part of this block, on the windward side of it, at a time when diarrhoea was prevailing in the depot. The depot was immediately disinfected by myself, and the men were put upon dilute sulphuric acid in addition to Squibb's mixture. The diarrhoea ceased in a great measure, and the appetites of the men greatly improved; one case, however, suffered with cramps of the extremities. At the recruiting rendezvous, 115 Cedar street, one case approached the stage of collapse. There were some convulsive movements of the abdominal muscles; there were no pains or convulsive movements of the legs; and the man complained of coldness of his hands and forearms. The diarrhoea in this case continued about six hours. Two doses of the diarrhoea mixture, taken about the last two operations, stopped it, and after twenty-four hours of perfect rest and dieting he was reported for duty. It was prevalent and fatal about State street, about the quartermaster's and commissary's departments, but did not reach either of the latter. The dilute sulphuric acid is an excellent tonic and astringent, and apparently admirably adapted to cases of epidemic diarrhoea occurring in warm weather. Squibb's compound tincture of opium has met all the indications afforded. For the removal of epidemic diarrhoea after the stomach and bowels have been well evacuated, and for checking it even when the alimentary canal is charged with vitiated ingesta, it seems to be, with rest and proper diet, quite sufficient.

These places and families have been scattered from State street to Twenty-fifth street, and from Williamsburg, east of East river, to Jersey City; and men, women, and children are included among the cases. The measures, remedies, and medicines above mentioned were the only prophylactics employed, and the chief means used when diarrhoea occurred. Not a case of cholera has been reported, and not a life, so far, has been lost.

FORT SCHUYLER, NEW YORK HARBOR, February 20, 1867.

COLONEL: I have the honor to submit to you, by your request, the following statement in regard to an attack of cholera that I had at this post last summer:

I was taken sick about 3 o'clock in the morning on the ———, 1866. The disease began by violent purging, which lasted until about 9 o'clock, when I was first taken with the cramp in the limbs. If I remember correctly I had no passage of the bowels after the cramps commenced, but began vomiting freely. I think I had three attacks of vomiting, and after the last attack became unconscious.

I am of the opinion that I contracted the disease the day before on a boat running between Hart's island, Fort Schuyler, and New York city. I went aboard the boat at New York; lay down in the cabin and went to sleep. It was very warm, and I was covered with perspiration. I slept about an hour. When I awoke the boat was in motion; the perspiration had been entirely checked, and I felt chilly. I omitted to mention that before lying down I used the privy. This boat had been used the day previously for transporting the troops from Hart's island (where the cholera had been raging) to David's island, and the captain of the boat informed me afterwards that there had been several cases of cholera on board.

My general health was not very good. I had been suffering with a general lassitude of the physical system and depression of the mind for several days. The quarters at Fort Schuyler are very damp, dark, and disagreeable. The sinks are situated immediately in front of them, and in the summer time the effluvia arising from these sinks is at times almost unbearable. I have closed my windows often in the warmest weather, and suffered with the heat in preference to this nuisance.

I am, colonel, very respectfully, your obedient servant,

E. D. WHEELER,  
First Lieutenant First United States Artillery.

Brevet Lieutenant Colonel L. H. HOLDEN, Surgeon U. S. A.

**II. SOLDIERS' REST, BOSTON, MASS.**MEDICAL DIRECTOR'S OFFICE, BOSTON, MASS., *March 14, 1867.*

**GENERAL:** I have the honor to acknowledge the receipt, this day, of a communication from your office, of the 11th instant, requesting information of the antecedents of Private C. L. Farnum, sixth independent company, Veteran Reserve Corps, who died at the Soldiers' Rest, United States army hospital, Boston, Massachusetts, July 19, 1866, of malignant cholera.

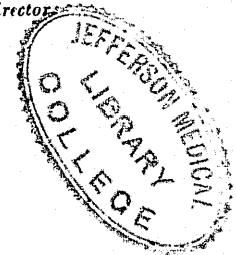
In reply, I have to report that, in the absence of the hospital records, and by the decease of Acting Assistant Surgeon W. E. Townsend, United States army, the surgeon in charge, I can only forward what information I can obtain from Hospital Steward Edwin H. Brigham, United States Army, on duty in this office, and who assisted Dr. Townsend in the care of the patient. From the statement of Steward Brigham it appears that Private Farnum arrived in this city in company with a corporal of his company, (name unknown,) from Hart's island, New York harbor, early on the morning of the 19th of July, 1866, each on furlough of fifteen days, *en route*, and with permission to visit some small town in the State of Maine. Soon after arrival Farnum was attacked while at the house of a friend with violent vomiting and purging, and while in this state was seen by Acting Assistant Surgeon W. E. Townsend, United States army, who, at the request of the friends, ordered his removal to the hospital. He arrived there about 3 p. m., and was able to give some account of himself, but shortly afterwards sank into a comatose state, in which he remained until his death, which occurred about 8½ p. m. the same day. Farnum stated that the cholera was raging at Hart's island on his departure, and that for two weeks previous he had been performing the duties of a ward master in the post hospital, and for three days before receiving his furlough had a slight diarrhoea. The disease was pronounced by Dr. Townsend, and also by Dr. Read, the city physician, who saw the case, to be a typical one of Asiatic cholera. Steward Brigham saw Farnum's furlough, and states that it was given at Hart's island, New York harbor. Farnum's body was removed from the hospital about 11½ p. m. on the night of his death, and buried at Mount Hope Cemetery, West Roxbury, Massachusetts.

Very respectfully, your obedient servant,

A. N. McLAREN,

*Brevet Lieutenant Colonel and Surgeon U. S. A., Medical Director.*

Brevet Major General J. K. BARNES, *Surgeon General.*

**III. TYBEE ISLAND, NEAR SAVANNAH, GA.**

[Extracts.]

HEADQUARTERS POST OF SAVANNAH,

*Savannah, Ga., July 31, 1866.*

**GENERAL:** I have the honor to forward to your office the following brief history of the introduction of epidemic cholera into the military quarantine grounds of this port:

The steamship *San Salvador*, of 970 tons new, or 1,100 old, measurement, left New York on the 14th instant, with seventy cabin passengers and sixty in crew and steerage, and is reported by the master to have been at the time of sailing perfectly clean. On her way out she stopped at Governor's island and received 476 recruits for the seventh United States infantry, under command of Brevet Captain E. A. Ellsworth, United States army.

During the voyage the portion of the vessel allotted to the men was what is called the "between-decks," forward of the wheel, a close, ill-ventilated compartment, containing, as nearly as I could judge without exact measurement, about 147,000 cubic feet, or 308 feet for each man.

The disease appeared among the troops on the second day out, and on arriving at the quarantine examining ship on the morning of the 18th instant, the master reported three dead and twenty-five sick. Immediately on being informed of the steamer's arrival I directed Captain Ellsworth to disembark his troops and encamp them on the sea-beach at a distance from the hospital, to isolate his camp by an efficient guard, to have sick call twice a day, and the men watched for the purpose of detecting diarrhoea cases as soon as they occurred.

The sick were removed to the hospital tents, which, through the inadvertence of the acting assistant surgeon in charge, had not been pitched on a ridge of sand hills which I had selected, but in the hollow directly behind them.

The disease increased rapidly until the 25th instant, and as rapidly declined afterwards, so that to-day there was but one new case. No cases occurred among the passengers and crew who remained on the steamer during her quarantine. The entire vessel was thoroughly cleansed and afterwards fumigated with chlorine, and the between-decks was further disinfected by the thorough use of super-heated steam. When she first arrived in quarantine a strong ammoniacal odor could be distinctly perceived at the distance of one hundred yards to the windward, with a stiff breeze blowing, but after the disinfection she became perfectly odorless.

Very respectfully, your obedient servant,

H. S. SCHELL,

*Brevet Major and Assistant Surgeon U. S. A., Post Surgeon.*

Brevet Major General JAS. K. BARNES, *Surgeon General.*

[Extracts.]

## QUARANTINE HOSPITAL, TYBEE ISLAND, GEORGIA, July 31, 1866.

GENERAL: I have the honor to report that in accordance with instructions I proceeded, July 22, to assume charge of quarantine station on Tybee island, occupied by detachment recruits seventh infantry, *en route* for Florida. I was informed by Captain Ellsworth, eleventh infantry, commanding, that epidemic cholera had developed itself on the second day after leaving Governor's island, and that four cases, with three deaths, had occurred during the passage.

The troops had been landed and camped on the beach July 18, and I found them in a terrible condition, having abandoned themselves to despair. A severe type of diarrhoea, culminating in cholera, was raging in camp, aggravated by the green vegetables rifled by the men from gardens where they were landed. Many deserted, and either perished by cholera in the interior, or were drowned endeavoring to escape. It was not only impossible to enforce discipline, but the officers were compelled to accompany with drawn revolvers details carrying sick to the hospital, as otherwise they were left to perish on the sand. The hospital had been located within the old fortification surrounding the "Martello tower;" in my opinion, a very injudicious selection, as the ramparts screened the tents from all circulation of air. All the supplies that could be spared from the post-hospital at Savannah had been sent down; but these had been exhausted, and the acting assistant surgeon in charge had not made a requisition for more, and many of the sick were lying exposed on the sand. No steward accompanied the command, and the details for hospital service deserted as rapidly as sent. The grounds consequently were unpoliced, and the sick suffered for necessary attention.

I made an immediate report of the terrible condition which existed, and Brevet Major Schell, Assistant Surgeon United States Army, then and subsequently made efforts to supply everything needed.

A suggestion had been made to change the camp ground, and a position designated which was considered eligible; but on examination I considered it unsuitable; so on the 23d instant the camp was moved a mile further down the beach, each tent was widely isolated, a rigid system of police enforced, regular hours for bathing designated, a chain of sentinels stationed to compel the use of the sinks, which were disinfected every two hours. In addition to surgeons' call, which had been held twice daily, each acting first sergeant was directed to watch the men carefully, reporting each one who visited the sinks more than once daily; a few simple instructions in hygiene were given, and each officer exerted himself to inspire courage and confidence among the men. After as careful an examination as the emergency permitted, the open beach fronting the "Martello tower" was selected for the hospital, and the tents moved down as rapidly as possible, everything being completed on 25th instant. The bedding, clothing, &c., in hospital, were burned twice daily when soiled, and chlorine freely used in tents and to disinfect cholera discharges.

Steward Lane, United States Army, reported on 24th instant, Brevet Major Carroll, United States volunteers, on 27th, and Acting Assistant Surgeon Burdett on 28th instant. With the two acting assistant surgeons, Drs. Higginbotham and Southwick, previously on duty on the island, I had now plenty of professional assistance, and was enabled to detail Dr. Southwick exclusively for duty at camp. Previously I was compelled to keep both in hospital, where I took position, except when holding surgeons' call.

But the type of disease was so severe that men kept in camp perfectly well in the morning were in a state of collapse before noon. Only those cases are designated as cholera in which the algid symptoms, cramps, and characteristic evacuations were present. Although in the majority of instances diarrhoea preceded the cholera, yet I am cognizant of some half a dozen or nine cases in which the patient was suddenly seized with the most prominent symptoms of collapse without previous illness. These cases, all of great severity, invariably died.

When the rice-water vomiting was succeeded by vomiting of bilious matter, it was properly considered as a favorable change, and was followed by tardy convalescence. A few cases had well-marked cerebral symptoms, like the stupor of typhus; these all died. The treatment relied on as the most efficacious was a combination of sub. nit. bismuth, gr. x., and acetate of lead, gr. v.; or sub. nit. bismuth, gr. x, and bi carb. soda, gr. x, every one, two or three hours, according to the severity of the disease, together with the free administration of ice in small quantities, and the external application of mustard cataplasms.

Dr. Sim's chlorodyne mixture in large doses, with hydrochlorate of ammonia, were used in some of the most severe cases, but was eventually abandoned as futile.

No post mortems were held, as the medical officers were unable to do more than attend to the necessities of the living. For the same reason it is impossible to enter into the details of cases, which I bitterly deplore; but the pressing urgency and horror witnessed here surpass everything seen during the war.

Chloride of lime was freely used in camp and hospital; also chlorinium and permanganate of potass; and, during the close of the epidemic, sulphuric acid was supplied and used for disinfecting sinks and vessels; but I preferred the chlorinium.

All the cases who survived the first shock of the disease were left in a state of exhaustion and emaciation, strikingly similar to that following typhoid fever, and there and then only were stimulants, punch, beef essence, &c., indicated and well borne. Previously they only aggravated the violence of the disease.

Very respectfully, your obedient servant,

CHARLES K. WINNE,  
Brevet Major and Assistant Surgeon U. S. A

Brevet Major General J. K. BARNES, Surgeon General.

[Extracts.]

## QUARANTINE HOSPITAL, TYBEE ISLAND, GEORGIA, August 9, 1866.

SIR: I have the honor to report that, in obedience to orders received from your office July 27, a. m., I immediately reported to Brevet Major Charles K. Winne, Assistant Surgeon United States Army; in charge of this hospital, for duty during the



epidemic of Asiatic cholera prevailing among the troops on this island. No new case nor any deaths having occurred since August 5, the epidemic is considered over. My services being therefore no longer required, I am directed by Special Order No. 15, post surgeon's office, Savannah, Georgia, August 8, 1866, to return to my station, and undergo the usual quarantine, at Braddock's Point, South Carolina.

The following report of the epidemic, as collected from statements of officers present on duty with infected troops and my own observations, is respectfully submitted:

July 14, 1866, the steamship San Salvador, bound from New York to Savannah, Georgia, with eighty cabin passengers and the usual crew, took on board from Governor's island, New York harbor, four hundred and seventy-six recruits, under command of Captain Ellsworth, eleventh United States infantry, and Lieutenants Mays, Nickerson, and Blenker, destined for the seventh United States infantry, serving in Florida. \* \* \* \* \* Cholera existed among the troops on Governor's island; one recruit was carried on board the ship with symptoms of that disease, which developed itself among the recruits on the ship the day after sailing, three of them dying of it during the voyage to the mouth of the Savannah river.

On the morning of July 18 the San Salvador ran into Port Royal roads, (i. e., Hilton Head harbor,) South Carolina, but was, by the health officer, Acting Assistant Surgeon Lathrop, United States Army, ordered, in obedience to existing quarantine regulations, to proceed to the quarantine station and hospital at Braddock's Point, South Carolina, to disembark the passengers and troops. The master of the vessel, however, proceeded to Tybee island, Georgia, on which the troops were landed, the cabin passengers and crew going into quarantine on the ship in Tybee roads, no disease having appeared among them.

Soon after landing, the troops ate freely of melons, cabbage, &c., in a garden on the island. The epidemic spread rapidly, and soon caused a panic among the troops, many of whom endeavored to escape, in several instances with success, some having subsequently been captured in Savannah and returned to camp. About eighteen were seized with cholera in their flight and died in the woods and swamps. Two steamboats were soon placed, by Brevet Major Schell, United States Army, post surgeon of Savannah, as patrols around the island, to prevent any further efforts at escape.

Until July 26th there were almost no provisions for the care or treatment of the sick, who were huddled together within the sand breastworks of an old fort, surrounding the Martello tower, on the north end of the island. Free circulation of air was impossible, while the rays of the sun were reflected from the inside of the walls into the enclosure. Water was defective in quality and deficient in quantity. There was very inadequate food, no hospital stores, bedding, or appliances, and almost no medicines. July 17, Acting Assistant Surgeon Higgenbotham, United States Army, had been landed on the island, with tents to establish a hospital, but the almost complete insubordination of the troops, and the absence of all the other essentials of a hospital, rendered his efforts in that direction futile.

July 19, Acting Assistant Surgeon Southwick, of the Freedmen's Bureau, reported for duty. July 22, Brevet Major Charles K. Winne, assistant surgeon United States army, arrived and assumed charge. He was accompanied by Rev. Father Kirby, a Catholic clergyman of Savannah, Georgia, who volunteered his services, and remained during the epidemic. Hospital Steward Lane, United States Army, reported July 23, followed by myself on the 27th, and Acting Assistant Surgeon James F. Burdett, United States Army, on the 28th. Assistant Surgeon Miller, United States Army, reported August 6, and Acting Assistant Surgeon Ridgely, United States Army, on the 7th.

On his arrival Brevet Major Winne at once began the removal of the hospital to a well-selected spot on the seaside, removed the troops to a camp over two miles distant, made urgent requisitions for needed supplies, characterizing past neglect as "cruel and atrocious;" and as soon as received, (July 27 and 28,) by his energy and good judgment brought order out of chaos. The virulence of the epidemic from that time forward rapidly diminished, the cases generally assumed a milder form, confidence was restored among the well, and, for the first time, due care extended to the sick.

The course and character of the epidemic may be inferred from the following facts:

*Strength of command.*

Officers, (line and medical) .....	8
Enlisted men.....	476
Total .....	484
Mean average strength present during epidemic.....	403

*Number of cases of cholera.*

On shipboard, from July 14 to 18.....	3
Admitted to hospital July 18 to August 6.....	180
Bodies found in the woods July 18 to August 6.....	18
Total .....	201

*Number of deaths.*

On shipboard during voyage .....	3
In quarantine hospital, Tybee island, Georgia.....	94
In the woods and marshes.....	18
Total.....	115



The deaths in the hospital occurred as follows:

July 19 .....	1	July 29 .....	8
" 20 .....	3	" 30 .....	1
" 21 .....	9	" 31 .....	2
" 22 .....	9	August 1 .....	..
" 23 .....	15	" 2 .....	1
" 24 .....	12	" 3 .....	..
" 25 .....	6	" 4 .....	1
" 26 .....	13	" 5 .....	2
" 27 .....	9		
" 28 .....	2	Total .....	<u>94</u>

The duration of the fatal cases admitted to hospital was as below:

Died the day of their admission to hospital .....	43
Died the day after their admission to hospital .....	26
Died two days after their admission to hospital .....	7
Died three days after their admission to hospital .....	5
Died four days after their admission to hospital .....	4
Died five days after their admission to hospital .....	4
Died six days after their admission to hospital .....	3
Died eight days after his admission to hospital .....	1
Died nine days after his admission to hospital .....	1
Total .....	<u>94</u>

As those who died on the day of admission did not, on an average, live twelve hours each after being attacked, the average duration of cases dying in hospital was less than one and a half days, while sixty-nine out of ninety-four died within twenty-four hours after their admission, which was usually from one to two hours after the first accession of the attack.

Of those admitted to hospital there were—

Returned to duty .....	18
Died .....	94
Remaining under treatment .....	68
Total .....	<u>180</u>

Of those remaining under treatment, all except five or six are rapidly convalescing, and will probably be returned to their command within the next ten days.

Of the deaths there were—

Line officers, (Lieutenant Mays) .....	1
Medical officers, (Acting Assistant Surgeon Burdett) .....	1
Enlisted men .....	113
Total .....	<u>115</u>

It is somewhat remarkable that not one of the cabin passengers or crew of the San Salvador were attacked, while of the ten civilians (white) residing on Tybee island nine were seized with cholera, and five died soon after the troops landed; the tenth escaped, and was reported in the newspapers as having died of cholera in the interior of Georgia, making the entire number of deaths one hundred and twenty-one.

The disease—true Asiatic cholera—assumed three well-defined forms—the algid, cerebral, and gastro-intestinal. In the algid type the rapid failure of the circulation, early accession of cramps after little or no vomiting, or purging, were the distinguishing features of the invasion. Of this form it may truly be repeated that "it begins where other diseases end—in death." It is cholera par excellence. In such cases, within the first hour or two of the attack, cramps, usually of the extensor muscles, seized the patient after little or no vomiting or purging, and were of the most painful character. The circulation failed rapidly, the skin turned blue, became icy cold, and was bathed in a most profuse clammy perspiration, while the patients experienced a sense of heat, refused to allow any covering upon them, and asked incessantly for ice-water. Rarely there was a sense of chilliness, and blankets were asked for. The eyes sank rapidly into their sockets, a blue crescent underneath them, and the balls upturned between the half closed lids. The features assumed a death-like hue and shrunken appearance, and the fingers, the "washerwoman's hand," shrivelling. The pulse sank to a mere thread, and the mind into apathy. Within two or three hours, from apparent health the patient was a livid blue color, shrunken in size, cadaverous in expression, and past the possibility of hope. After remaining six or eight hours in this state of profound collapse, death completed the work. No algid case recovered, remedies being utterly useless. The sixty-nine cases that died within the first twenty-four hours after their admission into hospital were chiefly of this type.

In the cerebral form the poison expended its force on the brain. The circulation suffered comparatively little, the distinctive choleraic symptoms being subordinate to a set so resembling typhus fever that Acting Assistant Surgeon Burdett, who had been resident physician during a typhus epidemic in Blackwell's Island hospital, remarked that, "At first sight I would have

supposed them cases of that disease had they not been in a cholera hospital." Mental excitement, delirium, apathy, stupor or coma early appeared and remained throughout the attack. Nearly all the patients, when unobserved, would crawl out of the head of their beds into the sand. In two or three cases the delirium was furious, but in the majority, the patients were submissive, and obeyed when sharply spoken to. The evacuations usually became involuntary. Only one cerebral case recovered; death, however, did not occur as early as in the algid form, the cases often continuing several days. The application of cold to the head was the only treatment that offered even temporary relief.

In the gastro-intestinal form the alimentary canal received the shock of the attack, although all the mucous membranes were involved in the visitation. The choleraic voice was present in marked degree, in some cases being reduced to a husky whisper; the conjunctiva highly injected, the hearing generally dull, and the urine diminished or suppressed. Vomiting and purging were persistent, or at least often recurred after being suppressed by treatment. Cramps came on later and were milder than in the algid cases, in which they were often the first symptom and intensely painful. I think that in the gastro-intestinal cases they were generally confined to the abdominal muscles, while in the algid the extensors of the extremities, the back, and back of the neck were chiefly involved. The circulation also sank less rapidly, and although there was cold moist skin, blue lips, fingers, toes, and nails, it was due to profound prostration and exhaustion, and eventually yielded to carefully sustaining treatment. It was somewhat different in character as well as degree from the blue lividity, icy, clammy coldness of the skin, which in the algid cases suggested the idea of some still active poison, changing the constitution of the blood from the healthy, red, circulating stream, to a viscid mass incapable of being driven into the capillaries. In several cases vomiting persisted for four or five days, the change to convalescence being marked by the appearance of billious instead of rice-water ejections. In the case of Private Lindsey, obstinate vomiting was accompanied by an obstinate suppression of the urine, the vomiting ceasing with the restoration of the renal function, after its absence for four days. Private James Hill, a severe gastro-intestinal case, suffered from obstinate vomiting for five or six days, accompanied by hiccough. While retained in the stomach, eight drops of chloroform in a drachm of alcohol relieved the hiccough, but it was soon rejected. Dr. Winne finally relieved both symptoms by the application of the actual cautery over the stomach, the wound being dressed with morphia. His voice had been reduced to a husky whisper. At the present date (August 9th) he is convalescing. Many gastro-intestinal cases recovered after all hope had been abandoned; in others the vital flame flickered, but ultimately regained a healthy vigor. Convalescence was, in almost all, astonishingly rapid for the shock sustained; four or five days in light cases, and six to ten or twelve in severe, usually restoring the patient to fair health. The case of Private Terry, employed in the hospital kitchen as cook, will serve to illustrate the oscillation of numerous cases between hope and fear. Of delicate organization, the first twelve hours of a gastro-intestinal attack had reduced him to the stage of cramps, blue skin, and general prostration. A day later Acting Assistant Surgeon Burdett came into the office and remarked that Terry was fast sinking and probably would not last another day; an hour afterwards I found him with a fair pulse and quite comfortable, and reported him getting well. We together visited him an hour later, and found him again sinking. He ultimately made a good recovery.

The gastro-intestinal cases, when light, usually recovered as rapidly and with as little trouble as from diarrhoea or cholera morbus; but the severe cases in general passed into the "cholera typhoid" stage, characterized by a general outward resemblance to typhoid fever, with sordes on the tongue and lips, typhoid expression of countenance, and dulness of mind; in some cases, tenderness of the abdomen; in more numerous instances, none. There was also some tendency to a return of the diarrhoea, but seldom any tympanites. Between it and typhoid fever there were the following important distinctions: the tongue was never hard or dry; there was no typhoid eruption, although the skin, owing to the great prostration and enfeebled circulation, remained for days a dark or reddish blue, cold and moist. Recovery usually took place in from four to ten days, and was often quite unexpected, or at first very doubtful. At a morning inspection Dr. Winne and myself estimated that out of sixty gastro-intestinal cases in my ward, about six to eight would be fatal. The following morning we feared one-half would be lost, general prostration and blue, cold skin and extremities being alarmingly general. The next morning the improvement was very apparent, and at this time it is probable that all, except four or five, will be returned to duty. With careful nursing, and a diet of eggs, beef tea, &c., and milk punch made with brandy, given in small quantities, the recoveries were unexpectedly rapid, considering the profound prostration which, in so many cases, followed the subsidence of the acute attack.

The division of the cases into three types may seem unnecessary and unwarranted, but during the present epidemic they were so boldly marked, and are so essential to the value of treatment as, in my opinion, to entitle them to a place in ever so brief a sketch of Asiatic cholera, as observed on Tybee island. Furthermore, they were not, so far as I saw, interchangeable, no algid passing into a cerebral state, or *vice versa*. Although the gastro-intestinal might appear to be only the first stage of the algid form, its subsequent course differed from it somewhat in character as well as degree, death taking place through exhaustion and general prostration, while in the algid the victim was at once struck down with irresistible force, the body being thrown into contortions by muscular spasms, or rendered cold as an iceberg from early failure of the circulation. The poison was, beyond doubt, the same in all, but the difference in its modes of manifestation was as great as between those of the malarial poison in congestive, remittent, and intermittent fevers. Internal heat was an invariable symptom in the three varieties of cases, as was unappeasable thirst; and notwithstanding the coldness of the skin, the patients usually complained of the presence of the lightest covering, and threw it off the first opportunity. In consequence of the patients being covered by the inflamed bites of myriads of mosquitoes, it was impossible to observe the existence of any cutaneous eruption. In my own person the usual symptoms of cholera, diarrhoea, internal heat, cold skin, and feeble pulse were followed a day later by reaction, and an eruption, exactly similar in appearance and pain experienced, to mercurial erythema, which, after a day or two, disappeared. It is to be regretted that it was impossible to take full notes of cases, and make post mortem examinations, but, under the circumstances, it was simply impossible.

To organize a hospital, with the sick awaiting its erection, the nurses and attendants, with a few exceptions, deserting as soon as the officers' backs were turned, rendered it no light task to extend even tolerable care to the living, while the dead, during the first week of the epidemic, were buried in their blankets in trenches dug for their reception.

As to the portability of cholera there can be left no doubt; it was brought to the island, and all the residents were attacked by it. Concerning its contagion, nothing new has been demonstrated by the present epidemic. None of the cabin passengers, officers, or crew of the San Salvador were attacked. The cases among the medical officers on duty in this hospital were in less ratio than among the troops in camp. The nurses, in several cases, were attacked, and in some instances died; but they were not in larger proportion than those less exposed. From the fact of some of the nurses having been attacked by diarrhoea soon after nursing severe cases, I incline to the belief that a zymotic poison is produced from the patient or his evacuations, which, under certain conditions of atmosphere and health not now understood, propagates the disease. The best preventative appeared to be a healthy balance of all the bodily functions, with a moderate degree of elevation, and perhaps equanimity of mind. Great strength of constitution certainly afforded no defence, the strong falling victims in as large proportion as the more delicately framed, and usually passing into the algid or cerebral form. Although fear, by disturbing the general balance, probably predisposed to an attack in the presence of the morbid agent, courage did not afford immunity, several of those who had been conspicuous for good conduct during the epidemic at last being struck down by a deadly blow, to which neither courage, previous good health, nor medical aid could offer the slightest effectual resistance. Treatment in the algid and cerebral cases proved utterly useless, all dying as quickly and painfully with as without it. During the first few days of the epidemic there was no treatment, or next to none, followed in any case, there being no medicines on the island; in fact, until the 28th of July the supply was most inadequate. Dr. Winne had made the necessary requisitions in the most pressing terms, but they had to be purchased by the quartermaster's department, which occasioned a tedious and painful delay. In three algid cases I gave the "chlorodyne cholera mixture," with hydro-chlorate of ammonia, as prepared by Dr. Thomas Sim, viz., ℞—Tinct. cannabis ind., f. ʒ ii; chloroform, f. ʒ iv; theriaca, f. ʒ ii; mucil. acacia, f. ʒ ii; morph. muriat., grs. v; acid hydrocyanic dil., (2 per cent.), f. ʒ ii; ol. menth. pip., gtt. vi; misc. bene. Dose, 12 to 30 drops; which is almost identical with the mixture of same name originally used, and highly vaunted by Surgeon Collis Brown, of the British East India Company's service, during an epidemic in India. The results were as follows:

Private Thomas Riley was admitted at 4 p. m., July 27; had been sick two hours; had cramps and rice-water vomiting and purging. Mustard was applied externally to the abdomen, arms, and legs, and the chlorodyne cholera mixture and hydro-chlorate of ammonia given internally in large doses. At first they were rejected, but subsequently retained. Some alleviation of the symptoms followed, and it was hoped he was better. He died at 12 p. m. the same night. Private Thomas Flaran was admitted at 5 p. m., July 27; had been sick but two hours; had but little vomiting, but now had cramps; the same treatment as in the preceding case was pursued without any perceptible effect. He died during the night. Acting Sergeant Harding was admitted at 11 a. m., July 29; had been sick about two hours; was a man of fine constitution and courage; was now in the cramps of the algid form. His treatment was the same as in the two preceding cases; the cramps and pains continuing so severe that he remarked, "If I had a friend he would shoot me." The fingers and toes were greatly distorted by spasm of the extensor muscles; not the slightest alleviation of the cramps nor improvement of circulation was produced by the treatment. He died the same night. Dr. Burdett used it in four cases, all of whom died without any alleviation of symptoms. When cramps supervened in gastro-intestinal cases, it afforded far less relief than a simple mixture of six drops of chloroform with twenty of laudanum, given in a tablespoonful of water, used by Dr. Burdett to relieve pain and alleviate spasm. The less of such remedies used the better was the subsequent convalescence.

The unanimous verdict of the medical officers present on duty was, that however it may have acted elsewhere, in the present epidemic the chlorodyne cholera mixture was worthless. All the plans of treatment used in algid and cerebral cases proved equally inefficacious, (except, perhaps, cold to the head in the delirium of the last class, which sometimes afforded temporary relief to the pain.) I conclude, therefore, that unless something more useful than the remedies now offered can be discovered, the patients may as well be spared the additional annoyance of treatment. It was only in the gastro-intestinal, which constituted over half the entire number of cases, that treatment was of any avail. Early in the attack there is time for remedies to be absorbed before the accession of the cramps. Numerous such cases will and did recover without any treatment; others were arrested in the first stage by the use of the usual combination of chalk, opium, vegetable astringents, and carminatives, left to nature, would terminate fatally. It is in this class of cases that the value of treatment is to be estimated. In such, which constitute ordinary mixtures for diarrhoea. A very considerable proportion of them, however, certainly more than half, chalk mixture, vegetable astringents, opiates, carminatives, &c., are not well borne by the stomach, nor usually very efficacious in arresting the vomiting or purging for any length of time; still less so, in preventing cramps and maintaining the circulation, the irritation of the alimentary mucous membrane seeming not to be effectually quieted, if it was not sometimes actually increased, by their use. Stimulants, except in the very earliest moments of the disease, are worthless; taken, however, at that time, and in moderate amount, they may, by the general but moderate elevation of the vital powers, ward off a half-formed attack. Their continued use, however, can be of no benefit, and in consequence of their irritating effects upon the alimentary mucous membrane, is ultimately an additional obstacle to recovery. Large doses of opiates did mischief only. The sulphuric acid treatment was not tried. Calomel had no advocates and was not used. In the algid cases, the patients would have died while awaiting its action; in the cerebral, the typhus and typhoid symptoms rendered it out of the question; and in the gastro-intestinal, simpler and safer means sufficed. The fatal effect of purgatives was illustrated by several cases, in which the men clandestinely obtained them for the relief of costiveness. The following case is in point: July 23, Private McCarthy, one of a fatigue party sent from camp to hospital, applied for relief from a pain in his stomach. A powder of ten grains each of bi-carbonate of soda and sub-nitrate of bismuth was administered. In the evening he reported himself entirely well, and returned to camp. August 1 he was admitted to hospital in a state of collapse, and reported that he had clandestinely procured and used Epsom salts; the diarrhoea induced had been treated with opium without effect. He died August 5. Several cases of cholera followed the use in a similar way of cathartics. July 28 a supply of sub-nitrate of bismuth having been received, the effects of a powder composed of ten grains of it, in combination with the same quantity of bi-carbonate of soda, were tried with gratifying effects. During over three years' service in the department of the Cumberland,

army of the Potomac, and department of South Carolina, I had found it the best of all remedies in diarrhoea and dysentery, and very useful in allaying vomiting. Subsequently the treatment adopted was as follows: As soon as possible after the first symptoms of cholera appeared, mustard plasters were applied to the abdomen, legs, and arms, and retained only long enough to redden thoroughly the skin. One of the powders above named was administered in a gill of water every fifteen minutes, half hour, or hour, until vomiting and purging were allayed. Only small quantities of water were allowed, as it was usually vomited, and the patient exhausted by a relapse; pellets of ice, however, were given freely. Dr. Burdett used in his cases, he thought with service when cramps supervened, six or eight drops of chloroform and twenty of laudanum, in a table-spoonful of water. As nearly as possible, absolute rest in bed was enforced throughout; hence, friction was but little used, as it always failed to restore the circulation, and greatly annoyed the patients. Dry heat, however, which permitted rest in its use, was applied to the extremities. During convalescence, moderate quantities, frequently repeated, of iced lemonade, milk punch made with brandy, and egg-nog were given. The diet consisted chiefly of eggs, which were very generally asked for and well borne, beef tea, corn starch, &c., with fresh beef and bread when health was sufficiently restored. Dr. Winne used in some cases, for vomiting and purging, the sub-nitrate of bismuth with acetate of lead. It was generally thought, however, that the ultimate effect of the lead was not as favorable as that of the bi-carbonate of soda, my own convictions being decidedly against its continued use. Other symptoms were treated by the acknowledged remedies. A case of vomiting that had continued for days was relieved by creosote in mint water. Another, as above mentioned, yielded to the wound of the actual cautery, and a dressing of morphia applied over the stomach, by order of Dr. Winne, after the usual anti-emetics had failed.

In estimating the effect of the preceding plan of treatment, it must be remembered that at the date of its introduction (July 28) the cases were assuming a milder type, the virulence of the disease being almost expended; that for the first time adequate supplies had been received, and that now the surgeon in charge was able to order the daily destruction of all straw in use, and of all soiled and infected clothing and bedding, and to replace them by fresh articles. Numerous severe cases, however, continued to be received for some days later, the lives of several of whom, it is confidently believed, were saved by the above treatment. Certainly no other operated so promptly in arresting vomiting and purging; and it is believed that cramps, when not entirely averted, were rendered much milder by its use. It has the important advantage of not increasing the patient's danger during subsequent convalescence, while so far as could be judged from its use in fifty or sixty gastro-intestinal cases, it was much more serviceable than any other plan of treatment in arresting and alleviating the severity of the acute stage. In the algid cases, like all other remedies hitherto used, it was powerless. The distribution of the powders of sub-nitrate of bismuth and bi-carbonate of soda among cholera-infected troops, with directions to take one every fifteen minutes, half hour, or hour, on the first appearance of vomiting, purging, or cramps, until the arrival of the medical officer, would doubtless save valuable time and lives that would otherwise be lost by delay. Hereafter, as heretofore, algid cases of cholera will die despite of all remedies, death beginning with the attack. In cases of the gastro-intestinal type the plan of treatment above recommended was followed by recovery in every instance in which it was used early in the attack. Its immediate effects were to quiet the irritation of the mucous membrane of the alimentary canal and relieve pain. As the cramps, when they occurred at all, were milder following its use, and the circulation better maintained, it is thought that the bismuth had an anti-spasmodic effect, while the soda in some measure prevented the viscidty of the blood. Their efficacy appears worthy of further trial.

The last death up to this date was that of Acting Assistant Surgeon James F. Burdett, United States Army, August 5. Dr. Burdett landed on the island July 23, in poor health, (having suffered for some days previously from diarrhoea,) but in good spirits. Although he was subsequently attacked by intermittent fever and cholera morbus, he, whenever able, labored cheerfully and with success among the sick. August 2, Dr. Winne directed him, on account of feeble health, to go to camp two miles distant, as a place of safety, which, however, he requested to be relieved from doing, preferring to continue on duty in hospital, and in deference to his wishes, was permitted to do so. Subsequently, his health greatly improved, and on the morning of August 5, was apparently as good as that of any one on the ground. At 11 o'clock a. m. he mentioned being slightly ill, but attached no importance to it; at 1 o'clock p. m. was attacked with purging and vomiting, which, being bilious, he thought was the old enemy, cholera morbus, and refused remedies until nearly 2 o'clock p. m., soon after which he was in the relentless grasp of the algid form of cholera asphyxia; at 4 o'clock p. m. he was speechless; at 6 o'clock the pulse could no longer be detected in the radial or temporal arteries; and at 10.30 p. m. he expired. He was thirty-two years of age, and leaves a wife and four sons in Salem, Massachusetts. Dr. Burdett's mind was of the solid, liberal, and comprehensive order, and his professional attainments and general knowledge in keeping therewith. His judgment was sound and discriminating; his social nature warm, lively, and congenial; in manners, frank and unassuming; in honesty and morals, above reproach; and in all the walks of life, the natural enemy of pretension. A rough but true diamond. "Formed on the good old plan, a true and brave and downright honest man." In the discharge of the duties of a profession of which he was a worthy and able member, he labored zealously to the last, and when met by the grim messenger, calmly laid down his life at the post of danger he had refused to leave. A large circle of friends will cherish his memory; none with more respect than those with whom he parted on Tybee island.

I have the honor to be, sir, very respectfully, your obedient servant,

WM. CARROLL,

*Brevet Major and Assistant Surgeon United States Volunteers.*

Brevet Lieutenant Colonel CHARLES PAGE,  
*Surgeon United States Army, Medical Director Department of the Carolinas.*

## IV. NEW ORLEANS AND OTHER POSTS IN LOUISIANA.

MEDICAL DIRECTOR'S OFFICE, HEADQUARTERS DEPARTMENT OF THE GULF,  
New Orleans, Louisiana, December 10, 1866.

**GENERAL:** I have the honor to forward morning sick reports of United States troops at New Orleans, Louisiana, from July 22 to August 26, 1866, which I have lately caused to be prepared to complete the series already forwarded. These constitute a record of the health of troops this season, to which a few explanatory remarks and comments should be added.

The enforcement of the quarantine and health laws of the State of Louisiana devolved upon the new Board of Health since May 20, 1866.

The proclamation of the governor of Louisiana, dated March 7, 1866, declaring certain ports infected, continued in force until suspended by resolution of the board October 23, 1866.

Until cholera and yellow fever appeared, the general health continued good in the community and among the troops.

The following points were occupied by troops in the city and vicinity:

*Sixth cavalry, G company.*—Holmes's foundry, corner Franklin and Euphrosyne streets, first district, June 24, to July 24, 1866; corner of Love street and Cotton Press, in a cotton press, third district, July 24 to present time.

*First regiment United States infantry, and light company K first United States artillery.*—Jackson barracks and the general hospital adjoining, Third district, July, September, October, and November, 1866; Lafayette square, in camp, first district, early in August. One company first United States infantry has continued in Lafayette square since August.

*Three companies first United States infantry.*—Commercial Hotel, corner of Tchoupitoulas and Girod streets, First district, since August, 1866, to present time.

*Eighty-first United States colored infantry.*—Cotton press on Robin near Annunciation street, first district, July, part of August, and September, 1866; cotton press on Tchoupitoulas near Hunter street, first district, October and November, 1866; Camp street, near the Levee, in camp, August 1 to August 10.

*Eighty-second regiment United States colored infantry.*—Cotton press on Tchoupitoulas near Hunter street, first district, in September, until mustered out of service September 22, 1866.

*Seventh regiment United States colored infantry.*—In camp at Greenville, Louisiana, near United States general hospital, from October 17 to October 27.

*Ninth regiment United States colored infantry.*—In camp at Greenville, Louisiana, near United States general hospital, from October 12 to December 1.

*One hundred and sixteenth regiment United States colored infantry.*—In camp at Greenville, Louisiana, near United States general hospital, from October 1 to present time.

*Ninth regiment United States colored cavalry, and thirty-ninth regiment United States colored infantry.*—In camp at Greenville, Louisiana, near United States general hospital, from August 1 to present time.

Recruits arrived from the north at Jackson barracks, by the steamship *Mariposa*, July 8; others for the seventeenth United States infantry, by the steamship *Livingston* from New York, July 16, and were shipped to Galveston on the steamship *Texas*, arriving there July 21 or 22. Recruits for the cavalry, from Carlisle, via New York harbor, arrived on the steamship *Merrimac* July 23, and in a few days were shipped to Texas.

In the seventh, ninth, thirty-ninth, and one hundred and sixteenth regiments cholera had appeared while on duty in Texas before their arrival here. The ninth United States colored cavalry and thirty-ninth United States colored infantry, both regular regiments, have been recruited and raised in this department.

There can never be the same accuracy in determining the first appearance of disease in a city as in a military command where all cases are recorded. The health ordinance of this city did not become a law until after cholera had manifested itself; cases may have occurred which were never reported, and it is difficult, therefore, to determine when the first cases of cholera existed. The attention of the Board of Health was drawn to cases in Hercules street, a central part of the city, near the head of the basin connecting with Lake Pontchartrain, where a citizen died July 13 of choleraic disease; also, to cases in Felicity street, (July 25, 28, and 31,) Race street, and White street near Thalia and Erato streets. The cases in Hercules and White streets, and Holmes's foundry were within a few (four) blocks of each other.

The first case in the military service occurred at Holmes's foundry, corner Franklin and Euphrosyne streets, where Private L. Nolan, G company, sixth United States cavalry, died July 22, five days after enlistment. Fumigation and purification of the foundry were at once instituted; and on the 24th the company was moved away to Love Street cotton press, a better locality, in the third district. Private Ellis, same company, enlisted July 16; was attacked with choleraic symptoms July 24, at headquarters; was sent to General hospital, and died July 25. On the same day died Corporal Fortescue, G company, of cholera, in general hospital.

At Jackson barracks (six miles below the city) died, July 25, of cholera, Private Jonas, recruit for fourth cavalry, lately arrived from New York, (July 23, on the *Merrimac*, as I believe.)

July 25, at the Louisiana cotton press, Robin street, in the first district, Private Anderson, eighty-first United States colored troops, was seized with choleraic symptoms and sent to hospital. He died on the 26th. On the 27th, Private Gradney, eighty-first United States colored troops, died at the regiment, (Louisiana cotton press.) He had been on duty at Bull's Head stables, near the levee, in the fourth district.

At Jackson barracks, July 28, died, also, of cholera, Private Williams, first United States infantry. In general hospital, (Sedgwick,) died, July 29 and 30, Privates Stevens and McElroy, of G company sixth cavalry, admitted 25th and 27th of July.

It will be seen that cholera was present in several distinct organizations, at widely distant stations, within three days.

At this time occurred the riot of July 30, requiring troops to be distributed in the city. The first infantry and a battery

of artillery occupied Lafayette square, and the eighty-first United States colored infantry camped at the foot of Canal street, near the levee. During ten days of this camp, in a most unfavorable locality, the eighty-first had many cases of cholera. The troops generally at this period were subjected to many inconveniences and discomforts by being temporarily away from their regular quarters. Drinking inferior water, receiving cold victuals, cooked miles away in the company kitchens, and sleeping directly on the damp ground, were changes very serious and prejudicial. Pure water was ordered to be procured at once and issued to the troops, and has continued to be distributed, as far as possible, since August 7 to this time with most marked beneficial results. The meals were inspected and improvements in cooking effected. Tea and rice replaced coffee and beans to considerable extent. Boards were procured and beds raised from the ground for such troops as did not return to permanent quarters.

By assiduous efforts the sanitary condition of the troops was soon restored. As a rule, cases were sent to hospital as soon as the tendency to diarrhoea of a suspicious character was detected. Constant observation was enjoined as to the habits and condition of the men, so as to receive attention in time. The latrines were kept clean and disinfected. At no time was there any panic, so far as I am aware. The disease attained its maximum about the 8th of August, and after the 10th declined. Among the citizens the greatest daily number of burials (forty-four) occurred August 17. In the sixth cavalry, after the change from the basin to new quarters in the Cotton Press, third district, and in the eighty-first United States colored infantry, after returning to proper quarters, the disease particularly abated. Considering the number of recruits admitted to the first infantry, the peculiar exposure of the regiment at Lafayette square and at the barracks, comparatively few (twelve by cholera, two by yellow fever) have died during the season. At Jackson barracks, with a large command, cholera was not even prevalent. An occasional case was brought under treatment. Prompt and thorough measures were instituted to prevent any possible extension of this disease (and of yellow fever also) in every case presented. Prior to the war it was the custom to vacate Jackson barracks, to preserve the health of the troops during the summer, moving them to East Pascagoula, and returning after the first frost in autumn.

The city has been more unclean and disease more prevalent in this than during any other summer since 1862. It will be seen that cholera has continued (though broken in force) in the city, and occasional cases break out in the command.

Recruits have been continued to be added to the regiments from the city and country, and from commands arriving for temporary duty or muster out; and new material has not been wanting for development of choleraic disease at all periods.

Whenever cistern water was not at hand and could not be purchased, the quartermaster's department has procured distilled water for issue to troops. The supply at Jackson barracks, at the barracks' hospital adjoining, and at the Sedgwick hospital, Greenville, has been rain water in cisterns.

The troops at the barracks have enjoyed great immunity from disease. The one hundred and sixteenth regiment United States colored troops, camped near the Sedgwick hospital, and supplied thence with cistern water, has continued entirely free from cholera. Quite recently, on muster out of the eighty-first United States colored troops, the one hundred and sixteenth was moved into quarters in the city, (Tchoupitoulas near Hunter street.) The supply of distilled and rain water, for a day or so, was scant, and some of the men used hydrant (river) water. Soon two cases of cholera occurred. Pure water was supplied, and there have been no more cases in the regiment.

The ninth regiment United States colored cavalry and the thirty-ninth United States infantry were supplied, but not sufficiently, with distilled water until the cisterns at the Sedgwick were repaired, filled, and furnished rain water to them. At first the distilled water, sent up hot in casks, could not become cool before it was needed. The men preferred to drink the river water because it was cold, and did so, against orders and repeated warning, accepting the risk of disease rather than wait for the water to be cooled and aerated. Case after case of choleraic diarrhoea followed. Critical inspection failed to develop any other probable cause except the use of river water, and recommendation was made to move the regiments away from the river far enough to prevent the men obtaining it. To avoid moving, the cavalry put on a strong guard to keep the men from the river, and cistern water was supplied from the Sedgwick hospital. Cholera, since that, has ceased in the regiment. The thirty-ninth United States infantry has been moved to the ground adjoining the hospital, (former healthful camp site of the one hundred and sixteenth,) and receives cistern water from the hospital. Its sanitary condition is good.

The ninth United States colored cavalry kept part of two companies guarding and attending to horses in the city, in old stables on Derbigny street, Second district. A few cases of cholera occurred among these men, until they were restrained the use of hydrant water and put into improved quarters elsewhere.

Circumstances have confirmed so strongly the importance of pure water, that even for troops in transitu, remaining a few days, its supply is recommended.

The camps at Greenville were infested, at one period, with vendors of liquors, pies, and other deleterious articles, until orders were issued and enforced against them.

Cholera has not yet entirely disappeared from this city; perhaps scattering cases may be expected to occur for some time. Professor Wood, writing in April, 1858, on a previous outbreak, says: "In the summer of 1850, and in every year since that time, it has occurred to a greater or less extent in various parts of the valley of the Mississippi, in which there is reason to fear that it has become naturalized; but the section of our country east of the Alleghaues, with some slight exceptions, remained exempt from the period of its visitation in 1849 until the summer of 1854, when it again made its appearance in the epidemic form." (Practice of Medicine, vol. 1, p. 715.) I trust no such continuance—"naturalization"—will mark this visitation, and that clear views of the etiology and conditions governing the propagation of cholera may at length be developed, by which the profession and the authorities may receive the co-operation of the great mass of individuals in enlightened communities in all measures that tend to prevent and stay the disease.

Observations in this as in previous visitations enforce the necessity of observing the first indications of disordered bowels, of having remedies at hand, and prompt medical advice. Taken at the stage of premonitory diarrhoea, the disease is quite manageable.

The tendency to diarrhoea has increased in the following rates in the department of Louisiana, viz: Number of cases in June,



94; in July, 171; in August, 546; of which number there were due to cases in New Orleans, in June, 10; July, 133; August, 375.

The number taken on sick report for zymotic diseases in Louisiana was, for June, 825; July, 1,099; August, 1,681; from which the deaths were, in June, 11; July, 16; August, 108. The class of zymotic diseases in August (1,681 as above) was made up from acute and chronic diarrhœas and dysenteries and cholera, 934; fevers, 581; other zymotic diseases, 166.

The total deaths, from all diseases and injuries, of those on sick report in Louisiana were, in June, 18; July, 22; August, 112. Deaths from cholera among citizens in New Orleans from July to October 31 were 1,180; among United States troops for the same period, 110. Deaths from yellow fever among citizens, 149; among troops, 4.

The record of sick and wounded of troops in Louisiana is not quite complete, but sufficient to show a total on sick report of 1,600 in September, and 1,591 in October; and the deaths, from all diseases and injuries, in September, 83; in October, 66. In these totals the class of zymotic diseases embraced, in September, 1,236 cases, of which 77 died; and in October, 1,329 cases, of which 62 died.

It may be of interest to notice the date of irruption of cholera at different points. So far as I am informed, it appeared at Galveston July 22; Fort St. Philip, Louisiana, (in troops from New Orleans returned to their station,) August 10; White's Rancho, on the Rio Grande, Texas, August 10, among troops. Dr. Merrill, one hundred and sixteenth United States colored troops, reports that several cases appeared among Mexicans at the station, a mile from camp, many days, perhaps a fortnight, previous, and that the disease was brought by citizens from New Orleans. It appeared also at Baton Rouge, Louisiana, August 17; at Brownsville, Texas, August 20; Brazos St. Iago, August 25; Ship island, Mississippi, September 8; San Antonio, Texas, September 10; eightieth United States colored troops, Shreveport, Louisiana, September 22. Surgeon Scoon reports, "for nearly a month previous the disease had been reported on the plantations below, and in the city of Shreveport, above this location."

The recruits who arrived at Jackson barracks in July were carefully inspected on arrival and placed in camp. Some of them visited the city and indulged in customary imprudences in eating and drinking. From the Mariposa and Livingston two or three sick soldiers had been taken out at quarantine; one of them, a recruit to the seventeenth United States infantry, died there. There was no case of cholera at the barracks until July 25. The Merrimack had arrived and landed her passengers (soldiers at the barracks and civilians in the city) on the 23d. The recruits by the Livingston, from New York, were landed July 16, and shipped to Galveston on a different vessel—the steamship Texas. A case of cholera occurred July 22, at Galveston, in one of the recruits, and was rapidly followed by other cases among them. July 22 occurred the first case among our troops, (Nolan, company G sixth cavalry,) but in a far distant locality from the barracks, and in the central part of the city—a locality where other cases had been appearing, from the 12th of July, among citizens.

The source of cholera and the date of its first appearance in this city can be determined better hereafter, when all the facts are known. Vessels and passengers have continued to arrive in New Orleans from eastern cities throughout the season. I have not heard of cholera being at the quarantine station on the Mississippi.

Of yellow fever, the first fatal case reported is said to have occurred in New Orleans at the Hotel Dieu, where a citizen died August 13. There were twelve other fatal cases in the city prior to September 15, at which date one of the clerks at these headquarters died at his lodgings, 190 Baronne street in this city. One other fatal case occurred at lodgings in the city September 21, and two fatal cases September 14 and October 18 at United States hospital, Jackson barracks. One fatal case occurred at Jackson barracks November 27, supposed to be yellow fever. The total reported of yellow fever among the troops is seven cases and five deaths. The number of fatal cases in the city was one hundred and eighty, prior to November 30.

There have been a large number on the sick report, from various causes, this season, as it was important to watch and treat promptly the beginnings of disorder and enjoin rest and respite from duty. The medical officer at the barracks has reported a number of cases of dengue fever.

The medical officers have manifested zeal and fidelity in the discharge of their important duties. Assistant Surgeon A. Hartsuff, United States Army, and Acting Assistant Surgeons S. W. Blackwood, Heber Smith, and Daniel McLean, United States Army, have been continuously on duty since cholera first appeared.

We had the sorrow of losing one of our officers—Acting Assistant Surgeon Samuel Catlin, United States army—who died in this city, of cholera, the 27th of November, while on duty with three companies of the first United States infantry, with which he had rendered valuable service.

Very respectfully, your obedient servant,

THOMAS A. McPARLIN,

*Brevet Brigadier General and Surgeon U. S. A., Medical Director Department of the Gulf*

*Brevet Major General J. K. BARNES, Surgeon General.*

*Extract from monthly report of sick and wounded of the Eighty-first regiment United States Colored Infantry, New Orleans, Louisiana, August, 1866. Surgeon Samuel W. Blackwood.*

On the 27th of July a case of cholera was brought from guard, in the neighborhood of Bull's Head, and died in camp. No other cases occurred near at that time. On the 2d of August the regiment pitched tents on the levee, at the foot of Canal street, and while there, until the 10th of August, cholera cases were brought off guard and from hovels in the city hourly, many coming into camp in a condition of collapse, and soon expiring. The water from the river was used both for drinking and to swim in; and the soldiers bought garbage of the hucksters and peddlers, and no doubt the mortality was thus increased. During the worst of the epidemic twenty to thirty cases were sent to general hospital, and one or two died in camp or in their huts. On the 10th of August the regiment returned to camp, and since that time not a death has occurred, and even choleraic



diarrhea has nearly disappeared. During the epidemic, companies A and D of the tenth United States colored heavy artillery occupied the quarters of the eighty-first United States colored infantry. Two deaths from cholera morbus occurred. The peddlers were then kept out of camp, and the disease abated at once. During the prevalence of the epidemic the regiment performed the most laborious guard duty, and in the most exposed and filthy places in the city. On the first night of their encampment on Canal street they were drenched in rain, and lay in a mortar bed, as it were, for two days succeeding, inhaling the effluvia of the river at low water, and using water from the filthy pools for washing and other purposes.

*Extracts from monthly report of sick and wounded, Sedgwick U. S. general hospital, Greenville, Louisiana, November, 1866. A. Hartsuff, Assistant Surgeon United States Army.*

During the prevalence of cholera here nothing has led to even a suspicion of the specific cause of the disease. That it is associated with uncleanliness, irregularities, &c., has been demonstrated in nearly every case that has come under my notice. The first cases here among the military occurred in company G, sixth United States cavalry, on duty at division headquarters. One day after, I made an inspection of their quarters, and on account of filth, wet, &c., recommended an immediate change. Almost immediately after the change was effected to light, dry, clean quarters, where disinfectants were freely used, the disease entirely disappeared, not to reappear; but before these sanitary measures were completed twenty of the company took the disease, and five died. Of the cases admitted from the first United States infantry, the first entered hospital August 3, just four days after the great riot, when that regiment vacated their comfortable quarters and exchanged them and their cleanliness, good food, and many small comforts, for, first, a bivouac in the streets of New Orleans, and then tents, where, for a want of conveniences and a change of clothing, their accustomed cleanliness could not be maintained. Their food was brought from their old quarters, a distance of five miles, and consequently served cold. Their drinking water was from the Mississippi river, and for a time they were deprived of all their minor comforts. The result was cholera, which broke out with some severity, as is indicated by my report for the month of August. \* \* \* \* \*

Good food, cleanliness, disinfectants, and other sanitary measures, succeeded in saving the regiment. That the work was speedy and entirely successful is shown by the report above referred to.

The early history of the disease, as it occurred in the eighty-first United States colored infantry, was precisely similar to that of the first infantry, described above. The occasion that demanded the services of the first also required the eighty-first, who, in obedience to orders, vacated their comfortable quarters and bivouacked on the levee, where for a few days they were subject to all the irregularities and privations consequent on a speedy change of quarters. Their food was badly prepared; their soiled linen was unchanged; their drinking water was from the dirty Mississippi; and, to add to their bad condition, heavy and continued rains rendered their camp little better than a quagmire. These changes were so great and sudden that the previous good health of the regiment succumbed to their influences, and on the 3d of August a large number were admitted to the hospital with cholera.

The political condition of the city was such at this time as to require the constant presence of soldiers in the streets, and hence their camp could not be immediately broken up, but every other known measure was quickly adopted to alleviate their condition; and these efforts were unquestionably of great service to the regiment, for, instead of an increase of cases, there was a gradual diminution, but still the disease prevailed with much vigor until camp was broken and the regiment restored to their old quarters; even then a few cases occurred, but they were as nothing compared with the number previously received from camp daily.

The above serves as an example of the early history of all the cholera admitted to this hospital, and shows that the disease has been associated with uncleanliness, irregularities, &c., although unquestionably not entirely dependent upon the same, but probably rather developing itself in this *nidus* for the accumulation and concentration of the *materies morbi* of the disease; and that, as a rule, the poison producing the disease must receive aid and support from these collateral agencies, in order to produce its effects in any considerable degree, is further illustrated by the total immunity from the disease experienced by all connected with this hospital who were not brought here with the disease. Here every sanitary measure to prevent the spread of the disease has been adopted and rigorously enforced. The wards are light, dry, and well ventilated; the sinks are of brick, laid in cement and sealed, and so arranged as to allow excreta, &c., to enter them, and prevent gases, &c., escaping from them, and into these large quantities of sulphate of iron are frequently thrown; close stools are also filled with the same previous to and after using. The wards are constantly strewn with disinfectants, such as lime, charcoal, zinc, sulphate of iron, permanganate salts, chlorine, &c. All badly soiled linen is immediately burned, and that washed for reuse is covered with lime as soon as removed from the patient, and as soon as possible sent to the laundry, where it is immediately immersed in boiling water, and after being washed, is dried by steam, at about 200° heat. Pure rain water is used for all purposes, and suspicious or indigestible articles of food are prohibited.

The above-named strict cleanliness and faithful observance of sanitary rules have been our only prophylactic, and have enabled doctors, attendants, &c., to stand over and prescribe for their patients, and perform numerous post mortem examinations, while the laundresses have faithfully and constantly performed all their duties; and, under fatigue, anxiety, and care, all have enjoyed that immunity from the disease which, under like circumstances, no other well established contagious disease would have permitted. That the disease, however, is not contagious, I will not pretend to affirm, for the authority in its favor is high and abundant; but if contagious, that it differs in its contagious nature from all other contagious diseases is, I think, evident from the above. The symptoms of the disease are described in my report for July, and are usually unmistakable in their character. The treatment is very unsatisfactory, because as yet no remedies have been discovered which have produced any decided effects. Various plans of treatment have been employed, but with such questionable success that we do not hesitate to abandon them all if other plausible remedies are suggested. \* \* \* \* \*

The post mortem appearances are, in brief, as follows: The brain is uniformly congested, otherwise of proper consistency,

and normal in appearance; chest, right side of heart engorged, left side empty, lungs normal; the whole length of the alimentary canal is congested, the small intestines especially so; bladder empty and contracted; spleen often smaller than usual; other organs healthy; the venous system filled, and arterial system empty.

*Extract from monthly report of sick and wounded of the Eightieth United States Colored Infantry, Shreveport, Louisiana, September, 1866. Surgeon James H. Scoon.*

September 22 the first well developed case of epidemic cholera developed itself in this command. For nearly a month previous the disease had been reported on plantations below, and in the city of Shreveport, above this location, but to this date we remained unscathed. However, the fact could not escape notice that all were subject to some new and peculiar exciting causes of disease, manifest by gastric derangement, diarrhoea, colic, and cholera morbus. Suspecting them to be the forerunners of cholera, I adopted every precaution to cleanse and remove all exciting causes of disease from the camp and its surroundings. Disinfectants were used extensively in the form of lime, thrown broadcast in and around quarters, sinks, and all points from which effluvia could arise. All cesspools were abolished, and chlorinium constantly used in, around, and under all quarters. To the free use of these agents I attribute the limited number of cases thus far developed, and anticipate its entire disappearance at no distant date.

## V. GALVESTON AND OTHER POSTS IN TEXAS.

HEADQUARTERS DEPARTMENT OF TEXAS, OFFICE OF MEDICAL DIRECTOR,

*Galveston, Texas, August 3, 1866.*

GENERAL: I have the honor to report as follows concerning the cholera, which appeared at this place on the 22d of last month:

On the 7th ultimo a detachment of five hundred and nineteen recruits, eleven officers, and three laundresses, for the seventeenth United States infantry, in this department, left Hart's island, New York harbor, on the steamship Herman Livingston, all in good health. The ship was well fitted up with bunks and other appropriate fixtures, was well ventilated by wind sails, and in every way was regarded as in good condition for transporting troops. There was a plentiful supply of fresh beef and ice, and the diet was varied and well cooked. The medical officer in charge (Acting Assistant Charles E. Warren, United States Army, late of the Volunteer Staff Surgeons) is above the average for efficiency and intelligence.

On the first day out, July 8, a recruit was taken down with strongly marked symptoms of Asiatic cholera, and died on the afternoon of the following day. On the seventh day after this case another recruit was taken in the same way, and died the next morning early. The vessel arrived off quarantine, Mississippi river, on the 15th ultimo, and put off two recruits, said to have diarrhoea, one of whom has since died. On the 16th ultimo the command disembarked at New Orleans barracks, from which two recruits were sent to hospital with diarrhoea, one of whom has since died of symptoms of cholera. Remaining three days in New Orleans, the command embarked on the 19th ultimo on the steamship Texas for this place, and arrived on the 22d ultimo, all well except one case of diarrhoea, one of dysentery, and one wounded. The day after their arrival at this place a recruit was taken down with cholera and died in thirty-six hours; and up to date thirteen other cases of cholera have occurred among the recruits, with sixth deaths, with an average duration of the disease of about eighteen hours. The disease comes on suddenly, and the symptoms are unmistakable and of a violent character. The treatment has been prompt and judicious, and guided by the most recent ideas on the subject, all of which will be fully set forth in the monthly report of sick and wounded of the post hospital, Galveston. The command in question was completely isolated soon after its arrival here, and thus far the disease has been confined to them. There is no excitement here on account of it, and no fears are entertained concerning its extension, for the reason that although cholera has often been imported into Galveston, it has always been confined to the original cases brought in.

I have the honor to be, very respectfully, your obedient servant,

EDW. P. VOLLUM,

*Brevet Lieutenant Colonel and Surgeon U. S. A., Medical Director*

Brevet Major General J. K. BARNES, *Surgeon General U. S. A.*

*Extract from monthly reports of sick and wounded, headquarters band and companies D and G, second battalion, Seventeenth Infantry, San Antonio, Texas, September, 1866, William M. Austin, Assistant Surgeon United States Army.*

During the past month cholera has prevailed as an epidemic both among the citizens of San Antonio, Texas, and the troops stationed there. The first case occurred at the San Juan Mission, six miles from town, on the 2d of September. The patient had just arrived from the Rio Grande, where cholera was prevailing. This case was soon followed by others, and cholera became generally prevalent. About the 20th of September the epidemic reached its height. The number of deaths has been studiously concealed, but it is known that forty-five permits for burial were issued in one day, and unprejudiced persons estimate the

number who have died as about five hundred. Among the troops, the first cases appeared September 10, in the fourth United States cavalry. This regiment was moving at the time; half of it was camped on the Medina river, fifteen miles from town, and half in town. Three cases occurred in the portion on the Medina on the 10th, and two in the portion in town on the 11th. The exact number of cases that have occurred I do not know, but nearly fifty have died. At this time it has been a week since any new cases have occurred there. In the seventeenth infantry, long prior to the advent of cholera, the strictest police and cleanliness had been observed. The men were in barracks, very unfavorably situated as regards health, low, badly drained, and next the commissary building, which was filled with old and damaged provisions. To remedy this the floor of the quarters was taken up, gravel filled in, and the floor relaid. Drains were dug, so that no water could settle near the place. The building was whitewashed, the sinks disinfected, the damaged stores removed, and personal cleanliness required among the men. Up to the 16th of September, when the seventeenth left town for the camp on the Medina, no cases of cholera had occurred in the regiment, though citizens had died in the immediate vicinity. The present camp was well chosen, on a high spur of land, well drained, and convenient to water. Every possible precaution to prevent cholera was taken. The camp was strictly policed, bunks were built for the men, so that none should sleep on the ground, bedding aired daily, tents struck every few days, sinks kept clean and disinfected, and sentries posted to prevent men from relieving themselves elsewhere, all meals inspected, and food not properly cooked forbidden to be served, men not allowed to visit the cavalry camp, and the prevailing diarrhoea promptly treated. Notwithstanding, cholera did appear, though it did not spread or last long. I trace its origin to the fact that two Mexican teamsters coming from town stopped for the night near the camp and died of cholera. I immediately had them and their effects buried, kindled large fires on the spot where they died, and disinfected it. A sentry kept the men away. Two days after, cholera appeared in camp.

*Extracts from the monthly report of sick and wounded, Fourth United States Cavalry, September, 1866.*  
*P. V. Schenck, Assistant Surgeon and Brevet Major United States Army.*

This regiment has been stationed at San Antonio, Texas, for one year. During the winter of 1865 and 1866 they were encamped in a place well protected from the northerners, at the head of the San Antonio, about four miles from the city. They occupied Sibley tents, which were brought from New Orleans, and old when issued. In the spring they were moved into town and the tents exchanged for the A or common tent.

San Antonio is an old Spanish town, located on a river of the same name. It is in a dry limestone region, and is only cultivable where it is irrigated from the river, which is done by means of ditches, which run through all portions of the town. No regard whatever is paid to the observance of sanitary laws. The population is mixed, composed of Americans, Germans, and Mexicans; the latter live in a most primitive manner, a bull hide on four sticks answering with many the purpose of a house; jerked beef, a corn cake, or tortilla, and red pepper sufficing for food.

The health has been remarkably good when we consider all the attending circumstances. During the winter there were several cases of pneumonia, and in the summer they suffered somewhat from the different fevers. \* \* \*

Cholera during the past month appeared in the city and among the troops in an epidemic form. It was brought into the city in the person of a Mrs. De Witt, who was taken sick at a mission several miles below the city, to which point it had been carried by Mexican trains from the Rio Grande. For several months previous every sanitary precaution had been taken in camp. Orders enforcing personal cleanliness and carefulness in diet, &c., had been rigidly carried out. Many had concluded that through our isolated position we would escape entirely the pestilence, or if it did come, we would hear of its gradual approach. Every one was therefore surprised at its unexpected appearance.

As soon as possible an order was given for the removal of troops from the town, and the camp commenced to be removed to the Medina, a distance of twelve miles, a point where they did not have cholera when it was so fatal in the city in 1849. Besides, the ground was high, and the Medina was not as strongly impregnated with limestone as the San Antonio. Added to this, we could have for the use of the officers and hospital pure cistern water, which in that country is a great essential during a cholera epidemic.

The time for moving proved peculiarly unfortunate, for when one-half of the command had moved, a flood of before unheard of severity came, causing the river to overflow the camp, and converting that which had been dry into one huge mud-hole. Over two hundred recruits had just arrived from the coast, many of whom had been sick. \* \* \* In this condition of affairs cholera broke out among the troops. The medical officer I had telegraphed for to Galveston had not arrived. My assistant was out at camp with the cases there; and I would here state that I am under many obligations to Assistant Surgeon William Austin, United States Army, for the assistance he there rendered me.

As soon as the roads would permit, the remaining portion of the command was sent out, and a cholera hospital established on the Medina. The first case occurred on the 7th, and the first death on the 10th. The greatest mortality was reached on the 19th and 20th, when it rapidly commenced to decrease, and at the end of the month it had entirely disappeared. The number of cases of diarrhoea I have not reported; three-fourths of the whole command suffered from it. An order was issued that when a man had more than one discharge during a day he should report the fact, and medicine was kept ready at the dispensary. To the aggregate should be added two hundred and seventy recruits. One remarkable fact is the large number of deaths in K company. This company had been for several months under the same circumstances as the others. I can only account for it in the manner of cooking not being as good as with the rest.

In regard to the treatment, every sanitary precaution was used; the evacuations were disinfected and buried. No one was allowed to come near the hospital unless he had some duty there. Lime was thrown all around the camp, and the sulphate

of iron used in the sinks. There was no unusual number of cases of diarrhoea until the disease actually appeared, when they became very numerous and severe. For the diarrhoea perfect quiet is of the utmost importance. The sulphuric acid mixture did not render as good results as I had been led to hope for. The compound tincture of opium, as recommended by Dr. Squibb, of New York, was used in large quantities, and in the early stages it could not have done better; but after the diarrhoea had existed for some time it did not answer as well as a pill of calomel, acetate of lead, and opium.

Acting Assistant Surgeon Miles used sulphate of copper in such cases, and he reports himself well pleased with its use. For cholera, to allay the vomiting, chloroform with camphor dissolved in it was given; small pieces of ice, heat to the extremities, and mustard draughts, and an injection of brandy, green tea, and acetate of lead, to be repeated after each evacuation. Acting Assistant Surgeon M. S. Jones used an injection of the chloride of sodium and the phosphate of soda, with good results. The quantity of this injection absorbed was remarkable. In the collapse, stimulants were used freely—aromatic spirits of ammonia, external heat and mustard to spine and extremities. I am strongly in favor of the use of calomel and in large doses, with the internal injection of brandy. I saw the happiest benefit in one very severe case from ice to the abdomen; the patient expressed great relief from it. I think it is worthy of use. Did not omit the heat to the extremities.

Is this disease contagious? In San Antonio, where, after so many people had fled, there were over six hundred deaths—where there is scarcely a house in which the disease did not enter—in the centre of this city, a Roman Catholic convent, filled with students, as soon as they heard of the disease closed their doors, allowing no one to enter. Not one single case occurred, nor were there any of the premonitory symptoms. There is no other house of the same number of inmates or any other school in town that can claim like exemption.

I cannot close without speaking in especial praise of the faithfulness and care of Acting Assistant Surgeons Jones and Miles. They both deserve to receive more than I can bestow by recommendation.

[Extract.]

JACKSBORO', TEXAS, February 8, 1867.

COLONEL: I have had the honor to transmit circular letter, office chief medical officer, Galveston, Texas, January 4, 1867, to the medical officer on duty with the part of regiment stationed at Austin, at which station cholera prevailed last summer and fall. I have none of the records with me.

Cholera first appeared in a detachment of recruits proceeding via Indianola to join the regiment, and before their leaving the coast. September 16 they were imperfectly quarantined at quite a distance from the city of Austin. Some four or seven deaths occurred in the detachment under the care of Acting Assistant Surgeon Kirk. Succeeding the approach of the recruits two cases appeared at Austin under my immediate charge, but my attendance was not called until late in each case. Sanitary measures and attention given to cases of bowel irritation among the recruits checked its appearance. Ten deaths had occurred out from Indianola. At Austin no further indications of its presence presented. Sanitary measures were here also carefully entered into. After its disappearance I was absent on duty. During my absence the disease again appeared in the command, a considerable number of deaths occurring.

I am, colonel, very respectfully, your obedient servant,

C. BACON, JR.,

*Brevet Major and Assistant Surgeon U. S. A.*

Brevet Lieutenant Colonel GEORGE TAYLOR, *Surgeon U. S. A.*

[Extract from a letter by the same to the same dated February 9, 1867.]

\* \* \* \* \* Cholera had appeared in the detachment prior to its leaving Indianola. \* \* \* \* \*

*Extract from monthly reports of sick and wounded at Brownsville, Texas, August, 1866. Ira Perry, Assistant Surgeon Ninth United States Colored Troops.*

Cholera suddenly appeared in this camp August 20th. No premonitory symptoms were known to exist at the time of invasion. Thirteen (13) of the fatal cases had not been under treatment before the third stage began. They were in collapse when the medical officer first saw them, and sank in spite of earnest efforts to avert death. Diarrhoea did not prevail in the regiment at this time. Only eleven cases came to sick call between the 1st and 22d of August, who were excused on account of diarrhoea. In a few days after the appearance of cholera diarrhoea increased rapidly. This camp is located on dry ground, but has stagnant, marshy water on three sides. No better spot can be had at a convenient distance. The sanitary condition of the camp is good. The men are kept steadily at work every day on guard or fatigue duty.

*Extracts from monthly report of sick and wounded of the One Hundred and Sixteenth United States Colored Troops, White's Ranch, Texas, August, 1866. Theodore Wild, Assistant Surgeon Thirty-sixth United States Colored Infantry, in charge of the One Hundred and Sixteenth United States Colored Troops.*

*List of sick officers of the one hundred and sixteenth United States colored infantry.*—Benjamin Hobbs, surgeon, patient in post hospital, Brazos Santiago, Texas, left the hospital on the 10th instant, when the cholera broke out in the regiment, to tender his services, although his attending physician and friends most urgently warned him against it. Exposing himself day and night, he contracted gastro-enteritis, of which he died August 28, 1866, a sacrifice to his attachment to the regiment.

\* \* \* \* \*

Companies D and K, stationed separate from the regiment, escaped so far cholera.

There occurred in all ninety-eight cases of cholera in the regiment, which were treated in the regimental hospital, which was immediately established when the disease broke out. The treatment adopted consisted in the application of powerful counter-irritants, as sinapisms over abdomen and region of the heart, heated iron to the feet, bottles filled with hot water along body and thighs, thorough friction with flannel moistened with a liniment of alcohol, oil of turpentine, and aqua ammonia. Injections of hot water, oil of turpentine, and ether succeeded, in three or four cases, in bringing on reaction, which, however, was only temporary. Inwardly, stimulants were administered, as hot whiskey punch in small but frequent doses, compound spirits of ether, aromatic spirits of ammonia, and extract of valerian.

In Captain A. Johnson's case, in which the vomiting was very violent, champagne was used with apparent relief and success. After four or five wine glasses full, which he drank at the interval of a quarter of an hour, the icy perspiration gave way, and reaction led to life. Ice, which we were anxious to try, could not be obtained. Opium and its preparations were used only in exceptional cases, for fear of increasing the stupor which set in in many cases. This stupor, amounting in some cases even to coma, was either due to the cholera poison or to uremia, the secretion of urine having been interfered with in every single case. In many cases of convalescence a diarrhoea set in of frequent light-yellowish discharges, which was very readily controlled by the use of aromatic sulphuric acid.

There remain at present fifteen patients in the hospital, who are, with the exception of one or two, out of danger. They are included under the head of "remaining."

## VI. RICHMOND, VA.

[Extract.]

CAMP GRANT, VIRGINIA, February 21, 1867.

SIR: I have the honor to make the following report relative to the epidemic cholera, which visited the troops of this command last summer:

The first undoubted case of the disease occurred on the 12th of August. The man, in company with a number of others, had spent the previous night in the city of Richmond in debauchery. On the following day, (13th,) four of the same company to which the first victim belonged, some, if not all, of whom were his companions on the night of the 11th, were attacked. On the 13th, 14th, and 15th ten cases occurred, of whom all but two belonged to the company above alluded to. As these cases were nearly all confined to the barrack occupied by this company, I suspected some defect in the cooking or in the police of the premises, and therefore inspected minutely the cooking, cooking utensils, and building. Everything was found in good order, but the company was notoriously in the worst state of discipline of any in the command, and I learned a number of the men had been surreptitiously obtaining green corn from a neighboring field, of which they had partaken freely. The first cases having occurred among men who had been in the city a night or two preceding the commencement of the epidemic, it was deemed reasonable to suppose they were exposed to the poison while there. With a view to ascertain the correctness of this supposition, I made inquiries of the Board of Health, and learned that the disease did not assume an epidemic form until some time after the first cases had occurred in camp. They were cognizant of but one case that had occurred previously, and this man had been attacked early in July. I have heard of one or two tolerably well authenticated cases, which did not come to the knowledge of the board, that occurred in the latter part of the same month.

During July and August detachments of recruits were received from New York harbor and Newport barracks. By the sanitary superintendent of the Metropolitan Board of Health I have been informed that cholera prevailed in the former at that time.

These are the circumstances connected with the outbreak of the epidemic, and from them reasons for supposing it originated in Richmond, in camp, or that it was imported from New York or Newport barracks, are deducible.

The barracks occupied by the troops at this camp are buildings which were used by the confederates as hospitals. They are well ventilated, and were not over-crowded. The site of the camp is elevated, the ground well drained, and during the summer months was most efficiently policed. Since occupied by our troops no epidemic of any kind had prevailed previous to this one, nor has any since. No discoverable conditions favorable to the generation of the disease existed. The only place in it where these conditions might have existed in the slightest degree was the guard-house, yet the disease had spread over a great portion of the camp before any of its inmates were attacked. These may be considered good reasons for supposing it did not originate in camp; and though the sanitary police of Richmond was not excellent, from the fact that the disease first assumed an epidemic character at this camp, a mile distant from the city, I think it the most probable supposition that the

disease was imported. An objection to this supposition may be that all of the first cases occurred not among the recruits who had just arrived from an infected district, but among men who had been here during the entire summer. We know the morbid matter has been conveyed long distances in clothing, &c., excluded from contact with the air, and that upon unpacking and exposure the disease has broken out in isolated places. May not the clothing of the recruits, packed in their knapsacks, have constituted *fomites*, which, being unpacked here, emitted the *materies morbi*. Of course, upon its escape, the poison was much diluted, and hence the first victims were those whose previous debauchery and indiscretions in diet made them peculiarly susceptible to its noxious influences. Had there been no fit recipients, it is probable we would not have been visited by the epidemic.

From the 12th of August, the time of its appearance, until the 30th of September, when it had entirely subsided, two hundred and fifty-five cases occurred, and of these, one hundred and three resulted fatally. During its prevalence the non-commissioned officers of the command were impressed with the importance of reporting *at once* all cases of illness among the men to a medical officer. Thus many cases were aborted in the incipient stages. These, in many instances, appear on the reports as diarrhoea, and frequently were not reported at all, as the men did not present themselves at "sick call." In a regular hospital, where the conveniences would have been at command, these would have been assigned beds as cholera patients, and thus the percentage of mortality of the number affected would have been materially reduced. No serious cases occurred among the officers; and in their families but one which resulted in death. Several house servants, however, were attacked. But four of the regular attendants at the cholera hospital in camp suffered from the disease.

On the 21st of August the third battalion of the eleventh United States infantry, which was in camp with us, was sent to Norfolk, Fort Monroe, and Yorktown. The disease prevailed among them when they were ordered away, but not a single case occurred on the way to, nor after they had reached, their destination that I am aware of.\* Yet when, on my recommendation, on the 5th of September, the troops here were ordered into tents at least a mile distant from this camp, little or no abatement in the violence of the disease resulted. This is mentioned merely as an incident in the history of the epidemic.

The treatment found most successful in the early stages of the disease was large doses of calomel in combination with morphia; ten to twenty grains of the former with half a grain of the latter.

I am, sir, very respectfully, your obedient servant,

J. H. FRANZ,

*Brevet Major and Assistant Surgeon U. S. A.*

*Brevet Major General J. K. BARNES, Surgeon General.*

## VII. CARLISLE BARRACKS, PENN.

*Extract from monthly report of sick and wounded at Carlisle barracks, Pennsylvania, August, 1866.*  
*Brevet Colonel J. J. B. Wright, Surgeon United States Army.*

Nothing worthy of special notice has happened since the date of last report, except the occurrence of four cases of cholera, three of which terminated fatally; the fourth patient survives, but the result of his case is yet involved in some doubt. One of the fatal cases was that of a woman, the wife of a soldier belonging to the permanent party of the post, who was attacked within thirty-six hours after her arrival at the barracks from Rochester, New York. Both the men who died came from Philadelphia, Pennsylvania, and had been here but about thirty-six hours when they were attacked. The third man (who survives) had served as an attendant on the two fatal cases. He was a convalescent in hospital, and had been a month at the post. It is regarded as a singular fact that all the men who suffered from cholera were natives of Switzerland. We have no knowledge of the time when Kuble and Hilpert (who died) arrived in this country; they may have crossed the Atlantic in an infected vessel, and enlisted immediately after disembarkation.

*Extract from monthly report of sick and wounded at Carlisle barracks, Pennsylvania, September, 1866.*  
*Brevet Colonel J. J. B. Wright, Surgeon United States Army.*

The soldier who was represented in last monthly report, under the head of "remarks," as still laboring under epidemic cholera, recovered from a state of profound collapse. The two cases of cholera herein reported were those of men of the permanent party who were attacked immediately after their return from Jefferson barracks, whither they had been as a part of the guard, on duty with a detachment of recruits sent from this post. They are both convalescent. I have nothing new to communicate in regard to this *opprobrium medicorum*, except that I have succeeded in all the last cases which have occurred at the post in arresting the vomiting and spasms by a saturated solution of camphor and chloroform in half-drachm doses, repeated *pro re nata*.

*Extract from monthly report of sick and wounded at Carlisle barracks, Pennsylvania, October, 1866.*  
*Brevet Brigadier General J. J. B. Wright, Surgeon United States Army.*

Charles Nelson, cavalry recruit, arrived at this post on the 16th day of October from Chicago, where he was enlisted, and where the cholera prevailed at the time. He was carried into the hospital on the morning of the 17th from the quarters in a

\* This is an error; one fatal case occurred at Norfolk in September, and three cases, with one death, in October.—ED.

state of collapse. He may have been suffering during most of the preceding night, but owing to the neglect and disobedience of orders of the non-commissioned officer in charge of the room, the case was not reported. The disease ran the usual course, and terminated fatally thirty-six hours after his admission to the hospital. The vomiting and spasms subsided under the influence of a saturated solution of camphor in chloroform, and some approach towards reaction was manifest twelve hours before death, in response to stimulation, &c. The function of the kidneys was entirely abolished during the last twenty-four hours of his life, while his condition rendered it apparent that the retained urea was poisoning the blood.

HEALTH OFFICE, PHILADELPHIA,  
Southwest corner Sixth and Sansom Streets, April 4, 1867.

SIR: Yours of the 2d instant is received, and in answer thereto I reply:

1. That the first case of cholera was reported to this office on April 25, and the second on April 27, 1866, and the last in December.

2. The deaths were as follows: In June, 2; July, 31; August, 246; September, 217; October, 340; November, 67; December, 7. Total, 910.

Yours, &c.,

WASH. L. BLADEN, *Chief Clerk.*

J. J. WOODWARD, M. D., *Assistant Surgeon, &c., Washington, D. C.*

### VIII. NEWPORT BARRACKS, KY.

NEWPORT BARRACKS, Kentucky, March 16, 1867.

GENERAL: In reply to your communication of the 13th instant, in reference to the case of recruit Thomas Gamble, who died of cholera at this post August 12, 1866, I would respectfully state that he joined this depot August 2, 1866, from Detroit, Wisconsin. He was detailed as teamster in the quartermaster's department August 5, and his duties called him to Cincinnati daily. The permanent party at this post joined from Governor's island July 12, 1866. No other men were received from New York harbor prior to Gamble's death. Recruits were received from Cincinnati, Ohio, almost daily from July 13 to August 12, 1866, and from St. Louis, Mo., on the 13th, 18th, 23d, 27th, and 31st of July, and on the 9th and 13th of August, 1866.

Very respectfully, your obedient servant,

G. PERIN,

*Surgeon and Brevet Lieutenant Colonel U. S. A.*

Brevet Major General J. K. BARNES, *Surgeon General.*

### IX. ATLANTA, GA.

*Extract from monthly report of detachment of Sixteenth United States Infantry, at Atlanta, Georgia, September, 1866. Acting Assistant Surgeon H. C. Yarrow.*

In regard to the occurrence of cholera among the recruits sent here for distribution to their several companies, I would state that the disease manifested itself the morning after their arrival, Sunday, September 9. It was at once determined upon by the commanding officer, on my recommendation, to send them at once without the city, and the mayor having tendered the use of a piece of ground, a quarantine camp was established, and four hours after the appearance of the first case the recruits were marched out. Most of the cases occurring were of the most malignant type, and some were almost in a state of collapse before reporting for treatment. The treatment consisted principally in the administration of small and frequent doses of calomel, acetate of lead, and opium, in connection with a compound chalk and chlorodyne mixture, muriate of ammonia in twenty to thirty grain doses, sub-carbonate of bismuth to control vomiting, besides sinapisms, continued frictions, &c. When other remedies failed to control purgation, injections of starch water and laudanum were found beneficial. From my experience in the treatment of this disease I am disposed to place great reliance in the remedies used, particularly the sub-carbonate of bismuth, and the chlorodyne mixture. The statistics will show that for the number of the recruits present at the camp the cases were few in number. Two of the cases received were brought from Chattanooga in a dying condition, which leaves five deaths under treatment. From all I can learn, the first detachment of recruits sent from Nashville to this post had received nothing to eat for two days except some hard bread and a canteen of coffee, and gorged themselves upon the road with green fruit and milk. It would seem as if very little authority had been exercised by the officer in charge to prevent these excesses. Great attention has been paid at the quarantine camp in regard to the cleanliness and diet of the recruits, and I have no doubt the disease was prevented from further ravages by the earnest sanitary measures taken.

### X. AUGUSTA, GA.

*Extract from monthly report of sick and wounded of detachment of First Battalion, Sixteenth United States Infantry, Augusta, Georgia, September, 1866. Acting Assistant Surgeon J. W. Magruder.*

The men of A and F companies (the fatal cholera cases reported) were recruits who were taken sick on their way to their commands.

ADJUTANT GENERAL'S OFFICE, *Washington, D. C., March 30, 1867.*

SIR: In reply to your inquiry of this morning, I have respectfully to inform you that the recruits who were received at Atlanta and Augusta, Georgia, in September, 1866, were sent from Newport barracks, Kentucky. With reference to Private L. Nolan, company G, sixth cavalry, the records show that he was enlisted by Lieutenant A. R. Chaffee, sixth United States cavalry, at New Orleans, July 17, 1866, and died of cholera at New Orleans, July 22, 1866. He was born at Galway, Ireland. It is not known whether he had acquired a residence in the United States, nor what other locality than New Orleans he might have been in previous to enlistment.

Very respectfully, your obedient servant,

R. WILLIAMS, *Assistant Adjutant General*

Brevet Major J. J. WOODWARD, *Assistant Surgeon U. S. A.*

### XI. NASHVILLE, TENN.

*Extract from monthly report of sick and wounded, detachment of Fifth United States Cavalry, Nashville, Tennessee, September, 1866. Brevet Major D. Bache, Assistant Surgeon United States Army.*

The increase in malarial diseases during this month is, with four exceptions, due to importation; a detachment of fifty men sent to Grenada, Mississippi, in July, returning September 22, having suffered, without exception, from remittent and intermittent fevers. Many of the men are still enfeebled, and the debility in all has been protracted, and the subsequent attacks have proved obstinate, and but little amenable to ordinary treatment. The increase in the number of cases of diarrhoea is to be ascribed, in great part, to the unusual tendency to such disorders which co-exist with an epidemic of Asiatic cholera; but two cases of this latter disease are reported, which shows this command to have so far happily escaped the violence of the epidemic. When the mortality alone in the city of Nashville is considered, not less than 1,200 in a population not exceeding 35,000, the exemption is the more remarkable. This immunity is due, in great part, to the healthy situation of the barracks, their commodious nature, and to the strict enforcement of sanitary precautions.

The two cases of cholera reported occurred as the direct result of a prolonged debauch in one instance, and in the other as the consequence of excessive indulgence in green and unwholesome fruit. In the latter case the man lived but three and a half hours from the inception of the attack. It could not be ascertained whether or not there was a premonitory diarrhoea in these cases. It is a fact worthy of remark that in no instance has diarrhoea, under treatment, resulted in cholera, although many times the diarrhoea has been protracted and severe.

*Extract from monthly report of sick and wounded, Post Hospital, Nashville, Tennessee, September, 1866. Brevet Major Samuel A. Storrow, Assistant Surgeon United States Army.*

The first two deaths in the foregoing list were of patients admitted in previous months with other diseases than those given as the cause of death. Also; the eighteenth one on the list was of a patient admitted during the month covered by the report, but with a different disease than the one causing his death. From this it appears that during the month forty-four cases of epidemic cholera occurring among white soldiers were treated in the hospital, with twenty-two deaths, or fifty per cent. of the cases treated. From the foregoing list it also appears that one half the deaths from epidemic cholera occurred among members of company F, third battalion, sixteenth United States infantry, which, since the 2d of August last, has been on duty at this hospital. Only two cases and two deaths occurred among white soldiers, patients in the hospital at the outbreak of the epidemic.

During the last days of August and the first of September four squads of recruits, numbering ninety each, from Newport barracks, Kentucky, in the immediate neighborhood of an infected city, were quartered for quarantine purposes at this hospital. The company on duty here were thrown in immediate contact with these recruits, in fact messed with them, while the patients at the time in hospital seldom came in contact with them. It is an interesting query how far association with these recruits on the part of the company doing duty here contributed to the occurrence of the disease so extensively and fatally among them. Previous to September 2 no cases of cholera had occurred among the recruits subsequent to their removal here, although diarrhoea of an unusually intractable character was quite prevalent among them.

TAYLOR BARRACKS, *Louisville Kentucky, March 20, 1867.*

SIR: I have the honor to acknowledge receipt of your communication of 13th instant directing me to inform your office "whether the first cases of cholera in Nashville, Tennessee, last September, occurred among recruits from Louisville, Kentucky, or other infected points."

The first three cases which occurred at Cumberland hospital were in the persons of recruits for the 16th United States infantry, from Newport barracks, Kentucky. Before this, however, Nashville itself had become an "infected point," more especially the outside surroundings of Cumberland hospital.

These men had exposed themselves to the prevailing influences by remaining absent, without leave, for two days in a "house of ill fame" infected with cholera.



The first case which occurred at Sibley barracks, of which command Acting Assistant Surgeon A. J. Comfort, was medical officer, was an enlisted man of the sixteenth infantry, who had been at the post twelve months. No cases of cholera occurring among recruits from infected points could have presented themselves at Sibley barracks, from the fact that recruits were quarantined at Cumberland hospital until the epidemic was over.

I consulted with Acting Assistant Surgeon Comfort in regard to his first case, and have a distinct recollection of the facts herein given.

This communication would have been answered on the day of its reception, save that I was ill with malarial fever, unable even to dictate a letter, which I am compelled to do now.

I have the honor to be, general, your obedient servant,

SAMUEL A. STORROW,

*Brevet Major and Assistant Surgeon U. S. A.*

*Brevet Major General J. K. BARNES, Surgeon General.*

### XII. LOUISVILLE, KY.

*Extract from monthly report of sick and wounded of United States Post Hospital, Louisville, Kentucky, July, 1866. S. H. Hornor, Assistant Surgeon United States Army.*

With regard to the cases marked cholera, I would state that the circumstances and symptoms left little room for doubt as to the diagnosis. Both were recruits, recently arrived here from Governor's island. I saw McCall for the first time at sick call on the morning of the 29th instant. Immediately after his admission to hospital he was seized with cramps, vomiting, and purging, and very quickly went into collapse. Under the effects of warm external applications, frictions, and internal exhibition of stimuli, viz., camphor, chloroform, and capsicum, he rallied about 11 o'clock a. m., relapsed at 12 m., and died at 1.30 p. m., July 29. In the other case the symptoms, although analogous, were not quite so severe. He was admitted this 31st instant.

*Extract from monthly report of sick and wounded of United States Post Hospital, Louisville, Kentucky, August, 1866. S. H. Hornor, Assistant Surgeon United States Army.*

In relation to the epidemic that has been prevailing at this post during the last six weeks, I have the honor to submit the following report:

In addition to my duties as surgeon in charge of the post hospital, I was, on the 19th of July, assigned to duty with the second United States infantry, stationed at Taylor barracks, Louisville, Kentucky. During that day and the three preceding ones three detachments of recruits, amounting to three hundred and sixty-four, arrived at this post from Governor's island, where cholera was prevailing at the time of their departure. The amount of diarrhoea existing among them at the time, taken in connection with the fact that Taylor barracks, before its occupancy by the second infantry, had not been kept under a very good system of police, but, on the contrary, was remarkable for its unhealthiness in a sanitary point of view, aroused my suspicion, and suggested the necessity of adopting every precaution possible to avoid or meet any contingency that might arise. To this end, upon my recommendation, a rigid system of police was instituted. A large quantity of disinfectant material (sulphate of iron and charcoal) was procured and scattered freely throughout the grounds, beneath the quarters, and in the privies; besides, the quarters were kept thoroughly ventilated, and disinfected with chloride of lime, chloride of sodium, sulphuric acid, and manganese. Moreover, lime was profusely used throughout the garrison, the men instructed to air their bedding daily, and at the same time cautioned against intemperance of any description. In a word, no means that hygiene or prophylaxis could suggest was left unresorted to. The sequel proved these measures not to have been ill-timed or unnecessary, for on the 29th of July cholera was upon us. The first case was that of Private McCall, recruit, reported last month. On the 31st there were two more cases; one a recruit, terminating fatally on the 1st instant; the other, an old soldier, married, was treated in his quarters, and recovered. On the 2d two new cases, and on the 3d two new cases, were admitted; but the symptoms in them being of rather a mild character, they are borne on this report as cholera. From the latter date up to the 17th instant, no new cases occurring, it was hoped that the disease had disappeared not to return. But, unfortunately, this hope was dispelled by its reappearance in all its characteristic epidemic virulence on the 18th. On this day there were six new cases, three of which terminated fatally in a few hours; on the 19th, two new cases, both recovered; on the 20th, five cases and one death; on the 21st, nine cases and three deaths; on the 22d, six cases and seven deaths; on the 23d, one case and three deaths; on the 24th, one case; on the 26th, two cases; on the 27th, one death; on the 28th, one case and one death, (an old case;) on the 29th, one death. It should be remarked here that the vast majority of these cases, at the time of admission, were in the second and third stages of the disease, with symptoms of the most aggravated violence; and every variety of treatment applied was of little or no avail. So true is this latter fact that I am almost convinced that, could the patient be kept quiet, without any further treatment than the use of ice to hold in the mouth, and local remedies to subdue the cramps, the result would be generally more favorable. As regards the different kinds of treatment employed—stimulants, sedatives, anodynes, acids, and salines—in the severe cases they were all equally unsatisfactory and inefficacious in overcoming the more violent symptoms. In the earlier stages of vomiting and purging, calomel, sub-nitrate of bismuth and opium combined, by

the mouth, and brandy and strong tea *per rectum*, appeared to control and arrest the symptoms. Creosote, to check vomiting, and hypodermic injections of morphine for the same purpose, as well as to assuage the pain of cramps, were employed, but not with sufficient success to warrant their continuance. Saline injections into the veins were resorted to in some cases, but, it is needless to say, without that miraculous effect some are disposed to ascribe to it. These patients were isolated and treated by themselves in a separate building, the best that could be done under the circumstances.

My experience in the epidemic just described warrants the conviction that cholera wards and cholera hospitals are to be condemned, for, in my mind, there is not the slightest doubt that in these epidemics many cases, at first comparatively mild in character, acquire their gravity the moment the patient is subjected to and yields to the moral influence derived from association. If each patient could be kept completely isolated by himself the rate of mortality would be greatly diminished.

An autopsy was made in two cases. One where death occurred in the stage of collapse, a strong, robust, plethoric, but intemperate man; rigor mortis, moderate; the body presented the usual characteristic blue, livid appearance; upon cutting down through the integuments of the abdomen, blood escaped quite freely from the small vessels; the stomach and bowels were filled with the rice water fluid; their mucous membrane injected and eroded in some places, and covered with a flocculent, gelatinous fluid, composed, I presume, chiefly of epithelium; the bladder was empty and firmly contracted; the thoracic viscera presented no unusual appearance. In the other case, where death occurred in the inflammatory or typhoid stage, the phenomena observed were precisely those met with in severe cases of typhoid fever. Post mortem, two hours after death: Rigor mortis complete; peritoneum inflamed and injected and thickened; the mucous membrane throughout the whole extent of both large and small intestines exhibited a state of inflammation in certain portions, particularly those of the lower half of the ileum, and in the cœcum this condition being very marked; the solitary follicles enlarged to the size of a pin head, the seat of pigment deposit, and projecting into the interior of the canal; the inflammation had not reached a destructive degree, except in the case of Peyer's patches; these were extensively altered, and presented signs of deep structural lesion; in some the mucous coat was entirely destroyed; they were generally enlarged (one enormously) to the extent of two inches in length by an inch in width; the spleen was found to be of twice its normal size, its capsule containing tuberculous deposit; the liver was also greatly enlarged, the gall bladder filled to distension, and, upon being opened, allowed at least a pint of dark brownish fluid to escape; the intestines were filled with a fluid of similar character. At the time of the patient's death, which occurred on the sixth day from the inception of the malady, he was upon a supporting and alterative treatment. The right lung was extensively compromised, its upper lobe being in a state of red hepatization; the left lung but slightly altered; heart normal.

The phenomena above described, as revealed by post mortem examination, cannot fail to warn the practitioner of the grave nature of the disease in this stage, and to point out the indications to be fulfilled in the course of treatment. He must be prompt, too, in the application of remedies, for the condition of the patient is one of extreme and almost immediate prostration. In some respects, the condition more closely resembles typhus than typhoid fever.

It is worthy of observation that more than fifty per cent. of the cases were from one company, chiefly composed of recruits. This prevalence I am disposed to ascribe to a want of proper care in the preparation of their food. This company (E) was ordered to Bowling Green on the 21st, leaving six cases of cholera in the hospital. It took the disease with it, as the commanding officer reported, three days after its departure, that six cases of mild nature had occurred since its arrival at that place. I have received no intelligence of the disease having extended to the community. Upon the first appearance of the disease, in the hope that it would not prevail generally, I endeavored to trace the cause to indiscretions committed on the part of the men, but the rapid multiplication of cases compelled me to abandon this idea, and to recognize the fact that it existed in its true epidemic form.

In conclusion, I would add that many of the cases marked "acute diarrhœa" on this report were of a sufficiently malignant type to render the question of diagnosis a very delicate one.

I am indebted to Assistant Surgeon H. Culbertson, United States Army, who relieved me of the charge of the regiment on the 6th instant, for kind and valuable assistance rendered.

*Extracts from monthly report of sick and wounded at Taylor barracks, Louisville, Kentucky, August, 1866. H. Culbertson, Assistant Surgeon United States Army.*

\* \* \* Other bowel diseases, during the period from the 19th of July to the 31st of August, 1866, inclusive, amounted to 25.34 per cent. in old soldiers, while in the New York recruits the percentage increases to 39.55, and the post recruits had such affections only to 10.40 per cent. The post recruits referred to were enlisted here within six months, and were carefully selected by the medical officer of the regiment, and hence, it would seem, arises the per cent. of sickness among this class. Again, it may be that so large a per cent. of the old soldiers had such diseases because it is well known that, although the majority of old soldiers are comparatively free from disease, yet there are unfortunately among this class many who are broken down from drinking and disease. The presence of such men in a cholera atmosphere would naturally increase the number of diarrhœa cases, and they might not suffer much from cholera. Further, it may be that the per cent. of "other bowel affections" in the New York recruits is largest, because these troops were exposed to cholera on Governor's island, which place they began to leave on the 12th of July, and all reached here by the 19th of July, 1866, and because they were exposed to the ills of travel *en route* here, and mainly because they were unused to the habits, diet, &c., of the soldier.

\* \* \* It will be seen, also, that the old soldiers suffered least, the post recruits more, and the New York recruits most from the cholera during the same period. \* \* \* On the 29th of July and 1st of August cholera occurred among the New York recruits, but not a post recruit or old soldier suffered from the disease until the 18th of August, nineteen days after the first visitation, when the old soldiers and post recruits took it on the same

day, in about the same per cent. The New York recruits did not have it again until a day later. From this it would seem that the first visitation came from exposure on Governor's island, and soon died out; but that the second appearance of the disease arose from the positive appearance of the epidemic here, and it prevailed at several points in the city of Louisville, and very generally in Cincinnati simultaneously. \* \* \* \* \* There was a strange increase of the bowel affections, including cholera, on every alternate day, save in one or two exceptions. This would indicate the presence of a malarious cause modifying the disease; and, in fact, periodical diseases have been largely present, and several patients here have taken cholera while suffering from intermittent fever. \* \* \* \* \* Most of the cholera cases arose in company E, and all of these sufferers were recruits. But it also appeared in other companies of the command, in the hospital, and among old soldiers and post recruits. \* \* \* \* \*

On the 21st of August, when the cholera was at its height here, diarrhoea and other bowel affections increased remarkably, which would seem to denote that these diseases have an intimate connection. It is a fact, mentioned before, that every man who took cholera here had diarrhoea before seized with the first-named disease.

By reference to the number of cases of diarrhoea which prevailed here in July, and of the same disease occurring in August, it will be seen that, as compared to the strength of the command, about 14 per cent. had it in July, and 25 per cent. in August. It would seem that these data show quite an intimate relation to exist between cholera and diarrhoea, and that, therefore, the conclusion seems proper to treat diarrhoea, during the prevalence of cholera, as cholera. \* \* \* \* \*

### XIII. MEMPHIS, TENN.

*Extract from monthly report of sick and wounded of detachment of Sixteenth Infantry, Memphis, Tennessee, August, 1866. Assistant Surgeon W. S. Tremaine, United States Army.*

The case of epidemic cholera reported this month was a soldier of the fifty-sixth colored infantry, taken from the steamer Continental, passing this post from Little Rock, Arkansas, on the way to Fort Leavenworth, Kansas, with the fifty-sixth United States colored infantry on board. \*

*Extract from monthly report of sick and wounded of detachment of Sixteenth Infantry, Memphis, Tennessee, September, 1866. Assistant Surgeon W. S. Tremaine, United States Army.*

The command was moved into camp, about three miles from the city, August 14, 1866. Epidemic cholera broke out about the 6th of September, the first case occurring in a recruit the day after his arrival from Nashville, Tennessee. From that time up to the 29th instant, there were twenty-one cases, sixteen of which died, and five recovered. Most of the cases were malignant in form, death occurring in a few hours. Different modes of treatment were adopted. Apparently the most successful was large doses of calomel, 20 grains, followed by castor oil, with chloroform to relieve cramps. There are four cases remaining under treatment at this date, September 30, all convalescent.

### XIV. VICKSBURG, MISS.

*Extract from monthly report of sick and wounded of second battalion Fifteenth United States Infantry, Vicksburg, Mississippi, August, 1866. Acting Assistant Surgeon A. N. Greenleaf.*

In regard to the cholera, I have the honor to state that the first case occurred in the command August 21, 1866. The colored barber was taken with the disease in a severe form, and died in about six hours. August 22 two soldiers were admitted to battalion hospital with unmistakable symptoms of the disease in an aggravated form; and from the above date until August 29 the whole number of cases admitted was thirty-four. The first cases that occurred were of a very severe form, the patients being attacked suddenly with vomiting and purging, and almost immediately going into a collapse, from which it was impossible to arouse them. The first cases attacked nearly all proved fatal; the last cases that occurred were of a much milder form, and they are all convalescent.

No cause to produce the epidemic could be found in or about the camp or quarters of the men. The camp is located on a high and dry bluff; the strictest sanitary measures have been enforced, and the men have been kept in as good health as possible. Strict attention has been paid to policing the camp; fresh lime and other disinfectants have been freely used in and around the quarters of the men, and all means used by the commanding officer to insure thorough cleanliness in the camp and vicinity.

**XV. JEFFERSON BARRACKS, MISSOURI.****HEADQUARTERS FIFTY-SIXTH UNITED STATES COLORED INFANTRY,***Quarantine Grounds, Missouri, August 18, 1866.*

**GENERAL:** I have the honor to report, that in obedience to Special Orders No. 18, current series, headquarters department of Arkansas, companies A, B, E, G, and K, which had been stationed at Duvall's Bluffs, Arkansas, joined the regiment at Helena, Arkansas, by steamer Commercial, August 5, 1866.

On the morning of the 7th the regiment was ready to move, but had to wait for suitable transportation until the evening of the 9th, when the steamer Continental came up the river, bound for Saint Louis; but she not having sufficient accommodations for the whole command, the five companies which had been stationed at Duvall's Bluff, Arkansas, (Captain J. M. Thomas commanding,) took passage for Saint Louis, Missouri, and the remaining five companies, with the regimental headquarters, took passage on the Platte Valley steamer on the morning of the 10th. Both boats were large and had the usual accommodations—that is, boiler and hurricane decks—for the accommodation of soldiers. The command had been unusually healthy during the summer; and as both medical officers of the regiment were in charge of post hospitals and had not yet been relieved, I had no medical officer with me, but sent an experienced hospital steward, with a supply of medicines, with the detachment on the Continental. When about twenty-four hours from Helena one man died on the Platte Valley, of what I supposed to be congestive chills.

Arrived at Cairo, Illinois, I was informed that the Continental, which preceded me a few hours, had thirteen dead bodies on board and from fifty to sixty sick. At the same time, the number of sick increased to an alarming extent on the Platte Valley, which induced me to engage a physician at Cairo, who treated about fifty men for various complaints, one of whom died of congestion between Cairo and Saint Louis, Missouri.

Arrived at the quarantine grounds, near Jefferson barracks, Missouri, I found the detachment from the Continental disembarked; and Captain Thomas reported to me that over fifty men had died on the passage, and deaths were rapidly occurring since the landing was effected. Brevet Colonel Swift, Surgeon United States Army, was on the ground, and at my request inspected the sick on the Platte Valley, and reported no cholera among them. The Platte Valley then proceeded to the port of Saint Louis, arriving about midnight on the 13th. I kept the troops aboard till morning, when the physician reported "a clear case of cholera" on board. I had the case removed by the civil authorities.\* I then reported in person at the headquarters of Lieutenant General Sherman, and was ordered to proceed to the quarantine grounds.

Although I had kept the two detachments in separate camps, the disease seems to have infected the whole regiment. Everything has been done that medical skill can do to stay the progress of the disease by Surgeon E. Swift, United States Army. Surgeon D. A. La Force, fifty-sixth United States colored infantry, (reported for duty yesterday morning,) with a number of citizen physicians, are untiring in their efforts to relieve the sufferings of the sick.

The following is the melancholy mortality report of the regiment since leaving Helena, Arkansas:

Detachment on Continental:	
Company A.....	27
" B.....	18
" E.....	26
" G.....	12
" K.....	19
	102
Detachment on Platte Valley:	
Company C.....	9
" D.....	5
" F.....	10
" H.....	9
" I.....	4
	37
Total.....	139

Up to the present time but one commissioned officer of the regiment has been affected by the disease.

I am, sir, very respectfully, your obedient servant,

**CHARLES BENTZONI,**  
*Colonel Fifty-sixth U. S. Colored Infantry, Commanding Regiment.*

ADJUTANT GENERAL, *Washington, D. C.*

**XVI. FORT RILEY, KANSAS.**

*Extract from monthly report of sick and wounded, Fort Riley, Kansas, August, 1866. Brevet Major W. H. Forwood, Assistant Surgeon United States Army.*

John Clare, private, company A, unorganized United States cavalry, died of epidemic cholera. Date of death, August 30, 1866. This man arrived August 25, with three hundred and eighty-four other recruits, direct from Carlisle, Pennsylvania, via

**FORT LEAVENWORTH—LITTLE ROCK.**



Saint Louis, Missouri. He evidently contracted the disease on his way from the States. The characteristic symptoms were prominent and very violent.

*Extract from monthly report of sick and wounded of detachments of the Second, Third, and Seventh United States Cavalry, at Fort Riley, Kansas, September, 1866. Brevet Major W. H. Forwood, Assistant Surgeon United States Army.*

The cholera was brought to this post by three detachments of recruits who came direct from Carlisle, Pennsylvania, for the seventh United States cavalry, and the disease was confined exclusively to these recruits. There were two companies of the third United States infantry and one company of the second United States cavalry, and four hundred and ninety quartermaster's employes, many of them with families, at the post, but not a case of cholera, nor any symptoms of it, occurred among them. A part of the recruits were camped near the post, and a part of them were in the barracks, and all the sick were treated in the post hospital.

The following table shows the date of the arrival of each detachment of recruits, with the number of cases and deaths, and the date of the first and last case:

Detachments.	Date of arrival.	No. of cases.	No. of deaths.	Date of first case.	Date of last case.
First detachment .....	Aug. 25.	26	11	Sept. 5.	Sept. 15.
Second detachment .....	Sept. 8.	12	4	Sept. 8.	Sept. 19.
Third detachment .....	Sept. 12.	8	4	Sept. 12.	Sept. 19.
		46	19		

**XVII. FORT LEAVENWORTH, KANSAS.**

[Extracts.]

FORT LEAVENWORTH, KANSAS, December 31, 1866.

**GENERAL:** I have the honor to acknowledge the receipt of your communication of the 3d instant, and, in reply, to state that of the four cases of epidemic cholera reported in the report of sick and wounded at this post for the month of October, 1866, none originated in the hospital. These cases occurred among troops recently arrived from other stations. \* \* \* With this last case the disease disappeared. A few days before its appearance at this post, some twenty-odd cases of epidemic cholera were reported at Leavenworth City, two miles south of the garrison.

Intercourse between the people of the post and city was unrestricted. As soon as the disease appeared here extra hygienic measures were promptly and regularly enforced. Sulphate of iron and unslaked lime were unsparingly used in all water-closets, latrines, and other foul places. Those attacked with the malady were treated separately in tents pitched at a convenient and safe distance from the hospital building. All excreta, soiled clothing, utensils, &c., used by those suffering from the disease, were constantly subjected to the influence of disinfectants. None of those in attendance on the sick contracted the disease.

In addition to the usual remedies used, chloroform, in drachm doses, was given internally to counteract spasmodic action. It acted in every case promptly, and seldom required more than one dose. Hypodermic injections of sulphate of morphia were given to allay irritability of the stomach, and found efficacious. Strychnine and atropia were used in one or two cases, but without producing any well-marked benefit.

Very respectfully, your obedient servant,

B. J. D. IRWIN,

*Surgeon and Brevet Lieutenant Colonel U. S. A*

Brevet Major General J. K. BARNES, *Surgeon General.*

**XVIII. LITTLE ROCK, ARK.**

*Extract from sanitary report, department of the Arkansas, for the year 1866, by Brevet Lieutenant Colonel Joseph R. Smith, Surgeon United States Army, Medical Director, March 18, 1867.*

In September, epidemic cholera appeared in the department. During the whole of this year the proportion of cases of bowel affections had been small as compared with any previous year since the occupation of Little Rock by our army. I had particularly observed and commented on the fact that intermittents and remittents of an obstinate type, and congestive chills, seemed to have replaced the chronic diarrhoeas and dysenteries, which in previous years had proved so unyielding and fatal. Nevertheless, as the summer advanced and reports reached us of the prevalence of cholera in other sections of our country, uneasiness began to be felt here. More rigid attention was paid to the police of the quarters and grounds occupied by the

troops, and every symptom occurring among them of sickness resembling cholera was closely scanned. Among the citizens of Little Rock similar uneasiness prevailed and similar steps were taken. Attempts were made to police the city properly, and a board of health was organized to meet any coming emergency.

From time to time, during the month of August, steamboats arrived both at Little Rock, on the Arkansas, and Duvall's Bluff, on White river, on which rumor said that cases of cholera either existed or had occurred. Examination, made by other physicians here and at Duvall's Bluff as well as by myself, failed to confirm the report of the present existence of cholera on board these boats, although I was satisfied in several instances, from the histories related to me, that fatal cases of cholera had occurred during their trips from Memphis to Little Rock. Upon the last day of August it was reported to me that great sickness existed at Duvall's Bluff, both among soldiers and citizens, believed by the inhabitants to be cholera. September 1, in obedience to orders from General Ord, I proceeded to Duvall's Bluff to investigate the nature and cause of this sickness. I was unable to find any cases of cholera. A number of cases were related as having occurred, which might have been cases of cholera. In these, after imprudences in eating, followed immediately by bathing in the river, the following symptoms occurred: pain in abdomen, with cramps more or less general; vomiting, purging, and death in a state more or less resembling collapse. No such cases were presented during my visit, and on my return to Little Rock I made the following report:

"MEDICAL DIRECTOR'S OFFICE, DEPARTMENT OF ARKANSAS,  
"Little Rock, Arkansas, September 3, 1866.

"GENERAL: I have the honor to report that, in obedience to your orders, I have inspected the post of Duvall's Bluff, and found as follows:

"Of seventy soldiers on duty there, twenty-five were sick on the 1st instant, or about 35 per cent. Their sickness is mainly diarrhoea, dysentery, and malarious fevers, which are the prevailing diseases of this latitude; no cholera. Similar diseases, and to a corresponding degree, affect the citizens at Duvall's Bluff. The troops were in crowded quarters. Their food was well cooked, their habits cleanly, and their quarters in good police. They used river water. Their medical supplies are of good quality and sufficient. The medical officer in attendance is inexperienced, but the prescriptions for the sick entered by him in his prescription book were generally well judged and appropriate. No better man is available to supply his place at present. I urged the immediate change of quarters previously directed by you, directed the use of well instead of river water, and gave the ordinary instructions in regard to the sanitary habits of the men. Should the health of the troops not show signs of improvement within the next two days I recommend that they be removed from Duvall's Bluff. I am of the opinion, however, that the change to better quarters and proper care will render a change of post unnecessary.

"I omitted to state that there have been no deaths among the soldiers at Duvall's Bluff during the past nine days. During the preceding nine days there were five deaths.

"Very respectfully, your obedient servant,

"JOSEPH R. SMITH,  
"Surgeon U. S. A., Medical Director Department of Arkansas.

"Major General E. O. C. ORD,  
"Commanding Department of the Arkansas."

No subsequent cases resembling or considered as cholera appeared at Duvall's Bluff, and the health of the troops improved so as to render a change unnecessary.

During the cholera epidemic at Little Rock the colored troops at the post consisted of a detachment of the fifty-fourth United States infantry, numbering three hundred and fifty men. These troops were quartered on the north bank of the Arkansas river, on a sandy ridge running parallel with the river, about five hundred yards distant. The ground was well drained with lower ground in front and rear. The barracks consisted of log huts built in company streets. Originally built for the whole regiment, the small detachment now occupying them had more than abundant room. The grounds and quarters were in excellent police, and had been so during the whole of the summer, so much so as to have met the frequent encomiums of the general commanding and inspecting officers.

A few hundred yards distant from the quarters of this regiment, directly on the river bank, was the small, dirty, and ill-built town of Huntersville, consisting of a few groceries, drinking shops, and huts occupied by forty or fifty whites and several hundred negroes. In this town cases of cholera had been rumored previously to exist, but none such are known authentically to have occurred. Here was the terminus of the railroad from Duvall's Bluff, on White river, the main avenue of travel between Little Rock and points east and north, and here also steamboats frequently landed. The first case of cholera among these troops appeared September 15.

The white troops at Little Rock consisted of four companies of the third battalion nineteenth infantry, numbering 330 men, and battery G fifth artillery, numbering 90; in all, 429 men. These troops occupied barracks erected in the grounds formerly occupied as the Little Rock arsenal. These grounds form a parallelogram, whose sides together make one mile. Beautifully shaded with trees of every variety native to this latitude, grassy, of the same elevation as the grounds on the north, east, and west, and with lower lands to the south, this arsenal is the choicest spot in the vicinity of Little Rock, from which a street only separates it. The barracks occupied by the troops consisted of ridge-ventilated pavilions, built for and formerly occupied as wards of the general hospital, from whose site they had been removed in pieces and erected on the arsenal grounds. One of these pavilions was devoted to each company. The grounds and buildings, occupied by troops but a few weeks, were well policed and in good order. The water supply was obtained from wells dug on the grounds, where water was readily reached at a depth varying from sixteen to twenty feet. The officers' quarters were brick buildings, formerly used for arsenal purposes.

A little more than a mile to the southward the arsenal and the town of Little Rock are surrounded by a bayou, filled in seasons of high water by the back-water from the river, but never dry, and without current generally. During the summer this bayou had experienced overflow from the high water previously described.

The first case of cholera of which I can obtain any authentic information, in Little Rock or vicinity, occurred in the arsenal grounds on the 12th of September. During the early part of this month reports multiplied of cases of cholera among the poor whites and negroes in Little Rock and at Huntersville, across the river. I made daily inquiries of practicing physicians in this city, who all denied having seen any case of cholera; and so late as the morning of September 12, I made inquiry of the secretary of the board of health, and was informed by him that no case of cholera had occurred in the practice of any physician of the place. On that same evening (September 12) I saw with Surgeon Vansant, at his hospital, (the post hospital of Little Rock arsenal,) a soldier taken with painless diarrhoea, rice-water evacuations, coldness, cramps, and collapse, whom I believe to have been the first case of cholera occurring at Little Rock, certainly the first among the troops. I so recorded it at the time in my private diary. On the 13th I saw two similar cases at the arsenal, and from that time the disease was fully declared. Preparation was at once made for the care of the cholera cases. A separate ward of the general hospital was selected, distant about four hundred feet from any other ward. To this the cases of cholera occurring among the troops were sent as soon as the disease manifested itself.

On the 14th and 15th the disease increased with rapidity. Careful examination, made by the commanding officer, Surgeon Vansant, and myself, failed to discover any local cause; nevertheless, on the 15th, I deemed it prudent to recommend to General Ord, commanding the department, that the arsenal be vacated and the troops sent to some other spot in the vicinity. Some very large quartermaster's warehouses were standing on the south bank of the Arkansas river, a short distance from the camp of the fifty-fourth colored infantry and Huntersville. These warehouses, which contained forage, were selected, emptied, and cleaned; and on the morning of the 16th the troops from the arsenal, deserting their quarters, established themselves in these roomy warehouses, leaving at the arsenal those sick in post hospital and a few sick in quarters.

At the time of selection and occupation of these buildings no cases of cholera were reported to have occurred in the camp of the fifty-fourth, where the first case appeared on the 15th, and was reported to me on the 16th. This change of camp was not followed by the desired effect. The disease still increased on the 17th, 18th, and 19th, on which last day General Ord, accompanied by the commander of the troops and myself, proceeded to select a site for another camp. A wooded position was selected about four miles southeast of town, on the Benton road, gravelly, and near a creek of good water. To this camp the troops from the warehouses removed on the morning of the 20th, and speedily made themselves comfortable, occupying hospital tents, for which lumber was furnished for floors. On the 21st, 22d, and 23d, the disease continued unabated, but on the 24th commenced its decrease, the last case reported in this camp being on the 27th.

During these two weeks the special report of Surgeon Vansant shows that there were sent to general hospital 119 cases. The same officer's monthly report of sick and wounded for September shows four deaths from cholera, being 123 cases. Among the convalescent and sick left at the arsenal at its evacuation by the command, seventeen cases are reported to have occurred, which came under the care of Acting Assistant Surgeon Cantrell, and are named in his special report. In all, then, there occurred 140 cases of cholera in a command consisting of the garrison of the arsenal, 429 stroug, and the escort and teamsters of a train from Camden, viz., 10 men, being in all 439 men, of whom it is thus seen that 31.89 per cent. were attacked.

In the fifty-fourth colored infantry the cholera made its appearance September 15, on which day two cases presented themselves. At this time the regiment was about being mustered out of the service, which was accomplished by the 22d, to which time only the record extends. Twelve cases are reported by Assistant Surgeon Wilson, of the fifty-fourth colored infantry, to have occurred on the 16th. From that time until the 22d, the disease decreased in violence. During this period twenty-two cases occurred, under care of Assistant Surgeon Wilson, and in September and October three, under care of Acting Assistant Surgeon Cantrell. Three cases of the same regiment were received into the general hospital on the 24th, making in all twenty-eight cases out of 350 men, or 8 per cent. Of these twenty-eight cases, fifteen died, or 53.5 per cent. Six of these died the same day they were attacked; three the second day; one the fourth day; three the fifth day; one the sixth day, and one date not reported. The length of time the disease lasted in the cases that recovered cannot be given, as most of them recovered after they had left the service.

Concerning the cases of cholera that occurred among the white troops, no detailed report has been given by Surgeon Vansant. Assistant Surgeon Wilson reports a preceding diarrhoea in nearly all his cases; and in nearly all the cases of Surgeon Vansant which were seen by myself, I know a milder diarrhoea of greater or less duration to have preceded the severer attack of cholera. I use the comparatives, milder and severer, advisedly, for I regard the so-called preliminary diarrhoea as much a part of the cholera as I do the chill as a part of the paroxysm of intermittent, or the preliminary fever as a part of small-pox.

It is from the general hospital, however, that the most valuable information is to be obtained. Hither, after the undoubted recognition of the epidemic, were sent for treatment all cases of cholera among the white troops. I deemed it best that the cases occurring should be separated as speedily as possible from their comrades, that the well might be saved as much as possible from any danger of infection from the sick, whether by their evacuations or otherwise. In the cholera ward, accordingly, were received and treated 129 cases of cholera, two of whom were received in October, the rest in September. Four of these were colored soldiers, the remainder white. Of these, sixty-five died, or a little more than 50 per cent.; and sixty-four, or a little less than 50 per cent., recovered. In the fatal cases, death occurred as follows:

On the first day, or day of admission.....	35	On the eighth day .....	2
On the second day.....	12	On the tenth day .....	1
On the third day.....	3	On the fourteenth day.....	1
On the fourth day .....	3	On the fifteenth day .....	1
On the fifth day .....	4		
On the sixth day .....	1	Total.....	65
On the seventh day.....	2		

## EXTRACTS FROM OFFICIAL REPORTS.

All these cases were brought to hospital in obedience to orders to send cases there as soon as they occurred, and, within a few hours; they, therefore, doubtless represent accurately the duration of the disease. The few hours' variation would occur in cases taken in the night, and not sent from camp to hospital, distant two to four miles, until morning. Two of these were cases of relapse. In one of these, during supposed convalescence, the relapse occurred on the thirteenth day, the patient dying on the fifteenth. In the other, convalescence being apparently established, relapse occurred on the fifth day, and the patient died on the seventh. Of the cases which recovered, a fraction were transferred from the cholera to a convalescent ward as soon as supposed out of danger. In these cases, transfer was made as follows:

On second day .....	1	On seventh day .....	2
On third day .....	2	On eighth day .....	1
On fourth day .....	2	On ninth day .....	3
On fifth day .....	2		
On sixth day .....	4	Total .....	17

The remaining forty-seven cases were returned to duty as follows:

On fourth day .....	2	On twenty-first day .....	2
On fifth day .....	2	On twenty-second day .....	3
On sixth day .....	4	On twenty-third day .....	1
On seventh day .....	2	On twenty-fourth day .....	2
On eighth day .....	1	On twenty-fifth day .....	2
On tenth day .....	3	On twenty-seventh day .....	2
On eleventh day .....	1	On twenty-ninth day .....	2
On twelfth day .....	3	On thirtieth day .....	2
On thirteenth day .....	3	On thirty-first day .....	1
On fifteenth day .....	2	On thirty-ninth day .....	1
On seventeenth day .....	1	No dates given .....	1
On nineteenth day .....	2		
On twentieth day .....	2	Total .....	47

Of the seventeen cases reported above as transferred, the day of return to duty is given in six cases, as follows:

On fifth day .....	1	On twenty-sixth day .....	2
On twenty-third day .....	1	On twenty-ninth day .....	1
On twenty-fifth day .....	1		

The cases reported as returned to duty so soon after they were attacked, viz., the fourth and fifth days, are described by Acting Assistant Surgeon Denell as presenting the symptoms of cholera before the stage of collapse—rice-water evacuations, vomiting, cramps, &c.

Regarded as an epidemic, the cholera, as observed in the hospital, may be said to have begun September 15, and ended September 28. Cases, however, were received in the hospital September 30, October 9, and October 17, one each day; and all three died. In one of the September cases no dates whatever are given; and in one it is only stated that the duration of the disease was ten days. The last two mentioned cases recovered. The remaining one hundred and twenty-four cases were received into hospital as follows:

Date of admission.	No. received.	No. died.	No. recovered.
September 15 .....	4	3	1
September 16 .....	10	5	5
September 17 .....	9	1	8
September 18 .....	5	3	2
September 19 .....	5	3	2
September 20 .....	19	10	9
September 21 .....	25	10	15
September 22 .....	21	14	7
September 23 .....	8	5	3
September 24 .....	7	3	4
September 25 .....	1	1	..
September 26 .....	5	2	3
September 27 .....	3	1	2
September 28 .....	2	1	1

From these figures it will be seen that by far the greater number of cases occurred about the middle of the epidemic, viz., on the 20th, 21st, and 22d, and the greatest mortality appeared among the cases occurring September 22.

The following meteorological observations were taken by myself, and relate to the period when the epidemic was at its height. The thermometer observed hung on a covered porch, with a northern exposure:

September 14.—Saunshiny, damp; thermometer at 7 a. m., 75°; sultry and hot; winds southerly; clouds flying, with much thunder and lightning.

September 15.—7 a. m., cloudy, raw, and damp, wind from southeast; dry bulb, 69°; wet bulb, 56°; 2 p. m., dry bulb, 85°; wet bulb, 73°; no wind, sky clear in centre, thunder and lightning, and clouds near horizon in all directions.



*September 16.*—7.30 a. m., misty; dry bulb, 72°; wet bulb, 59°; no wind; sun shone out bright about 9 a. m. 2 p. m., dry bulb, 86°; wet bulb, 66°; wind from south—gentle; wind blowing in puffs during afternoon, and clouds appeared in west; less sultry.

*September 17.*—7 a. m., dry bulb, 72°; wet bulb, 58°; slight wind from southeast; clear sky. 2 p. m., dry bulb, 89°; wet bulb, 71°; slight breeze west of south; thunder clouds in southwest; during the evening, wind in puffs from southeast and southwest, with clouds and lightning in north.

*September 18.*—7 a. m., dry bulb, 74°; wet bulb, 59°; slight breeze south by east; sky clear. 2 p. m., dry bulb, 88°; wet bulb, 68°; strong wind from southwest; many clouds flying.

*September 19.*—7 a. m., dry bulb, 75°; wet bulb, 61°; slight breeze from south; cloudy; rained during past night; commenced raining again at 7.15, with thunder. 2 p. m., cloudy; dry bulb, 84°; wet bulb, 68°; slight wind from south; thunder and lightning all the evening, constant, almost, in west-northwest and north.

*September 20.*—7 a. m., dry bulb, 66°; wet bulb, 53°; wind northwest; cloudy, with occasional gleams of sunshine. 2 p. m., dry bulb, 59°; wet bulb, 47°; strong wind from northwest; rained almost all day, hitherto; during afternoon, cloudy, but no rain; sky cleared about 9½ p. m.; fires required in houses.

*September 21.*—7½ a. m., dry bulb, 48°; wet bulb, 36°; slight wind from northwest; clear sky. 2 p. m., dry bulb, 62°; wet bulb, 50°; moderate breeze from northwest; clear, almost cloudless, all day.

*September 22.*—7½ a. m., dry bulb, 47°; wet bulb, 36°; slight wind from northwest; clear; heavy dew during night. 2 p. m., dry bulb, 65°; wet bulb, 52°; moderate breeze from northeast; clouds in west.

*September 23.*—7½ a. m., dry bulb, 56°; wet bulb, 45°; no wind; cloudy. 2 p. m., dry bulb, 76°; wet bulb, 65°; quite a breeze from southeast; cloudy; during the morning sun shone over two hours.

*September 24.*—7½ a. m., dry bulb, 74°; wet bulb, 62°; wind from south; cloudy; rained some in night. 2 p. m., dry bulb, 79°; wet bulb, 66°; wind southeast; cloudy; showers all day; heavy rain about 5 p. m., with lightning.

*September 25.*—7½ a. m., dry bulb, 60°; wet bulb, 48°; strong wind from north; cloudy; rained most of the night. 2 p. m., dry bulb, 68°; wet bulb, 54°; strong wind from north; cloudy; sky cleared towards evening.

*September 26.*—7½ a. m., dry bulb, 55°; wet bulb, 42°; slight wind from north; clear. 2 p. m., dry bulb, 71°; wet bulb, 57°; slight wind, north; clear.

*September 27.*—7½ a. m., dry bulb, 55°; wet bulb, 43°; slight wind from northwest; clear. 2 p. m., dry bulb, 73°; wet bulb, 59°; moderate wind from northwest; clear.

*September 28.*—7½ a. m., dry bulb, 55°; wet bulb, 42°; wind slight, northwest, clear. 2 p. m., dry bulb, 73°; wet bulb, 60°; wind northeast, clear. From this time on the wind continued northerly for nearly three weeks, the sky generally clear, and no thunder or lightning. It cannot fail to be noticed that the phenomena above recorded indicate much electrical disturbance in the atmosphere from the 15th to the 25th, and point to the ozone theory.

The treatment of patients in the cholera ward was various in kind, but uniform in the fact of being unsatisfactory, and the close of the epidemic left me as uncertain as to the true pathology of the disease, or the most appropriate remedies for its relief, as the commencement found me. All the cases in general hospital were treated under my personal supervision, and were seen by me daily, and in one or another case nearly every drug was tried that has been hitherto vaunted in the treatment of cholera.

When cases were presented in the first stage of diarrhoea I found Squibbs's mixture generally successful, and in the cases that recovered from the latter stages of the disease alcoholic and diffusible stimulants were freely used, and seemed to me entitled to the credit of producing beneficial results. Strychnia was a favorite remedy with Surgeon Vasant and Acting Assistant Surgeon Denell. Careful observation of the cases treated with this remedy failed to satisfy me that it was followed by the favorable results claimed for it by these gentlemen. With my present light, should the disease again make its appearance the coming summer, I should not fail to rely mainly on Squibbs's mixture, or some preparation of opium, and stimulants, in the early stage of the disease, and mainly on stimulants in the stage of collapse.

While cholera was epidemic among the troops the disease also appeared among the citizens of Little Rock, mainly among the poorer classes, white and black, and to a less degree among the better classes. Proportionally the number of cases among the citizens was less than among the soldiers. A number of these cases came under my observation and care, and with pretty much the same result as to treatment. I am unable to find any record of the number of cases of cholera which appeared among the citizens of Little Rock.

In the latter part of September cholera appeared at Batesville, on the White river, where it was brought by the steamers plying from Memphis. One company of troops was stationed at this point, and in this company one case of cholera is reported, which was fatal. Acting Assistant Surgeon Tonner, United States Army, was on duty at Batesville, and in his report says that after the case above reported, and a case occurring in a negro citizen, "We immediately had the men moved to their new quarters, and adopted the strictest sanitary rules; also placed the town under military supervision. No new cases have appeared; but every case of dysentery and diarrhoea at once assumed a more violent form, though not choleraic, and I have from it to report four cases of death in one week."

It may well be doubted whether these four cases were not cases of cholera.

Cholera also attacked the troops at Helena, on the Mississippi. The disease was prevalent at this place when occupied by troops in the last week of August. I have been unable to obtain a report on the subject from Helena, the medical officer on duty there, under contract, having left the service for his home in the north.

At Fort Smith the cholera first appeared September 14, and was brought there on a steamer from Little Rock. Contrary to our experience at Little Rock, the disease was more extended and fatal among the citizens than among the soldiers. Dr. Du Val, at Fort Smith, in a pamphlet written by him on the subject, reports three hundred as the number of cases of cholera treated among the citizens of Fort Smith. I was unable to obtain a special report on the subject from the medical officer at Fort Smith, who has also left the service:

At Fort Gibson cholera appeared, but not until October 15. It was then brought to that post by a company of soldiers from Fort Smith, who arrived at Gibson October 12. Of this company two men had been under treatment at Fort Smith for chronic diarrhoea. Upon arriving at Gibson one was attacked with cholera October 15, the other October 17. Both died. A hospital nurse belonging to Fort Gibson command, who attended the before-mentioned cases, was attacked October 19, but recovered.

A fourth case, belonging, like the last named, to the Gibson command, was attacked November 11, after excess in eating, and died in twelve hours. (This last case is called by Assistant Surgeon Hubbard, United States Army, sporadic, and is believed by him to have had no connection with the previously mentioned cases, the last of which died October 19, or over three weeks before, and no symptoms of the disease had appeared in the mean time. No cholera showed itself among the white citizens or Indians in the vicinity of Fort Gibson.)

I believe the cholera to have been imported into every place in Arkansas where it appeared during the summer by direct communication with infected points, and I deem it of vital importance to attempt its exclusion by well-devised quarantine measures.

I send herewith the special reports in regard to cholera of Surgeon J. Vansant, United States Army; Assistant Surgeon V. B. Hubbard, United States Army; Assistant Surgeon George M. Wilson, fifty-fourth United States colored infantry, and Acting Assistant Surgeon E. V. Denell. In making out my own report above of the history of the disease in the general hospital at Little Rock, I have been able, in a few instances, to correct the report of Acting Assistant Surgeon Denell by the morning reports received at my office from that hospital.

I have not been able to trace a connection between the outbreak of cholera at the Little Rock arsenal and its arrival from an infected point. Recruits arrived at Little Rock during the months of July and August. Their route to Little Rock was through an infected portion of the country. Within a few days I hope to be able to report specifically the dates of arrival of each detachment of recruits at Little Rock, and the depot from whence they arrived, with date of departure therefrom.

An examination of the report of Acting Assistant Surgeon Denell will show a striking exemption from cholera in the case of battery G, fifth artillery, as compared with the other companies in the same garrison. This company was quartered and supplied in the same manner as the companies of the nineteenth, by its side. But, under the personal supervision of its commander, Brevet Major General R. Arnold, this battery had attained a higher state of police and discipline than its neighbors, and to this must be attributed its comparative exemption.

I only desire to add that about the same date that cholera made its appearance cases of congestive intermittent fever also occurred both among citizens and soldiers at Little Rock, Fort Smith, Duvall's Bluff, Batesville, and Helena, which so closely simulated cholera in its symptoms as sometimes to defy distinction. They were equally fatal.

I have already detailed one of the principal means resorted to as a means of checking the epidemic, viz., flight from the infected barracks.

Other means, however, were not neglected. Scrupulous cleanliness of person and camp was enjoined, orders were issued to every soldier to repair to the surgeon upon the first appearance of diarrhoea, extra issues of potatoes were ordered, and ice was freely supplied by order of General Ord. The removal of the cholera cases to a distant cholera ward was ordered, not only to avoid the danger of infection, but also to prevent the natural feelings of alarm caused by the constant presence of the sick among their still healthy comrades. The almost daily visits of the commanding general, and the efforts of the other officers, especially their immediate commander, Brevet Major General R. Arnold, did much to keep up the spirits of the command. The position of Surgeon J. Vansant, United States Army, was a very trying one in charge of the camp where the epidemic was prevailing, and this officer is entitled to much credit for his untiring devotion to the command under his guardianship. Acting Assistant Surgeon E. V. Denell, in immediate charge of the cholera ward, was also constant in his attendance on the sick, and throughout behaved with coolness and judgment. I desire also to bring to the notice of the Surgeon General Hospital Steward Kelly, on duty in the post hospital at Little Rock; Hospital Steward Wilson, on duty in the cholera ward; and Hospital Steward Meyenn, on duty in my office, who volunteered for duty in the cholera ward, and there rendered valuable assistance. The nurses of the cholera ward have already been brought to the notice of the general commanding the department, and been mentioned by him in general orders.

*Extract from monthly report of sick and wounded, third battalion Nineteenth Infantry, Little Rock, Arkansas, September, 1866. Surgeon John Vansant, United States Army.*

During a part of the present month epidemic cholera prevailed extensively in this command. The first case occurred on the 14th day of September, and proved fatal in two days. On the same day, and nearly at the same hour, and in the same company quarters, another soldier was violently attacked with the disease, but, having a very vigorous constitution, he still survives, in a debilitated condition. The next cases happened in the post hospital, and then, in rapid succession, every day, men were seized in all parts of the garrison. The arsenal grounds, where the men were stationed, are dry, grassy and well shaded with large oak trees. The quarters are new, spacious, uncommonly well ventilated, and always thoroughly policed.

The situation of the place, with reference both to its near and more distant topographical relations, is such as might be supposed to indicate great salubrity.

The Arkansas river runs below a steep bank, about half a mile to the northward, while on almost every other side, distant from one to three miles, a high, verdant, and prettily timbered ridge encompasses the site; but, notwithstanding these seeming

advantages, this place and vicinity are annually visited by the most pernicious forms of malarial diseases. As soon as it was discovered that patients convalescent from fever were having cholera in the post hospital, every one was removed from the building, and it was filled with chlorine gas, but if any good resulted from this it was not perceptible, and the disease continued afterwards just as before the experiment. At this time there was little or none of the disease in the town of Little Rock, six or eight hundred yards distant. The disease seemed to be localized in and around the post. In view of this it was deemed proper by the general commanding the department to have the troops removed to the opposite side of the Arkansas river, and this was done on the morning of the 16th. After a trial of the new locality for four days, it was found, however, that it was worse than the old. The command, therefore, took up the line of march again, recrossed the river, and encamped in a beautiful grove four miles southwest of Little Rock, on the 20th. Numerous cases of cholera occurred after reaching this camp; but these, as well as all seriously threatening cases, were sent back as soon as possible to the general hospital, adjoining the arsenal grounds. The last case showed itself on the 26th, six days after we left the infected position on the north bank of the river. The disease is now apparently on the increase in the town of Little Rock, while it is greatly decreasing at the arsenal, where it began.

It might be asked, do not these things indicate that cholera, like other infectious diseases, has a period of incubation, at the expiration of which it bursts forth without regard to the place where the infected person may be? And also that a local cause analogous to that producing malarial fevers, combined with a certain *general* atmospheric condition favorable to the development of this local cause, is necessary to the production of the disease in question? With reference to the peculiar atmospheric condition, it was observed that about the time when the congestive intermittents began here, say the middle of August, the oxygen of the air seemed to acquire a singular activity, as evinced by the rapid rusting of all oxidizable metals, and this without any notable increase of the moisture. My observations of this epidemic point to nothing which I can imagine might probably be the local cause. In regard to the treatment, a variety of remedies, singly and in different combinations, administered by the mouth and by hypodermic injection, were tried, but, with regret it must be said, none seemed to exercise much influence after the cold stage set in fairly. The medicine which, however, seemed to me to be incomparably more efficient than any other I used, in checking the watery diarrhoea, allaying the nausea, removing the distressing or painful sensations about the epigastrium, in short, in arresting and curing the disease when not too far advanced, is strychnia. I gave it usually in watery solution, (dissolved in a little acetic or sulphuric acid,) in doses of one-tenth of a grain, repeated according to the urgency of the symptoms, but rarely oftener than every two hours, until three or four doses were taken. Frequently a smaller quantity will suffice. I have thought that this medicine acted in cholera more beneficially *alone* than in combination with other substances, as morphia, chloroform, quinine, or diffusible stimulants. I have prescribed it in cases of intermittent fever and diarrhoea many hundreds of times in the last two months, and have never seen it produce a bad symptom, but always the reverse.

*Extracts from Report of Assistant Surgeon George M. Wilson, Fifty-fourth United States Colored Infantry, Little Rock, Arkansas, October 2, 1866.*

**Sir:** In obedience to instructions received from you, I have the honor to submit the following report of the appearance, cause, and treatment of cholera at the post of Huntersville, Arkansas, during the month of September, 1866. As my regiment (with the exception of one company) was mustered out and discharged the service of the United States, and myself ordered on duty at the general hospital at Little Rock on the 22d day of September, I can state its history up to that time only.

In the latter part of August and beginning of September there were rumors among the inhabitants of Huntersville and its vicinity that there had been several deaths from cholera, and these rumors caused some to move away.

The fear of these people was not quieted by the assertions of a practitioner of medicine in that place, that he had treated several cases of undoubted Asiatic cholera. Some of these cases did certainly die; but, from what I could learn about them at the time, and from what I have heard of them since, I do not think they were cases of real cholera; and, in my opinion, the first undoubted case of the kind that did occur near Huntersville was taken in my regiment on the morning of the 14th of September. For about two weeks previous to this date there had been a great increase of diarrhoea, but nearly always with paroxysms of intermittent fever, and were reported as quotidian or tertian intermittent.

Previous to the time that the diarrhoea spoken of commenced, cases of intermittent fever nearly always required an active cathartic in beginning their treatment; but at this time the diarrhoea was unusually severe, and was with difficulty controlled, and several cases came near dying from it, but without exhibiting any other symptoms of cholera. It is my opinion that such cases as these had been pronounced to be cholera, and caused the alarm of the citizens of Huntersville and vicinity.

On the morning of September 15, Private John Buskey, company I, who had been on sick report for three days with intermittent fever and diarrhoea, was attacked with profuse vomiting and purging, with cramping and coldness of extremities, and, in spite of all remedies, died at about four o'clock the same day. I am satisfied that this was the first real case of cholera we had on the other side of the river. On the night of the 16th ten other persons were attacked in the same manner as the one above, most of whom had been on sick report for several days before, with either intermittent fever or diarrhoea, or both.

It will be observed by the above cases that the epidemic came upon the regiment suddenly, and, I am sure, unexpectedly. Twelve cases of well-defined cholera occurred during the night of the 16th September, the greater number of which had been preceded by diarrhoea for several days, with intermittent fever, and had been under treatment for those diseases. After the cholera commenced there were many cases of severe diarrhoea, but without the intermittent fever in most cases. The diarrhoea was also of a different character; for, before the appearance of the epidemic, quinine would always have a good effect upon the diarrhoea; but after it appeared, nearly every case seemed to be irritated by it, even when combined with opium and

aromatics. Strychnia, with opium, was used in many cases of the premonitory diarrhoea, and apparently with very good effect. Where the diarrhoea was very great, it was frequently checked by tannin and tincture of opium in brandy; but nearly always when so checked caused great pain and uneasiness in the bowels, which was not removed until the bowels were again moved. Such cases were so frequent that I almost ceased to give any astringent, and treated cases of diarrhoea with stimulants, a diet of easy digestion, and perfect quiet.

### XIX. FORT GIBSON, C. N.

*Extract from monthly report of sick and wounded, Fort Gibson, C. N., October, 1866. Brevet Major V. B. Hubbard, Assistant Surgeon United States Army.*

The two cases of cholera reported were privates of company F, third battalion, nineteenth infantry, who were brought here from Fort Smith, Arkansas, where the disease had been prevailing with unusual virulence for a considerable time, by company F of the third battalion of this regiment, which passed through Fort Gibson *en route* to Fort Riley, Kansas.

But one case occurred in this first battalion, a nurse who attended the two who died; but the disease was easily controlled by the speedy use of appropriate remedies. The most strenuous efforts were immediately adopted to prevent the spread of the disease in this command, which, happily, were entirely successful.

#### FIRST BATTALION NINETEENTH UNITED STATES INFANTRY,

*Fort Gibson, C. N., November 18, 1866.*

SIR: In reply to your communication of the 3d inst., requiring "a special report upon cholera at this post," I have the honor to submit the following:

During a summer of unusual heat and dryness, with a great abundance of fruit, much of which was brought to the fort in an unripe condition by the Indians, and although no efforts were made to interrupt communication by land or the river with Fort Smith, Arkansas, where cholera was prevailing with great severity, and a large daily mortality, no symptoms of cholera developed themselves until the 15th day of October, 1866. There had been, up to that time, but three cases of cholera morbus, which yielded kindly to the ordinary remedial measures, and diarrhoeas were far less prevalent than might have been expected. Dysentery prevailed to a considerable though not alarming extent, and, excepting three cases, one of which proved fatal, the disease was very manageable.

On the 12th day of October, 1866, company F of the third battalion of this regiment arrived at this post, *en route* from Fort Smith, Arkansas, to Fort Riley, Kansas. On the day following, John Taylor, a private of said company, was admitted to the post hospital suffering from chronic diarrhoea. The commanding officer of the company informed me that Taylor had been for some time in the post hospital at Fort Smith, undergoing treatment for the same complaint. On the 15th, two days after admission to the hospital, he was seized with violent cramping of the stomach, bowels, and legs, with profuse diarrhoea and vomiting. The extremities were cold, the countenance livid, the hands shrivelled, and no pulse could be felt either at the wrist or ankle. The diarrhoea was checked at the sixth discharge, and vomiting ceased after three evacuations of the stomach. The discharges from the mouth and rectum were of the rice-water character. The cramping was only partially controlled. The most persistent and well-directed efforts failed completely in restoring natural warmth to the extremities; the patient remained pulseless to the last. He died at 6 p. m. in the collapsed state, twelve hours from the attack.

The second case was private William Yaeger, of the same company, (F, third battalion.) The company was encamped on the opposite side of the Grand river from the fort. On the night of the 17th of October, 1866, Yaeger was attacked with cholera, and requested the sergeant of the company to send for me. This was not done. I did not see the case until the man was brought to the hospital at 8 o'clock on the morning of the 18th. He was already in a state of collapse. The history of the first-mentioned case, *nomine mutatis*, will very accurately describe this case. The patient died at 9 p. m., October 18, 1866, about eighteen hours after the attack. It should be stated that this man, like the first, had been in the post hospital at Fort Smith for chronic diarrhoea. The third case was private Charles I. Davis, company E, first battalion, who attended very assiduously to the wants of the above men in the capacity of hospital nurse. He was attacked on the morning of the 19th of October, but the adoption of prompt measures subdued the symptoms in twelve hours. He is still on duty as hospital nurse.

The fourth case was August Westphal, private company G, first battalion, who died on the 11th day of November, of sporadic cholera. I call the case sporadic because there were no symptoms of the disease either at the garrison among the soldiers or among the natives residing at the fort at the time, nor had there been since the departure of company F, third battalion, on the 19th day of October, nearly a month previously. This soldier, on the day preceding the day of his death, had eaten inordinately of fruit and pies. Feeling indisposed he was relieved from guard at midnight. I was not sent for until 7 a. m. of November 11, when I found him collapsed. The vomiting and purging had ceased, though the cramping still continued. He was pulseless, and remained so until noon of the 11th instant, when he died, twelve hours after being attacked. The symptoms in this case were very similar to those described as occurring in the case first mentioned. In fact, there was a striking similarity in the symptoms of the first, second, and fourth cases.

I do not entertain the slightest doubt that the disease was brought to this post by company F of the third battalion, from Fort Smith, Arkansas, where cholera had been prevailing to an alarming extent for several weeks, and was prevailing at the

time of the departure of the company from that point. This explains satisfactorily to my mind the "origin" of the first three cases described. The case last described I regard as purely sporadic, and as having no connection with the disease at Fort Smith.

The most strenuous measures were at once adopted to prevent the spread of the disease, which, aided by the lateness of the season, I am glad to state were entirely successful. I have conversed with Dr. Hitchcock, who is engaged in civil practice at this place, who informs me that he has seen no genuine cholera, though he has had occasion to treat several cases of a disease very closely simulating cholera. All which is respectfully submitted.

Very respectfully, your obedient servant,

V. B. HUBBARD,

*Brevet Major and Assistant Surgeon U. S. A.*

Brevet Lieutenant Colonel Jos. R. SMITH,

*Surgeon U. S. A., Medical Director Department Arkansas.*

## XX. LA VIRGIN, NICARAGUA.

HEADQUARTERS DETACHMENT EIGHTH UNITED STATES CAVALRY,

*La Virgin, Nicaragua, December 27, 1866.*

GENERAL: I have the honor to report myself on duty with the above detachment, *en route* for San Francisco, California. The command sailed from New York November 20, and after a long and unpleasant voyage (occasioned by the steamer becoming disabled) reached San Juan del Norte December 8, but on account of the rough sea did not disembark until the 15th. On the morning of the 16th the troops were placed on a steamer and proceeded up the San Juan river. The command up to this date was in perfect health. No communication was allowed with the shore, and fruits of all kinds were prohibited. Canteens were filled with coffee, and the men were not permitted to drink the water of the river.

At 9 a. m. of the 16th I was called to see Private McDonald, and recognized a well-marked case of cholera. The fact was immediately reported to the commanding officer, and every step taken to check the disease. The efforts were fruitless. McDonald died at 2 p. m. the same day; and at daylight of the 17th we buried five men. On the 17th there were four additional deaths, on the 18th three, and on the 19th two—all of cholera. On the morning of the 20th we reached La Virgin, a point on Lake Nicaragua, twelve miles from the Pacific. Here the command halted, a hospital was established, and the troops quartered.

The steamer on the Pacific had, on account of our long delay, sailed for San Francisco some days previous, and we were compelled to await the sailing of the next steamer.

I found much difficulty in fitting up a hospital suitable for cholera cases. Nothing in the way of furniture could be procured from the natives, but with the aid of men in the command the more necessary articles were extemporized, and in a few hours the hospital was supplied with everything actually needed. The supply of medicines was nearly exhausted; a messenger was sent to Granada, and a supply purchased.

Up to this date (27th) I have had among the troops forty-two (42) cases and twenty-six (26) deaths, including one officer, Major J. H. Gamble, eighth cavalry, with seven cases of cholera in hospital.

Simultaneously with the appearance of the disease among the troops the passengers and *native boatmen* on *another steamer* were attacked. There had been no communication between the two boats, and the native boatmen on the passenger steamer (who were the first seized) had never been within two miles of the troops.

There was no sickness at San Juan del Norte. As to the cause of this epidemic I do not feel at liberty at present to express a decided opinion.

I am investigating a circumstance connected with certain *baggage* landed from the steamship, and feel confident, from the best of evidence, of being able to trace the infection to it. Should the department desire it, a complete report will be forwarded.

The passengers and native boatmen have suffered very much, the natives in particular—every case, without an exception, proving fatal. I have rendered them all the assistance in my power. Considering it my duty to attend the troops first, but little time was left me to devote to them. I cannot ascertain the exact number, but think there have been among the passengers and natives employed by the transit company about fifty fatal cases.

At the commencement the epidemic was the most malignant I have ever seen. No treatment seemed to have any effect, many cases proving fatal within twelve hours. At present the disease has assumed a milder form, and a patient is received with much hope of recovery.

Not anticipating such a delay on the passage, I have not the blanks for a proper report.

Careful notes have been taken of every case occurring in the command, and I hope to be able to furnish the department with any data they may require.

Should the health of the command permit, we expect to sail for San Francisco about January 10.

I am, general, very respectfully, your obedient servant,

THOS. McMILLIN,

*Brevet Major and Assistant Surgeon U. S. A.*

Brevet Major General J. K. BARNES, *Surgeon General.*

*Extract from monthly report of sick and wounded unassigned recruits for Eighth United States Cavalry, La Virgin, Nicaragua, December, 1866. Brevet Major Thomas McMillin, Assistant Surgeon United States Army.*

The command, consisting of six officers and three hundred and fifty unassigned recruits for the eighth United States cavalry, sailed from New York city November 19, 1866, for San Francisco, California, and arrived at San Juan del Norte December 8, 1866, but was not disembarked until December 15, 1866. On the morning of December 16 the command proceeded up the San Juan river, all on board in perfect health. No communication was held with the mainland, nor did the men have access to fruit or liquor. The first case of cholera occurred on the 16th, shortly after leaving Del Norte. It appeared also at the same time on another steamer, among the passengers and native boatmen. On the 20th the detachment reached Virgin bay, Nicaragua, went into quarters, and the hospital was established. Up to this date there has been among the troops fifty-four cases and twenty-seven deaths from cholera. The epidemic has been equally severe among the passengers, and much more so among the natives. A communication informing the Surgeon General of the appearance of the epidemic and the detention of the command in the transit was forwarded from Virgin bay on the 27th of December.

### XXI. FORT DELAWARE, DEL.

*Extract from the monthly report of sick and wounded at Fort Delaware, September, 1866. Brevet Major E. McClellan, Assistant Surgeon United States Army.*

Epidemic cholera has existed to a very considerable extent during the past month in and around Delaware City, where, in an aggregate of fifteen hundred inhabitants, some thirty-odd deaths have occurred. It has also existed to some extent in Salem, New Jersey, and the surrounding country. No case has occurred among the troops of this command, and but one upon the island—this in the family of an officer of the post, whose wife, after neglecting a slight diarrhoea for several days, was taken on the morning of the 11th instant with a violent cramp in the lower extremities, and rapidly went into a state of collapse, of which the symptoms were fully marked. Pure chloroform, in doses of 60 minims, was administered in iced water every forty minutes, until four drachms had been taken. Dry heat and frictions were applied to the surface of the body. Reaction was very slowly established, and it was many hours before the entire surface had regained its heat. I would here note that the diarrhoea was arrested after the first dose of chloroform, and that when reaction was fully established at least three quarts of turbid urine were voided in the space of half an hour, establishing, to my mind, the truth of the assertion of Dr. H. Osborne, of London, as to the mode in which chloroform is eliminated from the system when used internally. I regret that, on account of severe mental anxiety under which I was laboring, the pathological condition of this urine was neglected. The treatment in this case, after reaction, consisted of small doses of calomel and the exhibition of camphor and the preparations of ammonia. The convalescence was slow; at the expiration of three weeks the patient has but partially recovered the use of her lower extremities. There have been during the month frequent cases of painless diarrhoea. They have invariably yielded readily to the action of chloroform, which has, in the majority of cases, produced the diuretic effect before mentioned.

The command is in a good state of police. The most rigid regulations are enforced as regards communication with either of the adjacent towns, viz., Delaware City, Delaware, and Salem, New Jersey, and no fruit is permitted to be landed upon the island. During the past ten days the diarrhoea has disappeared, and is followed by remittent fever, which has prevailed to a considerable extent, some eighteen cases having occurred among the persons who remain outside the fortifications. These cases have been characterized by the intensity of the hepatic disorder, and, in the majority of cases, by the jaundiced condition of the skin.

Advantage has been taken to test the power of chloroform in eliminating the bile—ten minims of chloroform, agitated with a fluid-ounce of iced water, given twice daily, or oftener, as required by the case. The removal of the bile from the skin and conjunctiva is very rapid, and the urine being tested after the manner of Petenkofer, the bile in every instance responded.

[Extracts.]

FORT DELAWARE, DELAWARE, November 20, 1866.

GENERAL: I have the honor to forward a report of cases of epidemic cholera which occurred in the vicinity of this post during the past few months.

During the spring and early summer months of this year intermittent and other fevers were unusually prevalent upon the banks of the Delaware river, and continued until early in the month of August, when, in isolated cases, epidemic cholera made its appearance. In each locality, as it occurred according to its severity, the type of the general diseases was changed, and diarrhoeas, of greater or less intensity, complicated any constitutional disturbance.

The usual course of this disease, in ascending the banks of rivers, was not observed in the occurrence of this epidemic. Its first appearance was in an isolated case, which occurred July 22, at New Castle, Delaware, in an aged resident of the town. During the latter part of August it became epidemic in Delaware City, a small town at the eastern terminus of the Chesapeake and Delaware canal, and ten miles down stream from New Castle, here being confined to the lowest class of the community. It was virulent and fatal in its type, and was not arrested until about the 20th of September, by which time it had become epidemic in New Castle, the point first visited.

During the prevalence of the disease at Delaware City one case occurred at Fort Delaware, which is distant from it one and a quarter mile, situated nearly in the middle of the river, and at this season subject to strong east winds. This case has already been noticed in report of sick and wounded for September of this year; and although during the months of August and September diarrhoeas were prevalent, there was no recurrence of the disease, a very strict quarantine having been established, and all fruit and unripe vegetables excluded from the island. A close watch was also kept upon the men's sink, and any one found with two or more discharges from his bowels was immediately placed under treatment.

In August an isolated case occurred in Salem, New Jersey, which is situated upon a small tributary of the Delaware, some seven miles below this post, but with no recurrence of the disease until the following October, when several malignant cases appeared within a few days of each other. About the same time, the disease occurred with much severity at Bridgeton, New Jersey, also upon a tributary of the Delaware, but some twenty miles further down stream. By the kindness of Drs. Worrell and Kemp, of Delaware City; Drs. Merritt and Fromberger, of New Castle; Drs. Sharp and Gibbons, of Salem; and of Dr. Elmer, of Bridgeton, I am able to report their cases, with the treatment pursued.

This report of cases of epidemic cholera which have occurred in this vicinity (in fact, encircling this post in the course taken by the disease) has been forwarded, in view of the extensive and expensive policing and improvements which were made upon this island during the past winter, the orders for which were based upon the sanitary reports which, at the time, I had the honor to make for your consideration. I am very strongly of the opinion that, had not this island and the fortifications been placed in the very highest sanitary condition, and had not the most rigid quarantine been established, this command would in all probability have suffered severely from epidemic cholera during the past season. In this opinion I am joined by the line officers of the command who were on duty at the post prior to December, 1865.

I am, general, very respectfully, your obedient servant,

E. McCLELLAN,

*Assistant Surgeon and Brevet Major U. S. A.*

Brevet Major General JOSEPH K. BARNES, *Surgeon General.*

## XXII. ON THE DISTRIBUTION OF CERTAIN RECRUITS.

ADJUTANT GENERAL'S OFFICE, *Washington, April 8, 1867.*

SIR: In reply to certain inquiries made by you in a communication without date, you are respectfully informed:

1st. The detachment of the fifteenth United States infantry, at Vicksburg, Mississippi, received 185 recruits July 11, 1866, from the general depot at Fort Columbus, New York harbor.

2d. Company E, second battalion fifteenth United States infantry, Jackson, Mississippi, received 51 recruits July 17, 1866, from Fort Columbus.

3d. The detachment of the nineteenth United States infantry, at Helena, Arkansas, received 28 recruits August 3, 1866, by transfer; supposed to be a portion of a detachment of 60 recruits which left Newport barracks, Kentucky, July 28, 1866, for the nineteenth infantry, at Little Rock.

4th. Detachments of recruits left Newport barracks, Kentucky, for assignment to the sixteenth infantry, as follows: August 21, 1866, 90; August 24, 1866, 90; August 26, 1866, 90; August 30, 1866, 90; September 10, 1866, 98. Of these recruits, 59 were assigned to the companies at Memphis, Tennessee, September 6, 1866.

5th. The detachment of the nineteenth United States infantry, at Little Rock, Arkansas, received 9 recruits August 10, 1866; 60 recruits left Newport barracks for this regiment July 28, 1866, and the 9 recruits above mentioned are supposed to be a portion thereof. None were received in September. Battery G, fifth United States artillery, received no recruits either in August or September, 1866.

6th. Company G, nineteenth United States infantry, at Fort Smith, Arkansas, received 3 recruits by transfer August 3, 1866, supposed to be a portion of the detachment of 60 which left Newport barracks July 28, 1866. Company F received no recruits either in August or September, 1866.

Very respectfully, your obedient servant,

E. D. TOWNSEND, *Assistant Adjutant General.*

Brevet Major J. J. WOODWARD,

*Assistant Surgeon U. S. A., Surgeon General's Office, Washington, D. C.*

## XXIII. ON THE AMOUNT OF ORGANIC MATTERS CONTAINED IN CERTAIN WATER FROM NEW YORK HARBOR.

LABORATORY, SURGEON GENERAL'S OFFICE,

*Washington City, D. C., August 13, 1866.*

SIR: Having received five samples of the water used for drinking at posts in New York harbor, where cases of cholera have occurred, I proceeded to make a comparative analysis of them, with a view to the determination of their organic matter. The method used was that of digesting the water for a limited period with an acid solution of permanganate of potash, and subsequently determining the amount of undecomposed permanganate. As the digestion is stopped at a certain point, it gives,

## EXTRACTS FROM OFFICIAL REPORTS.

not the whole amount of organic matter present, but that portion of it which is in the act of decomposing, or which is the most ready to undergo decomposition. In the present state of our knowledge, the results thus attained would seem to give, more correctly than anything else, the tendency of water to become the vehicle of disease, or to produce any of the effects which are commonly attributed to its bad quality.

The samples of water sent for examination were labelled as follows:

No. 1.—Sample of water from well inside Fort Columbus, where companies A and C, and company D recruits, are quartered. The handle of this pump has been taken off, and the use of the water discontinued.

No. 2.—Specimen of water used in mess 7, by Privates David Henderson, Anthony Acorn, Alfred Fifert, and Michael O'Brien, second battalion seventeenth United States Infantry, company C, who died of cholera at De Camp general hospital, David's island, New York harbor.

No. 3.—Specimen of water used in mess 10, by Privates Wm. H. Haskins and Patrick Shields, first battalion seventeenth United States infantry, company G, and Frederick Jackson, second battalion seventeenth United States infantry, company B, who died of cholera at De Camp general hospital, David's island, New York harbor.

No. 4.—Sample of water from well at South Battery, where company B music boys are quartered, Governor's island, New York harbor.

No. 5.—Sample of water from well near Rotten Row, used by the prisoners, officers' families, and, since the discontinuance of the well inside Fort Columbus, by men from fort.

As a standard of comparison, the water supplied from the Washington aqueduct, which is decidedly impure water, containing more organic matter than that supplied to London from the Thames, was employed.

The results obtained might be expressed in various ways, but I have concluded to state them in the quantities of permanganate decomposed by a gallon of the water, while standing for three hours at a temperature of 80° Fahrenheit, the permanganate being supposed to give up one-half of its available oxygen, which is about the case when it is used for the purification of water.

The following table gives, in grains and decimals of a grain, the amount of pure permanganate of potash actually required for the purification of each gallon of the different waters examined:

Water, one gallon.	Permanganate, Grains.
Washington aqueduct .....	0.5106
No. 1, New York harbor .....	3.5880
No. 2, New York harbor .....	0.4370
No. 3, New York harbor .....	0.4508
No. 4, New York harbor .....	0.4830
No. 5, New York harbor .....	1.7940

The large amounts required in Nos. 1 and 5 are partly dependent upon the presence of considerable quantities of nitrites, whose abundance indicates that these wells receive filtration of water charged with animal matter. The waters Nos. 1 and 5 may be pronounced unsuitable for drinking purposes in their present condition. Nos. 2, 3, and 4 are much better in quality, but not so pure as to be altogether safe for those who are suffering from diarrhoea, or who are exposed to the infection of cholera. When permanganate of potash is added in suitable quantities to impure water, it converts the organic matter into carbonic acid, water, &c., undergoing itself a gradual decomposition, with the deposition of insoluble dextoxide of manganese, and the production of carbonate of potash to the extent of nearly one-half of the weight of the permanganate actually decomposed. The officinal crystallized permanganate is the most suitable for the purpose, and if the impure green salt, termed permanganate in commerce, be used, its real strength must be ascertained if it is to be added by weight. A good practical rule for purifying water is to add any solution of permanganate until the water, as seen in an ordinary-sized tumbler, appears perceptibly pink. This corresponds to the addition of from one-half a grain to one grain per gallon. After standing for a few hours the color disappears, and the water is left pure as far as regards organic matter. If, after two hours' standing, the water has a pinkish color when viewed in a large white dish, or in a bucket of polished tin, the amount of permanganate used has been sufficient, and if a pink color still remains after twenty-four hours, it has been used in excess.

Very respectfully, your obedient servant,

B. F. CRAIG,

Acting Assistant Surgeon U. S. A.

Brevet Major J. J. WOODWARD, Assistant Surgeon U. S. A.

## LABORATORY, SURGEON GENERAL'S OFFICE,

Washington City, D. C., August 25, 1865.

SIR: The water sent from Hart's island, New York harbor, being tested with permanganate of potash, together with water from the Washington aqueduct, gave the following results, expressed in the amounts of pure permanganate required to destroy the organic matter present by standing with it for three hours:

Washington aqueduct .....	.36 grains per gallon.
Well No. 1, Hart's island .....	.42 " "
Well No. 2, Hart's island .....	.36 " "
Well No. 3, Hart's island .....	.38 " "

Very respectfully, your obedient servant,

B. F. CRAIG,

Acting Assistant Surgeon U. S. A.

Brevet Major J. J. WOODWARD, Assistant Surgeon U. S. A.



**XXIV. REPORT ON DISINFECTANTS AND THEIR USE IN CONNECTION WITH CHOLERA.**LABORATORY OF THE SURGEON GENERAL'S OFFICE, *May 1, 1867.*

**SIR:** The methods in which disinfectants act are not yet understood in all their detail; but they may for the most part be referred to one of two general lines of chemical action, the tendency to follow the one or the other of which serves to separate these bodies into two tolerably distinct classes.

The name of disinfectant may, in its narrowest meaning, be limited to those bodies which destroy or render inert certain products of decomposition in organic matter, or of morbid action in the living being, through the agency of a reaction in which the disinfectant itself undergoes chemical destruction. The power of acting in this way belongs to substances which are possessed of a high degree of chemical activity, or which, in other words, exist in a state of unstable equilibrium, or of strong affinity for other matter.

The class of antiseptics, or of bodies which antagonize putrefaction, is a larger and, in respect of its practical applications, a more important one.

The power of preventing or delaying spontaneous decomposition seems to belong, in a greater or less degree, to all substances which are capable of combining with or impregnating organic matter, and which are at the same time themselves of stable composition, and not possessed of any very powerful chemical affinities.

The metallic salts generally, including chloride of sodium, and many of the more stable forms of organic matter, such as sugar, alcohols, and resins, fall within the class of antiseptics, and all such bodies, when in contact with substances prone to putrefaction, may be imagined to act in the manner of cements, holding together by their own molecular adhesiveness the loosely connected atoms of organic matter.

It has been, moreover, very clearly observed that the most efficient of the volatile antiseptics possess, probably in virtue of their power of imparting stability to matter, a poisonous influence over those organic forms which play so important a part in the propagation of putrefactive fermentation, and, in fact, over all the lower forms of organic life.

Antiseptic and destructively disinfecting properties are sometimes combined in the same body; that is, for example, we find an antiseptic salt, such as sulphate of iron, capable of effecting a chemical reaction with sulphuret of ammonia, and with other ammoniacal salts contained in the emanations from decomposing matter; and where bodies act only as antiseptics, the same hygienic results that flow from the use of such destructive disinfectants as chlorine gas are often practically attained; but as we have two modes of action distinct from and opposed to each other in their essential characters, the one that of hastening change and bringing about quickly the final decomposition of infectious and offensive matter, and the other that of hindering change and preventing decomposition, it would seem that the classifying of disinfectants generally, in accordance with these their chemical demeanors, was likely to assist in the intelligent understanding of their use.

Among antiseptic bodies, those which are volatile have a particular usefulness where the virus of a disease is diffused through the air or impregnates buildings. The vapors of burning sulphur have been used for such purposes from immemorial antiquity, and although their powers seem to have been partially forgotten in modern times, the last two or three years have witnessed new trials and new proofs of their value in the epidemics of the cattle plague in England and of cholera in this country.

In New York during the year 1866, when repeated cases of cholera had occurred in a house, giving evidence that it had become generally infected with the virus of the disease, the Board of Health adopted the expedient of closing it and of fumigating it, together with its contained furniture, clothing, &c., in some cases with burning sulphur, and in some cases with chlorine gas, each of which measures seemed to be thoroughly effective.

When sulphur was used it was put in pans supported on long legs. Apertures in the building having been closed, the sulphur was set on fire, first in the upper rooms and then in the lower; after this the house remained closed for several hours, when it was opened, ventilated, and reoccupied.

As an extemporaneous means of fumigation, the occasional burning of a few sulphur matches may be recommended.

Among organic bodies we find a very interesting class of volatile antiseptics, which are included in the general group or type of alcohols.

The preservative power of common alcohol in its liquid form is very familiar to all, and in the form of vapor it has been found of considerable efficacy in checking decomposition. Fusel oil, a liquid nearly related to it, has been found to be possessed of the highest antiseptic virtues, and in places where it is to be cheaply procured may be used as a substitute for carbolic acid, &c.; but in the present connection a greater interest attaches to certain products of the destructive distillation of coal, whose real chemical characters as members of the group of alcohols have not always been recognized, and which, indeed, have been classed and spoken of as organic acids. The two homologous substances, carbolic and cresylic acids, or, more properly, carbolic and cresylic alcohols, have been used separately and conjointly as means of arresting the spread of the cattle plague or rinderpest in England, and, as would appear, with the most marked success. The power of even small quantities of these liquids in arresting putrefaction, and in destroying the lower forms of life, is very great; and they have this advantage over the fumes of burning sulphur, that they are themselves more permanent than sulphurous acid, which undergoes gradual oxidation when exposed to the air, so that it cannot be relied on for the continuous preservation of a mass of organic matter, except in closed vessels.

These coal tar alcohols have not as yet been much used in this country, but creosote, a body closely allied to them in physical properties and antiseptic powers, is well known and easily procured, and carbolic alcohol itself is now on the supply table of the Medical Department, and can be obtained from medical purveyors.

The powers of volatile antiseptics are most striking in the form of vapor, and when acting upon somewhat dry substances, in the presence of large quantities of water, they seem to yield in efficacy to certain metallic salts.

The theory of the mode of propagation of cholera which is the most widely received and has in its favor the greatest amount of evidence, is that the virus is not eliminated as such from the bodies of cholera patients, but that it is formed in their discharges by some specific process of decomposition, a process which is supposed to go on only in alkaline fluids. The sanitary indication, therefore, is to retard putrefaction in the discharges, and to keep them if possible in an acid condition: This indication could be fulfilled by the use of many of the metallic salts of acid reaction, but from its cheapness and abundance the sulphate of iron has been preferred both in this country and in Europe. It should be added, either in powder or in saturated solution, to vessels in which the discharges of cholera are received and to privy vaults, boxes, &c. The board of health in New York used about twenty pounds to disinfect an ordinary-sized privy vault. It should not be used in combination with the hypochlorites of lime or soda, unless an excess of some mineral acid be also added, the object being to prevent the development of an alkaline reaction. It may be here remarked that when an acid or an acid salt is added to matter well advanced in putrefaction offensive volatile acids are often set free, making the odor for the time being worse than before. The use of the sulphate of iron, or of some other metallic salt, such as chloride of zinc, in the way above indicated, may be regarded as the most important of the disinfectant measures to be adopted during the prevalence of cholera, regarding the cholera discharges as the medium through which the disease is propagated. The occasional use of sulphur fumigations in localities particularly exposed to infection may be strongly recommended as an additional precaution.

The use of the destructive disinfectants, or disinfectants proper, as contradistinguished from the conservative disinfectants, or antiseptics, remains now to be spoken of. They act in the main as oxidizing agents, either directly, as when permanganate of potash parts with oxygen to organic matter, or indirectly, as when chlorine, decomposing water, sets free oxygen in a state of chemical activity. They oxidize and consume whatever organic matter they come in contact with, attacking the more advanced products of putrefaction first. Where they can be used in sufficiently large relative quantity, they are the most effectual and satisfactory of all disinfectants, as they thoroughly destroy and dispose of the dangerous material submitted to their action. In dealing with large amounts of decomposing matter their action is often not as satisfactory as it appears to be. If in too small quantities, they will remove offensive odors, producing a seeming disinfection, but undergoing destruction themselves before they attack the more dangerous organic virus. Even in larger quantities, they will remove all danger and offence for the time being, but what organic matter they do not destroy will afterwards go on in its decomposition. If a piece of putrefying meat be exposed to chlorine gas, all offensive odor will be removed, but after the chlorine has been exhausted putrefaction will go on as before. If, on the other hand, it is acted on by creosote or carbolic alcohol, no disinfection will be evident at first but the odor of putrefaction will pass away in time, and the meat will then be found indisposed to further decomposition—will be, in fact, in the condition of smoked meat.

The proper use, therefore, of oxidizing disinfectants is to decompose effluvia and to destroy small quantities of organic matter, rather than to deal with great masses of it. Chlorine gas, and the equivalent gases which are liberated from bleaching powder and from chlorinated soda by the action of acids, are, of course, those of this class of disinfectants which will first suggest themselves. The diffusion of these gases in the air of the sick-room or wards is perhaps of less importance in cholera than in other infectious diseases, but still is not to be altogether omitted, and the solutions of chlorinated lime or soda have been advantageously used for washing floors and for disinfecting bedclothes and linen.

A very convenient non-volatile disinfectant, which has come into use of late years, is the permanganate of potash. In the recent epidemic of cholera in New York this salt was largely used in the cleansing of bedclothes and under-garments. By the rules of the Board of Health all bed linen, &c., soiled by the discharges of the patient was boiled in a solution of permanganate of potash of the strength of about 100 grains to the gallon. This was found to be effectual as a disinfectant measure.

Linen may be very efficiently treated by steeping it in water containing small quantities of chlorinated lime and of hydrochloric acid, but in that case the clothes should afterwards be wrung out from successive waters in order to get rid of the chloride of calcium, which has the property of keeping the linen damp.

One important use to which permanganate of potash is particularly applicable is that of purifying drinking water. Water, as the great final receptacle of all soluble substances, is almost always contaminated with organic matter, especially in the neighborhood of the habitations of man; and the investigations made by Pettenkofer and others point to the upper water-bearing strata of the earth as a great habitat and reservoir of cholera poison. A method which will destroy organic matter in water, without adding to it anything unpleasant or injurious, is an evident desideratum at all times, and especially during the prevalence of cholera, and there is perhaps no method more effectual and convenient than that by treatment with permanganate. The quantity used can be regulated in a simple and practical way by using so much of a solution of the salt that the water shall be decidedly pink upon the first addition, and just perceptibly pink when seen in large quantities after several hours' standing. The permanganate is decomposed by the organic matter, and leaves in the water a small quantity of carbonate of potash, not enough to affect its potable qualities.

The list of disinfectants particularly available against cholera may be closed by the mention of two, which have the important quality of cheapness—lime and charcoal. These act partly as destructive disinfectants, and partly, especially in the case of charcoal, as mechanical absorbents of effluvia. Besides the very important use of lime in whitewashing, by which, when freshly done, a large disinfecting surface is exposed to the air, it may be advantageously employed wherever there are moderate quantities of organic matter in a moist condition, as in half-dry gutters, in the neighborhood of privies, and in all damp and filthy localities.

The application of lime in these places should be freely made and frequently repeated so long as decomposing matter is present, the complete destruction of such matter being the point aimed at. Where great masses of matter, such as the contents of privies, are to be dealt with, antiseptic substances, as above remarked, are preferably indicated.

A particular application of lime in its unslaked condition is that of absorbing moisture in unventilated rooms. A damp and close cellar may be kept dry by the presence in it of a quantity of quicklime in lumps.

The action of charcoal is mainly that of an absorbent, effluvia of all kinds being entangled in its pores; but while thus entangled the charcoal promotes their destruction by the oxygen of the air.

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